WRR

SCIENTIFIC COUNCIL FOR GOVERNMENT POLICY

Infrastructures

TIME TO INVEST

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Infrastructures

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Gelieve hierbij aan te treffen een door de WRR verricht onderzoek naar de borging van lange termijn investeringen in vitale infrastructuren in de nieuwe institutionele context waarbinnen die infrastructuren functioneren. Infrastructuren zoals (drink)waterleidingen, dijken, wegen, elektriciteitsnetten, spoorwegen en gasleidingen zijn van levensbelang voor samenlevingen. Niet alleen voor het vervoeren en leveren van de diensten, maar ook voor de bredere en toekomstige economische, ecologische en culture kwaliteit van de samenleving. Om de kwaliteit van deze infrastructuren ook voor de toekomst te borgen moet er worden geïnvesteerd. Voor enkele infrastructuren is de investeringsopgave juist nu heel urgent, aangezien klimaatverandering en het opraken van fossiele brandstoffen systeeminnovaties vergen die grote investeringen met zich meebrengen.

Het onderhavige rapport is vooral een signalerend rapport geworden. Uit het onderzoek blijkt dat alle infrastructuren te maken hebben gekregen met meer of minder ingrijpende vormen van regimeverandering (als gevolg van bijvoorbeeld liberalisering, privatisering, commercialisering). Dit heeft de bestuurlijke en strategische context van infrastructuren aanzienlijk veranderd. Er zijn meer en ook andersoortige spelers bijgekomen. Bovendien speelt de besluitvorming zich af op meer niveaus: lokaal, regionaal, nationaal en Europees.

Het rapport signaleert in alle infrastructuren een potentieel risico voor de realisatie van lange termijn publieke waarden. Deze risico's hangen samen met de gerealiseerde regimeverandering, maar ook met de nieuwe uitdagingen waarvoor de infrastructuren staan. Die regimeverandering is tot nu toe vooral gericht op het vergroten van de efficiëntie en op het verbeteren van de dienstverlening. Er zijn ook belangrijke resultaten geboekt ten aanzien van deze belangen. Maar andere, meer toekomstgerichte publieke belangen, zoals innovatie, duurzaamheid en lange termijn beschikbaarheid en toegankelijkheid dreigen ondergesneeuwd te raken door deze nadruk op de korte termijn belangen. De raad doet op basis van het verrichte onderzoek suggesties voor een nieuwe strategische beleidsoriëntatie die, rekening houdend met de verschillende aard en situatie van deze infrastructuren, voorziet in mogelijkheden die lange termijn belangen beter in beeld brengen c.q. borgen.

Volgens de procedure van de instellingswet WRR ziet de raad graag de bevindingen van de ministerraad tegemoet.

De voorzitter

Prof.dr. W.B.H.J. van de Donk

De secretaris

Prof.dr. A.C. Hemerijck

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SUMMARY IN DUTCH

INLEIDING

In het politieke debat, in de kranten en op straat zijn heel wat zorgen te beluisteren over de staat van de Nederlandse infrastructuren. Het zijn zorgen over treinen die niet op tijd rijden, prijzen die alsmaar stijgen, energievoorziening die uitvalt en dijken die het dreigen te begeven. Al gauw wordt dan een verband gelegd met de liberalisering en privatisering die in de afgelopen vijftien tot twintig jaar hun intrede hebben gedaan in al onze infrastructuren. De marktwerking, zo valt overal, ook onder parlementariërs, te beluisteren, moet worden teruggedraaid en de overheid zou weer volledige zeggenschap moeten hebben over wat 'van ons allemaal' is. Met infrastructuren doelen we hier op de fysieke, onroerende voorzieningen die ons economisch leven onderbouwen: wegen en spoorwegen, dijken en drinkwater, vliegvelden, riolering en afvalverwerking, elektriciteit, gas en elektronische communicatie.

De Wetenschappelijke Raad voor het Regeringsbeleid deelt deze conclusie niet, maar wel de onderliggende zorg om de huidige en toekomstige staat van de Nederlandse infrastructuur. In de eerste fase van de introductie van de marktwerking is vooral gekoerst op vergroting van de efficiëntie en vergroting van de keuzevrijheid van consumenten. In vrijwel alle sectoren is daarbij winst behaald, doorgaans in het voordeel van de consument. Maar langetermijnwaarden, zoals innovatie, onderhoud, beschikbaarheid en duurzaamheid, zijn binnen het nieuwe regime zelden expliciet aan de orde gesteld. Ze dreigen daardoor minder aandacht te krijgen, waardoor kortetermijnwaarden (gericht op de individuele consument) bevoordeeld worden boven deze langetermijnwaarden (waarden die het individu overstijgen). In het WRR-rapport worden de eerstgenoemde waarden aangeduid als 'Type I'-belangen en spreken we van 'Type II'-waarden als het gaat om de laatstgenoemde.

Ervaringen uit het buitenland en wetenschappelijk onderzoek ondersteunen het vermoeden dat de huidige institutionele arrangementen onvoldoende in staat zijn om op de lange termijn dergelijke publieke waarden te realiseren. De vrees hiervoor wordt niet weggenomen als infrastructuren, en de dienstverlening die zij moeten garanderen, weer worden ondergebracht in een publiek monopolie: daartegen pleiten de daarmee verbonden risico's van politiek opportunisme, verkokering en een te gering innoverend vermogen. Daarbij komt dat de fysieke netwerken van onze infrastructuren nauwelijks meer nationale netwerken zijn: ze zijn geïnternationaliseerd, ze zijn netwerken van netwerken geworden. In veel sectoren bestaat er gedetailleerde technische afstemming op internationaal niveau, maar ontbreekt de bestuurlijke en politieke besluitvorming op systeemniveau van de infrastructuren. Een terugkeer naar nationale publieke monopolies vult dit democratisch hiaat niet.

Het is noodzakelijk voor het realiseren van 'Type II'-waarden dat voldoende geïnvesteerd wordt in de toekomst. Sommige infrastructuren kampen met achterstallig onderhoud, dat dringend ter hand moet worden genomen. In andere sectoren vereisen uitputting van natuurlijke hulpbronnen en dreigende klimaatverandering een ingrijpende systeeminnovatie. In beide gevallen moet een overstap worden gemaakt naar een benadering waarbij investeren op lange termijn voldoende aandacht krijgt. Daarbij gaat het om de vraag, of daarvoor in de situatie van het nieuwe regime de garanties en voorwaarden aanwezig zijn, en zo niet, hoe die gerealiseerd en georganiseerd kunnen worden.

Naar het oordeel van de Raad bieden investeringen in infrastructuur een helder aanknopingspunt voor de vormgeving van een op de lange termijn gerichte strategische beleidsoriëntatie op deze problematiek. Van daaruit kunnen institutionele arrangementen voor de infrastructuren worden ontworpen die recht doen aan zowel doelen als efficiëntie en dienstverlening, alsook aan leveringszekerheid op de lange termijn, innovatie en duurzaamheid. Lagere prijzen en consumentenvrijheid zijn wezenlijk, maar nu gaat het ook om de lange termijn. In het rapport *Infrastructures: Time to Invest* worden drie pijlers gegeven voor een strategische heroriëntatie: nieuwe rollen en verantwoordelijkheden voor alle betrokken publieke en private partijen; nieuwe 'checks and balances' om de rollen en verantwoordelijkheden van al die partijen te stimuleren en daarin tot een nieuw evenwicht te komen, mede door de transparantie te vergroten; en nieuwe verbindingen tussen de nu veelal versplinterde niveaus, zodat een gezamenlijke, strategisch sterke visie op de toekomst tot stand kan komen.

INFRASTRUCTUREN IN DE SCHIJNWERPERS

Voorzieningen als drinkwater, mobiliteit, communicatie en energie zijn van levensbelang voor het functioneren van de hedendaagse samenleving. Zonder deze voorzieningen zou elke moderne samenleving instorten. Stroomstoringen en treinongelukken drukken ons wat dat betreft regelmatig met de neus op de feiten. Van even wezenlijk belang zijn de infrastructuren die ons beschermen tegen overstromingen, evenals de elektronische communicatiemiddelen en het transport over wegen en spoorwegen en door de lucht.

De slagvaardigheid van onze economie en de kwaliteit van onze samenleving worden sterk beïnvloed door de doelmatigheid, kwaliteit en universaliteit van deze voorzieningen. De aanwezige infrastructuur behoort tot de wezenlijke randvoorwaarden als bedrijven beslissen om al dan niet op een bepaalde plaats te investeren, hetgeen de weerslag van een efficiënte infrastructuur op economie en samenleving nog vele malen vergroot. Vanwege hun kernfunctie, hun structuur en het vereiste van gegarandeerde beschikbaarheid, heeft de overheid zich op een andere manier beziggehouden met deze openbare voorzieningen dan met de overige sectoren van economische bedrijvigheid. Ze zijn niet onvoorwaardelijk aan de werking van de markt overgelaten.

De totale infrastructuur is ook van cruciaal belang voor het behoud van veiligheid en welzijn in een samenleving en een economie die in toenemende mate van buitenaf onder druk worden gezet – zowel door een groeiende afhankelijkheid van externe natuurlijke hulpbronnen als door terroristische dreigingen. Daarbij komt dat bepaalde infrastructuren een sleutelrol spelen in een succesvolle overgang naar een duurzame, CO_2-vrije toekomst voor de wereldeconomie. Nederland, met zijn sterke afhankelijkheid van (steeds vaker geïmporteerd) gas en kolen, zijn overbevolkte wegen, spoorwegen en luchthavens, en zijn ambitie om een kennisintensieve samenleving te zijn, vormt hierop geen uitzondering. Bovendien is er de noodzaak tot aanpassing van de Nederlandse dijken, het watermanagement en de ruimtelijke ordening aan het stijgende zeewaterpeil en de groter wordende druk op de rivieren. De kosten van een overgang naar een duurzame toekomst zijn niet met zekerheid vast te stellen, maar dat substantiële investeringen noodzakelijk zullen zijn, is zeker.

Wereldwijd zijn er voldoende illustraties te vinden van de cruciale rol die infrastructuren in ons dagelijkse leven spelen, maar ook van hun kwetsbaarheid. De overstromingen in het zuiden van Engeland in juli 2007 stelden de elektriciteits- en drinkwatervoorziening tot het uiterste op de proef. Een belangrijke waterzuiveringsinstallatie begaf het en een groot tussenstation in het landelijke elektriciteitsnetwerk bleef met moeite overeind. De Russisch-Oekraïense gascrisis in december 2005 onderstreepte eens te meer hoe kwetsbaar de Europese Unie is door haar groeiende afhankelijkheid van externe energiebronnen. De dramatische stijging van de olieprijzen maakt dat beeld nog grimmiger.

In Nederland hebben problemen in de elektronische communicatie en de stroomvoorziening duidelijk gemaakt hoe belangrijk een betrouwbare infrastructuur is. Softwareproblemen bij ProRail veroorzaakten in februari 2007 een etmaal lang ernstige vertragingen in het spoorverkeer en in 2005 bleef Haaksbergen drie dagen lang van elektriciteit verstoken als gevolg van een netwerkstoring. Grote stroomstoringen, bijvoorbeeld in 2001 in Californië en in 2003 in Londen, Rome en Noord-Italië, vestigden de aandacht op het belang van een betrouwbare energievoorziening. Deze gebeurtenissen tonen niet alleen het vitale belang van de infrastructuren voor onze samenleving aan, maar evenzeer de dringende noodzaak van investeringen in het onderhouden ervan.

Omdat infrastructuren in toenemende mate geïntegreerd en vervlochten zijn, kan een investeringsbeslissing (of het uitblijven daarvan) in een land ook een directe invloed uitoefenen op de levensvatbaarheid van de infrastructuur in een buurland. Zo hebben aanzienlijke investeringen in windenergie in Duitsland geresulteerd in de noodzaak het Nederlandse hoogspanningsnet te versterken. Het uitblijven van investeringen in hogesnelheidsspoorwegen in Duitsland heeft daarentegen een zeer negatief effect gehad op de enorme investeringen in de aanleg van de Betuwelijn. Vergelijkbare samenhangen en wederzijdse afhankelijkheden zien we in de mobiele communicatie, waar de aarzeling van een

nationale regering om in te grijpen in hoge 'roaming' prijzen verijdelde dat consumenten in andere landen konden profiteren van prijsverlagingen, en in de afvalverwerking, waar een beleidswijziging in Duitsland belangrijke consequenties had voor de organisatie van de afvalverwerking in Nederland.

Maar ondanks de cruciale rol die infrastructuren spelen in de hedendaagse samenleving hebben de rails, de kabels en de buizen meer dan een eeuw lang nauwelijks publieke belangstelling getrokken. Minder dan dertig jaar geleden konden water-, telecommunicatie- en elektriciteitsmaatschappijen hun werk in relatieve anonimiteit verrichten. Hoewel ze een sleutelrol hadden, stond hun functioneren in het realiseren van bredere economische en maatschappelijke doelen nauwelijks ter discussie; dit terwijl deze doelen toch uiteenliepen van het verstrekken van goedkope energie aan grootverbruikers en het breed aanbieden van aardgas of kabeldiensten aan de Nederlandse huishoudens, tot universele telefoondiensten voor alle consumenten in ons land. Paradoxaal als het wellicht klinkt, was het de onzichtbare hand van de marktwerking die deze verwaarloosde sectoren in de schijnwerper heeft geplaatst.

REGIMEVERANDERING IN INFRASTRUCTUREN

Na de lange periode waarin infrastructuren zich in relatieve anonimiteit konden ontwikkelen en hun diensten op een bijna vanzelfsprekende wijze aan de man werden gebracht, is twintig jaar geleden een regimeverandering ingezet. Dit proces van regimeverandering is nog steeds gaande in vrijwel alle Nederlandse infrastructuren. Het kan in grote lijnen worden omschreven als een overgang van een publiek monopolie op het eigendom en het beheer van deze infrastructuren en dienstverlening, naar een nieuwe situatie waarin meerdere publieke en private partijen het eigendom en de verantwoordelijkheid delen op grond van uiteenlopende institutionele arrangementen.

De belangrijkste doelstelling van de regimeverandering was om een zekere mate van concurrentie te introduceren, als een middel om de efficiëntie te verhogen en om klantgerichtheid en keuzemogelijkheid te bevorderen. De regimeverandering was mede gemotiveerd door de wens om politieke interventie en opportunisme binnen de infrastructuren terug te dringen door de ondernemingen meer vrijheid toe te staan om commerciële in plaats van politieke doelen na te streven. Het beleid was aldus meer op dienstverlening dan op de infrastructuren zelf gericht.

De regimeverandering in de organisatie van de infrastructuren heeft uiteenlopende vormen aangenomen, die op verschillende momenten zijn geïntroduceerd. Deze vormen hebben gemeen dat ze worden gekenmerkt door een onderstroom van institutionele liberalisering. Deze onderstroom kan op verschillende manieren uitpakken. Het is van belang erop te wijzen dat regimeverandering een voortdurend proces is, dat echter niet noodzakelijk in alle sectoren tot dezelfde uitkomst leidt. De sectoren verschillen onderling immers

substantieel. Zo is de manier waarop regimeverandering in de verschillende sectoren heeft plaatsgevonden afhankelijk van specifieke technische, institutionele en economische omstandigheden, eigenschappen en karakteristieken. De mogelijke keuzes kunnen dus sterk variëren, afhankelijk van context en beleidsvoorkeur.

Vijf verschillende, elkaar soms overlappende vormen van regimeverandering kunnen worden onderscheiden.

Liberalisering – In een sector worden concurrentiebeperkingen weggenomen, zodat meerdere bedrijven kunnen concurreren in het aanbieden van goederen en diensten aan de consument. De achterliggende gedachte is dat concurrentie leidt tot efficiëntere productie en derhalve tot lagere prijzen. Voorbeelden van liberalisering treffen we aan in de energiesector, waar de exclusieve rechten van GasUnie en regionale elektriciteitsbedrijven zijn afgeschaft en de netwerken zijn opengesteld voor concurrerende aanbieders (de introductie van benchmarks in bijvoorbeeld de watersector is ook een vorm van concurrentie, namelijk maatstafconcurrentie).

Privatisering – Het eigendom van een infrastructuur wordt overgedragen van de publieke aan de private sector. Liberalisering en privatisering kunnen hand in hand gaan, maar dat hoeft niet. Staatsbedrijven kunnen geliberaliseerd worden (zoals gas- en elektriciteitssectoren) en privatisering kan plaatsvinden zonder concurrentie te introduceren – het publiek monopolie wordt dan vervangen door een privaat monopolie.

Splitsing – Verticaal geïntegreerde onderdelen van een activiteit worden opgesplitst in afzonderlijke eenheden en overeenkomstig hun functie. Potentieel commerciële activiteiten kunnen zo gescheiden worden van essentiële netwerkvoorzieningen. De opsplitsing van de voormalige geïntegreerde Nederlandse Spoorwegen in een dienstverlener (NS) en onafhankelijke beheerder van het spoornetwerk (ProRail) is een goed voorbeeld.

Commercialisering – De trend om een infrastructuur die publiek eigendom is, te gaan beheren op basis van commerciële managementprincipes. Voorbeelden zijn de afsplitsing van KPN uit het ministerie van Verkeer en Waterstaat en de concentratie van gemeentelijke energiebedrijven in regionale bedrijven in de jaren tachtig en negentig.

Internationalisering – De internationale handel, de fysieke verbinding van netwerken tussen landen, internationale wetgeving en internationale samenwerking tussen landen, toezichthouders en bedrijven.

De verschillende modi van regimeverandering hebben, zoals gezegd, verschillende vormen aangenomen in de fysieke infrastructuren. De onderstaande tabel geeft hiervan een overzicht.

Tabel 1

Infra-structuur	Liberali-sering	Privati-sering	Splitsing	Commer-cialisering	Internatio-nalisering
Riolering					
Drinkwater	✓			✓	
Afval	✓	✓		✓	✓
Dijken	✓			✓	
Wegen	✓	✓		✓	
Spoorwegen	✓		✓	✓	✓
Vliegvelden	✓			✓	✓
Elektriciteit	✓		✓	✓	✓
Gas	✓		✓	✓	✓
Elektronische communicatie	✓	✓		✓	✓

De modus van regimeverandering is ten dele een politieke beslissing geweest: de spoorwegen en de energiesectoren zijn gesplitst, terwijl riolering en waterbedrijven geïntegreerd zijn gebleven. In technisch opzicht hadden de laatstgenoemden ook opgesplitst kunnen worden, maar de negatieve gevolgen daarvan, met name de hoge transactiekosten, wogen zwaarder dan de veronderstelde voordelen van splitsing. Daarnaast is de gekozen vorm van regimeverandering afhankelijk van zekere technische kenmerken. Het kan bijvoorbeeld de vraag zijn of het mogelijk is een tweede, concurrerend netwerk te creëren – met andere woorden: is een netwerk een natuurlijk monopolie? In het geval van een natuurlijk monopolie vereist de introductie van liberalisering of privatisering altijd een onafhankelijke regelgeving. Op deze wijze beïnvloeden de technische kenmerken altijd het gekozen institutionele arrangement.

Een belangrijk gevolg van de regimeverandering is dat er nu meerdere en andersoortige partijen betrokken zijn bij de besluitvorming rond de infrastructuren. Zo zijn er nieuwe partijen ontstaan en hebben oude partijen nieuwe rollen gekregen. Er zijn zowel publieke als private partijen, er zijn partijen die verantwoordelijk zijn voor de exploitatie van een netwerk, partijen met verantwoordelijkheid voor de financiering en toezichthoudende partijen. De vroeger in dit terrein zo dominante overheid is nu één speler te midden van al die andere. Beslissingen aangaande infrastructuren worden nu ook op meerdere niveaus genomen: internationaal, Europees, regionaal, nationaal en zelfs lokaal. Dat geldt niet alleen met betrekking tot supervisie en regelgeving, maar ook met betrekking tot de financiering van de infrastructuur.

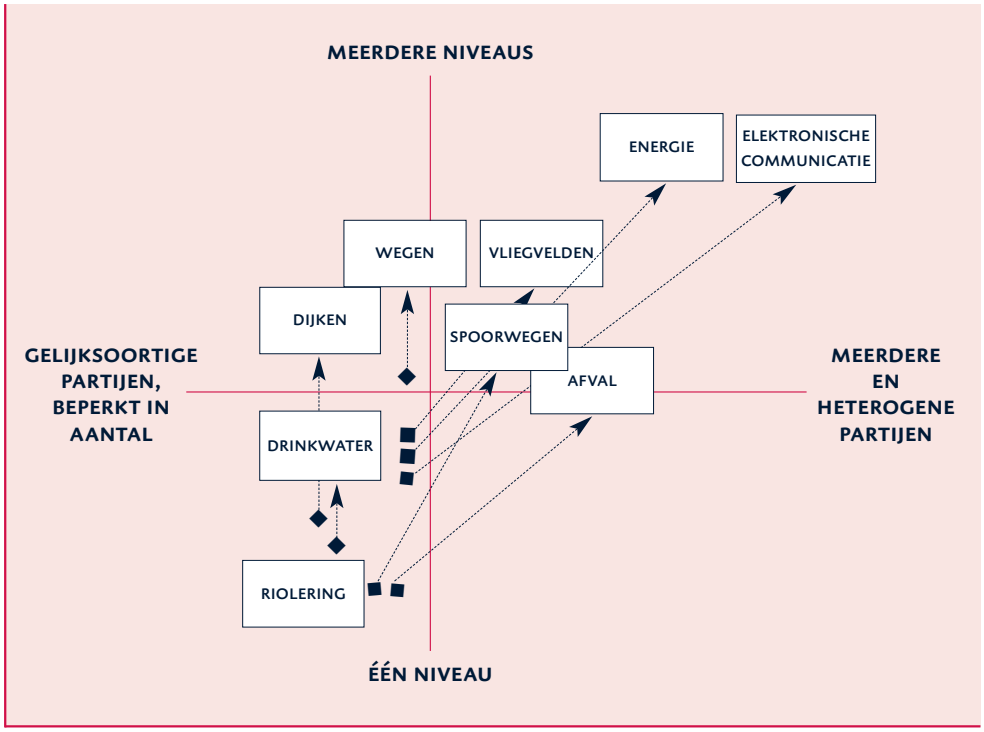
Dit alles heeft geleid tot een versplintering in de transactieketen in de infrastructuren. De keten is opgesplitst in afzonderlijke transacties, en verschillende partijen met uiteenlopende belangen zijn nu betrokken bij verschillende delen

van de keten. De infrastructuur is gescheiden van de dienstverlening, regelgeving is gescheiden van de uitvoering, kortetermijntransacties zijn gescheiden van de langetermijntransacties en technische zaken zijn gescheiden van politieke zaken. Verschillende delen van de transactieketen worden dus uitonderhandeld tussen specifieke partijen die actief zijn in dat deel van de keten.

Figuur 1 schetst de posities van de infrastructuren aan de hand van het aantal betrokken overheidsniveaus en aan de hand van het aantal betrokken partijen. De x-as loopt van sectoren waar partijen actief zijn die veel op elkaar lijken (bijvoorbeeld geïntegreerde drinkwaterbedrijven) naar de infrastructuren waar veel verschillende partijen actief zijn (bijvoorbeeld aannemers, onderaannemers, publieke dienstverleners, private dienstverleners, toezichthouders, private-equityfondsen, consumentenorganisaties). De y-as loopt van sectoren waar slechts sprake is van één (bestuurs)niveau naar de sectoren waar meerdere niveaus relevant zijn.

Deze twee assen (mate van diversiteit van de partijen en het aantal lagen van bestuursniveaus) spelen in het WRR-rapport *Infrastructures: Time to Invest* een cruciale rol bij de analyse, omdat het twee belangrijke wijzigingen in de context van infrastructuren zijn als gevolg van de regimeverandering.

Figuur 1



EFFICIËNTIE EN PUBLIEKE WAARDEN

In de eerste fase van regimeverandering in de Nederlandse infrastructuren heeft sterk de nadruk gelegen op het afslanken van de voormalige staatsmonopolisten en op bevordering van de keuzevrijheid voor de consument. In dit opzicht is de regimeverandering in de meeste sectoren ook redelijk succesvol verlopen. Het ministerie van Economische Zaken heeft eerder dit jaar geconcludeerd dat deze inderdaad tot grotere keuzevrijheid en lagere prijzen heeft geleid in de elektronische communicatiesector en dat er in de energiesector een duidelijke efficiëntiewinst is geboekt, die eveneens tot lagere prijzen voor de consument heeft geleid.

Tegelijkertijd zijn echter ook de beperkingen van de introductie van marktwerking aan het licht gekomen. De grote nadruk op efficiëntieverhoging heeft de institutionele en wettelijke kaders zozeer gedomineerd dat de inspanningen vooral gericht zijn gebleven op statische effecten die op korte termijn zichtbaar, meetbaar en geoperationaliseerd kunnen worden. De vraag is echter of de markt in het huidige regime in staat is om adequaat in te spelen op publieke waarden die relevant zijn voor de langere termijn. Bestaat niet het risico dat de markt zal falen waar het gaat om vraagstukken met betrekking tot innovatie en duurzaamheid, maar ook volksgezondheid en milieubescherming? Moet er, om deze onzekerheden en risico's af te dekken, op grote schaal worden geïnvesteerd in onze infrastructuren? Er zijn, kortom, meer waarden in het geding dan alleen consumentenbelangen op de korte termijn en de vraag is, of ook die andere waarden met de huidige arrangementen voldoende gewaarborgd zijn.

Dergelijke punten vragen doorgaans om dynamischer arrangementen, omdat ze moeilijker te omschrijven zijn, nauwelijks meetbaar zijn en, anders dan efficiëntievraagstukken, ook veel minder zichtbaar worden. Een publieke waarde als 'bescherming van de consument' kan voor een deel nog gerealiseerd worden via een maximumprijs die deze consument moet betalen voor een dienst. Hoe staat het echter met de betrouwbaarheid van de netwerken op langere termijn, de toegankelijkheid op langere termijn, innovatie, mobiliteit en duurzaamheid? Deze waarden kunnen moeilijk in contracten en overeenkomsten worden vastgelegd, omdat ze talloze dimensies omvatten die op talloos verschillende manieren kunnen worden geïnterpreteerd.

Het proces van regimeverandering heeft zo de interactie tussen het publieke en het private domein ingrijpend gewijzigd. De overheid kan niet langer voorschrijven dat bepaalde investeringen worden gedaan, omdat deze beslissing in toenemende mate in handen is van commercieel georiënteerde (publieke of private) ondernemingen en gebaseerd is op commerciële criteria. En deze commercieel gemotiveerde partijen kijken met wantrouwen naar een overheid die mogelijk zal interveniëren. Aanvullende of nieuwe regelgeving kan een directe invloed hebben op het rendement van hun investeringen en op hun

commerciële vrijheid om te bepalen waar en wanneer er wordt geïnvesteerd. Private partijen die andere prioriteiten en ook andere mogelijkheden hebben, kunnen dan immers eieren voor hun geld kiezen.

De belangrijkste vraag waar beleidsmakers in infrastructurele sectoren mee geconfronteerd worden, is dan ook hoe bredere publieke waarden gerealiseerd kunnen worden zonder dat ze een bedreiging vormen voor private investeringen. Een opportunistische, ad hoc politieke interventie zal nieuwe investeerders eerder afschrikken, omdat daarmee risico's en onzekerheden gepaard gaan. Aandacht voor investeringen betekent het aanpakken van het probleem van een langeretermijndynamiek bij zijn wortels. Geenszins is het daarbij de bedoeling de huidige benadering met zijn nadruk op efficiëntie overboord te gooien, maar juist om deze aanzienlijk uit te breiden.

DE NOODZAAK VAN INVESTERINGEN

Er is een cruciale fase ingetreden in het hiervoor beschreven proces van regimewijziging. Over de gehele linie worden de infrastructuren in ons land (en daarbuiten) voor uitdagingen gesteld, die ingrijpende beslissingen vergen met betrekking tot de toekomstige richting ervan. In aanvulling op de kortetermijnstrategie – de efficiëntieverhoging die centraal stond in de achter ons liggende periode – dient de aandacht nu onverwijld te worden gericht op de lange termijn. Hoe urgent dat is, is op uiteenlopende wijze in de verschillende infrastructuren zichtbaar geworden.

In de energiesector is als gevolg van de uitputting van fossiele hulpbronnen en klimaatverandering behoefte aan een grote systeeminnovatie, in feite aan een geheel nieuwe infrastructuur. Bij de waterkering zijn nieuwe oplossingsrichtingen geboden als gevolg van stijgende zeespiegels, heviger stormen en turbulenter stromende rivieren. In de Nederlandse rioleringssystemen zijn grote investeringen nodig om achterstallig onderhoud alsnog te verrichten. Bij de spoorwegen zijn investeringen geboden in veiligheid en beveiliging. Wegen en openbaar vervoer kampen met enorme files die dringend aangepakt moeten worden. In al deze gevallen zijn langetermijninvesteringen geboden, waarbij de strategie gericht moet zijn op het borgen van gemeenschappelijke waarden.

Het realiseren van deze kritieke investeringen in infrastructuren is een complex proces waarin netwerkplanning, milieuplanning, ruimtelijke ordening, financiële beslissingen en soms ook regelgeving en overheidsgoedkeuring samenkomen. De verantwoordelijkheid voor de initiële besluitvorming over het type investeringen, over uitbreiding, onderhoud en bedrijfsvoering van de infrastructuren en over de financiering zullen van sector tot sector variëren. Waar het bijvoorbeeld het wegennet, de spoorwegen en de dijken betreft, is de toewijzing van budgetten een politiek besluit. In sectoren als gas, elektriciteit, water en elektronische communicatie zal een dergelijke beslissing eerder commercieel gemotiveerd zijn.

We kunnen een onderscheid maken tussen twee soorten investeringsbeslissingen die nu urgent zijn. De eerste categorie betreft het grootscheepse onderhoud en de nieuwe aanleg van infrastructuren waarbij bestaande technologieën worden gebruikt – bijvoorbeeld de aanleg van wegen of de uitbreiding van het spoorwegnet. De tweede categorie betreft investeringen in systeeminnovatie – bijvoorbeeld de overschakeling op schone energiebronnen. Hiervoor zijn nieuwe infrastructuren en nieuwe technologieën nodig. Het zijn de uitdagingen in deze tweede categorie die, gezien het risico van marktfalen in de realisatie van publieke waarden, vragen om een heroverweging van de publiek-private interactie en de rol van de staat.

Investeringen in infrastructuur zijn een voorwaarde voor een adequate dienstverlening, nu, maar zeker ook in de toekomst. Als de huidige regimes die de verschillende systemen beheren geen investeringen op lange termijn kunnen realiseren, kan de levering van goederen en diensten die van levensbelang zijn voor onze samenleving niet worden veiliggesteld voor de toekomst. De aandacht moet nu worden verlegd naar het creëren van een stabiel en stimulerend kader voor investeringen in infrastructuren op de lange termijn, waarbij kosten en risico's evenals beloningen en verantwoordelijkheden op de juiste wijze aan de betrokken partijen worden toebedeeld. Dit kan betekenen dat er nieuwe bevoegdheden en taken worden toegekend aan toezichthouders die de realisatie van publieke doelen moeten waarborgen.

Investeren in infrastructuur is een voorwaarde voor de realisatie van de publieke waarden die met de infrastructuren geassocieerd worden. Infrastructuren dienen ook bredere maatschappelijke doelen, waaronder de algemene economische ontwikkeling en duurzaamheid. Investeringen zijn, kortom, een belangrijk instrument om zowel publieke waarden op de korte termijn als op de lange termijn veilig te stellen.

UITDAGINGEN VOOR DE TOEKOMST

De dynamiek van het proces van regimeverandering in de Nederlandse infrastructuren creëert fundamenteel nieuwe voorwaarden voor de te nemen investeringsbeslissingen. Er zijn verscheidene spelers op het toneel verschenen en het spel wordt in meerdere arena's gespeeld – soms over de landsgrenzen heen. Er zijn tal van nieuwe uitdagingen, die de noodzaak van investeringen in infrastructuur onderstrepen. Ook deze uitdagingen hebben een directe invloed op de kaders waarbinnen regelgeving en toezicht zijn georganiseerd. Er is grote behoefte aan structuren die de benodigde investeringen in de toekomst kunnen veiligstellen.

De WRR heeft drie nieuwe, inhoudelijke uitdagingen onderscheiden: technologische vernieuwingen, nieuwe investeringsbronnen en klimaatverandering. Deze uitdagingen worden nog verder versterkt door de Europese dimensie, die de laatste jaren een steeds grotere rol speelt in de besluitvorming rond de infrastructuren.

Technologische ontwikkelingen zijn een belangrijke factor bij investeringsbeslissingen. Nieuwe technologische ontwikkelingen vereisen nieuwe arrangementen voor toezicht. De toenemende verbondenheid van nationale elektriciteitsnetwerken als gevolg van een groeiende handel over de landsgrenzen heen, vergt herziening van de strikt nationaal georganiseerde institutionele arrangementen. De toenemende afhankelijkheid van buitenlandse aardgasbronnen vereist de aanleg van ondergrondse opslagcapaciteit. Anderzijds kunnen technologische ontwikkelingen juist nieuwe vormen van bestuur en beheer mogelijk maken. Telefonie en kabel waren aanvankelijk een natuurlijk monopolie vanwege de enorme kosten van het dupliceren van de netwerken. Maar de opkomst van de elektronische communicatie heeft het landschap ingrijpend gewijzigd: tegenwoordig kunnen concurrerende netwerken diensten voor televisie, internet en telefonie aan de consument aanbieden.

In sommige sectoren verloopt de technologische ontwikkeling razendsnel, zoals in de elektronische communicatiesector. In andere sectoren gaat het veel trager. Maar zelfs in de meer stabiele sectoren verandert de technologie en dat kan van invloed zijn op het bestuur en beheer ervan. Zelfs in een ogenschijnlijk inerte sector als de waterkering doen zich technologische vernieuwingen voor: in plaats van het bouwen van steeds hogere en sterkere dijken, is het beleid nu gericht op het geven van ruimte aan rivieren.

Na een periode van consolidatie en vaak internationale overnames, worden de geprivatiseerde infrastructuren steeds vaker gezien als een aantrekkelijk doelwit voor private vermogensinvesteerders. Deze nieuwe investeringsbronnen kunnen pensioenfondsen zijn of andere institutionele investeerders, die voornamelijk geïnteresseerd zijn in stabiele inkomsten uit gereguleerde infrastructurele sectoren. In bijvoorbeeld het Verenigd Koninkrijk is een aanzienlijk deel van de infrastructurele sector al in handen van private-equityfondsen.

Wat is de betekenis van de internationaal opererende kapitaalmarkt voor beleidsbeslissingen om investeringen in Nederlandse infrastructuren veilig te stellen? Is het voor ons nationaal beleid relevant dat de eigenaar van een Nederlandse infrastructuur zijn hoofdkwartier in Australië, de Verenigde Staten of Koeweit heeft? Vooralsnog zijn de meningen hierover verdeeld. Er zijn echter steeds vaker tekenen van bezorgdheid te bespeuren, zowel bij de overheid als in sommige sectoren van de financiële gemeenschap, dat het groeiende aandeel private-equityfondsen een bedreiging zou vormen voor de toekomst van infrastructuren. In het bijzonder worden vraagtekens geplaatst bij de bereidheid van dergelijke fondsen om zich aan een langetermijninvesteringsstrategie te committeren. Bij het realiseren van langetermijnstrategieën ondervinden zowel overheden als private partijen dus nadelen. Een robuust regime zal om die reden zowel markt- als overheidsfalen moeten aanpakken. Daarmee komt de vraag naar voren of publieke waarden en doelen wel realiseerbaar zijn binnen een infrastructuur die in handen is van private-equityfondsen.

Ten slotte is er wereldwijd een klimaatverandering gaande. De schaal waarop deze zich zal voltrekken en de gevolgen ervan zijn nog in belangrijke mate onzeker. Infrastructuren zijn echter kwetsbaar voor allerlei natuurlijke of door de mens teweeggebrachte verstoringen. Klimaatverandering zou de productiviteit van infrastructuren kunnen beïnvloeden, of de betrouwbaarheid ervan of zelfs de vraag naar de diensten op basis van infrastructuren. Daarom kan de behoefte ontstaan aan meer onderhoud of vernieuwing van wegen, start- en landingsbanen op luchthavens, spoorwegen, dijken en buizenstelsels, naarmate deze bijvoorbeeld met grotere temperatuurfluctuaties worden geconfronteerd.

Anderzijds zijn de infrastructuren zelf juist nodig om het hoofd te bieden aan de uitdagingen van klimaatverandering. Infrastructuren spelen bijvoorbeeld een sleutelrol in de overgang naar een schone, CO_2-vrije economie. In ons land is de infrastructuur ook nodig om de gevolgen van een klimaatverandering op te vangen – een stijgende zeespiegel kan een bedreiging vormen voor onze dijken. Zo heeft klimaatverandering dus een dubbel effect: er zijn veranderingen (lees: investeringen) nodig om de infrastructuren zelf te beveiligen tegen klimaatverandering en tegelijkertijd zijn infrastructuren noodzakelijk voor het beveiligen van de samenleving tegen de gevolgen van klimaatverandering.

DE EUROPESE DIMENSIE

De inhoudelijke uitdagingen die hiervoor zijn aangeduid, worden alledrie geïntensifieerd door een Europese dimensie die aan het besluitvormingsproces rond de infrastructuren is toegevoegd. In wezen is het een dubbele dimensie: de Europese Unie is enerzijds de aanjager van nieuwe ontwikkelingen in de infrastructuren die ons voor de huidige problematiek stellen, anderzijds kunnen juist op Europees niveau maatregelen worden genomen die helpen bij het vinden van de juiste oplossingen.

Als een van de grootste drijvende krachten achter de regimeverandering in de infrastructuren heeft Europese regelgeving een grote invloed op het nationale beleid uitgeoefend. Europese richtlijnen hadden voornamelijk tot doel nationale grenzen te doorbreken, zodat open en concurrerende Europese markten voor elektriciteit, gas en elektronische communicatie konden worden gerealiseerd. Ze moesten nationale monopolies en exclusieve rechten en privileges uit de weg ruimen om nieuwe, competitieve partijen toegang te verschaffen en de markt te openen voor geïmporteerde goederen en diensten. En, wat even belangrijk is, ze moesten nationale partijen de kans geven om een grotere, Europese markt aan te boren.

Aanvankelijk heeft de Europese interventie in infrastructuren de vorm aangenomen van richtlijnen die aanzienlijke ruimte lieten aan de lidstaten. Maatregelen ter bevordering van de liberalisering hebben niet per se nationale regelgeving en nationale publieke waarden overstemd. Onder bepaalde voorwaarden kunnen nationale publieke waarden zelfs aangewend worden om het liberaliseringsproces te temperen. De nationale infrastructurele regimes kunnen dus nog steeds

een afspiegeling zijn van nationaal beleid en nationale publieke waarden. Anderzijds zijn infrastructuren zélf steeds minder nationaal van karakter.

Maar deze relatief indirecte benadering is in vele infrastructuren langzaam aan het veranderen. Europese wetgeving en beleid worden steeds meer interventionistisch van aard. De ontwikkelingen op Europees niveau hebben niet alleen geleid tot de opkomst van nieuwe spelers en tot nieuwe rollen voor bestaande spelers, maar ook tot nieuwe podiums en niveaus waarop potentiële conflicten tussen nationale beleidsdoelen en commerciële doelen kunnen worden uitonderhandeld. Europese toezichthouders nemen meer en meer de plaats in van nationale institutionele arrangementen. Het wordt daardoor lastiger om nationale publieke belangen te waarborgen.

Al met al hebben de ontwikkelingen op Europees niveau een belangrijke nieuwe en externe dynamische factor geïntroduceerd in het nationale besluitvormingsproces inzake investeringen in infrastructuren. Deze factor werkt op uiteenlopende manieren door in de verschillende infrastructuren. Bij de spoorwegen heeft de Europese standaardisering en coördinatie al geleid tot de noodzaak van aanzienlijke nieuwe investeringen. Van andere infrastructuren, zoals de energiesector, wordt verdergaande coördinatie en integratie verlangd om tegemoet te kunnen komen aan nieuwe vraagpatronen.

De rol van de nationale overheid is dus aan ingrijpende veranderingen onderhevig. Deels wordt de overheidsrol meer en meer op Europees niveau ingevuld. Voor een ander deel blijft er echter een substantiële rol voor de nationale overheid bestaan.

Tabel 2

Sector	Uitdagingen			
	Technologie	**Nieuwe investeringsbronnen**	**Klimaatverandering**	**Europa**
Riolering	✓		✓	
Drinkwater	✓		✓	
Afval	✓	✓		✓
Dijken	✓		✓	✓
Wegen	✓	✓	✓	✓
Spoorwegen	✓			✓
Vliegvelden	✓		✓	✓
Elektriciteit	✓		✓	✓
Gas	✓		✓	✓
Elektronische communicatie	✓	✓		✓

Tabel 2 geeft de uitdagingen weer waarmee de diverse infrastructuren op korte termijn (in de komende vijf jaar) in Nederland worden geconfronteerd.

EEN STRATEGISCHE HERORIËNTATIE

Infrastructuren dienen niet alleen als vehikel van belangrijke diensten, ze zijn ook een voorwaarde voor de economische, sociale en culturele ontwikkeling van een gebied. Dit is een belangrijke reden dat de overheid zich in het verleden op alle fronten heeft bemoeid met infrastructuren. In veel infrastructuren was de overheid als publieke monopolist de eigenaar, de beheerder en de manager van de infrastructuren.

In het proces van regimeverandering is de infrastructuur inmiddels op afstand van de overheid gekomen. In de eerste fase van dat proces waren de inspanningen van zowel de overheid als van de infrastructuurbeheerders gericht op het goed functioneren van de markt van diensten, op het vergroten van de efficiency en het verbeteren van de dienstverlening aan de (nationale) consument. Het proces heeft echter ook een grote mate van versnippering opgeleverd in de transactieketen van de infrastructuren, doordat het aantal betrokken partijen, elk met onderscheiden belangen, sterk is gegroeid. Ook is er een grote diversiteit ontstaan in de niveaus waarop besluitvorming plaatsvindt.

Langzamerhand worden de risico's duidelijk die hierin liggen besloten. Publieke waarden die op een langere termijn spelen, lijken door de inzet in de eerste fase onvoldoende te zijn gewaarborgd. Het gaat daarbij om waarden die inherent zijn aan de dienst die over de infrastructuur wordt verleend, zoals leveringszekerheid op de lange termijn, maar ook om waarden die betrekking hebben op het bredere maatschappelijke belang van infrastructuren, bijvoorbeeld innovatie en duurzaamheid.

De grote opgave die hier centraal staat, is om institutionele arrangementen voor infrastructuren te ontwerpen die zowel waarden als efficiëntie, dienstverlening en optimaal functioneren van de markt kunnen realiseren ('Type I'-publieke waarden), alsook publieke waarden als leveringszekerheid op de lange termijn, innovatie en duurzaamheid ('Type II'-publieke waarden). Dit moet bovendien plaatsvinden in een context die wat betreft het aantal partijen, de diversiteit van de partijen en het aantal niveaus waarop beslissingen worden genomen (lokaal, regionaal, nationaal én Europees) aanzienlijk is veranderd.

Voor de nieuwe institutionele arrangementen in infrastructuur heeft de WRR een nieuwe beleidsoriëntatie ontwikkeld die uit drie pijlers bestaat, die in de hierop volgende hoofdstukken worden toegelicht en uitgewerkt:

- nieuwe rollen;
- nieuwe verbindingen;
- nieuwe 'checks and balances'.

Uitgangspunt bij deze nieuwe beleidsoriëntatie is dat deze alleen haar vruchten kan afwerpen als alle partijen zich binden aan de 'Type II'-publieke waarden, zoals leveringszekerheid op de lange termijn, innovatie en duurzaamheid.

NIEUWE ROLLEN

De regimeverandering in de infrastructuren heeft, zoals hierboven al is aangegeven, tot gevolg gehad dat er nu veel meer partijen betrokken zijn bij de besluitvorming, die bovendien op meerdere niveaus plaatsvindt. Dat heeft consequenties voor de functies die vervuld moeten worden om tot investeringen te komen: informatievoorziening, toekomstvisie, agendering, doelen stellen, politieke besluitvorming, wet- en regelgeving, financiering, projectplanning, toezicht, enzovoort. De opgave bij nieuwe rollen is vooral het opsporen van rollen die nu onvervuld blijven, het toewijzen van nieuwe rollen die zijn ontstaan als gevolg van de regimeverandering en het uiteenrafelen van rollen als er ongewenste combinaties ontstaan.

In *Infrastructures: Time to Invest* beschrijft de WRR hoe sommige van die functies – die vroeger in één hand berustten – nu verspreid zijn over verscheidene partijen. De overheid is niet meer de enige en alwetende partij die beslist, implementeert en toezicht houdt. Sommige functies die noodzakelijk zijn voor het investeren in infrastructuur, blijven in de nieuwe situatie onvervuld. Het gaat vooral om de rollen van informatieverzameling, strategieontwikkeling en toezicht. Ook zijn sommige functies tegenwoordig gecombineerd binnen één partij. Deze combinaties zijn echter niet altijd even wenselijk of haalbaar, vooral als het gaat om een combinatie van de rollen van scheidsrechter, financier en politieke besluitvormer. Ten slotte kunnen naast of bovenop de bestaande functies nog nieuwe functies worden onderscheiden. Met name bij invoering van liberalisering van infrastructuren met natuurlijke monopolies is toezicht noodzakelijk geworden – een rol die voorheen door de publieke infrastructuurorganisatie intern werd vervuld.

Een implicatie die niet altijd goed is gezien, is dat de rol van systeemcoördinatie op een passende wijze opnieuw vorm moet worden gegeven, nu de oude invulling daarvan in onbruik is geraakt.

Gezien deze feiten bepleit de WRR een nieuwe definitie van de rollen, functies en verantwoordelijkheden die noodzakelijk zijn om investeringen te kunnen realiseren. Zo moet dringend aandacht worden besteed aan combinaties van rollen die vóór de regimeverandering in de infrastructuur geen probleem opleverden, maar gaandeweg dat proces wel problematisch zijn geworden. Dit is vooral van belang bij infrastructuren waar commercialisering heeft plaatsgevonden – en dus niet privatisering, liberalisering of internationalisering – namelijk de publieke organisaties die nu commercieel gemanaged worden. In de drinkwatersector, bijvoorbeeld, bestaat geen verplichting om de winsten die de drinkwaterbedrijven maken, te herinvesteren in de infrastructuur. Maar in de afgelopen tien jaar zijn

de drinkwaterbedrijven wel veel commerciëler gaan opereren. In situaties waar publieke organisaties een commerciële drijfveer hebben gekregen en waar geen onafhankelijk toezicht is ingesteld, is speciale aandacht geboden voor investeringsfuncties als toezicht en arbitrage, omdat deze het moeilijkst zijn te combineren met een commerciële zienswijze.

Het gaat echter niet alleen om het ontrafelen van bestaande combinaties van rollen, maar ook om het identificeren van nieuwe rollen, in het bijzonder het toezicht op monopolies. In geen enkele van de in het WRR-rapport bestudeerde infrastructuren vindt momenteel op systematische of structurele wijze toezicht op en beoordeling van investeringen plaats. Waar er al sprake is van toezicht, gebeurt dat vooral indirect, bijvoorbeeld door de kwaliteit van de dienstverlening en de onderbrekingen in de voorziening van water, gas of elektriciteit te meten. Het meten van kwaliteit is uiteraard noodzakelijk, maar onvoldoende. De kwaliteit van de dienstverlening geeft immers uitsluitend inzicht in de huidige staat van de infrastructuur, terwijl investeren een langetermijnkwestie is. Als op dit moment onvoldoende onderhoud wordt gepleegd, zal dit zich pas over enkele decennia gaan uiten in een meetbare kwaliteitsvermindering.

In sommige infrastructuren hoeft een gebrek aan toezicht niet problematisch te zijn, namelijk waar de marktpartijen nieuwe infrastructuren kunnen neerzetten om te voldoen aan de vraag naar nieuwe diensten. Een voorbeeld is de elektronische communicatie, waar afschrijvingstermijnen relatief kort zijn en waar marktpartijen onderling hevig concurreren. Maar in infrastructuren waar de afschrijvingstermijnen lang zijn of waar ze een natuurlijk monopolie vormen, kunnen de betrokken organisaties niet op kortetermijninvesteringen realiseren. Daar is langetermijnplanning nodig om publieke waarden en doelen als leveringszekerheid, innovatie en duurzaamheid te bereiken. Voor dergelijke niet-concurrerende monopolies beveelt de WRR het monitoren van de investeringen aan.

Toezicht op investeringen kan verschillende institutionele vormen aannemen. De benadering die in Australië is gekozen voor de elektriciteitssector (en die in het WRR-rapport is geanalyseerd), zou tot voorbeeld kunnen strekken voor de Nederlandse situatie. In een geprivatiseerde context is daar een nationale netwerkmonitor ingesteld, die over de nodige technische expertise beschikt om de behoefte aan onderhoud en investeringen te identificeren en die technische plannen kan opstellen en investeringsvereisten in kaart kan brengen. De WRR beveelt aan om de mogelijkheid van de introductie van een (publieke) netwerkmonitor te onderzoeken. Afhankelijk van de vraag of het fysieke netwerk al dan niet grensoverschrijdend is (de netten voor drinkwater zijn bijvoorbeeld lokaal, maar de netten voor elektronische communicatie en elektriciteit zijn grensoverschrijdend), zou ook overwogen kunnen worden om een Europese monitor in te stellen.

Door bij het herinrichten van een infrastructurele sector gebruik te maken van de pijler 'nieuwe rollen', wordt bijgedragen aan de realisatie van 'Type II'-publieke waarden die voorheen onvoldoende geborgd waren. Denk bijvoorbeeld aan het

expliciet toedelen van de rol van toezicht op investeringen. De toedeling van deze functie aan een onafhankelijke toezichthouder maakt het mogelijk dat er in een sector beter gestuurd en afgerekend wordt op het onderhoud van de infrastructuur en de investeringen daarin. Zonder een dergelijke heroriëntatie op de rollen zou de publieke waarde van langetermijninvesteringen ondergesneeuwd kunnen raken.

NIEUWE VERBINDINGEN

Regimeverandering in de infrastructuur heeft niet alleen nieuwe partijen – vaak met uiteenlopende belangen – opgeleverd. Ook spelen besluitvormings- en onderhandelingsprocessen zich op verscheidene niveaus af. De WRR beveelt aan om nieuwe verbindingen te creëren tussen de versplinterde arena's, gezien de noodzaak van een brede strategische visie op investeringsbeslissingen – met name waar deze systeeminnovaties 'Type II'-publieke waarden betreffen.

Het is de rol van de overheid om een horizontaal gestructureerde dialoog tot stand te brengen tussen de betrokken partijen en tussen de verschillende arena's, om bruggen te slaan tussen concurrerende belangen. Daarbij ligt de nadruk niet op het coördineren van processen of het vervangen van versplinterde processen door een top-downbenadering. In plaats daarvan is het belangrijk om de uitkomsten van die versplinterde processen te verbinden en op één lijn te brengen. Een inhoudelijke nadruk op de realisatie van de 'Type II'-waarden door alle betrokken partijen is hierbij noodzakelijk.

Deze pijler van de beleidsoriëntatie heeft de toegevoegde waarde dat rekening wordt gehouden met het groeiende aantal niveaus in de infrastructuur dat wordt bevolkt door internationale netwerken van experts, toezichthouders en beheerders, systeemgebruikers en serviceproviders en, in mindere mate, eindgebruikers. Deze netwerken zorgen voor een schat aan kennis en expertise, maar ook voor een breed scala van visies en meningen over definitie, prioritering en realisatie van publieke waarden. Wij bespreken hieronder vier soorten van verbindingen: de verbinding tussen verschillende en concurrerende expertises; de verbinding tussen departement en toezicht; de verbinding tussen de relevante partijen binnen een infrastructuur; en ten slotte de verbinding tussen toezichthouders.

'Nieuwe verbindingen' kunnen helpen om de expertise die in verschillende groepen wordt voortgebracht effectief te gebruiken voor nationaal infrastructuurbeleid. Ter inspiratie zouden de praktijken op Europees niveau kunnen dienen. Daar laten kleine groepen van functionarissen zich leiden door de inbreng van externe, vaak concurrerende soorten expertise die soms ook verschillende belangen hebben. Op dit moment maken nationale beleidsmakers nog onvoldoende gebruik van het potentieel van dit proces van concurrerende expertiseontwikkeling. Om te beginnen kunnen nationale beleidsmakers actief gebruikmaken van de concurrerende visies op infrastructuur die nu al op Europees niveau beschikbaar zijn, afkomstig van belangenbewegingen (bijvoorbeeld de consumenten-

bond en de milieubeweging), Europese overkoepelende organisaties van toezichthouders of netwerkbeheerders.

Een verdere behoefte aan nieuwe verbindingen heeft betrekking op de aansluiting van de ontwikkeling van langetermijnstrategieën op de betrokken departementen en het sectorale toezicht op infrastructuren dat zich baseert op beperkte kortetermijndoelen. Ook hier moet strategische coördinatie tot stand worden gebracht via horizontale verbindingen, opdat de uitdagingen waarvoor de infrastructuren op de lange termijn staan, inderdaad worden opgepakt.

De WRR beveelt aan dat er een gezamenlijke risicostrategie wordt ontwikkeld, waarin de betrokken partijen (departementen, toezichthouders en dienstverleners, systeemgebruikers en consumentenorganisaties) gezamenlijk onzekerheden en risico's in kaart brengen, bijvoorbeeld door scenario's op te stellen die door alle partijen als haalbaar en realistisch worden gezien, inclusief een degelijke kosten-batenanalyse. Deze aanpak heeft als voordeel dat partijen zich binden aan de uitkomsten van deze strategie. Deze gezamenlijke aanpak kan verschillende (institutionele) vormen aannemen. Op het niveau van toezicht zou bijvoorbeeld naar Brits model een formele 'Gezamenlijke Strategie Groep' met een permanent secretariaat kunnen worden ingesteld als platform voor sectoroverkoepelende aangelegenheden als het ontwikkelen van 'best practices'. Van daaruit zou ook de ontwikkeling van sectorspecifieke regimes ter hand kunnen worden genomen.

Een ander voorbeeld van nieuwe verbindingen betreft intensieve samenwerking tussen de toezichthouders. Zij zouden daarmee een meer proactieve rol kunnen spelen in de omgang met nieuwe problemen en uitdagingen. De urgentie van samenwerking wordt zichtbaar bij de recente opkomst van private-equity- en sovereign-wealthfondsen. Toezichthouders als de Directie Toezicht Energie van de NMa of de Vervoerskamer beschikken niet over de nodige expertise om financiële strategieën te beoordelen. De Autoriteit Financiële Markten daarentegen beschikt op dit terrein over meer kennis en ervaring waarmee de andere toezichthouders hun voordeel zouden kunnen doen. Door op deze wijze in specifieke gevallen onderling expertise te 'poolen', zouden deze organen veel effectiever kunnen optreden.

Het is eveneens van essentieel belang dat nationale beleidsmakers doordrongen raken van de toegevoegde waarde van nieuwe, internationale netwerken, zodat ze kunnen leren van ervaringen in andere infrastructuren en in andere landen. Ook hiervan is een bijdrage te verwachten voor het beoordelen en evalueren van 'best practices'. Het verbinden van de resultaten van internationale netwerken met nationale doelen zou toevertrouwd kunnen worden aan de voorgestelde Gezamenlijke Strategie Groep.

De pijler 'nieuwe verbindingen' draagt dus op verschillende manieren bij aan het realiseren van 'Type II'-publieke waarden op de lange termijn. De verbinding

tussen toezichthouders en ministeries helpt om stabiliteit en duidelijkheid in een infrastructuurbeleid te vergroten. Die visie zou niet alleen moeten gaan over één kabinetsperiode, maar zou een langere termijn moeten behelzen. Op deze manier kunnen private partijen gestimuleerd worden om langetermijninvesteringen (mede) te financieren, zo was ook de conclusie van een recent onderzoek naar infrastructuren van het Britse House of Lords. In dit advies is voorgesteld dat ministeries en toezichthouders gezamenlijk beleidsdoelen op hoofdlijnen voor een periode van minstens vijftien jaar overeenkomen, uiteraard met behoud van parlementaire bevoegdheden om hierin in te grijpen. Maar de bewijslast wordt zwaarder als het parlement wil inbreken op een langetermijnvisie, zo is het argument. Op dit moment ervaren partijen die willen investeren in infrastructuur nog te veel onzekerheid over de koers die verschillende ministeries en toezichthouders de komende jaren willen varen.

Bovendien draagt de pijler van 'nieuwe verbindingen' bij aan de ontwikkeling van een gemeenschappelijke visie, niet alleen tussen overheidspartijen, maar tussen alle partijen die relevant zijn vanuit investeringsoogpunt. Met name door de gemeenschappelijke risicoanalyse wordt voorkomen dat overheden plannen voorbereiden die volgens de organisaties uit de sector niet haalbaar of niet wenselijk zijn. Deze oefening mondt uit in breed draagvlak en brede betrokkenheid. Dit is vooral noodzakelijk voor infrastructuren die voor een systeeminnovatie staan, omdat zonder deze verbindingen de innovatie niet wordt bereikt.

Een laatste voordeel van 'nieuwe verbindingen' betreft het manco dat het huidige institutionele arrangement te eenzijdig en soms uitsluitend gericht is op het kortetermijnbelang van de nationale consument. Als het systeem al aan de orde is, gaat het slechts om *nationale* pijpen, netwerken, buizen, dijken en wegen. Er is onvoldoende aandacht voor de fysieke systemen, zeker waar deze de landsgrenzen overschrijden. Nieuwe verbindingen tussen departementen en toezichthouders, tussen nationale en Europese lagen, maar ook tussen politiek en nieuwe belangengroepen en nieuwe groepen die over expertise beschikken, zorgen ervoor dat het fysieke systeem weer in het centrum van de aandacht kan worden geplaatst.

NIEUWE CHECKS AND BALANCES

De omstandigheden waaronder infrastructurele organisaties opereren, zijn de afgelopen vijftien jaar drastisch gewijzigd. Toch wordt nog vaak vertrouwd op het systeem van 'checks and balances' dat onder het oude regime is ontwikkeld. Een voorbeeld is dat in een aantal sectoren waarin organisaties met publieke aandeelhouders opereren, het toezicht op investeringen intern wordt uitgeoefend (door de raad van commissarissen). Maar in de loop van de regimeverandering zijn vrijwel alle prikkels in en op het infrastructuurbedrijf gericht op het vergroten van de efficiëntie. De nadruk op efficiëntie die op korte termijn gerealiseerd en beloond wordt, is een risico voor de realisatie van langetermijnwaarden. Een ander voorbeeld van verouderde checks and balances in de huidige situatie is

dat specifieke bepalingen voor de verhouding eigen vermogen en vreemd vermogen in infrastructuurbedrijven veelal ontbreken. In een wereld waarin private-equityfondsen en sovereign-wealthfondsen actief op zoek zijn naar stabiele investeringen, kan dit een risico zijn voor de financiële gezondheid van infrastructuren.

We mogen niet verwachten dat het oude systeem van checks and balances recht kan doen aan de dynamiek van de huidige omstandigheden, waarin – als gevolg van de integratie van infrastructuren in de markt – meerdere partijen en meerdere niveaus betrokken zijn bij de besluitvorming en waarin zeer complexe en vaak concurrerende belangen met elkaar verzoend moeten worden.

Volgens de WRR moet een derde pijler van de strategische beleidsoriëntatie daarom bestaan uit het ontwikkelen van adequate checks and balances die onder meer de commerciële oriëntatie van de meeste infrastructurele organisaties weerspiegelen. Voorbeelden die hieronder nader worden besproken zijn het versterken van de positie van belangenverenigingen, het instellen van nieuwe belangenverenigingen, het doen van reguliere evaluaties van infrastructuurbedrijven waarin ook hun strategie wordt geëvalueerd en ten slotte het aanstellen van onafhankelijke leden van de raden van commissarissen in infrastructuurbedrijven die in publieke handen zijn.

De WRR beklemtoont dat het systeem van checks and balances een vorm moet krijgen die politiek opportunisme uitsluit, vooral omdat de belangrijkste financieringsbronnen voor investeringen in de markt moeten worden gevonden. Vanzelfsprekend is het zo dat publieke beleidsprioriteiten om legitieme redenen moeten kunnen worden aangepast. Dan moet echter worden voorzien in weloverwogen stimulansen die nodig zijn om eventuele investeringsrisico's af te dekken die daaruit kunnen voortvloeien. Ook dienen er voldoende procedurele waarborgen te zijn, zodat het proces van ontwerp en implementatie van een gezamenlijke planning zo transparant mogelijk is voor de betrokken partijen in de verschillende arena's.

In dit kader stelt de WRR voor om de taken en het doel van de toezichthouders duidelijker te definiëren. Als de taken van de toezichthouder worden uitgebreid met de realisatie van publieke waarden, moet de armslag die de toezichthouder heeft, duidelijk worden vastgelegd in wetgeving en in heldere richtlijnen van de regering. Het is immers de taak van regering en parlement – en niet van toezichthouders – om de belangen van de burger te definiëren en te bevorderen. Daarmee is niet gezegd dat de overheid hier een monopoliepositie zou moeten krijgen. De eerder geschetste situatie waarin gemeenschappelijk aan strategieontwikkeling wordt gedaan, is daar een rem op. Ook kan een uitgebreide, onafhankelijke rol voor eindgebruikers en consumenten(organisaties) in dit verband een adequaat mechanisme van checks and balances vormen.

Verder meent de WRR dat procedurele checks and balances vergezeld dienen te gaan van ministeriële en parlementaire checks and balances. Een brede, reguliere evaluatie door de overheid van de functies van de infrastructuur zal veel effectiever zijn dan de huidige werkwijze, waarin slechts sprake is van beperkte evaluaties van de toezichthouders door externe adviesbureaus. Een duidelijk mandaat voor toezichthouders om ook op strategisch gebied rekenschap tegenover de betrokken ministers en een kamercommissie af te leggen in plaats van slechts over en naar aanleiding van incidenten, zou de voorkeur verdienen. De WRR benadrukt hierbij dat meer aandacht moet worden geschonken aan resultaatanalyses en aan de ontwikkeling van adequate indicatoren en 'benchmarks'. In dit opzicht kunnen Europese netwerken van toezichthouders een schat van vergelijkende informatie aandragen die bruikbaar is in de nationale context.

In het rapport van de WRR wordt erkend dat het buitengewoon moeilijk zal zijn om adequate checks and balances te ontwerpen voor besluitvormingsarena's die meerdere niveaus bestrijken. Momenteel wordt ook weinig aandacht besteed aan dit probleem. Maar als de verantwoordelijkheid voor de goedkeuring van langetermijninvesteringsplannen en van afzonderlijke investeringsbeslissingen naar een Europees orgaan wordt verlegd (zoals al is voorgesteld voor elektronische communicatie en energieagentschappen), verdient deze dimensie serieuze en urgente aandacht.

De WRR bespreekt in zijn rapport ook de mogelijkheid die de overheid in principe heeft om strategisch gebruik te maken van haar aandeelhouderschap in geprivatiseerde bedrijven, ten einde invloed uit te oefenen op de realisatie van publieke waarden in deze organisaties. Een dergelijk gebruik zou echter zeer wel ten koste kunnen gaan van de prestatie en waarde van de betreffende onderneming. Toezicht, bij voorkeur door een onafhankelijke instantie, lijkt daarom een potentieel meer geschikt – want minder beperkend en meer transparant – middel om publieke beleidsdoelen te bereiken.

Tegelijkertijd geeft het aandeelhouderschap de overheid wel toegang tot waardevolle informatiebronnen aangaande infrastructuren, bijvoorbeeld ook in infrastructuren die nu het doelwit worden van buitenlandse sovereign-wealthfondsen. In deze context kan overheidsparticipatie op een horizontale basis – als een van verscheidene aandeelhouders – een belangrijk potentieel controlemiddel vormen. Hoe dan ook, naar de mening van de WRR moet vervaging van rollen en verantwoordelijkheden worden voorkomen. Een strikte scheiding tussen beleid en zakelijke doelen moet gehandhaafd worden, bijvoorbeeld via protocollen die worden opgesteld tussen de minister van Financiën (als aandeelhouder) en de functionele ministers die verantwoordelijk zijn voor het beleid.

Ten slotte merkt de WRR op dat checks and balances niet alleen van toepassing moeten zijn tussen de betrokken partijen; ook binnen organisaties moeten ze versterkt worden. Gemeenten en provincies, bijvoorbeeld, hebben nu vaak verschillende petten op: ze zijn aandeelhouder in een nutsbedrijf, maar ook zijn

ze de politiek verantwoordelijke toezichthouder (als lid van de raad van commissarissen) en bovendien klant. In zeker twee van die rollen zal het langetermijnbelang van investeringen in de infrastructuur niet hoog op de agenda staan. De WRR pleit daarom voor toevoeging van deskundige leden aan de raad van commissarissen die niet worden benoemd vanwege hun banden met de aandeelhouders, maar vanwege hun expertise.

Met de regimeverandering in de infrastructuren is de aandacht gericht op contracteerbare, zichtbare, afrekenbare en kwantificeerbare waarden. Door de juiste checks and balances kunnen echter ook de langetermijnwaarden, de onzichtbare, kwalitatieve waarden, worden ingebracht in het afwegingsproces, zelfs als die zich niet zo gemakkelijk laten kwantificeren en contractueel laten afdwingen.

TOT SLOT

Bij het ontwerpen van een nieuw institutioneel arrangement voor een infrastructuur zijn de hiervoor beschreven pijlers voor strategische beleidsoriëntaties alle drie van belang. Vanwege de aanmerkelijke verschillen tussen infrastructuren varieert de toepassing van deze oriëntaties. Zo is van belang of er concurrentie tussen infrastructuren mogelijk is of niet, over welke periode de afschrijving plaatsvindt, de tot nu toe doorgevoerde regimeverandering en ook de uitdagingen waarvoor de sector momenteel staat – is er een grote systeeminnovatie nodig, of gaat het om onderhoud?

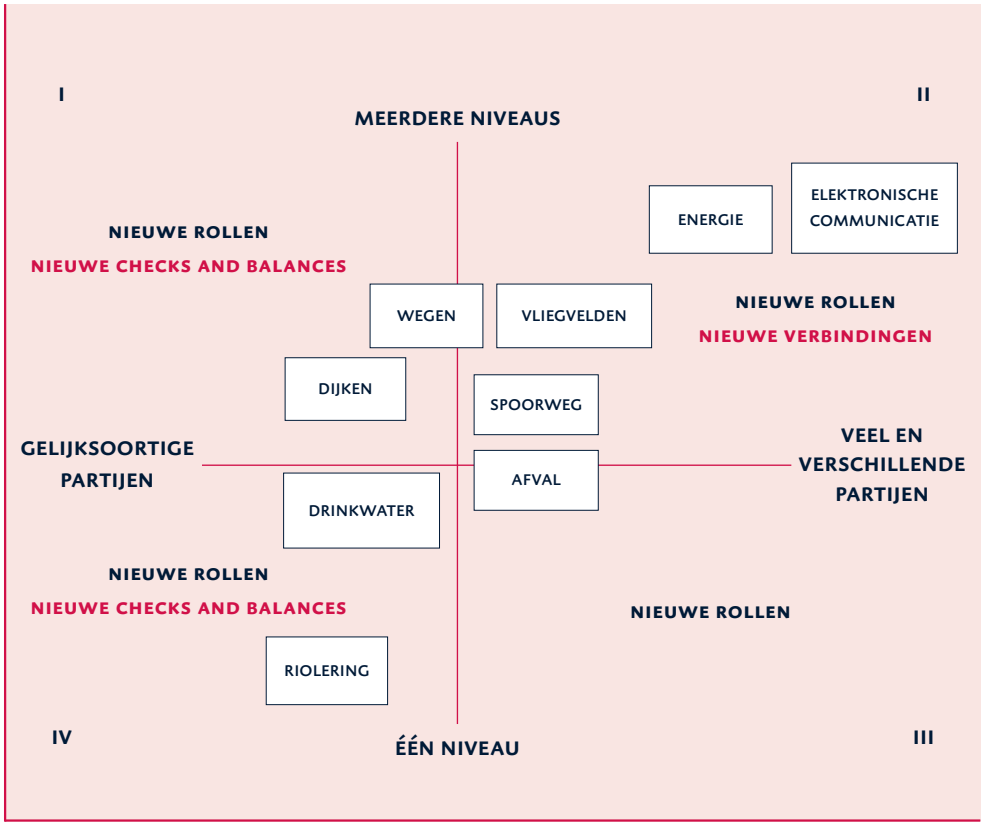
Voor de analyse van de toepassing van pijlers voor de verschillende infrastructuren, is gebruikgemaakt van Figuur 1 (pagina 13). In onderstaande figuur is aangegeven hoe de drie pijlers van een strategische beleidsoriëntatie passen in de kwadranten.

Voor álle infrastructuren geldt: nieuwe rolverdeling. In alle sectoren moet de minister inventariseren waar gaten zijn gevallen in rollen, waar onwenselijke combinaties van rollen zijn ontstaan (bijvoorbeeld arbiter en speler) en waar nieuwe rollen zijn ontstaan als gevolg van marktwerking of commercialisering (onafhankelijke toezichthouder op investeringen).

De tweede strategische beleidsoriëntatie, nieuwe verbindingen, is vooral van toepassing op infrastructuren die gekenmerkt worden door een hoge mate van versplintering onder de betrokken partijen en in de besluitvormingsarena's. Verticale integratie van de infrastructuurbedrijven is hier mogelijk noch wenselijk. Publieke waarden op de lange termijn zouden echter krachtiger gerealiseerd worden als toezichthouders, ministeries en de infrastructuurorganisaties horizontale verbindingen met elkaar aangaan.

Voor infrastructuren waar de betrokken partijen redelijk homogeen zijn en die bovendien vaak nog nationaal georiënteerd zijn, is aandacht voor nieuwe checks

Figuur 2 **Drie pijlers van strategische beleidsoriëntatie in de kwadranten**



and balances van belang. Immers, deze vaak nog publieke organisaties hebben een winstoogmerk ontwikkeld (met uitzondering van riolering) en worden expliciet afgerekend op efficiëntie (bijvoorbeeld via benchmarks), wat een kortetermijndoel is. Om juist in deze infrastructuren ook de publieke waarden op de lange termijn te realiseren, is deze aandacht voor checks and balances nodig.

Met deze strategische beleidsoriëntatie is geen kant-en-klaar institutioneel arrangement ontworpen voor alle infrastructuren. Maar het is wel duidelijk geworden dat er een reëel risico bestaat dat publieke waarden op de lange termijn als innovatie, duurzaamheid en langdurige beschikbaarheid en toegankelijkheid van de infrastructuren op het tweede plan geraken indien de institutionele arrangementen niet worden herzien. Als we ook de publieke waarden in de Nederlandse infrastructuren op de lange termijn willen blijven realiseren, is een strategische heroriëntatie op de drie pijlers noodzakelijk. Deze heroriëntatie resulteert in een investeringsopdracht in beleid, institutionele arrangementen en in de harde infrastructuur.

EXECUTIVE SUMMARY

Drinking water supply, mobility, communications and energy are critical for the functioning of contemporary society. Without these services all modern societies would collapse, as major energy blackouts and train accidents often remind us. Equally indispensable are the infrastructures that enable the protection against flooding, that facilitate electronic communications and transport by road, rail and air.

The efficiency of the entire economy is heavily influenced by the effectiveness, quality and universality of these infrastructures. They are priority factors in locational decisions for investment by firms in many industries. The effects of efficiency and universality ripple throughout the economy and society in a manner that multiplies their direct impact many times. Because of their core functions, infrastructures and the services they deliver (also referred to as public utility services) have been treated differently from other sectors of industry and have not been simply left to market forces.

Core infrastructures have become truly critical infrastructures – in the sense that they are key to continued societal and economic security and well-being in the face of external threats. Such external threats may be brought about by factors such as a growing dependence on external natural resources and terrorist threats. Indeed, these threats are increasingly recognised by policy makers both at the European and the national level. At the same time, infrastructures are also seen as the key to a successful transition towards a low-carbon sustainable future for most of the world's economies. The Netherlands, with its heavy reliance on (increasingly imported) gas and coal, its overcrowded roads, railways and airports and its ambitions to become a knowledge intensive society, is no exception. In addition there is the need to adjust the Dutch flood protection, its water management and spatial planning to the challenges of sea level rising and increasingly violent run-off of rivers. The costs of transition to a sustainable future are both uncertain, as well as enormous in monetary terms (Euro 2 billion a year in the near future, according to the Energy Transition Platform). Thus, system innovation is necessary in various infrastructures. In others, maintenance will require substantial investments in the future.

Why this report: From a 'Type I' to a 'Type II'-strategy

Over the last two decades most infrastructures have been subject to significant regime change, which led to more emphasis being put on service delivery, lower prices and enhanced consumer choice, together with a greater concern for efficiency. In fact, five modes of regime change may be identified: liberalisation, privatisation, unbundling, corporatisation and internationalisation. Liberalisation concerns the opening up of an infrastructure to allow for competition in supplying goods and services to consumers. Privatisation involves a transfer of ownership from the public to the private domain. Internationalisation refers to

the processes involving a transfer of functional operations and in some cases, governance aspects of infrastructures to a supra-national level. Unbundling concerns the splitting up of vertically integrated undertakings into separate units. Lastly, corporatisation involves the trend in which publicly owned infrastructures are increasingly managed according to commercial or market based 'principles'. In virtually all infrastructures, effects of regime change can be distinguished, albeit that these various modes of regime change have been introduced in the various infrastructures at different times with varying scope.

Regime change in infrastructures has to a large extent lived up to its original objectives. However, problems and limitations of regime change have also manifested. First of all, regime change in some cases has created a bias towards short-term interests at the expense of long-term investment requirements. A singular eye on static efficiency runs the risk of undermining relevant public values like accessibility, affordability, reliability as well as wider economic and societal concerns, including the environment and public health. Second, a narrow focus on service delivery is likely to crowd out attention to the quality of physical infrastructures. Thus, the initiative drive of regime change has tailored to address what are called in this report 'Type I' market failures (i.e. lacking or improper market functioning). What is needed today is a strategy that effectively addresses 'Type II' market failures (i.e. ineffective and/or inefficient realisation of long term – public – values).

In the light of the foregoing, the central question of this report is: what strategic policy is necessary to secure long term investment in physical infrastructures under the new conditions brought about by the process of regime change and in the light of the future challenges which these infrastructures are required to meet.

Achieving both 'Type I' and 'Type II' values requires major investments in infrastructures. Investments offer, therefore, a relevant lead for designing a new strategic policy framework. On the basis of such orientations, institutional arrangements may be created that serve both short term values such as efficiency and service provision and long term values such as security of supply, innovation and sustainability.

The effects of regime change

A strategic policy framework must be related to the current situation in infrastructures, which is characterised by the effects of regime change. Firstly, regime change has led to a change in actor constellation in infrastructures. Not only has the number of actors increased, but also the heterogeneity of actors. Instead of one public monopolist, infrastructures now consist of a mix of public and private parties, regulators, consumer watchdogs etcetera. Secondly, the number of levels on which the decision making, financing, development of expertise, monitoring, supervision and regulation takes place, has increased too. The European Union has become an ever more relevant governance level, other interna-

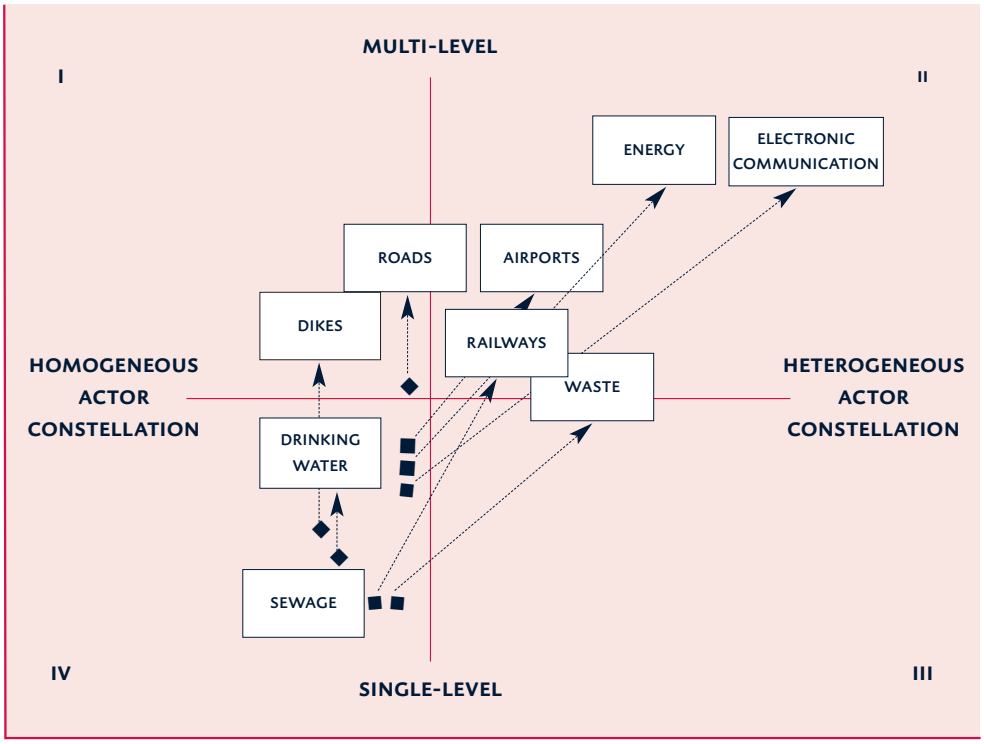
tional, regional and local authorities have become increasingly relevant as well. Not only supervision and regulation, but also financing infrastructures is nowadays a concern of multiple levels of governance. These two developments (change of actor constellation and shift towards multiple levels) taken together result in a splintered transaction chain, in the sense that investment decisions are often made in bilateral and discrete relations (for example between regulator and net manager). Different actors with differing interests are involved in different parts of the 'decision chain'. Consequently, infrastructures are separated from service, regulation is separated from implementation, short term transactions are separated from long term transactions and technical issues are separated from political issues.

Obviously, regime change has had different consequences in the various infrastructures. Introducing concrete modes of regime change has been in part a *political* decision. Railways and energy infrastructures have been unbundled, while sewerage and water infrastructures have remained integrated. Although unbundling would have been a technical possibility in these infrastructures, for reasons of high transaction costs it was decided not to turn to this particular mode of regime change. Regime change is also dependent on technical characteristics. A natural monopoly in an infrastructure requires independent regulation in case of liberalisation or privatisation. This may not be so if it is possible to create alternative, competing infrastructures.

Consequently, the role of the state has changed substantially across the various infrastructures. By and large and in most cases, the role of the state as owner, planner, financer and operator of the majority of the national infrastructures has been severely challenged with the introduction of market-based principles. Thus, the process of regime change has created critical dilemmas for future infrastructural provisions and investments, which is referred to as the 'mission paradox' in this report. As part of the regulatory bargain of institutional liberalisation, the state has relinquished direct responsibility for the operation of infrastructures, to a multitude of actors. At the same time, even if policy makers and regulators are increasingly operating at a distance in the interest of effective consumer demand and delivery, they cannot relinquish responsibility altogether. Public policy remains critical in ascertaining whether infrastructural provisions remain able to meet and uphold (long term) public values.

The actor constellation and the constellation of governance levels are decisive for understanding the consequences of regime change in infrastructures. Therefore, these dimensions are used to cluster the various infrastructures. Thus, a template is created on the basis of x: homogenous and heterogeneous actor constellation and y: single/multi-levels. Figure 1 aims to provide an indicative 'snapshot' of the historical/critical and current position of the various infrastructures. The dotted lines (which depict the position of the sector some twenty years ago) illustrate the dynamics in the position of the different infrastructures.

Figure 1 **Infrastructures in a multi-level and heterogeneous-actor constellation stakeholders**



A strategic policy framework needed based on three pillars

The WRR recommends to develop a strategic policy framework for the realisation of both 'Type I' and 'Type II'-public values in a heterogeneous actor and multi-level constellation. To this end, the WRR has developed three pillars:

- define and redefine roles and responsibilities;
- realign goals and resources through joining-up and connecting actors and levels; and
- recalibrate risks and rewards through the elaboration of appropriate checks and balances.

The WRR recommends that any institutional design in infrastructures should combine these three pillars. However, given the substantial differences between infrastructures, the employment, scope and relative weight of the pillars will differ.

Pillar I: Redefine roles and responsibilities

A robust strategic policy framework requires the clear recognition and proper allocation of roles and responsibilities to the various actors involved to avoid default reliance on hierarchical, top-down interventionism. It is equally necessary to ensure a clear allocation of roles and responsibilities for implementation and for the constant evaluation of this process in order to engender commitment

and trust. Finally, the allocation of new roles may be necessary to address the specific consequences of regime change in certain sectors.
The WRR therefore advocates a (re)definition of functions, roles and responsibilities that are necessary for the realisation of investment. Redefining roles and responsibilities ensures that actors in infrastructures are guided by multiple incentives, instead of mainly commercial and short term incentives.

The role of government

Given the consequences of regime change, as analysed in this Report, a return to direct state intervention in investment decisions is no longer a realistic or fruitful option in the liberalised sectors.
A frequently heard political claim is for a return to the old paradigm of top down planning and state-controlled monopolies or even 'national champions'. Yet to conclude that this approach would be either desirable or possible is to ignore, that infrastructures have become in many sectors, not only a global good as opposed to national or local tool for industrial policy, but also an important, stable and predictable source of revenue for private investors as well as public shareholders, who may in turn be responsible for at least partly financing new investment.
The complexity of the heterogeneous actor and multiple level exacerbates the problem of asymmetrical information- given their operational responsibilities- the sectors themselves are the primary locus of detailed economic as well as technical knowledge and expertise. Full stakeholder involvement is necessary to ensure both the quality and eventual success of any longer term institutional arrangements for infrastructural provision.

The role of ministers in evolving Sectoral Road Maps

The evolution of sectoral roadmaps should be conceived as a form of strategic dialogue and partnership between the relevant stakeholders. The primary role of ministers should be to ensure that national policy strategies for major infrastructure developments are drawn up and revised at regular intervals. These strategies could be prepared in the first instance by a panel of independent advisors who would in turn draw on the expertise of a wide range of stakeholders, and who would provide informed and non partisan advice on the objectives to be met and the options for meeting them.

The Role of Independent Regulators

The process of regime change has generated new institutions, such as specialised economic regulators, with specific roles. In the sectors in which independent regulators are well established, this has led to a clearer demarcation between political and regulatory authority that enhances regulatory stability, creating a better climate for investment, and with it the realisation of longer-term public values. The relationship between regulators and responsible ministers should be re-considered as a target for realignment if the regulators are entrusted with the implementation of wider public value tasks. Regulators must continue to play a valuable role in the development of a strategic long term perspective. However, if independent regulators are to assume wider responsibilities for achieving social

and economic objectives this must be under clear political guidance, regularly updated on the basis of consistent monitoring processes, and stipulating how, as a matter of principle, trade-offs should be made.

New role in system coordination

In infrastructures in which the regime mode consists of corporatisation (and not liberalisation, privatisation or internationalization), special attention should be given to undesirable combinations of roles. An infrastructure organisation that is now commercially operating (in the drinking water sector for instance) may no longer be entrusted with all the functions necessary to realize investments. An external monitoring or refereeing role may be a useful mechanism to counter the disadvantages of hybridity and to directly address the merits of ploughing back profits into new investment in infrastructures.

Similarly, the disentanglement of combined roles and the assignment of new functions must be addressed. For example, in none of the infrastructures studied in this Report investment is monitored and assessed in a systematic and structural way. This may cause serious problems for infrastructures with long depreciation periods and for infrastructures with a (natural) monopoly in which infrastructure organisations cannot realize the investment in a short time span. For these non-competitive national monopolies, the WRR recommends obligatory monitoring of the quality and the level of investment of infrastructures. Thus, the identification of where and when major investments or maintenance are required is secured. The WRR recommends investigating the possibility of the introduction of a public network monitor in the Dutch context, after the example of the Australian national monitor which is independent from both politics and industry.

Avoiding Blurring of Roles and Interests

Explicit attention to allocating clear responsibilities for monitoring may ensure that the multiple, and often hybrid actors and organisations are guided by multiple longer term incentives in the public interest.

Pillar II: Realign goals and resources – exploring ways to join-up and connect actors and levels

An emphasis on joining-up and horizontal coordination is required to devise as well as implement and monitor sectoral strategies to ensure their full success. Joined up action at all different stages of the process of designing and operationalizing a strategic perspective will provide greater certainty and clarity for the various actors involved with the infrastructures and engenders trust and commitment. Furthermore, the process of joining up or re-connecting encourages and improves coordination across and between the different splintered arenas, creating openings for an alignment of competing interests.

Joined-up action at the political level

In sectors in which competition between networks is not economically feasible, joining up at political the political level may be realised by a joint mapping

approach in which the parties involved (ministries, regulator and service providers, system users and organisations representing final customers) together map the uncertainties and risks, for example by outlining scenarios that all parties regard as possible and realistic.

Joined up action at regulatory level

Maximizing various ways of reconnecting actors and levels can be an important guiding principle for the potential for regulators and regulation to realize long term perspectives, and for securing a coherent and consistent approach to monitoring and evaluating the objectives they seek to promote. Possibilities in this regard are the exchange of information between relevant regulators and promoting regulatory learning or installing a formal Joint Regulator Group with a permanent Secretariat in order to promote a platform for 'joined up thinking' on cross-infrastructural regulatory issues (after the proposal of the UK House of Lords). Similarly, a joined up regulatory process could be deployed to assess the advantages and disadvantages of formal as opposed to informal regulatory instruments.

Conferral of concurrent powers

The conferral of joint regulatory powers may allow infrastructural regulators to take a more proactive role in dealing with certain novel issues or new challenges. The possibility to jointly investigate certain issues across infrastructures could also be considered.

Multilevel joining up and Learning from Brussels

It is vital to recognize the value of the output which trans-national networks offer to national policy makers to formulate a more structured and at the same time sufficiently flexible approach, to learn form experience in other sectors and from other countries, to establish a clear, stable framework for assessing and evaluating best practices. This potential for national bodies this is currently unexplored territory and deserves serious attention.
The Council stresses the opportunities for government as a manager of the 'network of networks' to harness the deliberative processes developing within these networks to enrich both policy formation and regulatory policy at national level.

A structured link between regulators and ministries helps to increase policy stability and coherence. Moreover, realigning contributes to the development of a joint strategy, which involves not just state actors, but all actors that are relevant in the light of investment in infrastructures. This contributes to support and commitment. The resulting shared vision should extend over a longer period than just one cabinet term, in this way, uncertainty is reduced which may stimulate private actors to finance long term investments.

Pillar III: Recalibrate Checks and Balances

Substantive and procedural checks and balances ensure that longer term objectives are realized in practice, but without sacrificing flexibility. It follows that the

processes of redefining roles and aligning goals and resources may need to be supported by an adequate system of checks and balances which can ensure a fair and transparent allocation of investment risks and rewards.

In particular careful attention has to be paid to the requisite incentives for the various parties involved to commit to new investment. To mitigate the inevitable regulatory uncertainty and risk that attends major system innovation, urgent attention should be given to recalibrating incentive mechanisms and instruments. Although joined-up action and the institutionalisation of horizontal linkages and regulatory learning has considerable potential, this type of governance approach will be more powerful with the right incentives structures and (even) unattractive 'penalty defaults' in place.

A National Superfund for Infrastructures?

Certain exogenous developments are likely to put enormous financial pressures on infrastructures in order to meet the challenge, for example the transition to a low carbon economy. A state-sponsored investment fund – a Superfund for investment in infrastructures – could be created to ensure that critical investments are realised on time.

Strategic public shareholdings

The present policy of the Dutch government to exercise its shareholding rights in companies in which it still maintains a financial interest with restraint (Wilkeshuis 2008; De Pree 2008 and Kenniscentrum voor ordeningsvraagstukken 2006), is now being actively re-considered (Tweede Kamer 2007-2008, 24036, nr. 345). The Council considers that the eventual (re-) deployment of strategic public shareholdings must be evaluated in the context of regime change as analysed in this Report.

The added value of a strategic shareholding as a means to achieve public objectives is questionable. The Council subscribes to the conclusions put forward in a report by the Kenniscentrum voor ordeningsvraagstukken (2006). A strategic shareholding is only one of a number of mechanisms that can be employed as a form of check (chapter 5). Regulation may be seen as a potentially less restrictive and more transparent means of achieving public policy objectives than strategic public shareholdings, especially if carried out by an independent regulatory authority.

At the same time, it may be acknowledged that the retention of public shares may also provide government with a right to be well informed as a shareholder, and to have access to valuable sources of information in sectors where new actors are emerging. In this type of context, government participation on a horizontal basis, but on an equal footing with other shareholders, could provide an important potential check. Finally, participation by a state-owned company in new ventures can also be used to serve commercial objectives, and can prove a useful mechanism for encouraging major new investments.

If strategic shareholdings are to be actively used in any sector, a strict separation between policy and business objectives should be maintained and blurring of roles and responsibilities should be avoided. The Council is of the opinion that supervision by an independent regulator with an extended mandate to address 'Type II' public values is a preferable alternative to strategic shareholdings, given that transparency and accountability can be more effectively guaranteed.

Procedural Checks and Balances

The evolution of a joint strategic roadmap will also result in better checks and balances. The Council suggests that the duties of regulators/supervisory bodies need to be defined more clearly. If an expansion of the economic regulators' duties to include the realisation of more open-ended public interest objectives is deemed necessary, then the scope of the regulators' powers should be circumscribed by legislation, and accompanied by clear guidelines issued by ministers in accordance with legislation. In the Council's view, the interests of citizens and general public are for government and parliament – and not regulators – to define and promote. However, an enhanced, independent role for end-users and consumers may also be considered.

Multi-level checks and balances

The Council recognizes that devising adequate checks and balances on multi-level arenas are especially problematic. Very little attention is currently paid to this aspect by policy makers. But if responsibility for approving long-term investment plans as well as individual investment decisions shifts to a European body – as is now proposed with respect to the new electronic communications and energy agencies (see chapter 6) – serious and urgent consideration must be given to this dimension to . There is a pressing need to devise better and more open processes of accountability, which could be a task for the Joint Regulatory Group.

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PREFACE

This report has been prepared by an internal project group of the WRR. The group consisted of prof.dr. Leigh Hancher as member of the Council, and staff members dr. Willemijn Dicke (project coordinator), mr.dr. Ton van den Brink, dr. Aad Correljé (external advisor), drs. Gera Arts and drs. Niels Feitsma. In addition, ir. Marten Jorritsma contributed to this report for a year during the course of the project.

The analyses in this report are, in part, based on studies conducted by externals at the request of the Council. These studies will be published simultaneously with the report in the series 'Verkenningen' no. 19 *New Perspectives on Investment in Infrastructures*. That publication contains contributions by dr.ir.ing. Rudi Bekkers, dr. Theon van Dijk, drs. Dick van Duijn, prof.mr.dr. Ernst ten Heuvelhof, mr.drs. Hamilcar Knops, prof.dr. Pierre Larouche, mr.dr. Saskia Lavrijssen and prof.dr. Leigh Hancher, prof.dr. William Melody, mr.dr. Jan de Pree, prof.dr.ing. Geert Teisman, and mr. Kirsten Wilkeshuis. Along with this report and the 'Verkenning' a webpublication by prof.dr. Leigh Hancher, dr. Willemijn Dicke and ir. Marten Jorritsma will be published.

In preparing this report, the Council also used advice and information provided by people from the Dutch Court of Audit, the 'Algemene Rekenkamer'. We wish to thank Eric Polman, Cor van Montfort, Jan Wieles and Freek Hoek. Furthermore the project group organized several workshops with policy experts, practitioners and academics, and we did a number of interviews. During the seminars and interviews we spoke with: Nico Baken (KPN), Daniel Tijink (EZ), Robert Haffner (NMa), Wim Holleman (RWS), Luc Kohsiek (RWS), Arend Kroes (GasUnie), Mark Leijsen (Kennisinstituut voor mobiliteit), Frits Otte (EZ), Annetje Ottow (OPTA), Siebe Riedstra (VW), Robert Stil (OPTA), Gert Zijl (NMa), Alexander van Altena (Prorail), Sjoerd Bakker (EnergieNed), Edgar van Boven (KPN), Bernard Dijkhuizen (Zesko BV), Arjen Frentz (VEWIN), Lex Hartman (Tennet), Frank van den Heuvel (Delta), Helma Kip (Essent), Hans van der Meer (NAM), Petra Smeets (GasUnie), Maurice de Valois Turk (KPN), John Groenewegen (Delft University of Technology), Ger Ardon (VROM), Jurrien Prast (VROM), Ton Bestebreur (RWS), Erik van de Brake (Rabobank), Jaap Korf (Rabobank), Wim Dik (Zesko), Paul Disveld (DNB), Hubert Schokker (DNB), Jon Eikelenstam (EZ), Arjen Frentz (VEWIN), Wim Gideonse (VW), Martijn van de Groep (VW), Mira Huussen (NMA/DTe), Chris Kwant (The Hague municipality), Vincent Oomes (Deloitte), Aad van den Ouweland (Robeco), Gerben de Zwart (Robeco), Reinier Pollman (AFM), Roelof Prins (NPM Capital), Hans Speetjens (Delft municipality), Leo Valkenburg (BNG), Ger Vogelesang (Evides), Willem van de Wal (DTe), Bas ter Weel (AFM), Rob van Veldhuizen (ABN AMRO), Philip Karré (NSOB), Nicole van Gelder (ind. advisor), prof.dr. Jan Smit (EUR) and dr. Robert Went (WRR). The council is grateful to all concerned for their contributions.

1 INTRODUCTION

1.1 WHY THIS REPORT?

Drinking water supply, mobility, communications and energy are critical to the functioning of contemporary society. Without these services all modern societies would collapse, as major energy blackouts and train accidents often remind us. Equally indispensable are the infrastructures that enable the protection against flooding, that facilitate electronic communications and transport by road, rail and air.

The efficiency of the entire economy is heavily influenced by the effectiveness, quality and universality of these infrastructures. They are priority factors in locational decisions for investment by firms in many industries. The effects of efficiency and universality ripple throughout the economy and society in a manner that multiplies their direct impact by many times. Because of their core functions, infrastructures and the services they deliver (also referred to as public utility services) have been treated differently from other industry sectors and have not simply been left to market forces (Mooij and Prast 2002; Teulings, Bovenberg and Van Dalen 2003; Melody 2008).

Core infrastructures have become truly critical infrastructures – in the sense that they are key to continued societal and economic security and well-being in the face of external threats. Such external threats may be brought about by factors such as a growing dependence on external natural resources and terrorist threats. Indeed, these threats are increasingly recognised by policymakers both at the European and national levels. At the same time, infrastructures are also seen as the key to a successful transition towards a low-carbon sustainable future for most of the world's economies. The Netherlands, with its heavy reliance on (increasingly imported) gas and coal, its overcrowded roads, railways and airports and its ambitions to become a knowledge-intensive society is no exception. Moreover, there is the need to adjust the Dutch flood protection strategy, its water management and spatial planning policies to the challenges of the sea level rising and the increasingly violent run-off of rivers. The costs of a transition to a sustainable future are both uncertain, as well as enormous in monetary terms (€ 2 billion annually in the near future, according to the Energy Transition Platform, Taskforce Energie Transitie 2006).

1.1.1 THE VITAL (BUT OFTEN NEGLECTED) ROLE OF INFRASTRUCTURES

Events around the globe have illustrated not only the vital nature of infrastructures which provide key services, but also their vulnerability to external challenges – like, for instance, climate change (section 1.5.3). The floods in July 2007 in the south of England tested electricity and water infrastructures to their limits; in the immediate flood crisis, a major water treatment plant failed and a major

electricity substation for the national grid network also nearly failed. The Russian-Ukrainian gas crisis of December 2005 also underlined the European Union's growing vulnerability to external energy dependence. Price volatility – in particular soaring oil prices – has added to the grim picture. Energy security and the importance of infrastructures in guaranteeing the security and reliability of the supply became the new – or at least rediscovered – mantra.

These events illustrate not only how vital infrastructures are to our daily lives, but also underline how indispensable the long-term investment in the maintenance of investment levels in infrastructures has become. Power cuts around the world, for example in London in 2003, in California in 2001 and in Rome and the north of Italy in 2003 focused (not only politicians') attention on the potential consequences of ageing power networks on the reliability of the supply of electricity and on the need for higher rates of asset replacement (Tutton 2008).[1]

In the Netherlands, for instance, electronic communication problems and major energy blackouts have reminded us of how important reliable infrastructures are. Problems with software at ProRail caused serious train traffic delays for over 24 hours in February 2007 and an electricity network failure left the city of Haaksbergen without power for three days in 2005.

Box 1.1 Substantial investments are needed[2]

According to European Commissioner Andris Piebalgs, massive investment is needed throughout the global energy system to meet future energy demands. In Europe alone, this could be as much as € 1 trillion over the next 20 years.[3] The European Commission has called for investments of at least € 30 billion in energy infrastructure by 2013 (€ 6 billion for electricity transmission, € 19 billion for gas pipelines and € 5 billion for LNG terminals throughout the 27 Member States) (Lisbon Agenda[4] and the Commission Green Paper on Energy; (European Commission 2006a). Connecting more electricity generated from renewable sources to the grid will cost an estimated € 700 to 800 million per annum. Implementation of priority trans-European transport networks will require investments of € 260 billion by 2013 – out of a total estimated budget of € 600 billion, which will be required to fund investments in the entire trans-European network. Capital expenditures on fibre optic networks of up to € 25 billion per annum is required to realise ambitious goals in the electronic communications sector (European Commission 2007: 5).[5] The Commission's ambitious TENs policy calls for € 600 billion in investment in so-called Trans-European Networks (TEN) (see chapter 4). In the Netherlands, according to the Milieu en Natuur Planbureau, between € 1 to € 3 billion are needed to implement European Regulation policy regarding the environmental protection of rivers (Milieu en Natuurplanbureau 2006). In the sewerage sector, the investment shortfall is nowadays estimated at € 2.9 billion (Gerritsen and Sterks 2004). Furthermore, the port of Rotterdam has developed plans to capture and store CO_2. The costs of this storage system are estimated at € 100 to 200 million annually.

1.1.2 THE EFFECTS OF INTEGRATION AND INTERDEPENDENCE

What is perhaps equally important from the perspective of this report is that one single event – a falling tree or a boat mast hitting overhead transmission lines on the River Elbe in Northern Germany – can now have far-reaching implications and cause black-outs across large parts of Europe. The impact of Hurricane Katrina in the US in August 2005 also underlined how tightly integrated many infrastructures are: Katrina triggered problems for crude oil delivery but also hit natural gas production, oil and gas transport, refineries and electricity and water supplies in one of the world's most energy intensive areas.

Infrastructures are increasingly integrated and investment decisions – or the failure to make a decision in one country – can have a direct impact on the viability of infrastructures in a neighbouring country. Extensive investments in German wind energy have resulted in the requirement to strengthen the Dutch high transmission electricity grid (see chapter 6). The failure to invest in high-speed trains in Germany, on the other hand, has had a significant and negative effect on the huge investments in the construction of the Betuwe railway line. Similar externalities characterise mobile communications – a national government had little incentive to deal with high 'roaming charges' when the benefits of reducing these charges would accrue to users in other jurisdictions (Larouche 2008) and a change in German waste treatment policy has major implications for the organisation of waste disposal facilities in the Netherlands (Karré and In 't Veld 2007).

However, despite the vital role these infrastructures play in contemporary society, for more than a century, tracks, grids and pipelines were rarely at the forefront of public attention or concern, as is illustrated in detail in Van der Woud (2006) and Schot et al. (2003). As recently as 30 years ago, public water, electronic communications and electricity companies could carry out their work in relative anonymity, providing a convenient if scarcely visible instrument for the realisation of wider economic or social goals – whether it was the provision of cheap power to large energy intensive users, the widespread distribution of gas or cable services to Dutch households, or the provision of universal telephone services to all Dutch users.

1.2 REGIME CHANGE IN INFRASTRUCTURES

Paradoxically, it is the invisible hand of the market or market forces that have forced this rather neglected sector into the limelight. In the last two decades, an ongoing process of regime change – a process which can broadly be described as the shift from reliance on a state owned and/or controlled public monopoly provider for these public services (i.e., responsible for the operational processes), to a new situation in which, as a result of the introduction of market disciplines, heterogeneous actors both public and private, share ownership and responsibility in various institutional arrangements or constellations for the delivery of services

over the various infrastructures – has occurred in the majority of the Dutch infrastructures.

1.2.1 FIVE MODES OF REGIME CHANGE

The process of regime change for the organisation of infrastructure provision is conceptualised in this report to consist of five modes, namely liberalisation, privatisation, unbundling, corporatisation and internationalisation. These modes, which are discussed in detail in the next chapter, may be introduced in separate, sequential stages, but this is not necessarily the case. Regime change is an ongoing process. The primary objective of regime change throughout the infrastructures has been to introduce some form of competition as a means to ensuring greater efficiency, as well as enhancing customer orientation and customer choice. But it has also been motivated by the desire to reduce political intervention and opportunism within infrastructures – by increasing the freedom of companies to 'efficiently' pursue commercial as opposed to political objectives.

This process of regime change has nevertheless been accompanied by policy concerns regarding issues that are related to the specific characteristics of infrastructures. Most of the infrastructures discussed in this report once had a natural monopoly character (Berg and Tschirhart 1988). Once liberalisation or privatisation is introduced, some form of regulatory supervision must be created simultaneously to substitute the workings of the market and to prevent the abuse of market power by the incumbent monopolist. However, beyond regulatory supervision, regime change implies that government and industry should concentrate on their respective functions. Incumbents can no longer dictate regulatory and policy choices and conversely, government or regulatory authorities should focus on regulation and guaranteeing that public values are safeguarded, but, at the same time, they must let go of operational matters.

This report is based on ten infrastructures: sewerage, drinking water, waste, dikes, roads, railways, airports, electricity, gas and electronic communications. The five modes of regime change have taken different shapes among these ten infrastructures (see Table 1.1).

In part, the mode of regime change is a political decision: the railway and the energy sector have been unbundled, whereas the sewerage and drinking water companies have remained integrated. Although these sectors can, from a strictly technical view, be unbundled too, the negative governance implications (especially the increase in transaction costs) are thought to outweigh the supposed advantages of unbundling. But the chosen mode of regime change is also determined by the interplay with technical characteristics. Relevant elements are, for example, the feasibility of constructing a second, competing network. In other words: is the network a natural monopoly? The introduction of liberalisation or privatisation in case of a natural monopoly always requires independent regulation. In this way, technical characteristics directly influence the possibilities for

Table 1.1 Modes of regime change in (all physical) infrastructures

Infrastructure	Liberalisation	Privatisation	Unbundling	Corporatisation	Internationalisation
Sewerage					
Drinking water	√			√	
Waste	√	√ [6]		√	√
Dikes	√ [7]			√ [8]	
Roads	√ [9]	√ [10]		√ [11]	
Railways	√ [12]		√	√	√
Airports	√ [13]			√	√
Electricity	√		√	√	√
Gas	√		√	√	√
Electronic communications	√	√		√	√

institutional arrangements. Another relevant characteristic for the choice of the mode of regime change is the depreciation period of the infrastructure. For dikes, the investment for extensions last for over hundred years. In the drinking water sector, infrastructures can easily last for sixty years, whereas in the electronic communications sector, this period is much shorter as new technology offers new possibilities. Shorter depreciation periods enable more modes of regime change since the investments are less lumpy and sunk.[14]

1.2.2 TWO STAGES OF REGIME CHANGE: TYPE I AND TYPE II MARKET FAILURES

In the first stage of regime change, the emphasis was on 'trimming the fat' of the former public monopolist as well as enhancing affordability and choice for the consumer (Larouche 2008; Van Dijk 2008). In the majority of sectors, regime change has been fairly successful in this respect. According to a recent report on liberalisation (Ministry of Economic Affairs 2008), regime change has led to greater freedom of choice and lower prices for the consumer in electronic communications; while in the electricity and gas sectors it has resulted in efficiency gains and lower prices.

Whereas the current processes of regime change appear to adequately address what this report labels as 'Type I' market failures (i.e., improper market functioning), the potential for 'Type II' market failures has been largely disregarded. The latter category consists of market failures, which indicate the inability to address wider societal concerns (Van Dijk 2008) that lead to the failure to realise public values that are relevant for the long term, often requiring dynamic institutional arrangements, not least because these values are neither easily defined or measurable, nor indeed as visible in comparison to the efficiency issues typical of 'Type I' market failures.

'Type II' market failures thus refer to the ineffective or inefficient realisation of long-term values. Unlike the strategy aimed at 'Type I' failures – that used a static arrangement to monitor static efficiencies – the strategy towards 'Type II' failures will need to focus more probingly on dynamic arrangements to realise long-term issues that comprise both generic concerns (e.g., innovation or sustainability) and infrastructure-specific public values (such as public health, environmental care, spatial planning, etcetera).

To illustrate this point: the public value of the 'protection of the captive user' can be operationalised, among other things, through the price that customers have to pay for a service. But other public values are harder to define and determine in contracts or concessions. Prime examples of 'Type II' values that may not be realised in the case of 'Type II' market failures are: the long-term reliability of networks, long-term security of supply, long-term accessibility of networks, innovation, mobility and sustainability. For each of these 'Type II' values, major investments are indispensable. What these values have in common is that they are hard to put into contracts since their definition and operationalisation is contested. They comprise many dimensions and are open to many interpretations. Sustainability, to provide an illustration, is not just some item in a contract that can be checked off. Instead, there are many and often qualitative parameters necessary that indicate whether innovation or sustainability has indeed been realised.

In the case of market failures threatening to lead to public value failure in which broader, long-term interests are at stake, this report speaks of 'Type II' market failures. This, in turn, may require a reorientation of the interaction of the public and the private values as well as actors, to establish a stable long-term framework for infrastructure investment which properly allocates costs and risks as well as rewards and responsibilities to the various actors involved. To avoid the dangers of government failure, this new role should, however, supplement rather than replace the short-term, efficiency-based approach engendered by the first stage of regime change that has characterised the majority of infrastructures in the Netherlands to date.

1.2.3 THE CHANGING INTERACTION BETWEEN THE PUBLIC AND THE PRIVATE

The very process of regime change has fundamentally altered the interaction between the public and the private sectors in relation to decision making about future large-scale investments in many of the major infrastructures, even if these are considered to be vital to society. The state can no longer direct or mandate that certain investments should be made – this is increasingly a decision for commercially-oriented (public or private) operators, and based essentially on commercial criteria.

There is an increased recognition among academics and policy makers nowadays, that a focus on 'trimming the fat' and an exclusive concern for 'Type I' market failures is only a short-term strategy. However, when focussing on long-term objec-

tives public authorities should take into account that commercially motivated actors may be distrustful of (the threat of) renewed state intervention. Adopting additional or new regulatory instruments may indeed have either a direct or indirect impact on potential investment returns and competitiveness or intrude on their commercial freedom by determining how and when to invest and at what costs. This is perhaps the most important challenge facing policy makers dealing with infrastructures today – how to realise broader public objectives without threatening the very sources and possibilities of new and private investment. Opportunistic and ad hoc political intervention is likely to act as a deterrent to new investment, by creating risk and uncertainty. A focus on investment requires that we tackle the problem of longer-term dynamism at its very root.

1.2.4 CHANGING ACTORS, VARIOUS LEVELS

Regime change has lead to a new constellation of actors. It has even affected flood protection strategies (Broekhans and Correljé 2008). The operational role of the state has in some infrastructures been taken over by private enterprises. Regulators are installed along with international investment institutions. Unbundling has in some sectors resulted in different actors becoming responsible for the operation of the infrastructure and the delivery of services. Responsibilities are thus more fragmented than they were before. Inevitably, the relationships among the various actors change, and this will in turn affect the positions and roles of the actors involved. Regime change is thus not just relevant in terms of a growing list of participants.

Similarly, regime change has resulted in new layers of government becoming increasingly relevant. Most notably, the European Union is involved more intensively in sectors such as electronic communication, rail, energy, but also in the drinking water sector (section 1.5.4). Even in infrastructures not covered by specific EU measures, general provisions – for example on free competition, prohibition of state aid – remain applicable. The European (recently revised) Lisbon agenda is also relevant in this respect (see Box 1.1).

1.3 THE FUNDAMENTAL DILEMMA – THE MISSION PARADOX?

A principal contention of this report is that the very process of regime change together with challenges that will be described in section 1.5, has created fundamental dilemmas for future infrastructural provisions. This can be referred to as the 'mission paradox' (Larouche 2008). As part of the regulatory bargain at the basis of regime change, the state has relinquished direct responsibility for the operation of infrastructures, to a multitude of often heterogeneous actors. Yet, given the new demands made on infrastructural development and the massive level of investment, which is necessary for making the transition to a more sustainable, low carbon economy, the state can not intervene in the daily operations of these sectors without engendering mistrust and uncertainty among those actors who now bear the primary responsibility for very capital intensive invest-

ments in infrastructures. At the same time, even if policy makers and regulators must let go of an infrastructure and allow it to evolve in response to customer demand, they must also be there to judge whether an infrastructure performs in order to meet public policy objectives and to guarantee public interests or values. This, in turn, implies that policy makers should have a clear strategy on how these infrastructures should evolve and perform.

As we shall examine in the following chapters, the very process of regime change together with future challenges, has further complicated the picture. The change in interaction of the public and the private (values as well as actors) has led to the need for the design of new institutional architectures. These new institutional arrangements should enable public private interaction in such a way that long-term investment is guaranteed. These arrangements should, furthermore, be based on the fact that the state does not and can no longer perform the same operational role it once fulfilled. At the functional level (the cables, pipes, lines, roads, and dikes) a network of networks is emerging – or a system of systems. This system of systems has not yet fully emerged on the institutional or governance levels. In this report, the Council has sought to develop a strategic policy framework for institutional arrangements necessary to maintain long-term investment in physical infrastructures.

To summarise, this report and the aim to develop a strategic policy framework for the institutional arrangements is needed in light of two main concerns. The first concern is whether adequate investments have been secured in the present institutional arrangements. The apprehension concerns both the investment in infrastructures that require important maintenance investments and infrastructures where major system innovation is needed. Secondly, theoretical insights as well as empirical evidence in countries with a longer history of regime change foster the concern whether the current modes of regime change in infrastructures are able to achieve long-term public values that are hard to measure and lie beyond static efficiency issues, beyond the national consumer and beyond the issues of service delivery.

1.3.1 DEFINITION OF THE PROBLEM

This report seeks to examine a strategic policy framework for investment in infrastructures, and the necessary institutional arrangements needed to maintain long-term investment in infrastructures under the new conditions brought about by the process of regime change and in light of the future challenges that these infrastructures are required to meet.

The focus in this report is on so-called physical infrastructures. More specifically, the infrastructures of energy and gas, electronic communications, rail, road, airports, water, drinking water, dikes and sewerage have been explored. The analysis has been limited to physical infrastructures. Other infrastructures, such as social and/or financial are thus outside the scope of this report. Physical infrastructures

are marked by long-term investments, a high degree of dependence on technical developments and parallel needs for maintenance and system innovation. The special nature of investment in the field of physical infrastructures is marked by their lumpy character (system innovation in particular requires immediate major investments), their sunk nature and their long depreciation period. Moreover, the focus of this report on investment and the public-private interaction in that respect, distinguishes physical infrastructures from other infrastructures.

1.4 INVESTMENT IN INFRASTRUCTURES – A NECESSARY FOCUS

This report maintains that a focus on investment offers a clear crystallisation for a coherent and sector-wide approach to the major but multifarious challenges which must urgently be addressed to develop a longer-term strategic policy framework in order to restore the balance between the short-term efficiency-based approach engendered by the first stage of regime change that has characterised the majority of infrastructures in the Netherlands to date and long-term investments. The process of regime change is currently at a crucial juncture because major decisions on the future direction of these regimes should now be addressed. That we are now at a crucial point in time is visible in many different ways in the various infrastructures: in the energy sector, as a result of climate change, major system innovation requires an entirely new infrastructure; in flood management new solutions are also needed to deal with climate change; the Dutch sewerage infrastructure requires major investment to deal with overdue maintenance; the railway infrastructure needs investment in safety and security systems (Bekkers 2008) and the mobility infrastructures (roads and public transport) urgently need system innovation in order to deal with the 'mobility coronary' (see also OECD 2007). In all these cases, the shift towards a long-term investment approach has to be made. In the United Kingdom, this is already happening.

Indeed, this report does not seek to offer a final verdict on the merits of regime change. Its purpose is rather to stress that there is more to regime change than choice, service delivery and efficiency. Rather than evaluating past processes, our ambition is to examine the strategic parameters necessary to secure long-term investment in physical infrastructures. Instead of evaluating the reasons for starting the transformation process and its effects, the focus will be on how to shape a strategic policy framework for institutional arrangements to achieve public-private interaction to guarantee long-term investment. In this process, the roles (of both the government and the other parties) need to be redefined to prevent the blurring of responsibilities and to prevent a return to automatic hierarchical solutions (Teisman 2008) that are no longer adequate or even possible in the current situation in which infrastructures have become networks of networks. In this strategic policy framework for institutional arrangements, it is also necessary to identify new roles where needed, e.g., regulatory roles.

Furthermore, an univocal assessment of regime change is unlikely. Rather, the complexity of the process has produced heterogeneous results. It is this heteroge-

neous situation that will form the starting point of this report and the central question will thus be how to move forward in the current state of affairs.

The focus of this report is on the challenges that the process of regime change itself, in conjunction with other challenges, for example, technological change, has created for the future and longer-term demands which will inevitably be made on infrastructural provision if 'Type II' market failures (these challenges are described in detail in chapter 6) are to be addressed. It is vital to look to the future and not to long for the past or a romantic construct of it.

1.4.1 CRITICAL INVESTMENT DECISIONS

This report is concerned with the networks, the physical infrastructures – the grids, the pipes, the wires, the dikes and the transport infrastructures – and, more precisely, the investment in infrastructures under new conditions brought about by regime change. Service delivery is thus not the focus of attention here.

The types of investment dealt with in this report can be referred to as critical investment decisions involving not only investment in new or 'greenfield' projects but also in major extensions to existing infrastructures and large-scale refurbishment. The realisation of critical investments in all of the aforementioned infrastructures is a complex process involving a long time frame and an intricate series of stages from planning and design, environmental and spatial planning procedures as well as major financial decisions, and, in some cases, regulatory and governmental approval (Van Duijn 2008). The responsibility for making initial decisions as to what types of investment to make, or when extension and/or refurbishment is required, and for the subsequent maintenance and operations of the infrastructures, as well as how these investments are to be funded, varies from one sector to the next. With roads, railways and dikes for example, the allocation of investment budgets is a political decision, made in the political domain, whereas in the gas, electricity, drinking water and electronic communications sectors these decisions are essentially commercially driven.

This report distinguishes between two different types of critical investment decisions in infrastructures. The first category is major maintenance schemes and new construction of infrastructures in which existing technology is used, e.g., the extension of railways or the new construction of roads. A second category consists of investment related to system innovation. The envisaged transition to low carbon energy is an illustration of the latter category.[15]

New infrastructures and often new technologies are needed to enable this transition. Investments for 'business as usual' as opposed to investment for 'system innovation' necessitate distinctive approaches.[16] This report argues that, given the nature of the challenges in the latter category, and in order to address longer-term societal values ('Type II' market failures), a strategic policy framework and

the necessary institutional arrangements for infrastructure provision is required in order to secure long-term investment.

Decisions regarding major investments in infrastructure may occur at different stages in the sectors, depending, in part, on the depreciation period of the assets involved.The investment for extensions on dikes, as mentioned earlier, last for over a hundred years. In the drinking water sector, infrastructures can easily last sixty years, whereas for the electronic communications sector this period is much shorter as new technology offers new possibilities.

1.4.2 A SECTOR-WIDE FOCUS ON INVESTMENT

Infrastructures are undoubtedly diverse in several respects, including their manner of regulation, but the Council has identified the emergence of four common themes which justify a more generic or sector-wide focus on investment in infrastructures.

Adequate service delivery

First, investment in infrastructures is the precondition for adequate service delivery, not only now but more urgently, in the future. If the current regimes governing the respective systems do not secure long-term investment in infrastructures, the provision of the associated goods and services that are crucial for society can not be secured in the long term. Economists recognise that investment determines dynamic efficiencies and hence the price of services in the long term (Van Dijk 2008: 3). Even if public perception and media concern tends to be concentrated on (an allegedly) declining quality of service and rising prices, there is a direct relation to investment levels. Without good infrastructures and the investments necessary to secure them, a high level of service delivery in the long term is impossible.

A shifting focus

Second, a focus on infrastructure investment reflects the pace and course that regime change itself has taken in a number of infrastructures. What is referred to in this report as the first stage of regime change – and accompanying regulation – has focused on dealing with market failure 'Type I', and in doing so, promotes efficiency gains and lower prices. Once the fat is eliminated, the focus should shift from price control and efficiency concerns to establishing a stable, long-term framework for infrastructure investment which properly allocates costs and risk as well as rewards and responsibilities to the various actors involved. This trend can already be illustrated by the electronic communications sector, which is the most mature of the liberalisation regimes. The focus is gradually shifting in this direction, albeit not without controversy (Larouche 2008).[17]

However regime change is far from complete. Indeed the initial policy and/or regulatory response to the fostering of future investment levels is often to devise new policies and regulatory instruments as well as refining regulatory techniques to deal with short-term issues or address specific incidents (Holt 2007).

As we shall examine in chapters 2 and 5, this may take the form of conferring new powers and duties on regulators to address wider market failures, and to graft new objectives onto their existing powers. Or it may take the form of introducing supplementary or ad hoc tactics. The provision of subsidies or other forms of public support (for example, support for broadband roll-out at the local level) or the use of various specially tailored mechanisms to encourage investment by certain actors (e.g., a capacity payments scheme for electricity generators to build more reserve capacity), or the imposition of tougher pricing or access regulations on those infrastructure providers who are perceived to benefit disproportionately from asymmetrical regulation – that is, regulation addressed to former monopolists – are all examples of supplementary or ad hoc tactics.[18]

Regulatory risk

As this report will examine in later chapters, another equally common tactic is to encourage new investment by removing what is often termed 'regulatory risk' – that is to exempt new infrastructural development from the very regime which is supposed to regulate it. This may include the adoption of 'regulatory holidays' or lighter regulatory regimes for certain networks (the recent German proposal to exempt 'new' communications markets from regulation is a case in point) (Larouche 2008); or special exemption regimes for new electricity and gas interconnectors, storage facilities or LNG terminals (see chapter 6). While these policy and regulatory responses may well be motivated by broader public interest concerns, the effects of these types of initiatives on competing market players cannot be overlooked. Competing firms are confronted with *more* regulatory uncertainty, and may be less willing to engage in longer-term investment in this climate of insecurity engendered by ad hoc regulatory tinkering.

This gradual shift in focus is visible in a broader range of infrastructures in countries with more regime change experience, notably the United Kingdom (UK). In these countries, there are already serious concerns about the effect of the first stage of regime change for long-term investment (OFWAT and OFGEM 2006, see also MacAvoy 2007).

In most Dutch physical infrastructures, the necessary shift from short-term efficiency goals towards longer term or more dynamic investment-related goals has not yet been made.

However, academic analysis (Helm 2007; Larouche 2008), increasingly supported by foreign experience (House of Lords 2007), indicates that a further regulatory as well as a policy shift in focus towards investment in infrastructures is crucial. This does not imply that such a shift is an automatic process. Instead, urgent attention is required in order to establish whether the conditions for making this important policy shift are in place.

Trust and stability

Finally, and as will be discussed in chapter 2, economists recognise that investments in physical infrastructures have special characteristics as well – not only are they 'lumpy' and expensive, but their sunk character is such that investors are locked into the investment for a considerable duration – and will often only see a return on their investments in the long term (Van Dijk 2008). A commitment to invest may only be made after investors have been assured that the regulatory regime governing the sector is sufficiently stable in order to ensure that they will realise a reasonable return in the long run. This adds to the challenge facing policymakers – not only must they be able to address the new and increasingly urgent demands made on infrastructures, but they must do so in a manner which engenders trust and provides investors with an adequate level of security that they can realise future returns. The expected costs of government intervention must not exceed the expected benefits.

This report argues that the proper starting point for constructing a new paradigm on investment provision should be grounded in the policy and the regulatory framework for the relevant sector as a whole and not, as frequently appears to be the case, the other way around, with only a narrow short-term focus on the details of particular investment projects or specific short-term problems or incidents.

1.4.3 PUBLIC VALUES

Investment in infrastructure is a precondition for the realisation of public values that are linked to a specific infrastructure, including accessibility and affordability. Furthermore, infrastructures serve wider societal values, including general economic development and sustainability. This report maintains that investment is an important instrument for the achievement of public values.

Historically, the state was responsible for the realisation of public values associated with infrastructures. As a result of regime change, however, the Dutch infrastructures have undergone significant change, albeit at various paces and to various degrees. Nowadays, public values must be secured by private or at least commercially oriented firms and these types of actors hold different views towards the trade-off of public values, depending on the objectives they seek to pursue. The incentives guiding private infrastructure organisations are different from the ones that are prominent in public organisations. For example, as Van Dijk (2008: 8) and Ten Heuvelhof (2008) argued: infrastructure organisations in public hands make different trade-offs between public values. One example is the public value of efficiency. Since there is no pressure from the capital market on the company to minimise costs, the soft-budget constraint (risk of bankruptcy is not present) may lead to less pressure on the management. These are some of the reasons why public organisations face different incentives and make trade-offs with regard to public values that are different from those of private organisations.

Regime change has also altered the role of the state with respect to infrastructure provision. As public values are still broadly considered the heart of the matter in infrastructures, the state has shifted from an operational role to a strategic role. The state has become a 'director' (Tweede Kamer 1999-2000, 27018, no. 1). In the first stage of regime change, institutional arrangements such as the introduction of an independent economic regulation, contracts and concessions and self-regulation, have been developed to deal with 'Type I' market failures. The focus of these arrangements tends to be on short-term efficiency, which can lead to considerable risks for the achievement of public values other than static efficiency. Although there is no easy institutional solution for the problems engendered by the first stage of regime change, there is a need for review. A guarantee that public values are realised in the long-term needs to be part of the incentive structure for the infrastructure organisation, as much as short-term efficiency.

1.5 CHALLENGES ON INVESTMENT DECISIONS IN INFRASTRUCTURES

As this report explains in greater detail in chapter 2, the internal dynamics of the process of regime change in infrastructures have fundamentally altered the conditions under which investment decisions in infrastructures are made. Different actors are involved and decisions are made in different arenas, beyond the national political domain. Furthermore, the current regimes for infrastructural regulation are being put to the test by a series of challenges which interact with their internal dynamics, and which will have a direct impact on the design of a policy and regulatory framework – an institutional architecture (or governance structure) capable of securing adequate levels of investment in the future. In this section, we briefly review three developments: in technology, in new sources of investment and in the consequences of climate change. These challenges are further intensified by the European dimension, which, over the years, has gained importance in the decision-making processes concerning infrastructures. It has led to ongoing developments in European law and policy, especially in response to growing awareness of problems relating to external dependency, on natural resources and sustainability.

1.5.1 TECHNOLOGICAL CHANGE

Technological factors are an important dynamic for investment in infrastructures. On the one hand, technological advances can enhance interdependence between countries (e.g., the interconnectors in energy); on the other hand, European policy engenders new possibilities for technological interdependence (e.g., in the electronic communications sector). New technological developments stimulate demand for new forms of regulatory arrangements (e.g., the growing interdependency of electricity networks as a result of greater trade across national boundaries requires a re-consideration of purely national institutional arrangements) (Knops 2008). The gradually increasing dependency on longer distance EU external supplies of natural gas requires the large scale development of under-

ground gas storage, demanding specific forms of access and tariff regulation. Convergence in electronic communications (Larouche 2008: 2) is another example of changes in technology that may require new institutional arrangements. But technological developments may also *enable* new forms of governance. Originally a natural monopoly due to the prohibitive costs of duplication of the network, the introduction of electronic communications has changed the electronic communications landscape completely. Competing networks can now transmit data for television, internet and telephone to end-users.

In some sectors, the development of technology is rapid (electronic communications); while in other sectors it may be more inert (Knops 2008). But even in the more 'stable' sectors, technology does change and this can affect the governance. In the flood protection sector, for example, a sector that is known for its inertness, technology is changing: instead of building higher and stronger dikes, the policy on 'room for the rivers' is now dominant. These examples show that the infrastructure is constantly in transition regarding what is increasingly referred to as a 'system of systems' (Sajeva 2006; Larouche 2008).

1.5.2 NEW SOURCES OF INVESTMENT GAINING GROUND AND DIMINISHING PUBLIC OWNERSHIP/CONTROL

Following a wave of consolidation and (often foreign) take-overs, privatised infrastructures are now perceived as increasingly attractive targets for private equity investors – pension funds and other institutional investors, including sovereign wealth funds, who are primarily interested in the stable revenue flows, generated by regulated infrastructures. In some countries such as the UK, a major share of the infrastructures is already in the hands of private equity funds. What are the implications of a globalised capital market for the present and future policy choices for promoting and securing investment in Dutch infrastructures? Is it relevant for a national government and national infrastructural policy if the owner of a Dutch infrastructure is a global private equity fund, with its headquarters in Australia, Canada or the US, or even a sovereign wealth fund based in Dubai, Kuwait or China?

While some commentators claim that private equity companies are beneficial for the efficient operation of infrastructures, there is also growing concern in both government and certain sectors of the financial community that the rise of private equity could create a threat to infrastructure provision in the longer term (Melody 2008). The commitment of these types of funds to longer-term investment strategies, particularly given their highly leveraged financing strategies, has been questioned.

Yet many of the traditional instruments available to the state for the control or direction of strategic investment decisions in privatised firms have disappeared. Following a series of legal actions brought against it by the European Commission, the Dutch government has been forced to abandon its reliance on 'golden

share' type constructions, and no longer appoints board members to firms in which it has a shareholding. Arm's-length, sector-specific regulatory regimes are the primary instrument of control, even if their effectiveness for stimulating and/or preserving investment levels, given the emergence of new stakeholders and with distinctive financial interests and aims, has by no means been proven.

1.5.3 CLIMATE CHANGE

There are strong indications that the climate is undergoing change (WRR 2006). The scale of change, and the way it will be manifested is less certain. Infrastructures are vulnerable to a variety of anthropogenic or natural disruptions even though their functioning is vital to the creation and maintenance of quality of life. Climate change can influence productivity, demand and reliability of supply, and therefore roads, airport runways, dikes, railway lines and pipelines may require increased maintenance and renewal as they become subjected to greater temperature variation, for instance.

At the same time, infrastructures are necessary to meet the challenges of climate change, by delivering new solutions. For instance, infrastructures are seen as the key to a successful transition to a low-carbon sustainable economy (see section 1.1). In the Netherlands, infrastructures will also be necessary in order to adapt to the effects of climate change. Most notably, flood protection places new burdens on dikes. Climate change has thus a double effect: not only will adaptations be necessary in order to make infrastructures themselves 'climate change proof', infrastructures will also be necessary for society to be able to cope with the effects of climate change. In both instances, however, substantial investments will be required.

1.5.4 THE EUROPEAN DIMENSION

The three challenges mentioned above, are further intensified by a European dimension which, over the years, has gained importance in decision-making processes concerning infrastructures. The European dimension can be considered a dual concept. On the one hand, the EU is one of the main drivers for new developments in infrastructures, which have given rise to current problems. On the other hand, it is at the EU level where measures can be taken that contribute to the finding of the right solutions.

As one of the main drivers for regime change in infrastructures, European regulation has undoubtedly exerted a major influence on national policy, and has resulted in far-reaching changes to traditional national arrangements for infrastructure provision. European directives were adopted primarily with the aim of removing national barriers to the realisation of open and competitive internal markets, for electricity and gas, for electronic communications and so on. Their predominant aim was, therefore, to secure the erosion of national monopolies and the removal of exclusive rights and privileges, by facilitating access for

competitive new entrants as well as imported goods and services. New actors who could enforce their statutory rights of access to national infrastructures have emerged. Equally importantly, national actors are looking to wider markets and the potential and challenges offered by a wider European market are now driving commercial investment decisions in infrastructures.

In its early stages, European intervention in infrastructures were primarily in the form of directives which set the objectives to be achieved but left considerable scope to the Member State to decide how to best achieve its goals. As a result, these liberalisation measures did not necessarily replace national rules or national public values in the utility services sector. The latter could still be invoked, subject to certain conditions, to temper the liberalisation process. In other words, national infrastructural regimes could still be designed to reflect national policies and prerogatives and national public values.

This relatively indirect approach is gradually changing in many infrastructures: European law and policy is becoming more directly interventionist. As chapter 4 will examine in greater detail, European developments have not only resulted in the emergence of new actors and new roles for existing actors, but also in the emergence of a variety of arenas and levels in which potential conflicts between national policy objectives and commercial goals can be negotiated. Eventually the creation of new Euro-regulators (in addition to the already existing European Rail Agency) will further challenge if not replace national institutional arrangements – especially with regard to securing national public interest objectives. Taken together, these developments at the European level have introduced a major new external dynamic factor into the national decision-making process on investment. This factor works out differently in the various infrastructures. In the rail sector, for instance, European standardisation and coordination, as promoted by the European Rail Agency has led to the necessity of substantial new investments (see Bekkers 2008). Other infrastructures such as gas and electricity are confronted with coordination and integration challenges to meet changes to patterns of demand.

Table 1.2 describes the current challenges for the next five years. Given current legislation, statutory duties and institutional arrangements, some challenges are not expected to become prominent in the near future.

1.6 APPROACH

Although there is as yet no firm empirical evidence that investment in the infrastructures in the Netherlands is decreasing rapidly, there is evidence that earlier, 'pre-regime change' levels of investment are not being maintained (OECD 2007). The urgency for a clear focus on investment lays in the future challenges – challenges that are not yet identified in a coherent or systematic way by government.

This report draws on a series of case studies and essays, examining various aspects of infrastructural regulation, investment in infrastructures and future challenges

Table 1.2 Challenges in relation to infrastructure investment in the Netherlands at present[1]

Infrastructure	Challenges			
	Technology	New sources of investment	Climate Change	Europe
Sewerage	√		√	
Drinking Water	√		√	
Waste	√	√	√	√
Dikes	√		√	√
Roads	√	√	√	√
Railways	√			√
Airports	√		√	√
Electricity	√		√	√
Gas	√		√	√
Electronic communications	√	√		√

[1] This is a description of the current state of affairs and does not reflect predications on future developments.

in greater detail. These essays have been contributed by various recognised academic experts from a variety of disciplines. The essays, presented in an accompanying WRR study entitled *New Perspectives on Investment in Infrastructures* analyse regime change in selected sectors in greater depth and compare the results of different types of change on infrastructural and service provision.

We draw upon these essays in the following chapters. It must be stressed that these chapters do not aspire to provide a detailed sector-by-sector analysis. Instead, they are primarily indicative and aim to provide more general, sector-wide insights. Chapter 2 investigates the process of regime change and examines theoretical as well as empirical issues in relation to longer-term investment strategies (drawing on Van Dijk 2008; Ten Heuvelhof 2008). Chapter 3 evaluates the emergence of new types of actors and hybrid constellations of public and private actors in infrastructure provision and their impact on the principal-agent relationship through the emergence of discrete critical transactions which have to be negotiated in multi-layered but often splintered arenas (drawing on Teisman 2008; Knops 2008; Bekkers 2008; Wilkeshuis 2008 and Van Duijn 2008). Chapter 4 shifts the focus to the European level and examines the gradual shift of the arena for decision making on infrastructural operation and investment to a multi-layered setting where national and supra-national institutional arrangements interact through networks of experts (see inter alia Hancher, Dicke and Jorritsma 2008; Larouche 2008). Chapter 5 examines the impact of these various dynamics on public values in infrastructure provision (see further De Pree 2008; Van Duijn 2008).

This report's aim is to introduce a useful strategic policy framework and the necessary institutional arrangements to maintain long-term investment in

physical infrastructures under the new conditions brought about by the process of regime change and in light of the future challenges which these infrastructures are required to meet. The Council will devote some attention to one of the most 'developed' infrastructures – in which the combination of regime change as well as wider market integration (commercial and technical) has not only resulted in the emergence of multi-level and heterogeneous actor arenas, but is also now undergoing major institutional evolution. This case study of the electricity and gas sector, which is taken up in chapter 6, is intended to highlight new and emerging issues which can be of relevance as a learning exercise for other sectors. These findings are then further developed in the concluding chapter 7, which introduces a strategic policy framework based on three pillars that may be able to address these urgent challenges.

1.7 CONCLUSION

This report contends that, taken at a general level, the process of regime change – irrespective of whether or not it has resulted in fully fledged privatisation – has in itself led to or at least set into motion two interlinked institutional changes which have to be addressed in order to meet the challenges posed by what the Council refers to in this report as 'Type II' market failures.

Firstly, regime change is dominated by a pre-dominantly short-term focus on 'Type I' market failure – delivering cheaper goods and services over the infrastructures. This, in turn, has led to a reorientation and narrowing of the focus on the wider public values with which infrastructural provision has been traditionally associated. Secondly, the process of regime change has led to a major splintering of the traditional principal-agent paradigm, in which the state was responsible for many of the operational decisions associated with infrastructural provision. In its place, we can trace the emergence of a multitude of discrete and autonomous transactions in relation to infrastructures involving both multiple and heterogeneous actors and principals and at multiple levels or arenas, in which conflicts can be resolved or negotiated. In this process, the public-private interaction has altered significantly.

As a result of regime change, critical infrastructural systems have become complex 'systems of systems' (Sajeva 2006; Larouche 2008). It is in this specific context that the public-private interaction must be re-oriented in order to establish the potential for meeting the challenges of 'Type II' market failures – challenges which will require large-scale system innovation to ensure the transition to a low-carbon sustainable economy as well as to guaranteeing sustainable mobility and a robust, knowledge-based society. A strategic policy framework is needed in order to design the public-private interaction so that it will meet these challenges and guarantee the many public values associated with infrastructural provision in the longer term. This is the central concern and focus of the subsequent chapters of this report.

NOTES

1 In its Report 'Resilience of the National Electricity Network', published on 25 May 2004, the House of Commons Trade and Industry Committee stated that 'there is a danger that there is currently an insufficient investment in the (national electricity) network to replace in a planned and orderly way equipment which is reaching the end of its life' and 'we consider that the Regulator's concern to reduce costs to consumers should now be tempered by a greater emphasis on ensuring that electricity network owners have the financial resources necessary to secure a viable long-term electricity supply.'

2 See, for more figures, the *Stern Review*: The Economics of Climate Change (HM Treasury 2006).

3 Institute of European Affairs, Address by Commissioner Andris Piebalgs March 21, 2006, http://iiea.com/images/managed/events_attachments/IEAPiebalgs.pdf.

4 European Council (2000), *Presidency conclusions. Lisbon European Council 23 and 24 March 2000,* available on: http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm.

5 Estimate by London Economics regarding investments in tangible fixed assets in e-communication across the EU 25 was Euro 32 billion for 2004. Total investments were lower in 2004 than in 2001, dropping until 2003 and then increasing slightly in 2004 (London Economics and PriceWaterhouseCoopers 2006).

6 Through private equity.

7 Through outsourcing.

8 The formation of the 'Rijkswaterstaat' agency.

9 Through outsourcing and concessions.

10 In some instances, privatisation, through 'Public, Private Partnership' constructions.

11 The formation of the 'Rijkswaterstaat' agency.

12 Through concessions.

13 Competition between airports.

14 In the accompanying WRR study 'New Perspectives on Investment in Infrastructures', Knops (2008) has reflected on the interplay between technical characteristics and governance.

15 For instance, a series of expansions (three power plants) are planned for the Port of Rotterdam Area in the coming years. The power plants are constructed in a way so that CO_2 gasses are captured when they are released from the chimney and subsequently stored in exhausted oil fields in the North Sea (between 2015 and 2020).

16 The roles concern: initial steps of information gathering and analysis, agenda setting, political decision making, developments of principles and laws, the financing, monitoring and refereeing.

17 Twenty years after the start of electronic communications liberalisation with the 1987 EC Commission Green Paper, and almost 10 years after the removal of the

last monopoly rights in 1998, the 'fat trimming' operation has been largely successful, and in some areas, even beyond expectations. Instead of a single large incumbent with competitive fringes keeping it under pressure, the incumbent's market share has shrunk and the competitive fringe has become a set of well-established 'mainstream' players. But now the initial asset base of the fixed-line incumbent is no longer sufficient to guarantee a satisfactory level of innovation in the longer term. Fostering investment in infrastructure needed to continue to innovate is now displacing 'fat trimming' as the paradigm for market regulation (Larouche 2008). Other sectors, and most notably the energy and the transport sector, find themselves at a comparable juncture.

18 An example of this latter type of response is the motion of November 2006 in the Tweede Kamer for new legislation for the cable sector to put the latter on an equal stringent regulatory basis with KPN (Tweede Kamer 2006-2007, 30800, no. 19).

19 This is a description of the current state of affairs and does not reflect predictions on future developments.

2 REGIME CHANGE AND INVESTMENT IN INFRASTRUCTURES

2.1 INTRODUCTION

As the previous chapter described, infrastructures are critical for the functioning of modern society as well as the key to successful social change such as, for instance, a transition to a low-carbon sustainable future for most of the world's economies. In the context of a multitude of discrete and autonomous transactions in relation to infrastructures involving both heterogeneous actors and principals at multiple levels or arenas, hybrid constellations of public and private actors and technological developments, critical infrastructures have become 'systems of systems' (Sajeva 2006; Larouche 2008).

The first stage of regime change focused on 'Type I' market failures, which implies 'trimming the fat' of the former monopolist as well as enhancing affordability and choice for the consumer. Whereas the processes of regime change adequately address a 'Type I' market failure, the potential for 'Type II' market failures, that threaten to lead to public value failure in which broader, long-term interests such as the longer-term reliability, the accessibility of the networks and innovation are at stake, has been largely disregarded. This, in turn, may require a strategic policy framework for the institutional arrangements of infrastructure provision in order to establish a stable long-term framework for infrastructure investments, which properly allocates costs and risks as well as rewards and responsibilities to the various actors involved. This focus restores the balance between the short-term efficiency-based approach engendered by the first stage of regime change and has characterised the majority of infrastructures in the Netherlands to date and longer-term societal values.

This chapter commences with a description of the role of infrastructures in facilitating and pushing spatial, economic and social development in section 2.2. In section 2.3, the specific features of investment in infrastructures are enumerated, followed by an assessment of the process of regime change in section 2.4. In section 2.5, five modes of regime change are distinguished, namely liberalisation, privatisation, unbundling, corporatisation and internationalisation. The analysis in section 2.6 shows that regime change is never completed and in continuous transition. Subsequently, the difference between function and governance in infrastructures are highlighted in section 2.7. Regime change takes place in both dimensions, albeit not to the same degree and at the same pace. We conclude this chapter with two major consequences of the process of regime change: investment in infrastructures increasingly takes place in a multiple actor- and multi-level context (section 2.8).

2.2 THE ROLE OF INFRASTRUCTURES

In his study 'Een nieuwe wereld', Auke van der Woud (2006) provides an account of the growth of the main infrastructures in the Netherlands: water

transport via normalised rivers, canals and sea ports, the tram and railways, the postal services, telegraph and telephone and the roads system. He argues (2006: 17) that the layout of the network of 19th-century infrastructures became a dominant factor in the spatial, economic and social development of the Netherlands. '*Op de plek waar de infrastructuur de meeste capaciteit en het intensiefste gebruik kreeg, groeide het hart van het land, de regio van de grote steden, de huidige Randstad. Buiten die dominante regio ontwikkelde Nederland zich als periferie.*' The various infrastructures played a crucial role in facilitating and pushing spatial, economic and social development in the country.

Although one could argue that the role of infrastructures in contemporary society differ from those in an industrial society – the present emphasis on the distinction between the spatial centre and the spatial periphery can be disputed – the general idea that infrastructures are a precondition for development is still valid. This was obviously the case with the 19th-century transport networks, as it was in the 20th century when electricity, gas, water supply and other networks supported the development of concentrated modern cities and the process of industrialisation. The availability of and connection to communication and transport networks is today still considered a precondition for the growth of regions and economic activities. Moreover, by adjusting the functionality and shape of these networks, it is possible to influence patterns of growth and development, including the associated positive and negative environmental and social economic externalities.[1] This implies that the management and expansion of networked infrastructures goes way beyond the pure provision of a service to satisfy demand. The provision of infrastructural services should be responsive to a derived demand, resulting from established spatial and structural patterns of economic and other activities, but it is also an instrument for steering and supporting shifts in these patterns. Thus, decision making on the construction and planning of (new) infrastructures has special characteristics, from both a public and private interest perspective. The overall value of an adequately developed set of infrastructures to a society will most likely surpass the value that individual users attach to it, which can be considered a positive externality.

A second crucial aspect that follows from this specific role of infrastructures is that – almost by necessity – negative externalities are also present. There may be alternative systems conceivable to individual users, but these may cause an additional burden to society as a whole. The individual willingness to pay for the preferred solutions will be lower than the cost of establishing such a system, which means that a public value is again at stake. These issues are discussed in more detail in Van Dijk (2008).

With respect to the traditional solutions to the externality dilemmas posed by infrastructure development, history shows that the public realm has often played a crucial role. Whereas many infrastructures – in transport, electronic communication, energy and the management of water – were launched as private initiatives, public authorities generally took over at some point. The reasons for these

transfers varied, as Van der Woud (2006) has shown. But the arguments can generally be characterised as one (or a mix) of the two types of externalities listed above. Depending on the (optimal) spatial scale of several systems and the effects involved, the municipalities, the provinces or the state took a role in the further development and management of the systems. Sometimes, the systems were set up at arm's length as enterprises whose shares were publicly owned. Sometimes they were (re)established as executive departments under the close scrutiny of municipalities or the state. Interestingly enough, this distinction can be related to the extent to which the provision of these services either yielded a profit to their public shareholders, or whether they constituted an external cost, to be recovered from the public budget.

Current arguments regarding these externalities are essentially based on the notion that a private initiative is more efficient in providing these infrastructures and services. Either the profits generated for the public owners were much too high and needed to be replaced by normal taxation under democratic political control, or the costs at which the public sector provides these services could be reduced, by introducing competition and the discipline of a (quasi) market regime. A third argument concerned attempts to raise private funding to finance infrastructures. The longer-term developmental issues were generally considered less important, until very recently. On the one hand, it was thought that specific subsidies would be sufficient to cover these aspects, while, on the other hand, the market in respect to many services was seen as a better indicator for their indispensability than the political process and the public bureaucracy. The insights, as shown below, induced regime change which is the subject of this study.

2.3 THE SPECIFICS OF INVESTMENT IN INFRASTRUCTURES

Before turning to a detailed analysis of the relation between regime change and investment in infrastructures it is useful to highlight the complexity of the process of investment in infrastructures itself. Infrastructure investment exhibits certain specific economic characteristics that make the relation with regime change more complex than the relation solely between regime change and the provision of the services.

Van Dijk (2008) provides an overview of these characteristics in the accompanying WRR study *New Perspectives on Investment in Infrastructures* drawing on insights on the specifics of investments in infrastructures as referred to in the economic literature:

- *Sunk investment*: Investment in infrastructures is irreversible. Once a railway, a dike or a road is built, it can not be moved and used for other purposes;
- *Long lead times*: There is a long time between start and use of the investment in infrastructure investments;
- *Risk*: Investments in regulated monopoly infrastructures are characterised by asymmetric 'up-' and 'downside' risk. The 'upside' of an investment, or the extra revenues stemming from a successful investment, are ex post appropri-

ated via strict public regulation, while the 'downside' investment, the less successful investments, do not lead to a relaxing of the regulation. This is because network owners are less willing to invest ex ante.
– *Long duration*: Most infrastructures have a long physical life span. As an illustration, water pipes can last up to 100 years.
– *Lumpy*: Most expansion, renewal and construction of new infrastructures cannot happen gradually. The investment has to be carried out in big, discrete steps with an obvious risk of 'gold plating'.
– *Inelastic demand*: Demand for drinking water, electricity and gas is fairly predictable, as it is often a function of the number of consumers and their income levels. Thus, demand is inelastic to a large degree. As a result, there are stable cash flows for the infrastructure company. For some new investment projects, however, future demand is highly uncertain, e.g., the use of new technologies in the communications sector.

Inelastic demand is the only characteristic of infrastructure investment that decreases the investment risk. All other characteristics *in*crease the investment risk.

2.4 REGIME CHANGE: AN INCOMPLETE PROCESS

There seems to be a general level of discontent these days with the (perceived) results of regime change, and not just regarding infrastructures but in many liberalised sectors (see, for instance, Ankersmit and Linkers 2008). This is not only the case in the Netherlands.[2] An example of this dissatisfaction is the manifesto of the Dutch trade union, the FNV, which advocates a 'moratorium' on regime change (FNV 2007) in all sectors,[3] because of the many unintended and negative consequences, most notably unemployment. And last spring, of course, the Dutch Finance Minister, Wouter Bos, announced a change in policy that implies that the days of 'unlimited privatisation' are over. According to Minister Bos, further privatisation has been ruled out, unless deemed absolutely necessary.[4] This section offers a general overview of the main reasons for the processes of regime change since the 1970s.

Traditionally, the combination of *natural monopoly* and *public good* characteristics – known as the traditional neo-classical approach – had justified public ownership and regulation in infrastructure-based public services, such as communications and postal services, electricity, gas and water supply, and public transport based on the concepts of *market failure* and *market imperfections*. Here, the state is called upon to remedy market imperfections and failures, including problems involving excessive market power, externalities, lumpy investments, spill-over and so on (Scherer 1980; Stiglitz 1986). In the US, privately owned utilities were generally regulated by sector-specific federal and state agencies. In Europe, the utilities were owned by the state, municipalities or other regional bodies. The regulators in the US and public ownership in Europe also secured the *public interest* elements or *public values* associated with these services, which

involves issues of safety, security of supply, acceptable prices for specific types of users, objectives of local and sectoral development, the supply of jobs, and – more recently – issues of sustainability and environmental protection (Foreman-Peck and Milward 1994; Van der Woud 2006).

Meanwhile, the disadvantages of this approach, such as it being inert, inefficient and inward looking, have often been catalogued and analysed; see, for example, Williamson (1990 and 2002), Megginson and Netter (2001), World Bank (2002), Van Damme (2006) and Van Dijk (2008). The essays of De Pree (2008) and Van Dijk (2008) summarise the risks inherent in the public monopoly with regard to investment:

- Public organisations lack the pressure from the capital market regarding the management that will minimise costs;
- There is less pressure on the management in general because of soft budget constraints (there is no risk of going bankrupt);
- There is the risk of opportunism from political pressure to adapt objectives. Infrastructures are more vulnerable in this respect than other sectors because of its long-term perspective and the fact that it is taken for granted: installing or replacing sewers is not a front-page story. If politicians have to choose between an investment in education or in the sewerage system, political opportunism will lead them to prefer the first.
- There is opportunism caused by the variety and changeability of goals. To illustrate this point: in times of economic recession, employment becomes more important in relation to the investment in infrastructures. If the duration of the economic recession lasts for any substantial period of time, investment schemes will be delayed or thinned. This is often mentioned as a cause of the privatisation wave in the drinking water sector in the UK. The water pipes were in such bad condition, that only private money could finance the investment needed for an upgrade to European standards (Helm 2007; Dicke 2001).

The risks for investment stemming from these characteristics are obvious. If it is true that the management in public organisations is not scrutinised as effectively as in private organisations, the risk for investment is gold plating. Political pressure and the time span of the election period may bring about an incoherent and inconsistent strategy on investment. The volatility of goals may lead to underinvestment in times of economic depression.

By the late 1970s, the traditional neo-classical approach was, gradually and initially only in a few Anglo-Saxon countries and Chile, replaced by the kind of 'liberalism', associated with the late Ronald Reagan and Margaret Thatcher. Efficiency and economic reform were sought by 'rolling back the state', which involved the lowering of taxes, the privatisation of public enterprises and by introducing competition into the public sector wherever possible (Friedman 1962; Demsetz 1968; Parker 2000; Helm 2003). In 1985, the adoption of the European single market made liberalisation a point of departure for the European Commission, which was initially a major instrument used to tear down the

prevailing barriers to intra-community trade between the European national markets (Haaland Matláry 1997). The public service character of most infrastructure-based industries, however, has kept these sectors more or less immune from the pressures for liberalisation. It was not until the 1990s that the *efficiency* argument began to emerge in Europe and that liberalisation in the domains of electronic communications, electricity, gas, transport and water became accepted as a means to enhance welfare.

By that time, the experiences of forerunners, like the UK and Chile, had shown that a simple privatisation strategy and a withdrawal of the state did not yield the expected efficiency improvements. Selling public monopolies off to the private sector as private monopolies, only contributed to a reduction of public debt, but efficiency was not increased. This required a more subtle approach of infrastructure systems in which the notion of efficiency was actually related to market competition and not just privatisation. What emerged from this new perspective was the notion of unbundling, in which potentially competitive segments of industries had to be set apart from the inherently natural monopoly segments in the value chains. Generally this implied that, on the one hand, competition would have to be introduced in the production, services and retail segments while, on the other hand, the arteries of the systems, like pipes and wires, had to be regulated as essential facilities. The former implied a kind of transitory approach in which the regulation of prices, supply and quality were left to the market, in a step-by-step mode, parallel with the growth of competition via the entry of new suppliers. The latter implied the development of new approaches towards the regulatory control of monopoly segments. As a result of the developments in the UK's policy on the deregulation of its utilities, the Austrian school has become an important source of wisdom, providing the basis for a more dynamic type of regulation (Newbery 2000).

In contrast with the traditional static equilibrium approach, in which prices were regulated on the basis of assumed costs plus a reasonable allowance for invested capital, the Austrians focused on dynamic processes in competitive markets. For example, price-cap regulation (for an illustration see Box 2.1) encourages operators to reduce their costs, by letting them keep the difference with fixed prices for a period of time. For instance, the yardstick regulation of costs, tariffs, quality and efficient trading, and auctioning arrangements are being applied in these sectors to imitate the market process (Littlechild 1983; Laffont and Tirole 1993; Kirzner 1997; Newbery 2000; Robinson 2000; Hawdon and Stevens 2001). Moreover, a further requirement for 'dynamic' competition and for harvesting its advantages is that new concepts and solutions are embraced.

Box 2.1 The RPI-X approach

'The RPI-X approach is an example of a price-cap mechanism that gives firms incentives to operate efficiently. Under this approach, prices or revenues are only allowed to increase by some measure of

price inflation (retail price index, RPI) minus the X factor, where the X factor is set according to the regulator's expectation of potential efficiency improvements. The cap is then fixed for an exogenous period of time, often between three and five years. Any efficiency improvements achieved beyond the X factor can be kept by the company as profits. At the end of the control period, these cost reductions can be passed on to the consumer in the form of lower prices for the next period' (Oxera 2004: 25).

2.5 DEFINING LIBERALISATION, PRIVATISATION, UNBUNDLING, CORPORATISATION AND INTERNATIONALISATION

As described in section 2.4, the Dutch economy has witnessed a process of regime change in most of its infrastructures over the past two decades. This process can be described as the shift from the neo-classical approach in which publicly owned (local) monopolists were responsible for infrastructure provision to meet national needs, to a situation in which different parties, both public and private, share responsibility and ownership in various institutional arrangements. A new league of competing firms, supplying infrastructure-based services to a variety of users in the wider European markets emerged.

In regime change for the organisation of infrastructure provision, five different modes can be distinguished: liberalisation, privatisation, unbundling, corporatisation and internationalisation. These modes are sometimes considered sequential steps towards a full liberalisation of a sector. However, this is not necessarily the case. How regime change has taken place in different sectors has been driven by the particular technical, institutional and economic issues specific to the different infrastructures. Moreover, the choices made in different countries also vary strongly, depending on contextual factors and policy preferences (Correljé and De Vries 2008).

2.5.1 LIBERALISATION

The first mode of regime change, 'liberalisation', refers to an opening up of a sector, so that several firms can compete in the supply of goods and services to consumers. According to Van Dijk (2008):

Examples of this approach can be found in the electricity and gas sector, where the exclusive supply rights of the SEP, GasUnie and the regional energy companies were abolished by the Electricity and Gas Laws, so that new entrants could compete for the supply of electricity and gas to customers. To this end, the networks, as essential facilities, were forced to provide access on an equal footing to the competing suppliers. Network tariffs were regulated on a price-cap or RPI-X (see Box 2.1) basis, to ensure that the networks would be encouraged to reduce their costs of operation and capital. This, of course, required a ring-fencing of the network activities of the still integrated network operations.

2.5.2 PRIVATISATION

Another mode of regime change can be referred to as 'privatisation', which involves a transfer of ownership from the public to the private sector. Liberalisation and privatisation can be combined in a single programme, but this is not strictly necessary. Publicly owned companies can be liberalised, as is the case in the Dutch electricity and gas sector, and privatisation can take place without the introduction of competition, as many early examples in the British utility sectors show. Public monopolies then become private monopolies. These examples are generally seen either as unfinished business (in the Netherlands), or as a starter's mistake (in the UK).

There are different ways to privatise, which involve a) selling the utility as a whole to a private (or foreign public) conglomerate; b) selling shares to a group of private equity investors; c) sale via the stock exchange. However, in the Netherlands, the tendency has been to keep the networks in public hands, while the potentially competitive production and trading activities are considered potential privately operated activities.

As part of regime change and irrespective of a transfer of ownership to the private sector, certain new regulatory and monitoring functions have emerged. The state assumes the responsibility for regulation while – at a greater or lesser distance – public and private firms carry out commercial and network operations (Larouche 2008). The state can assume its regulatory responsibilities through a range of instruments, which vary across the infrastructures, as we explain below.

2.5.3 UNBUNDLING

A more rigorous step in the process of regime change is 'unbundling', in which the vertically integrated undertakings are split up into separate units, according to their functions, involving either potentially competitive activities, or essential network facilities. Unbundling may be carried out to various degrees, ranging from ring-fencing or organisational unbundling, to legal unbundling and eventually, full ownership unbundling. The Dutch energy sector is now fully unbundled so that control (and even ownership) of the networks is strictly separated from ownership of other energy assets. The main argument behind unbundling is to reduce the incumbent's dominance of the market via its control of the network components, by creating impartial operators of essential facility functions. An example of ownership unbundling is the separation of the formerly integrated Dutch railways into a service provider (NS) and an independent organisation, responsible for the rail infrastructure (ProRail).

The essential network facilities are normally maintained as regulated monopolies. The Dutch operation of the gas and electricity infrastructure is now in the hands of two state-owned companies, GasUnie and TenneT, both of which are

subject to extensive regulation as regards access conditions and tariffs for third parties, to 'trim the fat'. The regulation is undertaken by a sector specific body – the Directorate for the Supervision of Energy Markets (DTe), a specialised chamber of The Netherlands Competition Authority (NMa). The role of the state shareholder, the Ministry of Finance, remains at arm's length, and the Ministry is not involved in commercial and operational procedures.

The unbundled, potentially competitive, components of a sector may end up in public or private hands. Moreover, they may be split up horizontally, to create a number of competitors right from the start. Otherwise, competition would have to await the arrival of new, or foreign, entrants onto the market. It is generally considered difficult to gain market share from the incumbent supplier.

2.5.4 CORPORATISATION

The fourth mode of regime change is often referred to as 'corporatisation', which indicates a shift towards the management of publicly owned infrastructure on the basis of commercial management 'principles', including the valuation of assets, specific types of human resource management, etcetera. The introduction of commercial principles requires a weak separation of the infrastructure operator, or particular functions, from public bodies to be carried out by distinct legal entities with more commercial objectives. An example of corporatisation was the splitting off of KPN from the Ministry, which was responsible for electronic communications in the mid 1980s. The concentration of the municipally owned gas and power suppliers into regional energy companies, as well as the bundling of water supply companies, in the 1980s and 1990s should also be understood from this perspective.

2.5.5 INTERNATIONALISATION

The process of internationalisation includes both the physical and the governance aspect of infrastructures (see also section 2.7). Internationalisation refers thus to international trade, the physical connection of networks between countries, international laws, rules and authorities, and international cooperation between countries, regulators and companies. The term as it is used here, also encompasses the international expansion of the activities of infrastructure companies.

2.6 CONTINUOUS REGIME CHANGE AND HYBRID ARRANGEMENTS

At first glance, it could be argued that despite the liberalisation of most infrastructure-based sectors in the Netherlands, there has not been much of a fundamental change with respect to the networks as such. Ten Heuvelhof (2008) for example, concludes that:

On the level of infrastructures, the monopoly is still the dominant market form, with an occasional duopoloid or oligopoloid structure. The infrastructures have remained in public hands, with the exception of the electronic communications sector. The infrastructure operators have become more autonomous from the service providers. Regulation has become substantially stronger. The overall picture is that the present situation is between the classic paradigm and the new paradigm.

Regime change in the Dutch infrastructures appears to be an incomplete process which has only led to full privatisation and full liberalisation in special cases. With the exception of the electronic communications sector, public ownership is not contested and regime change has been characterised by outsourcing (roads, dikes, drinking water), unbundling (electricity and gas), or the deployment of concessions (railways).

However, and in order to appreciate the variety of the institutional regimes in Dutch infrastructures and the degree to which regime change has actually taken place in practice, it should be recalled that the separation of commercial responsibilities from state prerogatives and regulatory goals can and has pragmatically taken various forms in the Netherlands (Van Damme 2006). For example, the concession model is not frequently used in the Netherlands (Wilkeshuis 2008), apart from the railways where ProRail has a maintenance concession, whereas the concession model is widespread in other countries, most notably in France. Further, public organisations increasingly outsource key activities to private subcontractors or to specially created companies. But here too a huge variety in institutional regimes can be found. The degree to which subcontracting takes place varies considerably: from minor tasks to full operation and management. This model is applied to the drinking water, roads and dikes sectors. What these three sectors have in common is that more and more tasks are being outsourced (Ministry of Transport, Public Works and Water management 2004), even if the degree of autonomy enjoyed by the contractor varies. Another variant of outsourcing is Public Private Partnership (PPPs). These are a form of permanent cooperation between public and private actors, in which these actors develop mutual products and/or services and in which risk, costs, and benefits are shared. This method is believed to accomplish added value through the integration of public and private resources and skills (Teisman 2008). Thus, some forms of regime change as described in section 2.5 have taken place in all Dutch infrastructures, but to various degrees and it has led to different institutional arrangements. Another element in the variety of institutional arrangements that has attracted the attention is the various degree of distance between principal and agent: this distance is small in some instances (e.g., roads, dikes, sewerage) while it is large in other sectors (e.g., electronic communications).

Section 2.5 described regime change as a shift from the neo-classic approach towards a new situation, that involves liberalisation, privatisation, unbundling, corporatisation and internationalisation as if it were a straightforward step from A to B. This bold statement must be qualified: the process of regime change is

never completed. Most of the sectors examined in this report are still in transition and display a mix of features from both the classic and new approach. This continuous shift is partly due to shifting preferences in the political domain and to new external pressures, like technological developments that are constantly emerging.

However, on top of these factors that cause continuous change, there are also two other fundamental factors. Firstly, in the course of regime change there will always be a combination of intended and unintended consequences and, secondly, there are direct and indirect consequences. Thus, there are the intrinsic characteristics of the process of regime change itself that require continuous adaptation.

2.6.1 INTENDED AND UNINTENDED CONSEQUENCES

The process of regime change has both intended and unintended consequences. The intended – or expected – consequences are the achievement of customer choice, lower prices and increases in efficiency (World Bank 2002). In the Dutch drinking water sector, for example, efficiency has increased by 21% since the introduction of a sector benchmark (Van Damme 2006); the price for electricity has decreased by some 15% since the introduction of liberalisation and this general tendency of improved efficiency is visible in most sectors where regime change has been introduced (Ministry of Economic Affairs 2008; see also SEOR-ECRi 2007a).

But there are also unintended consequences of regime change, which are related to the characteristics of the infrastructures as identified in the economic literature (Van Dijk 2008; Ten Heuvelhof 2008). Most sectors studied in this report are similar in that they require a fixed natural monopoly network to deliver the services, and as such, some form of regulation has to be introduced to control access conditions and tariffs to third parties and to cap their revenues and/or tariffs (section 2.3). An exception is, again, the electronic communications sector. The introduction of a form of tariff or access regulation has a number of consequences for the industry as well as for the newly established regulator, stemming from the so-called principal-agent relationship between the regulated industry and the regulator. These include: information asymmetry, regulatory opportunism, various forms of strategic behaviour and incomplete contracts.

Information asymmetry can be attributed to the difference between the insight and information that the operators, as agents, have about their business, and that of the regulator, as the principal. Moreover, the agent may be confronted with multiple principals, e.g., various ministries, inspectors, regulators, and may receive conflicting instructions, information and requirements from these various principals. This renders it difficult to supervise and control the operators in a uniform or even coordinated manner.

Regulatory uncertainty and regulatory opportunism involves the risks that stem from regulatory behaviour, either unintended (regulatory uncertainty) or premeditated (regulatory opportunism). The latter refers to the behaviour of regulators who renege on agreements with the agents, for example, in cases involving cost recovery. As a result, the agent anticipates this behaviour and does not invest or postpones investment (Van Dijk 2008). Infrastructures are especially susceptible to regulatory opportunism given that infrastructure investment is irreversible and sunk.

Strategic behaviour of the regulated party is a form of opportunistic behaviour, which has always been and will always be part of the management of public utilities (Ten Heuvelhof 2008). However, under modes of regime change, additional incentives that create strategic behaviour may lead to either under- or over-investment.

Incomplete regulatory contracts (Van Dijk 2008; Ten Heuvelhof 2008) are related to the problem that formerly integrated functions must now be made explicit and embedded in a contract between different actors. This contract can never be all encompassing. New situations that are not described in the contract will always emerge so that regime change will never be complete. A similar issue is true for institutional arrangements: no matter how clear and restrictive certain rules and regulations are, there is always room for ambiguity in one's behaviour, which Ten Heuvelhof (2008) has called 'permanent ambiguity'. Although this behaviour is not unlawful, it is undesirable and regulatory institutions will respond to this behaviour by attempting to correct it so as to mitigate the undesired outcome. This, in turn, provokes new types of ambiguous behaviour, to which the institutions must then respond.

Potential reactions from the regulated entity are asset sweating and hold-up behaviour – examples of strategic behaviour that may lead to under-investment. It is not easy to predict whether certain types of behaviour either leads to over-investment or under-investment. Other factors may also influence the level of investment and these other forces may compensate for the strategic behaviour, but they may also strengthen each other. It can be concluded – tentatively at least – that under the classic paradigm, the incentives that tend to dominate incite strategic behaviour resulting in over-investment in infrastructures. Adverse selection and gold-plating are relevant in this context. Potential responses to incomplete contracts may seriously undermine long-term investment.

2.6.2 DIRECT AND INDIRECT CONSEQUENCES

In addition to the unintended consequences, there are also the indirect effects of regime change (Van Dijk 2008: 25). This distinction is relevant for understanding regime change, since it explains why the process of regime change is a continuous transition.

Liberalisation can mean that returns for the investor are more difficult to realise under competition, which, in turn, can act as a disincentive for making new investments. Furthermore, financing options may be limited by the unbundling of the network from other functions. Efficiency gains and synergies that were possible under vertical integration may disappear. Think, for instance, about what happened to the Dutch railways after unbundling.[5] Lastly, risks may arise in relation to the introduction of *ex post* regulatory measures, which cause further insecurity (Larouche 2008). In the case of gas and electricity network regulation, for example, certain investments may be treated as exceptions and a tariff increase may be allowed, but the network operator might not have a guarantee that this procedure will be followed through, nor can he predict the outcome until a later stage in the investment process. This has obvious repercussions for potential profit margins.

In conclusion, regime change itself leads to further changes within the institutional arrangements that require continuous adaptation (Sioshansi 2008). The process of regime change is therefore never complete.

2.7 FUNCTION AND GOVERNANCE

The consequences of regime change may be particularly complex for infrastructures and may go beyond the institutional level, given that we are dealing here with a physical network (the cables, pipes, dikes and roads). The five modes of regime change have both a functional and a governance dimension.

In these physical networks there are many relevant *operational* elements that may alternatively limit or accelerate and enable regime change including the degree of standardisation, and eventual interoperability with other networks beyond national borders. The same is true for the *financial* dimension: infrastructural assets also have an increasingly significant function in the international capital market, as Melody (2008) and Hancher, Dicke and Jorritsma (2008) have shown. Chapter 6 of this report will illustrate this process in the electricity and gas sectors in greater depth. This case study will examine the various stages of the process of the internationalisation of infrastructure markets and their major actors, starting with commercial integration through competition from new players from other jurisdictions and as a result of enhanced trade and pressure on the physical network, which then moves on towards technical integration to ensure more efficient and coordinated network management across national borders. The final stage in this process may well be enhanced *institutional* integration, with the creation of new European (or sub-European regional) regulatory institutions (see chapter 4). As we will see, institutional integration is also occurring in some other sectors, most notably in the energy and electronic communications sectors, where European liberalisation policies are the most established (Larouche 2008 and chapter 6).

Hence, operational functions are no longer confined to a purely national context. Regime change in the Netherlands has generally occurred as a response to international (or European) developments. For example, the liberalisation of the energy and communications sectors and the introduction of competition, was set in motion by the adoption of European directives. At the same time, as a result of liberalisation and of the increased independence of commercial operations, these sectors have become open to new actors and new interests, both operational and financial, while existing actors (both public and private) may seek new roles and explore the challenges offered by internationalisation. As a result, the underlying infrastructures take on a new functional role, and are no longer confined to the provision of primarily national public goods.

Regime change has therefore also opened up the possibility to a wider integration of national markets and national actors along different dimensions. For certain infrastructures this has meant a measure of commercial integration across Europe (e.g., gas, electricity, and electronic communications), while in others it has meant that an increasing physical or technical integration has been the leading characteristic (Railways). Functional change should therefore be viewed as an important component of regime change, and not just a consequence of institutional change (Knops 2008). It is a component that can develop and take shape irrespective of whether institutional change has progressed from public to private ownership and full competition – from the classic to the new paradigm. This is important to bear in mind because functional change occurs irrespective of national policy choices regarding the speed or direction of regime change.

2.8 RESULTS OF REGIME CHANGE: NUMEROUS AND HETEROGENEOUS ACTORS AND MULTI-LEVELS

The most important consequences of regime change for investment in infrastructures in general can be summarised as follows: 1) there are numerous and heterogeneous actors involved in investment in infrastructures; and 2) decision making on investment in infrastructures takes place on multiple levels.

As a result of regime change, new actors are involved in the investment in infrastructures, both public and private, including regulated and unregulated public and private actors; public and private actors responsible for operation/exploitation of the network, and new actors responsible for the financing as well as regulatory bodies with varying degrees of power over these various players. Moreover, existing actors have taken on new roles. This multiplicity of actors is the topic of chapter 3.

Decision making on investment occurs at many levels – international, European, regional, national and even local or decentred (Black 2007). This is not only true for the regulation and control of operations, but also of their financing. As a result of regime change, tasks related to regulation and supervision are diffused over different public actors including different ministries, regulators, and various informal or self-regulatory bodies. In other words, and as reflected in recent

research into Principal Agent theory, the 'principal' is no longer represented by one single body, but consists of numerous principals (Steenhuisen and Van Eeten 2008). Chapter 4 describes the emergence of multiple layers of decision making in greater detail.

The introduction of heterogeneous actors and of multiple layers has important consequences for the investment process in infrastructures. As a result of the introduction of new actors, new interests and values emerge. What is good investment? What is adequate investment? New criteria and values become relevant when evaluating the adequacy of investment, and inevitably, new conflicts, for example, between private and public organisations, come to the fore. The multiplicity of actors, the new roles they take on, combined with the multiple layers, may lead to distrust and insecurity and provide for more opportunities for strategic behaviour and regulatory opportunism. A combination of the multiplicity of the actors and of the levels in turn leads to what the Council terms 'splintered arenas'[6] of decision making. However, given the specific features of the investment in infrastructures, as discussed in section 2.3 above, it is this new multi-actor/multi-layer constellation that creates a major challenge for future infrastructure provision, especially given the huge levels of investment that are expected to be essential over the coming decades.

2.9 CONCLUSION

This chapter described and analysed regime change in general during the past 15 years in the Netherlands. The Council identified the (potential) consequences of regime change for long-term investment. In doing so, we have investigated the current framework of the public discourse on regime change for infrastructures. The Council contends that this discourse has all too frequently shown a one-dimensional tendency and is often based on a 'from-to' model – from public ownership to private ownership and from non-commercial to commercial exploitation under conditions of competition. The model assumes that regime change should follow the pattern shown in Table 2.2.

In other words, the assumed logic of regime change is couched in terms of a steady progression from full public ownership to full private ownership with a

Table 2.2 Ordering in the classic paradigm and the new paradigm

	Classic paradigm	New paradigm
Relation between links in the chain	Vertical integration	Unbundled
Competition	No	Yes
Ownership	Public ownership	Private ownership

Source: Ten Heuvelhof 2008: 20.

limited role for government as a 'director' or '*marktmeester*' that is responsible for correcting market failures. It implies the reverse logic: if the new paradigm does not deliver the results, then a return to the classic one is the best solution. This chapter has shown, however, that on the basis of the experiences with regime change across the sectors, there is no such 'from-to' model either in theory or practice. Instead, the process of regime change is one of continuous evolution. Once the initial structures, institutions and commitments have been erased, there is no returning.

The primary lessons to be drawn from this chapter are that regime change is a constant and incomplete process, and that it is also multi-directional – so that risks and rewards for infrastructure investment are not clearly apportioned. Uncertainty with regard to investment in infrastructures has to be seen in view of the particularities of infra-investment (lumpy, sunk, long term). Further, this chapter has also stressed that regime change has intended and unintended consequences. Perhaps unfortunately, one cannot deal with these unintended consequences simply by reversing the process by returning to the classic paradigm, nor can we expect additional regulations to deliver a final solution. Inevitably, new regulatory responses will generate *new* indirect and unforeseen consequences. Finally, this chapter has stressed the interaction between function and governance in infrastructures. The next two chapters discuss two aspects of regime change in more detail: the relation between multiple and heterogeneous actors and multiple levels for investment in infrastructures, in order to establish the remaining scope for national public values to be achieved in increasingly integrated markets, in which the interests of a variety of actors must be addressed in a range of arenas.

NOTES

1 Positive and negative impacts on any party not involved in a given economic transition.

2 See 'Rising power prices sour German view of liberalisation', *Financial Times*, 7 January 2008.

3 See also 'FNV wil einde aan privatiseringsgolf', *Trouw*, 24 March 2007 and 'Staak liberalisering tot duidelijk is of het werkt', *de Volkskrant*, 24 March 2007.

4 See 'Minister Bos kondigt gematigder privatiseringsbeleid aan; PVDA-minister is terughoudender met privatiseringen en wil snelle invoering van sociale vennootschap', *Het Financieele Dagblad*, 16 March 2007.

5 See 'Ontspoord; Duizenden treinen rijden elke dag over gebrekkige wissels van ProRail', NRC *Handelsblad*, 17 November 2007, 'Ontspoord (2); ProRail heeft te weinig greep op het onderhoud van het spoor', NRC *Handelsblad,* 24 November 2007 and 'ProRail erkent problemen; Privatisering onderhoud spoor mislukt', NRC *Handelsblad*, 24 November 2007.

6 See also Graham and Marvin (2001).

3 A NEW CONSTELLATION OF ACTORS

3.1 INTRODUCTION

Concerns have recently been raised on the negative aspects of private involvement in infrastructures, a discourse for which the rise of private equity funds, foreign actors and discussions on the – possible – transfer of ownership into private hands provide the new context. More generally, the desirability of the private actors' involvement in infrastructures has become an ever more probing issue in political debates. There is no doubt that many new actors have come to the fore, albeit that differences between infrastructures are substantial. It would be too simplistic, however, to limit the effects of regime change on the actor constellation to the mere emergence of private actors next to a public actor that used to have a monopoly position. Inevitably, the emergence of new actors – but also other manifestations of regime change – has caused existing relations to change and new relations to develop. These changes have demonstrated that the role and position of government is, in fact, a multifaceted one, because it comprises decision making, financing, regulating and supervising functions, but also (in sectors in which regime change has had only limited effects) operational functions and ownership.

This chapter addresses two issues. First, it focuses on the developments in the actor constellation. As a result of regime change, both the roles, and the interests and interactions between the (now multiple) actors have changed. Secondly, this chapter shows that the intensity of the change is in part a function of the degree of regime change itself and is also intrinsically linked to the degree and the type of competition in the sectors.

When analysing the trends in actor constellations, the differences between the various sectors cannot be ignored. In some sectors, infrastructures are now in private hands, and a regulator has been introduced (electronic communications). In other sectors, the state has awarded a concession to a publicly owned company (railways), while in still others the network is in the hands of public owners (drinking water). In the gas and electricity sectors, networks are owned and operated by a regulated monopoly. Lastly, regime change may have resulted in a public organisation, such as a government department or a local authority, outsourcing various activities, such as waste management, to private actors. Although the actual situation may thus differ from sector to sector, parallels may nevertheless be drawn with regard to the underlying trends and issues they are faced with.

3.1.1 REGIME CHANGE: RIVAL ACTORS, MULTIPLE PRINCIPALS AND SPLINTERED ARENAS

There are three elements of importance in connection with the relation between regime change and the constellation of actors: rival actors, multiple principals and

splintered arenas. The first, rivalry, originates from the fact that as a result of regime change, heterogeneous actors were introduced into infrastructures, some were public, some were private while others were hybrids. Regime change fosters a rivalry between these existing and 'new actors'– with rivalry being the essence of a competition that was introduced intentionally with regime change (see also chapter 6). While it is true that most infrastructures themselves remain natural monopolies, there has been a competition between producers/service providers supplying for networks, and between rival wholesalers/traders that deliver goods and services from the networks to supply-end users. In the initial stage of regime change, the networks are supposed to facilitate these processes by facilitating access in an efficient way. Unbundling networks from other operational functions has been designed to secure this. Separation of ownership and regulatory functions is also designed to prevent conflicts of interest between different actors and to facilitate competition. Regime change was meant to encourage new entrants with rival solutions. It is inevitable that this would effect the way the networks themselves performed (see also chapter 6). The result of all this is that there are not only heterogeneous actors, but also rival actors.

A second issue of regime change is that instead of one principal, multiple principals have emerged, mainly as a result of the ownership and regulation changes. This has important implications for the implementation of strategic goals into the practice of infrastructure organisations – as this chapter will show.

A third aspect of regime change is that the transactions needed for investment in infrastructures take place in splintered arenas. A direct effect of regime change is the emergence of separated arenas in which these transactions take place. Unbundling has led to a separation between the operation of the infrastructure and the delivery of services. Privatisation does not imply the end of government involvement, but may in fact strengthen the regulatory function of government. This leads to a separation of regulatory and operational arenas. Naturally, these separated arenas are not without their risks if they become too isolated and distinct from each other. In section 3.2 the separation of arenas will be analysed.

A major consequence of regime change, but also of the developments discussed above, are the changing roles of actors in the different arenas. Network companies have begun to act increasingly like market players, driven by commercial motives and seeking new business opportunities outside their traditional businesses, even if they are in fact in public hands. In sectors such as electronic communications, public actors are no longer responsible at the operational level, but have assumed new functions, i.e., such as the monitoring of the activities of private actors. The roles of actors have also changed via the process of functional or ownership unbundling, or structural separation of different functions, and most notably as a result of the separation between service and infrastructure provision (e.g., the unbundling of the railways, gas and electricity sectors).

An example that provides an extreme illustration of the new roles, new interests and potential collision forms the trend for – public or private – owners to view infrastructure assets as important financial assets in their own right. This causes the roles of the actors to change as well. Infrastructure assets will more often be used to underwrite borrowing for other, not necessarily related, purposes. With the growth of private equity participation, this changing function for the infrastructure itself is likely to become more marked. Long-term investments may thus be seriously endangered. Melody argues that:

> For public utilities, the entry of Funds is unlikely to bring strategies for long-term investment in infrastructure development. Rather they are likely to bring strategies for disinvestment by massive cash payouts as long-term investor value is converted into short-term value. This in turn can be expected to have significant negative multiplier effects on the growth of utility industries (Melody 2008: 7).

In the electricity sector, regulatory measures have been taken to counteract such behaviour. The Electricity Act of 1998 explicitly prohibits network managers from using infrastructure assets to create funding for investments with other objectives than the infrastructure itself. Another example can be found in drinking water legislation and the gas and electricity legislation that basically prohibited the privatisation of drinking water companies (Tweede Kamer, vergaderjaar 2006-2007, 30895, no. 3) These examples illustrate the importance of the government's role not only in the adapting of its policies to a changing cast of actors, but to the changing roles of the actors as well.

3.2 SPLINTERED ARENAS

The analysis in the previous chapter of the transaction chain in infrastructures – as a result of regime change – divided it into separate transactions with different actors involved in different parts of the chain. The investor in the infrastructure, for instance, is not necessarily the actor who operates the infrastructure; the service provider and the owner or operator of the infrastructure, have increasingly become different actors. Different parts of the transaction chain are negotiated between those specific actors who are active in that particular part of the chain, which in turn causes sub-arenas to emerge (Knops 2008). These sub-arenas are relatively unconnected and different actors may be present in the different (sub) arenas, but also in a variety of other roles.

The most important dividing lines between these arenas result from the following inherent characteristics of regime change, as discussed in chapters 1 and 2: 1) the separation between infrastructure and service; 2) the separation of regulatory and operational functions; 3) the separation between short-term transactions and long-term transactions; and 4) the separation between technical and political arenas.

Separation between service and infrastructure

The separation between infrastructure and service stems from the introduction and promotion of free competition. Establishing a situation of free competition for services that require infrastructures is only possible when service delivery companies have equal access to the network. This requires a clear split between service and infrastructure functions; otherwise those service companies with the closest ties to the network manager would be in the most favourable positions. This rationale for so-called unbundling played a dominant role at the time of the introduction of competition in sectors with one or a few vertically integrated incumbents that were also active in the market of service provision.

However, the negative side effects of unbundling have become increasingly clear. The case of NS and ProRail is exemplary in this respect. Bekkers (2008) observes that the unbundling of infrastructure from service, information from end-users has not reached the level of the network manager, however. Consequently, investment decisions are made using inadequate information. Larouche makes a similar argument with regard to the electronic communications sectors in countries such as the UK where infrastructure and service have been separated (Larouche 2008).

Separation of regulatory and operational functions

It was initially seen as a temporary regulatory task to curtail the power that the incumbent still had in the early stages of liberalisation. The introduction of regulation is implemented in many sectors as a separation between regulatory and operational functions (Larouche 2008). Larouche argues that it was difficult to actually make this distinction in the electronic communications sector. Network managers, especially those working for incumbents, have found it difficult to accept that they will (no longer) be making all of the regulatory choices, while policy-makers must learn to accept that they are no longer involved in hands-on management (Larouche 2008: 11). This change has been difficult to accept, especially for policy-makers, because it requires a new type of involvement. Policy-makers must 'ensure that public policy objectives are fulfilled' without 'superimposing a holistic vision … on the sector' (Larouche 2008: 13). Above all, attention will have to be shifted from the network itself to the behaviour of, and the relations between, the actors in the sector (this is what Larouche refers to as the 'network of networks').

Short-term and long-term transactions

Actors are interested in the short term and are relatively well versed in the details of the current institutional or regulatory framework (service delivery). The introduction of free competition, embedded in a regulatory framework, guarantees and determines the relations between the actors. In various sectors, the results have meant price reductions and an improvement in the quality of services. Much less attention has been devoted to the situation with regard to the operation of networks. This questions the suitability of the institutional framework for long-term transactions. Larouche (2008) analyses the electronic communications

sector and argues that the institutional framework in that field fails to address long-term interests. In particular, policy fails to provide the sector with adequate incentives to stimulate investments. A systematic approach of tackling this issue is not available and solutions that address this problem are therefore ad hoc and come with their own particular problems (e.g., regulatory holidays).

Technocratic and political arenas

Investment decisions in infrastructures require a great deal of technical expertise. At the same time, however, infrastructures serve to satisfy the essential needs of the public and are used to realise public values of various kinds. As such, they require political involvement as well. A serious drawback of the political domain is (as was shown in chapter 2) political opportunism and a preference for short-term over long-term issues. The technical and the political arena must therefore be closely connected. This is, however, not always the case. This is especially at the international levels of government, where technical arenas of decision making have the upper hand over the political decision making arenas. This phenomenon is omnipresent even in the European Union (WRR 2007). As was noted in the previous chapter, technical forums and similar informal organisations which can determine norms and standards and coordinate regulation have been introduced and/or strengthened in the field of infrastructures various networks of experts. In many cases, these networks provide new opportunities for connecting national and European actors, but in general, they seldom succeed in reaching the political domain. The position of regulators fits into the technocratic arena as well, separated as they are from the political domain. In the Netherlands politicians are, therefore, not very inclined to entrusting regulators with extra-statutory or broadly defined powers (see chapter 5). Decisions on 'technicalities' may, however, have significant political implications as well.

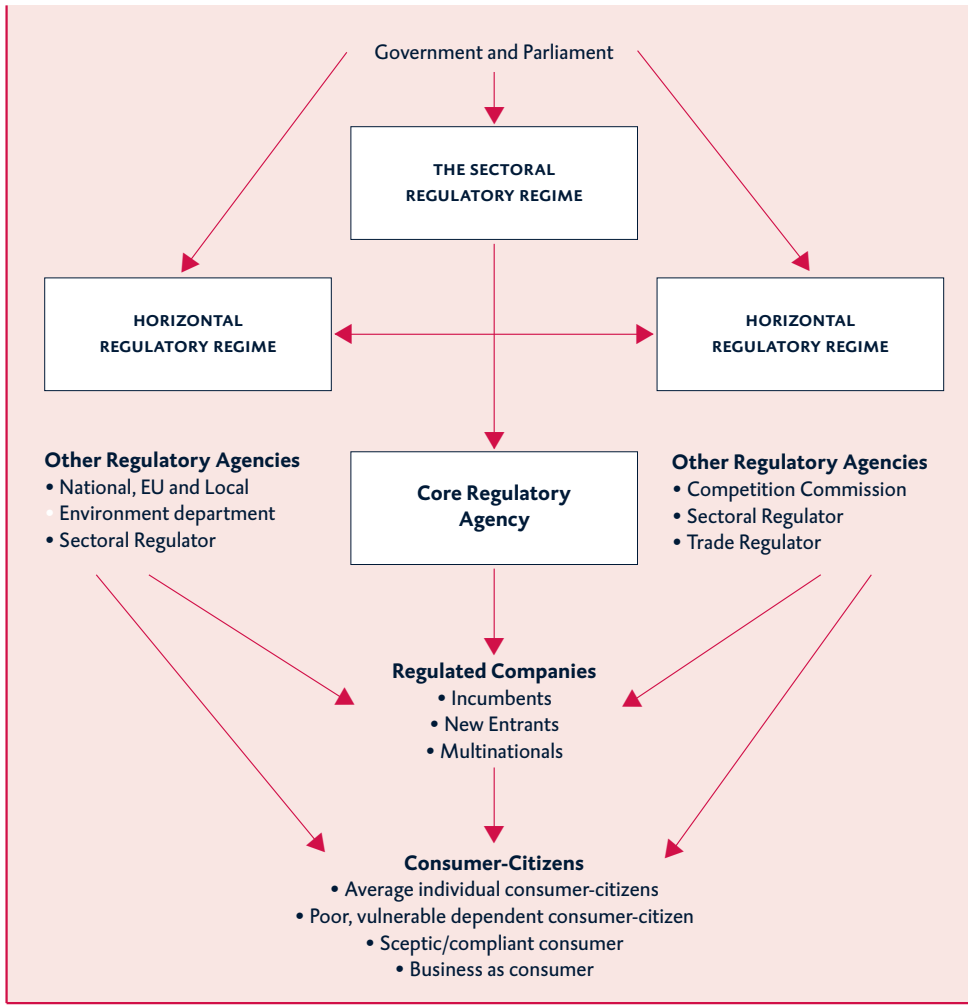
It is important that the institutional design of an infrastructure takes into account the implications of the four dividing lines, and its implications in terms of the emergence of divergent sets of actors with divergent roles and interests (Van Dijk 2008). The emergence of multiple principals and multiple agents across these dividing lines raises complex issues from the perspective of examining which (groups of) actors respond to what types of incentives to commit to longer-term investments, especially given the special characteristics of infrastructure investment discussed in chapters 1 and 2.

3.3 NEW ACTORS

The formerly single and homogenous actor constellation has changed into a multiple and heterogeneous actor constellation. Different actors have become responsible for the different parts of the chain of transactions in infrastructures, from planning the investment, financing the project, building the infrastructure, as well as ensuring its maintenance, operation, as well as the provision of goods and services. Multiple newcomers have thus entered these arenas. To name just a few of the newcomers to the infrastructural scene, we have private subcontrac-

tors, consultancy firms, engineering firms and legal firms assisting both the subcontractors and the state companies, regulators, meta-regulators (Black 2007) and private investors. As Figure 3.1 shows, there are now more than eight different actors, whereas prior to regime change, there was only one actor.

Figure 3.1 **The sectoral and horizontal regulatory regimes plus the business and consumer stakeholders**



Source: Wilks and Doern (2007)

As a result of liberalisation, supervision, peer reviews and regulation have been introduced (column on the right) and this too has introduced new actors. The form and the intensity of regulatory supervision differ from sector to sector. Some sectors rely primarily on the self-regulation of network companies, which is the case, for example, in the drinking water sector. The networks are owned by the drinking water companies, which are public owned companies with shares in

the hands of the provinces and municipalities. The quality of the drinking water is supervised by the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment (VROM), but the infrastructure investments are neither supervised nor monitored externally. It is the sole responsibility of the water company. A specialised regulator has also been introduced in other areas such as the electronic communications, energy and railways sectors. Moreover, consumer groups have become more active, although their activities are mostly focussed on service provision (e.g., Rover monitors the Dutch railways).

3.4 MULTIPLE PRINCIPALS AND MULTIPLE AGENTS

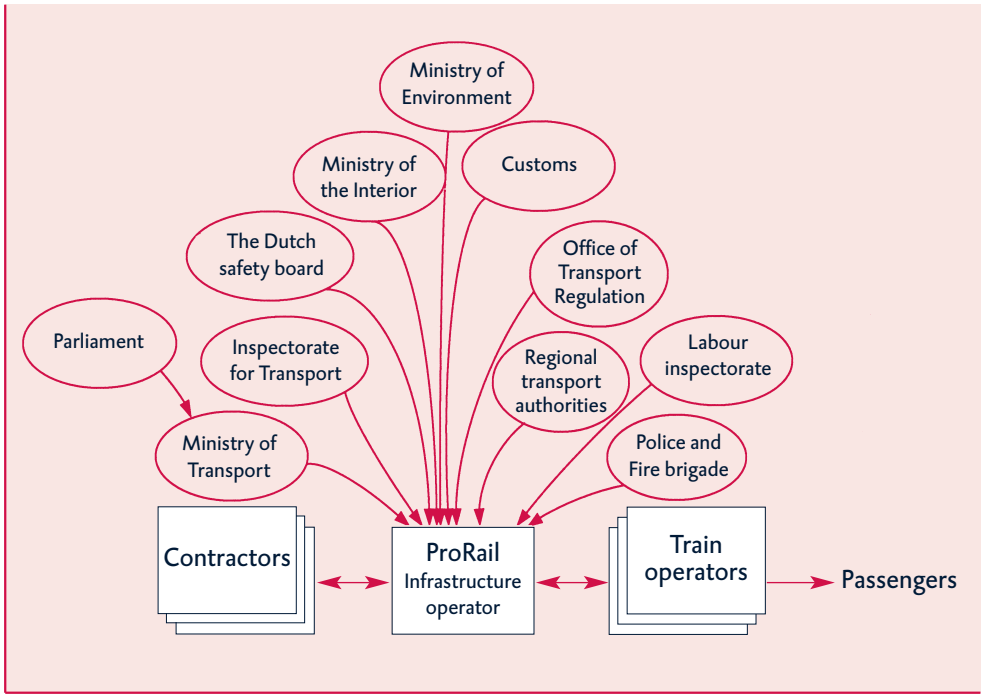
Furthermore, regime change has also led to changes in principal-agent relations. Principal-agent literature mainly focuses on an isolated relation between a single principal and a single agent. In infrastructures, this model is reflected in the traditional paradigm discussed in chapter 2. However, the result of regime change has been that actors within infrastructures fit in badly into this single principal/single agent model; in fact, the actual situation is not just limited to multiple agents, but also includes multiple principals.

The so-called 'multiple principals problem' is the subject of growing attention in the literature. According to Steenhuisen and Van Eeten (2008) this problem manifests itself in the effects of multiple incentives from multiple principals on the agents in the absence of a prearranged hierarchy among the principals (see e.g., Kagan and Scholz 1984; Waterman and Meijer 1998; O'Toole, Meijer and Nicholson-Crotty 2005; Jordan 2006). This literature shows that more incentives lead to more inconsistencies and conflicts between incentives, which correlates with more non-compliance (Kagan and Scholz 1984; Waterman and Meijer 1998; Verhoest 2002; Kim 2005; Perin 2005: 10). Non-compliance, in turn, results in the principals providing even more incentives, thus creating a vicious circle (Downs 1967; Bothe and Meier 2000). Furthermore, Coen (2005) describes how multiple principals enable agents to play principals off of one another. Multiple incentives can even interact in a more complex and counter-intuitive way, i.e., the 'crowding out' principle (Francois 2000; Miller and Whitford 2002). Thus the presence of multiple principals, from the perspective of safeguarding public values (chapter 5), is a complicating factor (Steenhuisen and Van Eeten 2008).

For instance, until 1994, NS was the only train operator in the Netherlands. The Ministry of Transport (as principal) used to supervise NS on how the railway network should be operated. Currently there are various transport companies that operate on the Dutch railway network, while the number of principals has increased as well. Although sector reform was intended to deregulate the industry, the number of separate supervisory bodies[1] has actually increased over the years, and so has their influence. As a result, the current 'multiple principals' structure' can be characterised by its detailed rules, extensive operational agreements and intense public debates (Steenhuisen and Van Eeten 2008). The actor constellation in the sector of rail is complicated, even when the picture is

restricted to actors entrusted with supervision. This is revealed in Figure 3.2. In chapter 6, this point is illustrated with concrete examples in the energy sector.

Figure 3.2 Multiple principals situation of ProRail



Source: Adapted from Steenhuisen and Van Eeten 2008

3.5 HYBRIDS

The distinction between public and private actors in the field of infrastructure investment decisions may suggest that the dividing line between the public and the private domain – and the roles assigned to each domain – is a clear one. However, in reality the dividing line not only shifts over time, but also blurs and becomes permeable. This was a result of the various hybrid organisations and forms of Public Private Partnerships (PPP) emerging (Teisman 2008).[2] We will discuss hybrid organisations and PPP below.

3.5.1 HYBRID ORGANISATIONS

Regime change was introduced in order to separate roles and organisations, thereby fostering competition. The line of argument was thatthis would lead to improvements in the production of goods and services related to infrastructures (see chapter 2). However, this separation, in practice, led to a blurring regarding the organisations, functions and roles. Over the last few years, the number of organisations that function between the public and private sectors has increased. The corporatisation and privatisation of public organisations, as well as the

(re)introduction of market-type mechanisms in the provision of public services has led to a situation in which that were originally public organisations have entered the marketplace to engage in commercial relations with private companies (Karré 2006).

Two schools of thought can be distinguished in the Dutch discussion regarding hybrid organisations (see, for an extended overview, Karré 2006). The first is influenced by Jacobs's (1994) theories on the basic incompatibility of the values of the public and private sectors. The most influential proponent of this view was Cohen, who, as the chairman of a government committee, proposed the legal banning of all hybrid organisational forms (Werkgroep Markt en Overheid 1997). Other critics include Simon (1989), Verhoef and Simon (2001) and Gradus (2005), who see hybrid organisations in a more positive light. In 't Veld (1995, 1997, 2001, 2005 and 2006), for example, argues that while there is a tension between public and private values, combining them within hybrid organisations may lead to synergy. The WRR (2004) and SER (2005) argue that dividing our world into two mutually exclusive domains might work in theory, but it has limitations in studies that involve social reality. Hybridity, they argue, is no unusual or perverse form. On the contrary, all organisations are more or less hybrid (Brandsen, Van de Donk and Kenis 2006: 421).

Although public and private values may indeed cross-fertilise and improve actual practices, certain roles in the realm of infrastructure investment (chapter 2) should not be blurred in theory or in practice, especially the roles of the arbiter and related roles.

3.5.2 PUBLIC PRIVATE PARTNERSHIPS

The Knowledge Centre, which supports PPP initiatives and was established by the Ministry of Finance, in 1998 argued that the establishment of Public Private Partnerships leads to the faster and more efficient implementation of infrastructural projects, an argument that has also been voiced in other countries (Teisman 2008: 3). Meanwhile, many politicians continue to be attracted to the notion of clearly distinguishing between the private and public domains. However, experience shows how difficult it is to combine the demands of the partnership with the internal 'logic of action' and the preferences of the individual actors. Both public and private actors are subject to this logic; public authorities remain highly attached to their formal decision-making powers, whereas private actors find it difficult to assume risks other than those related to the market (Teisman 2008: 7; a striking example is the Mainport Rotterdam project). Despite the advantages, the realisation that cooperation may be difficult and the clinging to formal but outdated roles may eventually present obstacles to the creation of effective forms of collaboration (NABU/Norton Rose 2004).

Public and private actors have become increasingly mutually dependent both in PPP and more general terms: public authorities need private actors to invest in

infrastructural projects, while private actors are dependent on public authorities for the necessary administrative decisions to be made. Moreover, private and public elements of physical infrastructures have become increasingly integrated.[3] Many authors therefore acknowledge the added value, in terms of output, of combining these arenas and focus on strengthening the mutually interdependent roles of the actors involved.

The emergence of multiple layers of government – as well as multiple principals – poses additional challenges to investment in infrastructures. The challenges of ensuring the compatibility of public-private partnerships with EU legislation on free competition and an open market are well-known. Moreover, as EU law is based on a dual approach (the involvement of private actors leading to legal consequences which do not arise in a totally public setting), uncertainty may arise regarding the applicability, scope and meaning of these rules to hybrid forms of cooperation. A recent example, although not involving infrastructure, was the application of EU public procurement rules to the realisation and development of social housing in a PPP-construction with housing corporations.

3.5.3 KEY OBSERVATIONS WITH REGARD TO HYBRIDS

Different constellations of heterogeneous actors, multiple principals and blurred roles in hybrids, each raise important coordination issues (see Teisman 2008). Regime change has led to a liberalised, quasi-privatised sector (see Box 3.1).

Box 3.1 Illustration of changes in the constellation of actors and their roles in renewable energy in vinex locations

The planned construction of large-scale housing projects in the sub-urban perimeter around Dutch cities since 1990 has afforded a lot of potential to implement new, integrated, energy systems, with low carbon emissions and high energy efficiency. Depending on the local circumstances, the scale of the projects and the type of residences, a range of energy supply solutions could have been installed. Examples include multi-fuel co-generation, green power, insulation, heat pumps, photo voltaic systems, heat storage, low temperature heating, secondary use of industrial heat, etcetera. Despite this potential, the large-scale realisation of such systems has not happened. The question is why. First we will look at the difficulties in incorporating such systems within the traditional context of project development. Subsequently, it will be explained how the restructuring of the energy market has created new barriers and why the application of new, market-oriented, policy instruments has thus far failed. The major elements in this chain include the *actor network*, the process of *decision making* and the dynamics of the *interaction* between the parties involved.

Energy infrastructures and VINEX

Traditionally, the utilities' supply infrastructures for large-scale building projects, or VINEX locations, evolved within a formal sequence of plans that determined land use, the lay-out of projects and housing design. The actor network includes several public policy-making, administrative and executive echelons of the state, the provinces and the municipalities; the utilities, later split-up into

suppliers and network operators; the construction sector, involving project developers, financiers, construction companies, sub-contractors, architects and real estate agents; and the local community, which includes citizens, potential buyers, housing corporations and NGOs. These actors interact at specific moments in the decision-making process, to deal with particular issues. This is partly determined by the formal planning process. Starting at the national level, via regional, structural and functional design plans, this process yields the concrete blueprints for an area and the buildings and infrastructures to be constructed. What was important was the identification of stages where crucial decisions about the energy system were made and where actors interact and engage in agreements and contracts. To some extent, their content is a function of laws and policy objectives. Moreover, there are the 'hard' considerations of financial economic and technical origins. But issues like the image of a municipality, a project or an architect also play a role. A potential buyer does not only purchase the premises, but also accessibility to infrastructures. These propositions represent hard commercial arguments in the decision-making process.

The objective of *municipalities* is to reap maximum revenues from the selling of lots, but they also seek to create attractive and affordable – and possibly sustainable – new neighbourhoods. These objectives reflect a functional variation among the different municipal departments, present in the process. *Housing corporations* seek to cover the costs of their housing projects with revenue. *Project developers* seek to maximise their profits, via a quick throughput of housing units at reasonable margins. Revenue is often needed to finance the later phases of a specific plan. Thus, developers are risk averse and strive for continuity. However, it is also in their interest to secure early involvement in the planning of new housing districts, by maintaining a good image and good relations with the municipality. The main issue of the e*nergy utilities* used to be the pay-back time – given up-front investments and fixed and variable cost – and given subsidies to stimulate the use of low carbon energy supply systems. Thus, the former backbone of the Dutch fossil fuel conservation policy, the public utilities had a double objective. Sustainable energy supply is clearly part of the broader set of objectives and thus has to compete with other issues, such as location, design elements, etcetera. Conflicts were resolved by negotiations and by trading-off bundles of interests from one party against the other. However, the capacity of the various parties to evaluate all of the options was limited and, thus, traditional supplies of power and gas prevailed.

Since the mid-1990s, the Dutch government has begun to stimulate the construction of sustainable energy supply systems by the subsidised participation of advisors, early on in the process: the so-called Optimal Energy Infrastructure programme (OEI). The objective was to improve the quality of the decision-making process, by bringing the right parties to the table at the right time. With relative independence and with a broader view over a range of projects, the OEI advisors provided new insights and information, supported and facilitated the use of subsidies, commissioned feasibility studies and validated technical and economic data. Thus, local decision making was made more transparent, taking into account site-specific circumstances and the various interests of the involved parties. This stimulated the application of sustainable energy supply solutions on a larger scale than before.

It is apparent from the case study that new actors have introduced new interests, and that the role of the principal should be adapted accordingly. After all supervision, peer review and regulation have been introduced as a result of liberalisation,

and this has also led to the introduction of new actors. The form and the intensity of regulatory supervision differ from sector to sector. Some sectors rely primarily on the self-regulation of network companies as is, for example, the case in the drinking water sector. The infrastructures are owned by the water companies, which are public companies, with shares owned by the provinces and municipalities. The quality of the drinking water is supervised by the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment, but the investments in infrastructure are not externally supervised or monitored. It is the sole responsibility of the water company. In other sectors, a professional regulator has been introduced (electronic communications, energy and rail). Moreover, consumer groups have become more active, although their activities are mostly focussed on service provision (e.g., Rover for the Dutch railways). The complexity of the actor constellation in the sector of rail, even when the picture is restricted solely to the actors entrusted with supervision, is shown in Figure 3.2. The case study shows a second element. Even in a process of limited regime change, for example, in the case of PPP construction or hybrids, coordination is important and can easily be obscured by blurring.

The conclusion must be that participating in hybrid forms of cooperation requires the public actor to adopt (and to adapt to) a new role – that of the network manager (Teisman 2008: 17). The real challenge for public authorities therefore lies much more in the shaping of this new role for itself, rather than in designing new institutional arrangements (public/private). As Goldsmith and Eggers (2004: 52) argue, the role of network managers is to '… master the challenges of governing by networks: aligning goals, providing supervision, averting communication melt down, coordinating multiple partners, managing the tensions between competition and collaboration, and overcoming data deficits and capacity shortage'. When a number of different (private and public) actors are involved, combining them (and strengthening mutual interdependence) is thus the main objective, and not the delineation of a rigid and inflexible borderline between what are and should be the public and private roles.

3.5.4 CHANGING ROLE OF GOVERNMENT IN MULTIPLE ACTOR/MULTIPLE PRINCIPAL SETTINGS

The most significant change of role has probably been that of the government. In sectors where regime change has made a lot of progress, government has now become the regulator instead of the owner of the infrastructure (e.g., electronic communications). Consequently, the government has become one among many other actors. In other sectors, the distinction between internal government roles has been more clearly indicated. In the electricity and gas sectors, shares of the network companies are owned by the Ministry of Finance, whereas regulation and supervision are the responsibilities of the Ministry of Economic Affairs. In the rail sector, the Ministry for Transport is responsible for regulation and supervision, while in the Ministry for Public Health, Spatial planning and Environment bears that responsibility in the drinking water sector. This may help prevent conflicts

with private actors, but it can also become the source of new tensions and conflicts within government itself. Whereas the Finance Ministry's interest may primarily be high returns on its investments (which may be realised through the exploiting of international opportunities), functional ministries may be focussed instead on protecting the shorter-term interests of the nation's consumers.

Although it no longer exercises a clear hegemony over the sectors that are the subject of this report, the government nevertheless remains a 'privileged' actor. Only government can employ it law-making powers to correct or adjust a particular regime, or to safeguard public values. Moreover, it can mobilise large-scale if not unlimited financial resources to fund infrastructure projects or rescue failing projects if and when political prerogatives so dictate.

In the current and future constellation of actors and roles, however, government policy will need to meet the following requirements.

i) It will have to be evaluated and assessed in terms of its impact on the role of new actors and their interests.
ii) It must take the different roles that the existing actors have assumed as a result of regime change fully into account.
iii) It has to be evaluated on the impact it has along the entire but splintered transaction chain of decision making as well as in the various other arenas.

Box 3.2 'Windfall profits' – unintended consequences

In 2007, the energy regulator performed further research into the effectiveness of the current tariff regulation system in order to determine whether the profits gained from regulated activities corresponds to the return which the NMa/DTe deemed to be reasonable and whether the system enabled the network companies to realise an adequate return within the framework of the present regulatory system to enable them to continue investing. In the case of the regional gas and electricity network operators, the NMa's subsequent research established that in the years 2003, 2004 and 2005 the companies generated more than 32% gross profits above the approved limit for under the standard rate of return in accordance with the regulatory method.[4]

As the regulator has admitted, when the regulatory system was designed, it was impossible to determine with any certainty whether the intended effect would be achieved and/or whether undesired consequences would occur (NMa 2007, under q.4). Based on its own analysis, it concluded that the networks were expected to outperform the x-factor and should be rewarded for being efficient. An unintended consequence of the present system of regulation for the regional network operators – given that it is based on tariff regulation and not turnover regulation – is that growth in volume results in higher profits which are not necessarily re-invested in expansion of the network. A further unintended effect of the system, which operates on 5-year regulatory periods, has been that it has allowed the regulated companies to reduce their operating costs much more quickly than was foreseen at the beginning of the regulatory period, but it was not required to pass on the improvements in efficiency to the consumers in the form of lower network tariffs. However, the network managers acknowledged that they were able to generate and maintain sufficient

revenue on the basis of their standard returns to finance necessary (replacement) investments. What was of greater concern to the NMa was that almost all of the profits realised on the regulated network activities were paid out to the holding company – i.e., the shareholders. If there is a guarantee that the network manager has had sufficient funds at its disposal at all times to make investments, there is nothing in the law to prevent the profits from being distributed to the holding company. The NMa currently has no powers however to prevent dividends from being paid out.[5]

As a consequence of this investigation the NMa is taking further steps to reduce information asymmetry. The possibility that it will take further steps to guarantee that the levels of dividends paid out to shareholders will not adversely affect investment strategies cannot be ruled out. Whether these measures will sufficiently deal with strategic behaviour, however, remains to be seen.[6]

One of the key questions for the government is whether institutional arrangements reflect and match not only the new *actors*, but also the new *roles* the various actors (including the government itself) have assumed. The above NMa case study on windfall profits shows that the roles are not always adapted to a new situation. The above case illustrates that profits are paid out to public share holders who have no incentive for reinvesting these profits back into the sector. An important lesson from this case is the need to further investigate whether other adjustments to institutional arrangements are necessary in order to cope with the changing scenario of actors and roles.

3.6 CONCLUSION

This chapter has described how the enormous changes in the constellation of actors has forced the government to change its role. The Council suggests that political attention will have to be shifted from the network itself, to the behaviour of, and the relations between, the actors in the sector. Larouche (2008) and Teisman (2008) refer to this type of government role as the 'network of networks'.

Furthermore, this chapter has argued that rivalry and competition – the necessary features of short-term goals typical of the first stage of regime change – can also pose longer-term problems in network sectors where coordination is still important for technical reasons. Electronic communications is one of the few sectors where this is less of an issue because competing networks are indeed possible. However, the natural monopoly situation in the remaining sectors has continued (Knops 2008) and this is especially problematic. Technical coordination may still be necessary to ensure optimal investment levels. This point will be elaborated upon in the case study in chapter 6.

Finally, this chapter described how the emergence of new actors has not only altered the number of actors involved in investment infrastructures, but has also altered the mutual relations and the interests of the actors. Therefore, new incentives may be necessary in light of this new constellation, a point which will be elaborated upon in chapter 7.

NOTES

1 These bodies include: 1) The provinces that have been developing their role as regional transport authorities from 2000 on; 2) The new inspection authority for rail safety issues that was created in 2003, which was formerly an internal NS division; 3) Interest groups and consumers' representation, which have become increasingly institutionalised since the new franchise arrangements were introduced; 4) The Office of Transport Regulation, established in 2004 as part of the Netherlands Competition Authority (NMA), which oversees the non-discriminatory provision of services; 6) Members of Parliament who increasingly claim that their role is to put pressure on ProRail on a variety of issues via the Minister of Transport. These pressures frequently deal with higher norms and new regulations (Steenhuisen and Van Eeten 2008; 9-10).

2 See the definition provided by the Ministry's of Finance's Knowledge Centre: www.pps.minfin.nl.

3 For example, the increasing importance of (private) ICT systems for public infrastructures.

4 This percentage was later challenged in an appeal against the NMA/DTe by the regional network operators.

5 This situation maybe addressed within the framework of the new Independent Network Management Act, however.

6 This case study is only meant to illustrate the new roles between various actors in the energy infrastructure. The Council is aware that regional network operators balance public values internally. However, at present, there is no external transparency or accountability mechanism with regard to the prioritisation of public values.

4 INFRASTRUCTURES IN A MULTI-LEVEL ARENA

4.1 INTRODUCTION

This chapter analyses increasing internationalisation as a second change to the organisation as well as the delivery of public values within the infrastructure. In chapter 2, we examined the impact of regime change and analysed how public values in infrastructure provision had come under pressure from private sector involvement and with it, a blurring of the dividing line between public and private values, undermining the 'public-ness' of infrastructures. The second relevant challenge is that of the increasing involvement of 'levels' other than the national. Together, these two challenges may lead to the hypothesis that national authorities are merely *one* of the relevant actors alongside private actors and international and regional public actors.

As was explained in chapter 2, the national level is traditionally the focal point of both the institutional and the operational aspects of infrastructure investment decisions. Decisions to invest in infrastructure are made at the national level based on national interests and policy objectives. However, as a result of the processes of internationalisation, the situation is becoming increasingly complex. Infrastructures have become more transnational and international in their operation and investment decisions are increasingly dependent on international, and most notably European, regulations.

For the Netherlands, the European Union has become by far the most relevant international organisation with regard to investment decisions in infrastructure. Its influence is, however, far from unequivocal. Indeed, a rich variety of policy objectives and measures affect national investment decisions in an equally rich variety of ways. Most of this chapter will therefore be devoted to the significance of the European Union on infrastructural policy. A distinction will be made between EU measures that support (or facilitate), and EU measures that constrain national investment decisions.

It is useful to recall that what has been referred to as the 'European regulatory space' has traditionally been dominated by the nation-states. Ministries have the formal regulatory powers, although, in practice, they have enjoyed very close relationships with the state-owned companies. The EU has played almost no role in the regulation of network industries; for instance, the EU telecommunications ministers met twice between 1959 and 1977; almost no EU sectoral legislation was passed, and network industries were seen as being beyond the reach of European primary law. Insofar as international coordination took place, it took the form of technical and administrative cooperation through intergovernmental organisations that were composed of national representatives and which had no powers to impose decisions on national members; examples included the CEPT in electronic communications and the UCPTE for

electricity – both of which had jurisdiction in both European and non-European countries.

However, since the 1980s, new European administrative structures have evolved to regulate the network industries. In part, these types of organisations are a response to the combination of three developments, namely the growth of EU regulation, the privatisation of suppliers and the modification of national regulatory structures. A fourth but equally important factor are the endogenous processes which have been generated in each previous phase of change in the make-up of the EU's regulatory space.

In this chapter, processes of functional internationalisation will first be analysed in light of their impact on investment decisions (section 4.2). The role of the EU in facilitating investment decisions in networks is the subject of section 4.3, whereas the constraining role of the EU is addressed in section 4.4. Finally, the increasing relevance of new governance modes will be analysed in section 4.5.

4.2 FUNCTIONAL INTERNATIONALISATION OF INFRASTRUCTURES

The functional internationalisation of infrastructures (as opposed to internationalisation at the governance level) has progressed substantially in the last decades. One of the driving forces for this was the EU Single Market system. Obviously, one of the main objectives of this project was to stimulate productive economic activities at those locations where they could be undertaken most efficiently. Trade between the Member States was expected to ensure the subsequent distribution of goods and services to consumers. This development has profoundly affected the flows of goods and services between – and through – the EU Member States. The growth of intra-community trade has clearly affected the orientation of the several modes of transport. From systems that were predominantly constructed to connect national centres of production, distribution and consumption, in particular, the roadway and railway networks had to evolve into networks that facilitated the growth in international trade flows. The functionality of many 'nodes' in the systems including that of air transport and inland and coastal shipping, like smaller airports and harbours, is changing in the sense that they are becoming part of broader Pan European systems of 'hubs and spokes'; connecting a few large globally oriented centres with the smaller locally oriented distribution centres in the hinterland. As a consequence, the particular role of these global and local 'nodes' and the transport corridors between them has become dependent by and large on the evolution of these global and local systems. Thus, decision making regarding their function, the use of these systems, the investments required or warranted, possible environmental and other externalities, has shifted away from local and national policy-makers. The international business community in collaboration with public authorities aligned with a few dominant players are essentially determining the shape of these intra-EU transport systems, thus influencing the performance of their local branches and nodes. In the railway sector, examples include the Betuwelijn and

the Zuiderzee, both of which are waiting to be linked to the German hinterland. The role of several local airports, like Zestienhoven, Lelystad and Maastricht, is a case in point in the area of air transport and reveals the difficulties of national policy-making. The same logic applies to the position of several smaller Dutch seaports, such as Delfzijl and Amsterdam, vis-à-vis their globally oriented competitor, the Rotterdam-Antwerp node.

The liberalisation of 'hard' grid based services, such as electronic communications and energy, has seen a rapid increase in the international exchange of data and communication and trade in electricity and gas. The water sector has obviously been less affected by this development as it remains based on local systems. The electronic communications sector has shown that the evolution of the system reveals that it has shown similarities in growth with the 'hubs and spokes' structures in transport systems, with particular locations getting a specific role, linked up to the overall system as network centres via primary glass fibre arteries, or just connected to the secondary local networks. Again, decisions on the technical role of these locations are generally beyond the reach of local or national authorities.

The role of the energy networks is changing even more fundamentally. This is a consequence of the fact that the *national* energy supply is becoming an increasingly internationally oriented undertaking. In the past, most EU Member States maintained their own energy supply system, by and large, reflecting their access to raw energy resources, like coal, water, natural gas or their acquired control over nuclear energy, while accepting the costs incurred as a fact of life. In this context, limited non-commercial exchanges of power as part of international support and balancing agreements took place, coordinated between the national networks and power producers. Of course, natural gas has been transported throughout Europe since the mid-1960s. However, a major role was reserved for only a few countries with significant levels of indigenous production and a relative favourable location vis-à-vis exporters, like the Netherlands, Norway and the USSR. Over the past decade and a half, the role of natural gas has rapidly increased in new areas, like the Iberian Peninsula. These international flows of gas were fully coordinated over the whole of the value chain, by the participating public and private operators in the various segments of production, transmission, distribution and marketing, often in forms of joint ownership of the facilities involved.

EU market integration today is creating a development in which the production of energy carriers – essentially power but also oil products – is happening wherever it is most efficient. As a consequence, increasingly large flows of power and other energy are being transported internationally, while in some countries the local production of energy resources, like gas and coal, and power are in decline. This structural shift in energy supply patterns is driving a functional change, transforming the national energy transport networks with some international interconnection into an international system with national and local distribution branches.

Moreover, in addition to this structural shift in energy supply, international flows are increasingly caused by pure trade transactions, in which commercial firms trade quantities of power and gas back and forth along the network, responding to opportunities for price arbitrage between separate pockets of demand. In contrast to the past patterns of relatively coordinated flows of power and gas through designated arteries from producers to consumers, the emerging patterns are much less controllable and predictable regarding their use over the shorter and the longer term. Again, the functionality and utilisation of (segments of) the national power and gas systems will be determined by how embedded they are within the international networks and by the facilities they are connected to, not only at home but also elsewhere in Europe. This turns the process of decision making on investments and (inter) operation of these systems into a delicate undertaking. On the one hand, the functioning of the gas and power systems and their performance will be, like that of other transport systems, determined by external factors that are beyond the control of national authorities. On the other hand, to ensure an adequate supply of power and gas to national consumers, national authorities have to take these international factors into consideration. An additional concern in this respect involves the extent to which these national authorities take the potential international ambitions and interests of national firms into consideration in their decisions regarding network management.

There is a real risk that developments at the functional level will not match the level of internationalisation at the governance level, even if EU single market policy indeed has encouraged these developments. Shuttleworth (2008) argues that in the energy and gas sectors these mismatches may occur as a result of the EU's focus on non-discriminatory market access and transparency (see the following sections) and inclinations of national governments to be guided by national interests. Regional optimisation may thus be impaired, especially regarding investment security, as investors are confronted with a high degree of regulatory uncertainty and are poorly protected from national regulatory decisions that impair the rights of investors to recover the costs of investment and a normal rate of return. Only supranational regional authorities (i.e. the EU) with the power to override national governments or regulators who continue to exercise their powers in a way that is purely nationalist could be a satisfactory remedy.

4.3 THE EUROPEAN UNION FACILITATING INVESTMENT DECISIONS IN INFRASTRUCTURES

4.3.1 INTERNAL MARKET-RELATED POLICIES

At first sight, the European Union competences for intervening in infrastructures appear limited. National decisions on investments have not been replaced by a common European policy and a common budget from which the infrastructures are financed. However, the European Union influences national policies on

infrastructures in a substantial way via its internal market and competition policies. Obviously, a common market without internal borders to ensure free movement of goods, persons, services and capital is to a large extent dependent on the availability of physical infrastructures. Free movement of goods, for instance, not only requires the abolition of import duties and other barriers, but also adequate road and railway infrastructures to facilitate the transport of such goods in practice. For this reason, ever since the 1950s transport has always been a separate policy field in the European Union and its forerunners. However, the European Union may not have mandated the construction of infrastructures on the basis of internal market policy.

The same is true for regional development, which is the second policy area that affects infrastructures. Territorial differences in economic development may cause a threat to overall political and social cohesion, which EU regional policy aims to counter. Investing in infrastructures is a key instrument for the development of regions that are lagging behind and it provides a powerful incentive for mitigating economic disparities between regions. Removing such disparities generally has a positive effect on the economy of the internal market. A direct impact on trade is therefore not a key feature of EU regional policies (unlike EU internal market policies). However, the Member States are the main actors who shape regional policies as the activities of the European Union are limited to
a) the coordination of the general economic policies of the Member States; and
b) supporting national and regional policies by an intricate system of structural and cohesion funds and other sources of financial aid.

4.3.2 TRANS-EUROPEAN NETWORKS (TENS)

Since infrastructures are extremely important for both internal market and regional policy objectives, the development of Trans European Networks (TENs) has become a separate field of interest for the European Union. The Treaty of Maastricht introduced specific treaty provisions for the development of TENs (Roggenkamp 1998). The scope of the policies that may be adopted in this regard is, however, limited. Encouragement is the key word rather than regulation, the exception being the harmonisation of technical standards for the interoperability of infrastructures (Article 155 EC). Otherwise, the TENs policy is aimed at establishing general guidelines and priorities as well as identifying projects of common interest. Such projects of common (European) interest may be financially supported by the EU (the Betuwe railway line is an example of such a project of common interest as a link in the railway system between Rotterdam and Genua). Limited financial support may be available for carrying out feasibility studies or during the construction stage of an infrastructure project, but it can never replace or displace national financing initiatives.

Individual Member States have a strong say in TENs policies as their approval is required for measures that concern infrastructural projects within their territory (Article 156 EC). As the effect of such measures is limited and very much depend-

ent on the individual member States, TENs policies have not always been a success (Larouche 2008). In the area of transport infrastructures (the so-called TEN-T policy), initial concrete goals with a time horizon of 2010 were set in 1996 by the Council and the European Parliament (Decision 1692/96/EC), but it soon became clear that these goals could not be met. A revision of the initial guidelines produced a more focussed approach (i.e., zooming in on specific projects, without rejecting other projects) (see Decision of June 2007).

TEN-E (Trans European Networks in the field of electricity and natural gas) policies have undergone a similar fate, but these have recently received a new impetus as the need for a common energy policy has become apparent. Security of supply, the need to combat climate change and to improve the consumer's level of choice and service are relevant motives in this respect. The European Council of March 2007 called on the Member States to achieve 10% of electricity and gas interconnection capacity by 2010. It called on the Commission to appoint European coordinators who will monitor and accelerate the implementation of projects of common interest. Such acceleration is necessary as planning and approval processes in the Member States are often complex and lengthy. Thus, even though the need for a stronger EU policy in this area has been acknowledged, EU TENs policy still merely serves in a supporting role. Strengthening TENs policies is, however, high on the Commission's agenda. In 2006, the Trans-European Transport Network Executive Agency (TEN-TEA) was established and entrusted with the management of the Community funds available for the promotion of the Trans-European Transport networks. In the field of energy, a proposal for a regulatory agency is awaiting adoption. This particular agency (the Agency for the Cooperation of Energy Regulators – ACER) will focus on overseeing cross-border cooperation for the transmission of gas and electricity between Member States. Nevertheless, the Commission's proposal does not grant strong independent regulatory powers and thus doubts have been raised about the potential of the ACER to address issues of under-investment in cross-border power transmission capacity and the lack of an effective coordination strategy between national regulators.

Box 4.1 The Reform Treaty

The new title (XXI) on Energy (Article 194) of the Treaty on the Functioning of the EU provides for an explicit competence for the European institutions to adopt measures related to the promotion of the interconnection of energy networks. The inclusion of the promotion of interconnection as one of the key objectives of EU policy on energy appears to have gone unnoticed by the signatory governments. At the same time, the new article seeks to strike a balance between common European interests and individual Member States' interests as the latter will retain the right 'to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply'.

4.3.3 CRITICAL INFRASTRUCTURES POLICIES

Safety and security have, because of a growing awareness of terrorist attacks, provided for a new policy perspective on infrastructures. Indeed, infrastructures are extremely sensitive to acts of terrorism, but also to any other types of disruptions, accidents and manipulations. A growing dependency on infrastructures only adds to this vulnerability. Following the terrorist attacks in Madrid in March 2004, the European Council asked the Commission to prepare an 'overall strategy' to protect critical infrastructures. The Commission proposed a European Programme for Critical Infrastructure Protection (EPCIP) and a Critical Infrastructure Warning Information Network (CIWIN) (European Commission 2004). In a 2005 Green Paper (European Commission 2005), the Commission explored several policy options, mostly aimed at improving communication, coordination and cooperation nationally and at the EU level, resulting in a proposal for a Directive (European Commission 2006b) on the identification of European critical infrastructures and a common approach to determine whether and how these infrastructures can be better protected. The Commission's intention to come up with a joint integrated risk management strategy of critical infrastructures cannot be limited to technical solutions, but will have to address the socio-economic aspects (e.g., who pays for what, what are the consequences for the market, how are decisions made, etcetera), including the linking of security to well-being, prosperity, competitiveness and economic development as well.

At the national level, these initiatives have met with considerable opposition. Both the Dutch government and Parliament have voiced concerns on the so-called subsidiarity issue, i.e., the question of whether or not the EU level is the most appropriate level at which to take these measures, even though the Commission awarded key responsibility to controlling the processes to the Member States.

What is key is not only cooperation among Member States, but also among private actors, since the greater part of critical infrastructures, as defined in the draft Directive, is in private hands, including food supply infrastructures and electronic infrastructures, both of which fall within the ambit of the definition of critical infrastructures. Critical infrastructures are therefore marked by an ever increasing, plurality of stakeholders. If the rapid technological developments are added to the picture, it becomes clear that developing an integrated approach to risk management presents an enormous challenge in the future.

4.4 THE EU CONSTRAINING INVESTMENT DECISIONS IN INFRASTRUCTURES

The EU may also constrain national decisions on infrastructures. Network industries are economic sectors, and thus they fall under the ambit of the EC Treaty provisions on the internal market and on competition law (Larouche 2008). This implies that state measures concerning these industries must respect the four

freedoms underpinning the internal market. Furthermore, state measures should not distort competition on the market. European public values thus directly influence national decisions regarding infrastructures. These public values are expressed in legally binding ways as a result of which they are both imperative and imposed top down. However, much depends on the exact type of state intervention. Moreover, the regulation of both the internal market and competition allow for exceptions in favour of other public interests.

State intervention in the area of infrastructures may take different forms. As they exclude private parties' involvement entirely, state owned monopolies are one of the most interventionist instruments. Lighter forms of intervention may include financial (subsidies) and legal (regulation) instruments. Article 86(1) EC lays down the principle that state measures with regard to public undertakings and undertakings with privileged rights are subject to internal market rules and competition law. Since the early 1990s, Article 86(1) EC has become more intrusive as the ECJ developed a stricter approach (Larouche 2008).[1] There is, however, an escape available to justify measures that may distort competition. Article 86 (2) EC states that national measures shall be allowed to remain if necessary to enable its holder to fulfil its obligations concerning services of the general economic interest under economically acceptable conditions. The only acceptable measures are those that are strictly necessary to fulfilling the public policy objectives for which they were adopted. These tight constraints may be explained by the possible dangers that monopoly rights may pose to the policy objectives of the EC.

Other types of state intervention, such as the granting of subsidies and the use of economic regulation are subject to legal supervision, although these instruments allow for more discretion on the part of the Member States. Subsidies are subject to EU state aid policy; Article 87 EC contains a more or less general prohibition on state aid, but at the same time allows for numerous exceptions. State aid for the development of disadvantaged areas that is closely connected to EU regional policy, is permitted, for example (Larouche 2008) and may cover subsidies for infrastructure projects. In recent years, state aid law has evolved so that it creates a general framework for public authorities to inject public funds to support regulatory objectives. The ECJ in its case law has given national public authorities relatively unconstrained discretion in the development of their 'public service obligations', but, in return, has imposed a relatively strict set of disciplines on the use of public funds to compensate firms that are burdened with such obligations, so as to ensure transparency and objectivity.

When it comes to economic regulation, the evolution of EC law in regulated sectors confirms that EC law is a form of discipline for Member States. The scope of the application of internal market regulation to national regulatory measures is extremely wide, as the key concept of the 'impact on trade between Member States' is consistently interpreted in an extremely broad manner. The internal market policy objectives are not absolute as the possibility for the Member States

to adopt such measures is provided for, but their justification must be assessed on the basis of the aim of the measure concerned as well as the proportionality of the measure. This is the legal context for the trade-off between EU internal market policy objectives and national policy objectives. Similarly, Member States are prevented from using national measures as a shield for cartels or abuses of their dominant position, which would be prohibited if private operators were to enter the market.

Another type of EU involvement in national investment decisions arises in the field of public procurement. Preventing national protectionism is an important underlying motive for EU public procurement policy. Public tenders are subject to various *good governance* principles such as transparency and non-discrimination so that business undertakings from other EU Member States must have equal access to public tenders.

All in all, EU law assumes a 'control' function over national law, providing citizens and firms with the ability to challenge national choices made regarding policy, instruments, enforcement, etcetera. Over time, as case-law evolves, Member State actions in practice become subjected to 'good governance' requirements imposed via EC law, including openness, transparency, and non-discrimination amongst operators and customers. EC law becomes a force to promote better administration and to combat protectionism and arbitrary discrimination. It provides a vehicle for a healthy – but not fatal – dose of scepticism towards Member State action.

These various general principles of Community law provide an important framework for Community control over national infrastructure investment initiatives and constrain the latter through the imposition of various conditions, but they do not replace national powers with Community or centralised procedures. In general, they stimulate commercial market integration and do not lead to changes in physical operation or new institutional arrangements. However, developments within sector specific regulation reveal a different picture.

The EU's expanding regulatory repertoire is binding on Member States and is composed of three elements: First, liberalisation or ending domestic legal monopolies, initially in specific market segments but later throughout an entire industry. However, the EU did not simply 'deregulate', because the second element includes the adoption of re-regulatory rules that govern market competition and set conditions for suppliers and public actors. Key elements included rules about access to infrastructures, cost-based tariffs and universal service – i.e., rules which were designed to stimulate commercial integration.

The third element concerns implementation and is most directly relevant to this chapter. EU legislation placed duties on enforcing liberalisation and especially re-regulation on 'national regulatory authorities' (NRAs). It insisted that these NRAs be kept apart from industry, thus ruling out ministries that both regulated and

owned companies (originally the case in the Dutch electronic communications and postal services and still the case in energy, transport and water).

Thus, in this first phase, EU regulation sought to open up national markets through liberalisation and re-regulation but left the institutional architecture of implementation up to Member States. There were few available instruments to coordinate NRAs or to ensure consistent implementation of EU law, which is a major issue for the EU given that most of its legislation was very broadly defined in line with 'the politics of compromise' among Member States as well as between EU institutions. However, it must be stressed that there have been only limited attempts to define and coordinate or harmonise public values or 'public services' – with one major exception – electronic communications – where the introduction of the concept of universal service has, of course, harmonised certain but not all public values associated with the provision of communications services (Larouche 2008).

4.5 NEW TYPES OF GOVERNANCE AT THE EU LEVEL: GOVERNANCE THROUGH NETWORKS AND AGENCIES

4.5.1 INTRODUCTION

With the emergence of the EU as an increasingly relevant governance level for infrastructures, policies in this field have become genuinely multilayered. In the previous sections, the centralised, top-down influence of the EU was elaborated. However, newer modes of governance aim to take up the challenge of developing non-hierarchical forms of decision making. As such, these forms of governance seek to strike a new balance between national interests and responsibilities and the need for diversity on the one hand, and the need to facilitate internal market objectives to address cross-border issues which call for centralisation, on the other hand. An example of this is the Council of European Energy Regulators (CEER), which functions as an informal forum for cooperation among national energy regulators and with EU institutions. Sabel and Zeitlin call this type of governance directly-deliberative polyarchy (DDP) (2007). These networks may sometimes also include private actors. The so-called Florence Forum, which was set up to discuss the creation of a true internal electricity market, is an example. It not only brings together national regulatory authorities, Member States and the European Commission, but also transmission system operators, electricity traders, consumer organisations, network users and the like. In section 4.5.2, we will explore different types of networks, as they differ in practice in structure, task and composition. The patterns in which they evolve will be analysed in this section as well. Their hybrid nature allows networks to connect different levels of governance and actors but their growing influence also gives rise to the emergence of possible accountability gaps and democratic representation issues. These issues as well as their merits will be evaluated in section 4.5.3.

4.5.2 DIFFERENT TYPES AND DEVELOPMENTS

The concept of network governance is a key concept for the explaining of non-hierarchical and decentralised modes of governance. As such it is generally applied in public administration science and specifically analyses developments at the EU level. Indeed, networks to date account for a significant part of activities in the field of infrastructures as well. Such networks may be informal or even ad hoc and entrusted with only limited powers. Examples include the European Gas Regulatory Forum of Madrid ('the Madrid forum') set up 'to discuss issues regarding the creation of a true internal gas market' and the aforementioned Electricity Regulatory Forum of Florence ('the Florence Forum'), which has a similar function in the field of electricity infrastructures. Forums are consultative in nature and have no legal powers or responsibilities. Their strength depends on a broad level of participation among the stakeholders. Public and private actors from the EU and national levels may be represented in these forums. Policy learning through peer review or setting benchmarks and norms may be the most concrete results of these informal mechanisms. The networks of National Independent Regulatory Agencies (NIRA's) are similarly informal in nature, but have a somewhat stronger institutional setting. As participation in these networks is limited to public sectoral regulators (thereby excluding inter alia government and European Commission officials as well as representatives from the private sector), facilitates focussing on common issues and problems. In the water sector, the Common Implementation Strategy is an informal institution that was not provided for by the Water Framework Directive (Kaika and Page 2003), but which indeed has a key role in the implementation of the directive (Scott and Holder 2006). It helps the Member States at three levels: working groups, the so-called Strategic Coordination Group (composed of higher ranking civil servants) and biannual meetings of water directors. This proves that informal networks may supplement regulation and networks with more far reaching powers and not necessarily serve as alternatives in cases in which the latter options are, for whatever reasons, not available.

On the opposite end of the spectrum, one finds Federal European Regulatory Agencies (FERA's). These agencies would have independent powers to make rules and set standards for implementation throughout the EU, which would have to be transferred from the Commission and the national governments. To date, no such FERA exists in the field of infrastructures, but the European Central Bank (ECB) provides an example in the monetary sector. The need for increased policy-making efficiency, especially in the complex and technical policy domains of infrastructures, as well as the desire to insulate national bodies from domestic pressures has created a demand for such agencies in these sectors as well.[2] If the US experience in sectors such as electronic communications and energy were to be copied, lower-level regulatory agencies would continue to exist and to have powers in certain fields, notably intra-national issues, but questions that affect inter-(member)state trade would fall under the jurisdiction of the FERA.

Practice has shown the existence of many hybrid forms of cooperation. These contain both 'national' and 'European' elements. European Regulatory Networks (ERNs), for instance, are created through a 'Double Delegation' – the Commission and national regulators. The element of Commission representation distinguishes ERNs from networks of NIRA's, while the fact that national bodies continue to exist and have to implement EU legislation, alongside instead of subordinate to the ERN, distinguishes them from FERAs. European Regulatory Agencies (ERAs) are comparable to ERNs, but have a stronger institutional structure. They may have advisory, inspection or even decision-making powers. The European Regulators Group for Electronic Communications Networks and Services (ERG) is an important example of this.

Networks of regulators evolve incrementally, while distinct patterns in this evolution can also be distinguished. As Thatcher and Coen have suggested 'analysing EU developments as the product of incremental change, collisions and compromises between organisations and endogenous processes may offer a better paradigm to understand the institutionalisation of Europe than "grand bargains" and "intelligent design"' (Thatcher and Coen 2008). Indeed, there has been no movement towards a neat and tidy 'European regulatory space' for infrastructure provision. However, some general trends may be discerned. The first was the result of concerns in the 1990s about the lack of coordination among national regulators, uneven implementation across Member States and the adverse effects thereof on the European single market. This resulted in a rise in informal networks and forum governance. Between the late 1990s and 2002, restructuring European regulatory space again became the subject of considerable discussion as the problems had still not disappeared. The first calls for independent 'Euro-regulators' (the above-mentioned FERAs) stem from that period (e.g., Majone 1997). Another call was for greater EU Commission control. In the practice of many network industries, the option often chosen involved a 'double delegation' of functions and powers from the Commission and national IRAs. The hybrid (neither national nor European) entities resulting from these double delegations thus increasingly manifested themselves in an autonomous way (Lavrijssen and Hancher 2008: 2). It allowed them to operate in a position that distanced themselves from the political realm.

The current debates are dominated by the need to overcome obstacles in the proper functioning of the internal market (entry barriers to national markets, difficulties in cross-border trade due to diverse national standards, etcetera) on the one hand, and Member States and national regulators stressing national autonomy on the other. Both the Commission and the European networks and agencies have called for an increase in their respective powers.

Energy and electronic communications are key sectors in this respect. Thus, in electronic communications, for instance, the EU Commissioner for Information, Viviane Reding, has proposed strengthening Commission powers over IRAs, as part of a review of the 2002 regulatory framework. This proposal entailed inter

alia empowering the European Commission to issue authorisations (i.e., licences) that would allow service providers to operate throughout the EU. Later on, she even went so far to propose the strengthening of the ERG, either by transforming it into a classic European Agency (which would advise the Commission), or into a FERA, with its own powers to make binding decisions concerning IRAs and market players. But, some national IRAs and ERNs have been sceptical about additional Commission powers (see, generally, Larouche 2008). The Commission took a new step in this process in November 2007 when it proposed transforming the ERG into a European Telecom Market Authority (ETMA), thereby choosing a combination of the network (the board of the ETMA would be composed of representatives of the national regulators) and the agency model. Although it was presented in various media as a 'super regulator', establishing the ETMA does not entail the granting of formal decision-making authority. Thus, the ETMA cannot be considered a 'federal' European Regulatory Agency, but in preparing European Commission's decisions, it would nevertheless have considerable influence in the decision-making process.

The desire for an increase in powers manifests itself in other sectors as well. In energy, the European Regulators' Group for Electricity and Gas (ERGEG) has argued for an 'ERGEG -plus' as part of a 'European System of Energy Regulation' with powers to enforce decisions through sanctioning mechanisms, to have an enhanced role in advising on legislation and gathering data and to be awarded additional resources. More generally, the European Commission and ERNs have led vigorous debates in the mid-2000s about reforming institutions in several sectors. Such reforms were deemed necessary for the opening up of markets. Moreover, moving away from the consensus principle would mean that a decision could be made more effectively and the constraints to act according to the 'lowest common denominator' would be eliminated. The discussion on transforming the ERGEG into an 'ERGEG-plus', is currently part of a broader discourse on the creation and strengthening of European agencies (Lavrijssen and Hancher 2008). Lavrijssen and Hancher argue, however, that the change is in fact less revolutionary than it appears; it is basically a formalisation of the informal de facto influence of the European networks into formal regulatory powers. The increasing powers of agencies demand adequate accountability mechanisms. The formalising of these powers provides for opportunities as it would make for greater clarity regarding the different European and national responsibilities and the political and legal accountability of the 'networks plus' (see section 4.5.3).

All in all, as Thatcher and Coen have indicated, the institutional patterns that may be discerned across the various sectors are marked by incrementalism, growing centralisation, and increasing institutionalisation (Thatcher and Coen 2008). A clear demarcation between EU and national responsibilities (since these networks and agencies are comprised of actors from both levels) as well as adequate accountability mechanisms is, however, indispensable.

4.5.3 ACCOUNTABILITY ISSUES

Networks and agencies sometimes have far-reaching abilities to influence both the European Commission and national authorities (Lavrijssen and Hancher 2008). The knowledge and expertise of these networks and agencies certainly help to improve the quality of the decision-making process. At the same time, however, accountability 'gaps' may arise, as the hybrid nature of these networks and agencies may make it unclear whom they are accountable to. Although they operate in the public interest, they are in practice rather distanced from and invisible to the public. Even for the democratically elected institutions it is quite difficult to get a grip on these networks and agencies. Since networks do not constitute EU institutions, they are not accountable to the European Parliament, although the European Parliament may hold the Commission accountable for its participation in networks (Lavrijssen and Hancher 2008: 15). Similarly, national parliaments may hold national ministers accountable for their involvement in networks, but the network as such remains outside the scope of overall accountability arrangements, thus resulting in a scattered and patchwork accountability system. Agencies are better embedded in the EU institutional legal structure which makes democratic control over their activities easier.

Things are further complicated by the fact that generic accountability requirements are difficult to set. Indeed, as may be concluded from the preceding section, networks and agencies are so diverse that catchall accountability mechanisms may not be imposed. In the case of informal networks, accountability of the network as a whole is irrelevant. Instead, the individual participants of such networks should be held accountable. Conversely, if these networks enjoy more autonomy, accountability mechanisms should be tailored to this fact.

Moreover, as networks and agencies are highly dynamic, the need for accountability mechanisms evolves over time as well. As networks tend to centralise and see an increase in their powers (see previous section), stronger demands will be put on the possibilities of holding such networks accountable. The differences between networks and their evolution over time imply that accountability mechanisms always need to be tailor made.

It is widely seen as a fundamental drawback of network decision making that it departs from the key principles of representative democracy (Sabel and Zeitlin 2007). Deliberation and decision making among technical elites seem to be at odds with majority decision making by directly elected representatives.

The legitimacy of networks is, however, strongly supported as well. By labelling such forms of governance *directly-deliberative polyarchy,* Sabel and Zeitlin have pointed to the legitimacy advantages of network cooperation (2007: 9). As a form of deliberative governance, it is based on argumentation and may as such contribute to redefining individual, but also common, interests, practices and assumptions. This is facilitated by the fact that the participants have concrete

experience in dealing with the issues at stake. Thus, an environment is created that allows for mutual learning, common disciplining and setting goals with considerable openness for corrective and adaptive action (Sabel and Zeitlin 2007: 9). Peer review may be a strong accountability mechanism: confronted by the various solutions to similar problems, participants, but also politicians, are stimulated to publicly defend their policy choices. Instead of a principal-agent accountability mechanism, peer review becomes an alternative accountability mechanism.

These forms of accountability, however, concern all internal mechanisms. The technocratic elite is accountable to other representatives of that same elite. In other words, these networks are largely left to control themselves (Kickert 1993: 275). Interdependent as the participants are, the network constitutes a mutual accountability network (Scott 2000: 38). However, Sabel and Zeitlin argue that the effects of such accountability mechanisms have broader spill-over effects as well (2007: 46ff). Transparency and stimulating broad participation constitute in their view driving forces for these spill-over effects. In the case of the Florence Forum, for instance (mentioned in the previous section), broad participation is realised by the participation of both industry and consumer organisations. This could, however, as Harlow and Rawlings argue, risk them being 'sucked into' a network of which the accountability function would be blunted by the mutual interest (Harlow and Rawlings 2007: 6). They therefore call for separate accountability networks to be established, along the lines of networks of ombudsmen and courts. Such accountability networks should be characterised by shared expertise and have inter alia powers to undertake joint investigations. In the field of infrastructures, accountability networks in the field of financial audits and parliaments may enhance the legitimacy of decisions made and complement the internal accountability mechanisms within networks of experts.

4.6 CONCLUSION

Does internationalisation (especially Europeanisation) have the effect of making the national level irrelevant when it comes to infrastructure investment policies? It is this question that often dominates in the assessment of the effects of internationalisation. In some instances, the effect of European Union policies may indeed be that national policies are not implemented. However, the effects of EU policies are generally much more subtle and complex than that. Moreover, other challenges that internationalisation poses may be overlooked when focussing exclusively on the issue of what is left to the national level.

The first of these challenges is whether the level of physical and functional internationalisation matches the level of internationalisation in terms of governance. Physical integration of infrastructures across Europe has led to a much greater mutual interdependence. Moreover, positive effects in terms of efficiency and enhancing security of supply (e.g., in the area of electricity) have been marked. Governance structures have also been internationalised, but not always to the

same extent or in the same way. This may very well lead to mismatches between the functional level and the governance level of internationalisation. When this becomes the case, the efforts of the Dutch government should aim to strengthen EU power in order to cope with the effects of physical internationalisation.

Secondly, internationalisation has led to the emergence of new governance structures. In coping with the tension between centralisation and decentralisation, networks and agencies have thus become important governance modes. These networks and agencies have an enormous potential in bringing together actors from the different Member States and the EU institutions and thus in pooling knowledge, expertise and problem-solving capacity. In other words, such networks contribute much to connecting different actors and governance levels. As such, they constitute an effective mechanism of dealing with increased internationalisation without totally losing one's grip at the national level.

Networks and agencies require adequate checks and balances – mechanisms, however, as some of them enjoy a considerable amount of autonomy and are able to influence the decision-making process. The academic literature on the internal accountability mechanisms of networks and agencies, whereby the individual participants are held accountable by the other participants, has analysed them and made its recommendations. However, these modes of peer review are insufficient. Political accountability is a particular problem, as these networks are mostly rather technocratic in nature. Because they are hybrids (composed of both national and European representatives), it is difficult to set up external accountability networks. Ideas to this end might, however, be found in the creation of parallel networks of accountability.

Thirdly, as stated above, the influence of the EU is much more multifaceted than simply posing a possible obstacle to national investment decisions. On the contrary, several EU policies aim to promote national investments in infrastructures, in the international interconnectedness, for instance, although these policies are admittedly hardly imperative in nature. More generally – although networks in different sectors are of a trans- or pan-European nature – the EU is only engaged in investment decisions to a limited degree. Thus, internationalisation at the level of governance is far from reaching the stage where national institutions and mechanisms are entirely replaced by new European institutional arrangements. In other words, pan-national institutional arrangements, which could lead to the initial determination of the relevant public values as well as their application to particular investments, have not yet been developed.

Even when it concerns EU policies that may pose obstacles to national infrastructure investments, the EU will most likely simply forbid national investments. Rather, the EU will prohibit particular ways of investing, while offering the Member States options to effectuate these investments in other ways. Thus, Member States will retain discretion but they need to remain aware of the limits thereof. It is, therefore, crucial to be aware of and to try to adapt to this European

policy context. This policy context is mainly aimed at market opening, the non-discriminatory functioning of markets, etcetera. Thus, the Europeanisation of infrastructures and governance has caused new public values and interests to emerge that need to be taken into account. In some sectors, especially electronic communications, this has led to significant regulatory frameworks that have in their turn altered the arenas considerably with regard to the emergence of private actors, regulators and the like.

NOTES

1 Networks as a tool for both connecting levels and arenas, and checks and balances.

2 See infra for the recent plans to establish such an agency in the field of electronic communications.

5 REGIME CHANGE AND PUBLIC VALUES IN INFRASTRUCTURES

5.1 INTRODUCTION

Infrastructures are the precondition for the delivery of services that are indispensable to modern societies, e.g., services such as drinking water supply, the provision of electricity, data communication and flood control. But the significance of infrastructures for society goes beyond the delivery of services. As Van der Woud's study (2006) has shown, infrastructures have been the prerequisite for economic, social and cultural development in societies. Infrastructures serve a wide array of public interests and values; from sustainability; public health, safety and reliability; affordability and many more. The relation between these public values and the investment in infrastructures is evident. Since the mid-19th century (Disco 1990), infrastructures have been a major policy tool for governments in the realisation of these broader public values and, over the last centuries, governments have sought to direct and develop societies through infrastructures.

With regime change that has occurred since the 1980s, however, emphases on efficiency gains, improvement of the service and on the short-term were introduced. Chapter 2 described this movement as an emphasis on 'Type I' market failure. Recently, attention has again been drawn to wider public values, which were described in chapter 2 as 'Type II' market failures. This renewed attention is partly a reaction to the narrower focus stemming from the previous stage of regime change, but it is also due to new external challenges, e.g., climate change and the future depletion of fossil fuel resources (International Energy Agency 2007). These challenges require systems innovations in many infrastructures, e.g., road and railway transport that is more sustainable; the strengthening of dikes; energy provision that relies on non-fossil fuel sources; CO_2 storage and natural gas storage.

Since public values are the heart of the matter in infrastructures, governments have continued to play a role in ensuring that 'physical' infrastructures are guaranteed now and in the future. The processes of regime change (as discussed in chapter 2) have altered the role of the state with respect to infrastructure provision, however. Instead of producer/operator, the state has now become a 'director' (Tweede Kamer 1999-2000, 27018, no. 1). This shift has an impact on the way in which public values are articulated, balanced, realised and monitored (see also Teisman 2008; Larouche 2008).

In this chapter the public values thus serve as a normative perspective for the analysis of change (chapter 2, 3 and 4). The purpose of this chapter is to first identify the impact of regime change on public values so far. This chapter builds on chapter 2, which noted that regime change up till now has concentrated on

'Type I' market failures: the institutional arrangements focus on static efficiency issues. Here it was argued that despite the fact that efficiency is an important value, it is not the only value that is relevant in relation to infrastructures. Sustainability, equity and innovation, for example, are also infrastructure-related public values. Chapter 2 pointed out that these values – unlike static efficiencies requiring dynamic arrangements – are currently undervalued in institutional arrangements. Considering this assessment, this chapter proposes some new institutional arrangements that can deal with these new issues, which were listed under 'Type II' market failures in chapter 2.

5.2 WHAT ARE PUBLIC VALUES IN INFRASTRUCTURES?

5.2.1 PUBLIC VALUES OR PUBLIC INTERESTS?

The conglomeration of concepts of public values, the common good, public interest and other related concepts – though not synonyms – have, as Bozeman (2007: 1) has pointed out, been identified as the worthy goal of government ever since Aristotle's *Politics* ('common interest'); St. Thomas Aquinas' *Summa theologiae* ('common good') and Locke's *Second treatise of government* ('public good'). All these terms and concepts are reflected in the current debate in the Netherlands and elsewhere on the role of infrastructures. This report follows Bozeman's distinction between public values and public interests (2007): Public interest is an ideal construct, whereas public values have specific, identifiable content. The public interest refers to the outcomes that best serve the long-run survival and well-being of a social collective construed as a 'public' (Bozeman 2007:12). A society's[1] public values are those providing normative consensus about a) the rights, benefits, and prerogatives to which citizens should (and should not) be entitled; b) the obligations of citizens to society, the state and to one another; and c) the principles on which governments and policies should be based. The term public value should not be equated with government responsibility. To say that a public value is held by a society says nothing about the responsibilities for providing for this public value.[2] It is, however, true that many of the public values refer to externalities for which the market will not provide a solution. In most instances, some kind of monitoring or enforcement from the state will remain necessary. The relation between public values and the role of the state is discussed in detail in the last section of this chapter.

5.2.2 THE DEBATE IN THE EARLY STAGES OF REGIME CHANGE

The preliminary steps in regime change formed the context for the discussion on public values in the late 1990s and early years of the 21st century. Until that time, public values in infrastructures, their trade-offs as well as the mechanisms to achieve them had remained largely implicit and obvious. Now that organisations were increasingly placed at arm's length from the state, public values and the mechanisms to realise or enforce them had to be made explicit.

This quest for more explicitness is reflected in the first reports that showed the renewed interest in the topic. The WRR report *Het borgen van publiek belang* (2000), for example, concentrated on the question of *how* public interests can be safeguarded. The decision on the definition and the priority attached to specific public values (the 'what' question) is principally an assignment of the political realm, a point also made in this present report.[3] The WRR identified four mechanisms to secure public values: rules (enshrined in laws or contracts); competition; hierarchy and institutional competition (enhancement of values and norms within an organisation engaged in the operational processes). Focussing on the mechanisms, the WRR did not list the public values that were at stake. In the official response by the government to the WRR report (Tweede Kamer 2000-2001, 27771, no. 1), it was argued that it was desirable, though impossible to provide a list of explicit public interests given the differences between the societal sectors, which varies from social security, to the police, housing and infrastructures. For the same reason, this report will not prescribe which public values should be realised in each infrastructure.

Another example of the debate in the early years of renewed attention is the Ministry of Economic Affairs publication on 'liberalisation and privatisation of infrastructures: public interests and market structures' (Tweede Kamer 1999-2000, 27018, no. 1).[4] This document focussed on different market structures (competition between infrastructures, competition on the infrastructure, competition for the market, and benchmarking) and ways to secure public values within the various market modalities. The following public interests in infrastructures were identified: universal provision of services; protection of the bounded consumer; security of supply; quality; environment; safety and public health; efficient (free) market processes and efficient regulation. The report sketched how certain public values could be embedded in laws, contracts or permits, for example. Another influential report was the Ministry of Economic Affairs and Ministry of Finance publication *De calculus van het publiek belang* in which the economists Teulings, Bovenberg and Van Dalen provided a detailed step-by-step plan on how to determine and prioritise public interests.[5] The calculus was criticised by public administration scholars in the publication *Calculeren voorbij de calculus* (De Bruijn, Ten Heuvelhof and Van Twist 2004), where it was argued that public values can not be 'calculated'. Instead, public values are ambiguous, relative and contested. Many other studies followed, some in line with Teulings, Bovenberg and Van Dalen, some in line with their opponents' view.

What these reports have in common is that they aimed to contribute to the realisation of public values at a time when the initial steps of regime change were being taken. They did not evaluate regime change or its impact on the realisation of public values as such. This report can be viewed as a renewed analytical attempt to connect the realisation of public values to institutional arrangements, given that regime change has developed in all infrastructures, albeit in a non-linear process. This chapter also aims to incorporate academic and practical

insights on the impact of the institutional arrangements that have developed in the course of regime change thus far. This is how it seeks to include an evaluation of the early stages of regime change and the set of instruments developed earlier to achieve public values. Our approach is analytical and based on the theoretical characteristics of the institutional arrangement, we carry out a conceptual analysis. An empirical illustration is provided in chapter 6.

5.2.3 PUBLIC VALUES AND INVESTMENT IN INFRASTRUCTURES

Investment in infrastructures is the precondition for the realisation of the public values that are directly linked to a specific infrastructure. Water mains and the sewer system, for instance, are a precondition for the realisation of public health; similarly, dikes are necessary to protect the public from floods. But infrastructures also serve wider societal goals, e.g., economic development and sustainability. Some policy reports (e.g., Raad voor Verkeer en Waterstaat 2004a-b) list investment as one of the public values that needs to be realised, along with innovation and sustainability. This report views investment not as a public value in and of itself, but as an instrument to achieve wider long-term public values such as sustainability, innovation, long-term accessibility and reliability.

Investment in infrastructures is necessary for all infrastructures, but it is especially important in stimulating the system innovation that is required in many infrastructures. Electric cars, for example, may be the future (Versteegt and Verbraeck 2004) but their development will not happen unless there is an infrastructure in place. The run-back of energy by green house farming is also a theoretical possibility, but in order to make it happen it must be made technically feasible as well. The storage of CO_2 will only become a reality if an infrastructure for transporting the CO_2 from producer to storage is developed. Infrastructures thus facilitate crucial system innovations, of which the transition to a low-carbon economy is probably the most critical shift at present.

5.2.4 THE DYNAMICS OF PUBLIC VALUES

In the various sector-specific publications we find slight variations regarding the quite stable collection of public values. The values most often cited are: universal service, NF consumer protection, overall efficiency, environment and conservation, quality of service, continuity of supply, affordability, research and development, efficient (free) market processes and efficient regulation.

A tempting line of reasoning could be that since the public values worth realising are known, the state or other actors only need to define them, and leave it to the (public or private) actors to realise them or otherwise enforce them, through laws, contracts, concessions or permits, for example. This chapter argues that, albeit seemingly persuasive, this line of reasoning which leans exclusively on the hierarchic mechanisms of laws, contracts and permits, is not viable. The difficulties are hidden in the characteristics of public values.

Public values are ambiguous

Public values, such as 'affordability' and 'sustainability' or 'continuity of supply' are ambiguous. After all, what does affordability mean in practice? Immediate questions arise: Affordable for whom? How will they be used in the infrastructure? How affordable is affordable enough? How can affordability be translated into norms that can be enforced? How do we measure affordability? It is a long way from the formulation of this abstract notions to the implementation of concrete norms that can be used in daily operations.

Prioritisation shifts over time

The collection of public values may be fairly stable, but that does not mean that the prioritisation of public values is stable as well. Prioritisation may shift as a result of new actors entering the infrastructure that are more successful in claiming or articulating public values. But prioritisation may also shift as a result of a change in the political tide. The recent attention being paid to sustainability was not foreseen five years ago. Technological developments are yet another source of change in prioritisation. The arrival of mobile phones, for example, made the public value of universal service less prominent on the infrastructure agenda. And there are, of course, incidents and accidents that push certain public values into the foreground. After the UK experienced a series of train accidents, for example, the one at Ladbroke Grove in West London on 5 October 1999, where 26 persons were killed[6], safety became suddenly more important. The same is true for the flood control: the willingness to invest in dikes increased considerably after the near flooding experienced in the 1990s.

Public values or particular values?

It is often not easy to make a distinction between particular or sector interests and 'public values'. This issue refers to the question of who or what is the public, which has important implications for the solidarity mechanisms: should all inhabitants pay for the flood control or only those living on the flood plains? Is the protection of these citizens a public value, or is it just a limited interest of that particular group of inhabitants?

Public values refer both to process and to content

Some of the public values listed above refer to substantive public values, directly related to infrastructures, e.g., security of supply. Other values are related to the ways in which actors involved in infrastructure provision should behave. For example, according to the report of the Ministry of Economic Affairs quoted above, the state should guarantee efficient free market processes. Other procedural values that are often found in publications on public values (Jørgensen and Bozeman 2007) are transparency, stakeholder involvement, honesty and integrity. But achieving a procedural public value may occur at the expense of achieving substantive public values, as Veeneman and Van de Velde have showed for the transport sector (2006). And this leads to our final point.

Public values are inherently relative

The realisation of one public value, e.g., drinking water quality, may compete for the resources that are also needed to achieve another public value, e.g., affordability: increased investments in quality will increase drinking water bills. Thus, the realisation of public values always requires a trade-off.

5.2.5 CONCLUDING REMARKS: AN APPROACH TOWARD PUBLIC VALUES

The dynamics inherent in public values (5.2.4) cannot be frozen; neither in laws, contracts nor in any other way (see also Kenniscentrum voor ordeningsvraagstukken 2006: 70). The focus in this chapter has therefore not been on how the dynamics regarding public values can be eliminated. Instead, the approach has been how public values can be realised, given these dynamics. It answers this question with special attention paid to three elements. The first is the impact of regime change on the realisation of public values thus far. Secondly, this chapter devotes attention to the role of the state in this new context. And thirdly, how can public values be realised in this new context and which institutional arrangements are necessary?

5.3 INSTITUTIONAL ARRANGEMENTS TO REALISE PUBLIC VALUES

In the traditional situation of infrastructures, i.e., prior to regime change, the state was responsible for almost the entire transaction chain regarding investment in infrastructures. The state, in various forms and at various levels, was responsible for the realisation of public values associated with infrastructures. Chapter two has described a situation that, since the 1980s, all Dutch infrastructures have undergone changes as a result of regime change, albeit at various paces and to various degrees. The question here is how public values have been achieved thus far under these new conditions and whether this is still a viable way considering future challenges.

We have seen different responses in the various infrastructures to the withdrawal of the state from infrastructure operations. The general response has been the imposing of regulations to reform and restructure the infrastructures. In addition to regulation, in some but not all infrastructures, an independent regulator has been introduced to implement the regulatory requirements regarding the public values, e.g., in the electronic communications sector, electricity, gas and railway sectors. Some infrastructures do not have an independent regulator, but they have increased the institutionalisation of self-regulation, e.g., the drinking water sector. Another response has been to make public values explicit in contracts. These various responses to regime change have implications for how public values are defined, protected, realised and monitored. In this section, the interplay between the various institutional arrangements and the risks and opportunities for the actual realisation of public values is described.

5.3.1 INDEPENDENT ECONOMIC REGULATION AND PUBLIC VALUES

Independent economic regulation can be found in the infrastructures for gas, electricity, electronic communications and railways. How are public values realised once independent economic regulation has been set up? Independent regulation was set up to realise certain aims, e.g., reasonable tariffs. But, given the inherent necessity of trade-offs between public values (5.2.4), the protection of one public value will influence the realisation of another public value.

The classic model of economic sectoral regulation has taken a largely open-ended approach, avoiding the pitfalls of attempting to predetermine the public values in any formulaic manner. This is the response to the characteristics of public values listed in 5.2.3. The open-ended approach seeks to realise public values in three ways (see European Policy Forum 2007). First, public values are (indirectly) realised via the the regulator's duty to promote market competition. Secondly, with incentive-based regulation, efficiency incentives are provided for the regulated firm, without the regulator having to get involved in management decisions, and these efficiency improvements are also seen as ways to provide both consumer and social benefits through lower prices and quality of service improvements, for example. Thirdly, specific social concerns have also been reflected in the statutory duties of regulators (for example, universal service obligations). The open-ended approach has focussed on preventing legislators and regulators from getting bogged down in attempts to reach comprehensive definitions of public values.

Tasks of three independent regulators: Short-term and procedural

In the table below, the responsibilities of three independent regulators are described with regard to public values. The table shows two things. First, regulators do not have the statutory tasks that allow them to interfere with the investments or the innovation of the infrastructure organisation. They focus on short-term efficiency, the consumers and competition. Secondly, the list of statutory duties of the three regulators shows the significance of procedural public values, which apply to the decision-making process.

Whereas substantive public values regard the qualities of the infrastructure itself (such as capacity, security of supply, safety, etcetera), procedural public values seek to enhance the quality of the decision-making process. Involvement of relevant stakeholders and openness are some examples of procedural public values. The implicit assumption is that optimising the parameters of the decision-making process will result in optimal investment decisions as well. As the arenas in which investment decisions are taken, as well as the infrastructures themselves, are becoming more dynamic and complex, procedural public values become an increasing necessity.

The rise of procedural public values occurs in all infrastructures. In the drinking water sector, two significant procedural values will be inserted into the coming

Table 5.1 Summary of economic regulators' statutory duties[7]

	DTe	Opta	Vervoerskamer
Statutory duties	Yes	Yes	Yes
Further/Protect the interests of consumers	Yes	Yes	No
Further/Protect the interests of citizens	No	Yes (internet security)	No
Protect specified vulnerable groups	Yes (retail tariffs for small consumers)	No	No
Promote competition	Yes	Yes	Yes
Facilitate market innovation	No	Yes	No
Encourage market investment	No (but they do have to provide a reasonable/fair return)	Yes	No
Maintain security of supply	Yes (they have to enable the companies to maintain security of supply)	No	No
Maintain the competitive position of NL	No	No	No
Facilitate the development of self-regulation	No	No	No
Promote public awareness	Yes, but it's not explicitly statutory as it falls under promoting the functioning of markets	Yes	No
Provide advice to the government	Yes	Yes (draft legislation, frequency allocation)	Yes
Enhancing efficiency	Yes	Yes	Yes
Market monitoring	Yes	Yes	Yes
Fixing tariffs	Yes	Yes	Yes

Drinking water act. Much attention was paid to the explicit provision that drinking water companies should be fully publicly owned, thereby reflecting the notion that public involvement in the drinking water sector is a public value in its own right. Secondly, the comparison of the output of drinking water companies may be considered a public value in the obligations of these companies to take part in benchmarking, thereby fostering transparency as well (chapter 5 of the Drinking water Act Draft). Meanwhile, transparency and stakeholders' involvement are both major public values in the electronic communications sector.

Substantive public values are not only increasingly accompanied by procedural public values, but they are also more frequently operationalised by procedural safeguards. In the railway sector, international interoperability is a significant (substantive) public value. Rather than setting concrete substantive norms, EU

directives contain extensive provisions on how to adopt so-called technical specifications for interoperability (TSIs) (EU directive 2001/16/EC on the interoperability of the trans-European conventional rail system). Such procedural safeguards may even be found in the Act on Water dams (for instance, the obligation of the network manager to periodically report to the provincial authorities on the condition of the dikes – Article 9 Wet op de waterkering).

Pros and cons of independent regulator for the realisation of public values

This model seemed to work well for about fifteen years, and, meanwhile, many public values such as transparency and efficiency have improved. But exogenous challenges (e.g., climate change, the depletion of fossil fuel resources) have put this model under pressure (e.g., Helm 2007). Investment, innovation and sustainability have moved to the forefront and these pressures seem to be leading regulators to involve themselves much more deeply into the size and composition of the investment programmes of regulated firms than originally envisaged (European Policy Forum 2007). As we have observed, one of the answers to these challenges has been the increase of the significance of procedural public values – such as public participation with regard to water management (e.g., obliged by the Water framework directive). This may be adequate for the replacement and maintenance investments. It is, however, not sufficient to stimulate system innovation since regulators only have a limited set of public values that they can monitor and enforce. Monitoring and the enforcing public values – such as innovation – that are necessary for the transition to a new kind of infrastructure, are typically not part of their legal mandate. Instead, independent regulators are focused on the short term and on the consumer.

5.3.2 CONTRACTS AND CONCESSIONS AND PUBLIC VALUES

Another way to realise public values under conditions of regime change has been to make them explicit in contracts. This is obviously the case in infrastructures that have undergone major changes as the result of regime change (electricity, gas, rail): actors that used to be vertically integrated are now unbundled. The relations between the heterogeneous actors are now institutionalised through contracts. Contracts, for example, between the responsible firms are made for building, operating and maintenance when one firm still owns the assets but as a result of unbundling, operation has been entrusted to another – as in the (regional) gas and electricity sectors.

But for the infrastructures in which regime change has been relatively limited, contracts have also become more important. The drinking water sector, for example, has undergone limited regime change, with maintenance often being contracted out. In the dikes and roads sectors, designing, building, operations and maintenance functions are often contracted out and the evolution of smart contracts that are more integrated and output based have become a major focus for Rijkswaterstaat over the last five years (De Jong 2003).

Increasingly, public values have become part of the contracts. In the waste sector, for example, a company owned by a municipality was recently bought by a private equity. In a contract between the city of Rotterdam and an investment 'consortium' (Hancher, Dicke and Jorritsma 2008) they agreed to not sell the AVR company until 2010. Secondly, they agreed not to sell any of AVR's business units separately until 2009. And thirdly, they agreed to keep the company's headquarters in Rotterdam. The municipality ensured that its tariffs for AVR's services would not increase disproportionately by signing a 25-year contract with the company just before it was sold.

Pros and cons of the use of contracts for the realisation of public values

The realisation of public values involves four issues. The first and foremost risk for public values is that contracts are eventually terminated. Public values that are put into contracts, for example, as in the AVR case described above, run the risk that they will no longer be safeguarded upon the end of a contract. Secondly, there is the potential risk that contracts create a bias towards values that can be easily described and quantified (e.g., quality in terms of the percentage of trains running on schedule) versus 'soft' public values that are much more difficult to quantify (e.g., the need for innovation). Another issue which is analogous to the first model, is that only those public values that are mentioned in the contract will be honoured. But contracts are by definition never complete (chapter 2) and this incompleteness refers especially to the long-term public values. Finally, contracts are more flexible than laws. The advantage is that the prioritisation of public values can be adapted to changing circumstances or political preferences. But the downside is that this may lead to tinkering, increasing the uncertainty for the infrastructure organisation. The conclusion must be that there are advantages to contracts for some public values (chapter 2), but they also have serious drawbacks (see also the report by the Kenniscentrum voor ordeningsvraagstukken 2006).

5.3.3 SELF-REGULATION AND PUBLIC VALUES

In some infrastructures, only very limited regime change has occurred and there was no apparent need to establish an independent economic regulator. Drinking water companies, for example, have through self-regulation actively sought to improve efficiency, quality and transparency in the infrastructures. Activities initiated under the heading of self-regulation may vary from the introduction of benchmarks that are made public (drinking water companies) or the active exchange of information and expertise.

Self-regulation and the pros and cons for the realisation of public values

Self-regulation has a potentially positive effect on the realisation of public values. There is the risk however, that the infrastructure will rely too much on the mechanisms to safeguard public values that matched the traditional situation, but no longer fit into the new reality in which the infrastructure organisation has become more commercial. It is especially the challenges that stem from hybrid

organisations that are not being properly addressed: the public values as well as the mechanisms to realise public values have remained largely implicit, while the orientation of the infrastructure organisation has shifted towards a commercial outlook. This commercial outlook may result in more trade-offs of public values than would have occurred in the traditional situation. This situation results in an arrangement in which efficiency and profits become the main incentives, while the public values involved are not part of the incentive structure. An example here is the drinking water sector. A study (SEOR-ECRi 2007b) showed that drinking water company profits have risen over the past few years. Political parties, especially the Socialist Party, have expressed their concerns that the commercial motive has overshadowed major public values such as affordability.[8] The question was raised whether infrastructures also needed to be monitored by an independent regulator. The debate in Parliament (Tweede Kamer 2006-2007, 30895, no. 3), however, resulted in the conclusion that no independent regulator was necessary, given the service quality and water costs for the average household in the Netherlands.

5.3.4 CONCLUDING REMARKS: THE NEED FOR REVIEW OF THE INITIAL RESPONSES

These three initial responses to the realisation of public values under the new conditions of regime change seem to be ripe for review from a public values perspective. Following Van Dijk (2008), Helm (2007) and European Policy Forum (2007), and in line with chapter 3, this report identifies three major causes.

Politics versus technocratic decisions

Public values and their prioritisation require political choices. In the past 15 years, it has been observed (European Policy Forum 2007) that the regulator has become more and more involved in what were once considered the management areas of the investment program; meanwhile, the government has also returned to reassume some of its regulatory functions. This is mainly because social and environmental concerns are becoming pervasive and because resolving any conflicts between objectives (in the energy mix, for example) seems to require political rather than technocratic decisions.

Focus on service values, not infrastructure values

In the institutional arrangement with an independent regulator, the focus has been on the safeguarding of the public values in the delivery of services, most notably the efficiency gains that should be translated into lower prices for the consumer. The independent regulator is not focused on the public values that are important in infrastructures (see De Pree 2008). Especially the long-term public values that are hard to quantify (investment, innovation, sustainability) have not been part of the mandate of the independent sector regulators. Values beyond the regulator's legal mandate tend to be ignored because they are not enforced elsewhere in the system (Algemene Rekenkamer 2006).

Focus on national values instead of international values

Chapter 2 explained the difference between the technology or function of the infrastructure, on the one hand, and the governance of the infrastructure, on the other hand. Chapter 4 described the pace of the internationalisation of the function of the infrastructure that does not run parallel to the internationalisation of governance. The independent regulator is part of this tension: the sector regulator's statutory duties focus on national territories. In practice, the sector regulator focuses on the national consumer. This focus has important implications for the safeguarding of public values that are not confined to the national boundaries or public values not related to the national consumer, as chapter 6 will show in detail for electricity and gas. For the potential conflicts between national public values and international (system) values, there are as yet no institutional arrangements in place to deal with these new public value conflicts (see also Shuttleworth 2008: 3).

The conclusion here is that all three initial responses need to be reviewed. The focus in all models tends to be on short-term efficiency, the national consumer, and primary service delivery. None of these models can accommodate long-term public values relevant to infrastructures, e.g., sustainability and innovation. The next section discusses the options for this kind of review.

5.4 OPTIONS FOR THE REVIEW OF THE INSTITUTIONAL ARRANGEMENTS

What are the options for improving the current institutional arrangement with regard to future challenges? There are two options that are most frequently debated. First, to review the tasks and the role of the independent regulator[9], or to establish independent regulation in infrastructures where it is not existent yet. The latter was for example proposed by the Consumentenbond, the Vereniging Eigen Huis and the Vereniging voor zakelijke watergebruikers (VEMW),[10] as based on an analysis by SEOR-ECRi (2007a) in the drinking water sector. The introduction of independent regulation for the road sector was also proposed by the Raad voor Verkeer en Waterstaat (2007). A second option that is often heard by the SP and FNV,[11] for example, is to allow the state to assume some of its former functions. This section explores the pros and cons of these options.

5.4.1 REVIEW OF THE INDEPENDENT REGULATOR

There are two main options in the area of safeguarding public values using the model of the independent regulator. (These options are largely taken from the European Policy Forum 2007.) The first is to add public value duties to the duties of the existing regulators, the second is to reformulate the duties of the regulator and to extend regulatory agencies into infrastructures where they are at present operating.

1a Make the independent regulator also responsible for new public values

The proposal is to maintain the competitive markets focus of the existing model and to rely on the regulator to absorb the new public value duties into their present functions. They are then treated in the traditional way as definable 'add on' responsibilities around the continued chief focus on consumer interests and competitive markets (European Policy Forum 2007).

Pros and cons of add-on responsibilities

When weighing these possible options, it is desirable to take stock of what has been achieved by independent sector regulators thus far. They are more capable of gathering information more effectively than the government, they provide centres of specialised expertise, they have become sources of epistemic authority in their field and among their peer groups, and they provide information to the public that is less distrusted than information provided by governments and other sources such as the business sector. They provide a more stable setting for those they regulate. They also have an incentive to inform the public and regulators of the reasons for their actions and to follow procedural disciplines that may be absent for governmental departments. They have achieved credibility with the public. This option endorses the current approach and involves a decision as to whether the resolution of public interest 'add-ons' into their component parts, is sufficient to realise their strategic public interest objectives. Another important issue is that the very nature of the regulator's role could become a political one: instead of regulating tariffs, he has to make trade-offs between various public values, e.g., affordability versus sustainability. The question is whether this kind of increase of the discretionary room would fit the Dutch current institutional make-up. Those in favour of such a revision (e.g., Algemene Rekenkamer 2006) would argue that a less profound divide between politics and the technical domain can be very fruitful for the realisation of public values that would otherwise tend to be disregarded. But opponents to this revision would argue that an increase of the regulator's discretionary room in the Dutch system, is not politically legitimate where political decisions are concerned; after all, political decisions should be made by bodies that are democratically legimitized.

1b Hiving off competition tasks to a competition authority and making sectoral regulators responsible for infrastructure issues

A second response would be to modify the competition and market efficiency focus of the existing model and place the new types of public interest concerns at the centre of the regulator's task. The regulator's statutory duties would need to be overhauled to reflect the new, more socially oriented mandate, and political priorities might need to be clarified in the case of conflicts between broad objectives. The task of promoting competition could be hived off to the competition authorities. This approach could also imply that regulatory agencies are introduced into infrastructures where they are not as yet operating. Recent pleas for independent regulation in the drinking water sector (Van Damme 2006; SEOR-ECRi 2007a) and in the transport sector (Raad voor Verkeer en

Waterstaat 2007) show that this issue is currently also being debated in the Dutch context.

Pros and cons of the reformulation of regulatory duties

This approach could potentially reflect the new public interest concerns more clearly and could provide greater guidance in cases involving conflicts between various public interest goals. But hiving off any pro competition responsibilities would remove an important procedural and analytical discipline and possibly overburden the competition authorities with relatively trivial complaints about the quality of services. Though this solution addresses the changing constellation of the actors (multiple and hybrid actors), it does not address the issue of multiple levels (see chapters 3 and 4).

5.4.2 BRINGING THE STATE BACK IN

The arguments used for 'bringing the state back in' refer to the issue of the realisation of public values involving choices that are essentially political in nature. 'Bringing the state back in' could take a variety of forms, from greater use of ministerial directives, to using state shares to more actively monitor and safeguard public values (for a more elaborate discussion of this topic, see chapter 7), or to reintroduce the responsibilities of the regulator back into various departments of the central government and within the general duties of government itself.

Pros and cons of bringing the state back in

The persuasive argument that can be made in favour of independent regulation conflicts with any attempt 'to bring the government back in' into the general operations of infrastructures. No one truly desires a return to various ministerial stop-gap measures and unclear departmental interference. Chapters 1 and 2 discussed the investment in dikes and sewerage (infrastructures where regime change has been limited and where the state still plays a major role) and it revealed that state involvement in operations is by no means a guarantee for sufficient levels of investment. The sewerage sector is especially known for its lack of investment in the past decades. Since the 1980s, efforts have been made to counter this lack of investment (RIONED), but the shortage of investment is currently mainly due to increased quality standards and rapid deterioration and is estimated at € 2.9 billion (Gerritsen and Sterks 2004). Moreover, this option is not a solution for problems involving internationalisation (chapter 4), especially the tension that exists between the function and governance of infrastructures.

The examples above refer to the direct involvement of the state in operations and the Council does not favour this solution for reasons previously stated. But there is another way in which the state can be included in the infrastructures, namely through its capacity for introducing various actors within the infrastructures (chapter 3) and by designing institutional arrangements that provide checks and balances, most notably for balancing the short-term and long-term interests but also with regard to the generation of expertise and vision in the long term.

5.4.3 TWO OPTIONS COMBINED

Although the Council recognises that the two approaches for reviewing the independent regulator (add responsibilities or hive off competition issues to a separate regulator and introduce sector-specific regulation for a broad trade-off of public values) can improve the realisation of public values in infrastructures, the Council is aware that this solution in itself will be insufficient for the realisation of public values other than static efficiency. The causes for this imperfection were provided in chapter 2: institutional arrangements in infrastructures will always have to deal with strategic behaviour, both by the regulator and the regulated (Ten Heuvelhof 2008), contracts will always be incomplete (Van Dijk 2008), and information asymmetry will always exist (Van Dijk 2008). These characteristics can never be ruled out. Their impact on public values, however, can be mitigated by two measures. First, redundancy, i.e., designing a web or network of various mechanisms to realise or negotiate public values instead of relying on one single mechanism to realise a particular public value, has proven to be a viable solution (De Bruijn, Van Eeten and Ten Heuvelhof 2006). Secondly, more attention can be devoted to the long-term values requiring dynamic safeguarding mechanisms. In recent years, there has been an emphasis on the mechanisms of laws, contracts and competition. Less attention has been devoted to institutional competition and the internalisation of values. It is precisely the latter category of mechanisms that can help achieve those public values that are hard to quantify. In this 'softer' category, one could consider measures such as corporate governance (Hancher, Dicke and Jorritsma 2008), quality of the board's members (Stout 2007) and the strategic use of the ownership of shares in infrastructure companies (Kenniscentrum voor ordeningsvraagstukken 2006). Both redundancy and the need for dynamic mechanisms result in a plea for broadening the repertoire of mechanisms to realise those public values that cannot be realised (directly or indirectly) by focussing on static efficiency.

Bringing the state back in is another viable option, but not in the sense that the state should necessarily own the infrastructures or that the state should be involved in its daily operation. There is, however, a major task for the state with regard to facilitating horizontal coordination of the multiple and heterogeneous actors (chapter 3) acting on multiple levels (chapter 4) in order to generate a coherent vision of the future of infrastructures. And there is an important task for the state in designing an institutional arrangement that provides checks and balances. In this sense, 'bringing the state back in' is not isolated from the option of independent regulation. In the two approaches for reviewing independent regulation (add-on responsibilities or hive off the competition elements), it is also suggested that the state be brought in again. Chapter 7 will discuss the mix of tools that can help improve the quality of independent regulation by bringing the state back in.

5.5 CONCLUSION

Public values are intrinsically relative and always require a trade-off. In the initial stages of regime change, institutional arrangements have been developed that favour the short-term efficiency goals over long-term public values. This does not necessarily mean that there is an actual public value failure (Bozeman 2007); but this chapter has identified considerable risks regarding the achievement of public values other than static efficiencies, especially with regard to those infrastructures in which a system innovation is required as a result of climate change and the depletion of fossil fuel resources in the coming decades.

Although there is no easy institutional solution to the problems engendered by the initial stage of regime change, the need for review is clear. Issues of investment, innovation and sustainability need to be as much part of the incentive structure of the infrastructure organisation, as short-term efficiency.

This chapter presented two options that placed long-term values centre stage: introducing and/or enhancing independent regulation or 'bringing the state back in'. The Council advocates a reform of independent regulation, in a way so that incentives also include dynamic long-term values. In the process of that reform, the state can and should be brought back in. This shift does not refer to the operational processes but to the role of the state in organising horizontal coordination and designing an institutional framework with strong checks and balances, starting with the balance between the public values that are related to (short-term static) efficiency issues and those public values that require a long-term, dynamic perspective, most notably sustainability and innovation.

NOTES

1 Bozeman also distinguishes 'individual public values': the content-specific preferences of individual concerning, on the one hand, the rights, obligations and benefits to which citizens are entitled, and, on the other hand, the obligations expected of citizens and their designated representatives (Bozeman 2007: 14), but that is not the subject of this chapter.

2 The 2000 WRR report *Het borgen van publiek belang* made no distinction between values and interests since the focus was different. In that report, the distinction between values that did or did not require government intervention was central (the 'how' question). Public values as employed in this Report is a sub-category of the societal interests in this earlier publication.

3 Others (Teulings, Bovenberg and Van Dalen 2003) have argued that this descriptive approach should be replaced with a more normative approach.

4 In both reports, public interests are those (societal) interests that require intervention by the government in order to be realised. This Report employs a different definition, as will be explained in section 5.3.

5 Available at: http://www.nidi.knaw.nl/en/output/2003/kov-report-03me18.pdf/kov-report-03me18.pdf.

6 'The accident is bound to renew questions about rail safety as a public inquiry hears details of the Southall collision 26 dead in West London train crash', on *Guardian Unlimited*, 5 October 1999, available at: http://www.guardian.co.uk/traincrash/Story/0,2763,201548,00.html. See also: 'Veiligheid van Britse Spoorwegen staat ter discussie', *Het Financieele Dagblad*, 6 October 1999.

7 This table is based on mission statements, competences and official documents from the various regulators' websites. The researchers' description of the economic regulators' statutory duties was later checked and refined by the three regulators.

8 Weblog Jan Marijnissen 2007, available at: http://www.janmarijnissen.nl/2006/10/10/de-kosten-van-drinkwater.

9 OPTA, e.g., in *Het Financieele Dagblad,* 'Fusie van toezichthouders nodig', 21 January 2008.

10 See: www.consumentenbond.nl/actueel/nieuws/nieuws2007/consumenten_drinkwater.

11 FNV wil hoorzitting over marktwerking, 23 maart 2007, available at: http://www.fnv.nl/defnv/actueel/nieuws/marktwerkingeuropa.asp.

6 REGIME CHANGE AND INVESTMENT IN ENERGY INFRASTRUCTURE

6.1 INTRODUCTION

This case study will apply the analysis developed in the previous chapters, to examine how investment decisions in infrastructures in the Dutch electricity and gas sectors have been affected by regime change thus far, and consider the likely impact of new exogenous factors on energy infrastructure development. The aim is to highlight the issues in one particular sector in which the process of regime change is relatively advanced.

Two sets of European directives were aimed at creating an internal market for electricity and gas within the European Union. Investments in infrastructures at the national level were not dealt with at all in these measures and in particular, the regulation of interconnectors between Member States or with third countries was left essentially to national policy and regulation. The latest package of proposals submitted by the EC Commission in September 2007 will, if finally adopted, expand the scope of European regulation considerably. Indeed the ambition is to secure the operation of the major electricity and gas networks as an integrated whole – as a true European gas and electricity grid network. Although ownership and financing of investments will remain a national matter, most other operational aspects will be coordinated at the European level through a combination of instruments. These include the creation of a new European Agency, the Agency for the Cooperation of Energy Regulators (ACER), which is comprised of representatives from the 27 national regulators in the EU. Moreover, the national TSOs (Transmission System Operators) is necessary to coordinate their operations via two European-wide bodies.

Dutch energy market liberalisation essentially mirrors the experience of other Member States, but in some aspects it went further than the EU rules. Today, multiple national and foreign firms are involved in the production, transport, distribution and supply of energy to end users who, since 2004, have had the freedom of choice to select their own electricity and/or gas supplier. The divergent interests of these different actors have led to contested public values, which are pursued on multiple national, EU-wide and regional levels. Market integration and corporatisation have resulted in increased trade within and between the Member States,[1] raising the pressure to further develop existing networks, cross-border interconnector capacity and other facilities. Finally, institutional integration seems to be turning the transfer of some key competences to the European level into an imminent reality. Yet, there is an ongoing debate on which competences will survive within the national system and what will be shifted to Brussels. As explained below, regulatory or institutional integration is necessary not only to underpin the functioning of the market, but also to guarantee technical operations and physical integration. Moreover, in achieving security over one's

energy supply and meeting the challenges of climate change, the current regulations have their limits, and this is specifically acknowledged in the European Commission's third package.

We will demonstrate in the following sections that, in the current context, the liberalisation of the energy market, in combination with ownership unbundling and shifts in public/private ownership relations – altogether constituting the notion of regime change – has turned long-term investment in the electricity and gas sectors into a series of *splintered* transactions. The investment climate is characterised by some degree of uncertainty and distrust due, at least in part, to a regulatory regime that does not clearly allocate risks and rewards among the actors. Moreover, it is plagued by conceptual, practical as well as political conflicts between the firms in the industry and the consumer, or the 'agents', and the multiple national and European authorities, as the 'principals'. Finally, there is a notable absence of a coherent long-term vision on infrastructural development among these several actors: many large scale infrastructure investment decisions can only be treated as exceptions to the current regulatory regime and are dealt with on the basis of ad hoc solutions, or *exemptions* to the main regime.

In the final section of this case study, we will explain why this could lead to longer-term risks given the challenges posed by climate change and the rising external dependency on gas in particular. There is currently no apparent evidence of under-investment in the Dutch sector in terms of meeting the short-term objectives, including safety or reliability of supply (see Van Dijk 2008). Although, both in the electricity and the gas sector, there are situations in which either higher gas or electricity prices or the inability to connect facilities to the grid may point out difficulties in the timely extension and expansion of the capacity of the various systems. However, it is precisely because of their long lead times and the fact that current investments have a long-lasting impact on future patterns of energy supply and demand, that we consider the challenges to electricity and gas infrastructures as pressing. We will briefly outline these challenges in the next section, before turning to examine the process and impact of regime change in more detail.

6.2 ENERGY INFRASTRUCTURE AND PUBLIC VALUES

A trinity of public values constitute the established foundation for the future development of the sector: reliability, sustainability and efficiency ('*betrouwbaar, schoon en betaalbaar*'). Given the developments in the energy sector over the last ten years or so, any longer-term energy policy perspective must deliver these three objectives simultaneously. Indeed, the challenges are closely interrelated. Reliability of energy supply, quantified in terms of the costs of supply failures, has a clear impact on the economics of energy supply. A failure to realise sustainability has incurred obvious external costs to society. The disregard for reliability issues will ultimately reduce the options available for achieving a sustainable

energy system at acceptable costs. An uneven development of environmental sustainability will jeopardise the reliability of energy supply options.

Energy infrastructure plays a fundamental role in meeting these three objectives. It will determine the nature of energy supply and demand, in terms of primary and secondary energy carriers, the degree of resource diversity and the flexibility of the energy system in the shorter as well as the longer term. As a consequence, choices with respect to the infrastructure directly influence the public values associated with the reliability, sustainability and efficiency of an energy system. Van der Woud's contention (2006: 17) that infrastructures determine spatial, economic and social development remains valid, particularly in a period of transition.

Infrastructure policy should thus embody many elements of the timing and coordination required to achieve the evolution towards a sustainable energy system. Indeed, it is by developing, constructing and operating these infrastructures in a specific manner that this transition process can be guided and stimulated, or even obstructed. Path dependency is an important factor. The long-term, sunk nature of infrastructure investments has a lasting societal impact; a lock-in effect. This can have a positive outcome, if the choices head in the right direction, but path dependency can also block positive developments over the longer term.

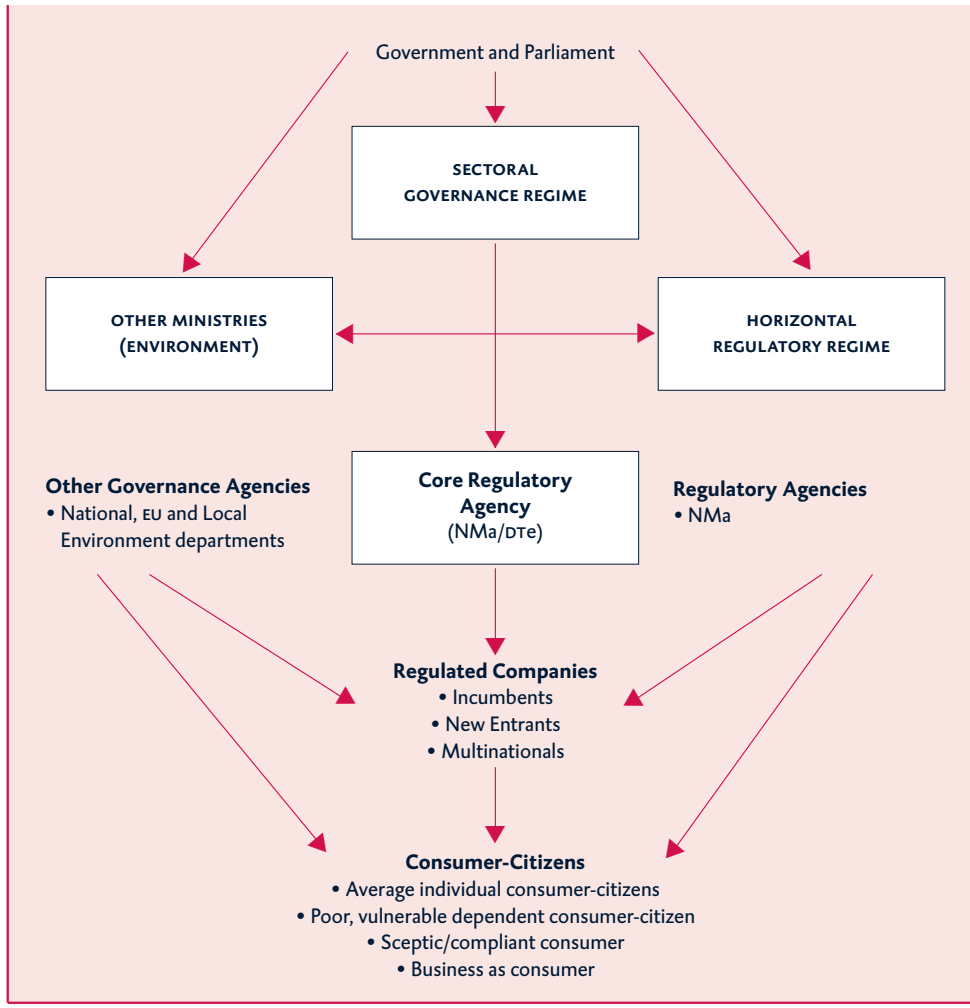
That energy policy is *not just* a production-consumption issue, with a neutral role for networks, is something that many policy-makers tend to ignore. In the following sections, the evolution of the Dutch perspective on energy infrastructure governance and its influence on the coordination of infrastructure development, and its impact on public values are examined. It is necessary, however, to first provide a brief account of the nature of regime change in the Dutch energy sector, highlighting the aspects addressed in the previous chapters: multi-level processes of coordination, within a multi-actor context with contested public values, causing splintered transactions in an environment characterised by uncertainty, rivalry and distrust.

6.3 REGIME CHANGE IN THE DUTCH ENERGY SECTOR

6.3.1 THE PAST

Traditionally, the Dutch electricity and gas sectors have been characterised by a highly integrated and centrally coordinated structure in which the industry enjoyed the exclusive rights to supply their 'captive customers' and to import and export electricity and gas. In exchange for this exclusivity, these companies were entrusted with various public service obligations and duties – to ensure a secure and reliable supply at acceptable costs to the various categories of users and to guarantee power connections and supplies to consumers on demand. Natural gas was supplied when a connection was economically 'justified'. Whereas public

Figure 6.1 **The sectoral and horizontal regulatory regimes and business and consumer stakeholders**



Adapted from Wilks and Doern (2007)

ownership by municipalities and provinces was the rule in the electricity sector, ownership of the gas sector was a more complex interdependency of public and private actors in the so-called 'Gasgebouw' structure that was established following the discovery of the Groningen gas field in the 1950s (Correljé, Van der Linde and Westerwoudt 2003).[2] Tariffs for electricity supplied to industrial and domestic consumers were based on a type of return regulation rate (see also Van Dijk 2008), while gas was supplied at prices reflecting the equivalent costs of the use of oil products. Prices were subject to a limited degree of ministerial control. The electricity and gas companies were able to pass on the costs of new investments directly to their customers, who had no alternative but to accept the tariffs. Furthermore, these tariffs were 'bundled' – a consumer paid a combined tariff for transportation and distribution as well as the fuel component.

6.3.2 REGIME CHANGE: NEW PRIMARY ACTORS, NEW INTEREST GROUPS

Over the past 20 years, the electricity and gas sector in Europe has been subjected to a continuous process of regime change. Initially, in the Netherlands, this process was aimed at rationalising the industry, by merging and combining the large number of local, municipal utilities into larger regional entities. But since the mid-1990s, following the *Derde Energienota* in 1996, policy became geared towards a liberalisation of the energy market, driven by the European Electricity and Gas Directives. The Dutch approach also foresaw a partial privatisation of the industry. The Electricity Act (1998) and Gas Act (2000) and later amendments formalised a thorough restructuring of the sector and introduced formal freedom of choice for all consumers by July 2004.

The main consequences of this restructuring were that the operation of the national as well as the regional networks was separated from the production and supply companies in both the electricity and the gas sector. National electricity and gas transmission functions became the responsibility of two Transmission System Operators (TSOs), respectively, TenneT[3] and Gas Transport Services (GTS)[4]. TenneT was acquired from the electricity production companies. The traditional GasUnie was split up into Gasterra, continuing its gas trading activities as a joint venture of Shell, ExxonMobil and the Dutch state, while GTS and some other assets were assembled in a *new* GasUnie. The ownership of TenneT and the new GasUnie was transferred to the Ministry of Finance. This restructuring has had important consequences as will be shown below in an account of the investments in the gas network.

There are currently 16 publicly owned regional distribution system operators (DSOs), distributing gas and electricity to the consumers. Gas and electricity production and wholesale supply as well as the retail electricity and gas supply has been opened up to private and public firms alike. Over the last ten years a continuous process of market consolidation has taken place, resulting in a significant concentration of the incumbent players in the electricity and gas retail sectors. At the same time, a considerable number of new, smaller entrants have become active in electricity and gas trading and the supply of both the large and other consumers. They buy their gas and electricity from a variety of sources, in the Netherlands and abroad.

Municipalities and provinces are in principle free to privatise their supply firms, however, that means that the network companies are to be split-off completely, while they must remain in public hands, as required by the *Wet Onafhankelijk Netbeheerder* (Act on Independent Network Management 2007). Finally, consumer organisations began to appear as important actors in the market, as is illustrated in the following Table 6.1.

Table 6.1 Interest representation of actors in Dutch energy sector

Actor		Interest associations they participate in at **National level**	Interest associations they participate in at **European level**	Interest associations they participate in at **International level**
DTe (regulatory authority)			- Council of European Energy Regulators (CEER) - European Regulators' Group for Electricity and Gas (ERGEG) - The Forum of Florence (electricity) - The Forum of Madrid (gas)	
Infrastructure: Transmission System Operator (TSO) LNG terminals, Gas storage	**TenneT**	Vereniging van Energienetbeheerders in Nederland (ENBIN)	- European Transmission System Operators (ETSO)	Union for the Coordination of Transmission of Electricity (UCTE)
	GasUnie/ Gas Transport Services B.V. (GTS)	Vereniging van Energienetbeheerders in Nederland (ENBIN)	- Gas Infrastructure Europe (GIE) - International Gas Union (IGU)	
Exchanges APX Power NL APX Gas NL ENDEX			EASEE	
Traders		- Dutch Traders Association 'Vrijhandels Organisatie voor Elektriciteit en Gas' (VOEG) - EnergieNed - Ephrin (producers who supply households and small businesses)	- European Federation of Energy Traders (EFET) - Eurelectric	
(Gas) producers and wholesalers		- Nederlandse Olie en Gas Exploitatie en Productie Associatie (NOGEPA) - EnergieNed/Ephrin	- International Association of Oil & Gas Producers (OGP)	- International Gas Union (IGU) - Eurogas
Large consumers		- Vereniging Energie- en Watergebruikers (VEMW) - EnergieNed	- The International Federation of Industrial Energy Traders (IFIEC) - Eurelectric, CEFIC en Business Europe	

6.3.3 REGIME CHANGE: POLICY, PUBLIC VALUES AND SUPERVISION

Government

Regime change also introduced important changes in the governance of the sector, which now falls under the authority of three ministries. The Ministry of Economic

Affairs has general policy responsibility for Dutch energy supply, including consumer and competition issues. Within it, the Department of Energy merged with the Department of Energy and Telecom, reflecting a more pronounced market. Every four years, the Minister issues the *Energierapport*, setting the priorities for the next period. Moreover, the Ministry is in charge of collecting state revenues from gas production; the '*gasbaten*'.[5] The Ministry of Housing, Spatial Planning and Environment (VROM) has the responsibility for environmental and spatial planning issues involved in the operation of the energy sector. The Ministry of Finance now holds the shares in both national network companies, TenneT and GasUnie, and requires a 'normal' commercial dividend on its shareholding in both networks. A fourth department that has been gaining influence in energy policy is the Ministry of Foreign Affairs. It is especially involved in the broader field of the European energy policy, dealing with substantial energy related issues and the link with climate change policy and the increasingly important function of developing energy relations with third countries, external to the EU.

The Dutch government and Parliament are advised by the Energy Council, the AER, an independent advisory body founded in 1976. The AER consists of ten members, appointed on a personal title, not representing any organisation from from sector-related social groups. The Council addresses a variety of energy-related issues, providing advice on issues requested by the government or chosen by the Council itself.

The Office of Energy Regulation

The 1998 Act created an electricity regulator, DTe, which subsequently also assumed responsibility for the regulation of the gas sector under the direction of the Minister of Economic Affairs. In July 2005, the DTe became a 'chamber' of the Dutch Competition Authority (the NMa). With regard to the enforcement of the Electricity Act 1998 and the Gas Act 2000, in addition to various advisory and monitoring tasks, the DTe was specifically charged with, inter alia, the following duties:[6]

- Determining the tariff structures and conditions for the transmission of electricity;
- Determining guidelines for tariffs and conditions with regard to access to gas transmission pipelines and gas storage installations and, if necessary, to issue binding instructions;
- Agreeing to the connection, transmission and supply of tariffs for electricity, including the discount factor (price cap) aimed at promoting the efficient operation of the electricity grid operators;
- Agreeing to the transmission and supply tariffs for gas, including the discount (price cap) aimed at promoting the efficient operation of the gas network operators;

A number of public service obligations or public values in relation to electricity and gas supply have been provided in the Electricity Act and the Gas Act. TenneT and GTS and the regional networks have the responsibility to operate, maintain

and develop their installations in an efficient, safe, reliable and environmentally friendly manner. TenneT and GTS have the statutory duties to provide a certain degree of security of supply and transportation, explicitly referring to the protection of domestic customers in the event of a default by suppliers or a failure of production and transmission capacity.[7]

Production companies are no longer subjected to public service obligations, but the DTe is now primarily responsible for ex post monitoring of compliance with the conditions of the supply licences, which all energy companies that supply directly to small consumers must obtain in advance.[8]

Regime change has deliberately induced the unbundling of potentially competitive production, trading and supply activities from infrastructure management. Moreover, as regards the several competitive activities, a host of new firms have entered the market. Finally, the disaggregation of the energy sector and the pattern of governance resulting from regime change have stimulated the emergence of numerous new and diverse secondary organisations. These organisations provide input into the ongoing societal debates on the restructuring of the electricity and the gas industry, the environmental challenge, consumer and business interests, energy supply security, etcetera. In part, they are driven by their alignment with specific primary actors (generators, traders etcetera) and in part by their technical expertise and/or broader societal conviction.

6.3.4 REGIME CHANGE: NEW MARKETS AND NEW TRANSACTIONS

Following regime change, most electricity and gas is still traded in bilateral markets, via contracts between, on the one hand, Dutch and foreign power generators and Gasterra and some foreign gas producers and, on the other hand, retail supply companies, large consumers and traders. However, electricity and gas is currently being traded by a variety of Dutch and foreign parties on an ad hoc basis, although in much smaller volumes.[9]

It was obvious that various additional instruments were required to enable the TSOs to balance the supply and demand of electricity and natural gas within their systems. Given the need to maintain a rather strict balance, it is necessary to compel users of the transport system to carefully balance their transactions. Eventually, however, it is the task of the TSO to maintain the technical balance of the network and the latter provides specific balancing services, including quality conversion services for gas.[10] This induced gradual growth and a refinement of the steering instruments employed by the TSOs.

Over the longer term, increased traffic on certain parts of the national transport system may lead to congestion, while new suppliers and customers may want to connect to the systems at specific points, like the Maasvlakte or Delfzijl. If expansion can be economically justified, the TSO should invest in expanding network capacity, to meet the demand for the transport of gas[11] or electricity[12].

Prior to liberalisation, the demands for balance were satisfied by a recurrent mix of bottom-up and top-down planning practices. A central generating board (SEP) and GasUnie, coordinated the sales of the electricity and gas distribution companies, the transport capacities required on the (inter)national electricity and gas networks, and the production of electricity and natural gas. Policy making, negotiation and planning determined the financial flows throughout the system, remunerating the parties for their investments and allocating the rents between the public and private entities involved.

As a consequence of regime change, however, this coordination process has been replaced by a set of transactions which, in principle, should reflect an efficient, scarcity-driven, market-based process. In other words, efficiently established 'market' values for the commodities exchanged between the parties and the associated needs for transport, conversion and storage should become the determinants for actors' behaviour in terms of engaging in commercial transactions or investing in production and handling capacities. As far as possible, these values, or prices, should be set in real, liquid, wholesale and retail electricity and gas markets in which as many buyers and sellers interact as possible.

However, as was shown in chapter 2, the natural monopoly characteristics of many of the infrastructures imply that many of the transactions take place outside a competitive market context and require supervision and regulation, to ensure that the monopolist operators 'post' the *right* price, or tariff, for their transport, balancing or other services, while providing these at an acceptable quality. These tariffs also have to be *right*, in the sense that they stimulate parties to make efficient choices in obtaining services and commodities. At the same time, however, the tariffs for such services have to be *right*, in the sense that the investors, either the TSOs or other parties, receive acceptable remuneration, inviting and allowing them to invest in the *right* capacities of the *right* infrastructure components.

A common assumption is that these tariffs have to be 'cost based'. But how should these costs be determined? Indeed, by imitating the competitive selection and optimisation process in 'real' markets, the regulated or controlled tariff (or price) for a specific transaction must strike a balance between the values attached to it by the seller or investor and by the buyer; otherwise the transaction or investment will not materialise. The various actors, obviously, assess these values regarding the anticipated costs and revenues associated with a transaction and their perception of the profits vis-à-vis the risk involved.

Large conceptual and practical problems arise precisely in the regulatory practice of establishing (or accepting) these tariffs for a number of reasons, such as:
- Difficulties with the establishment of capacities, quality and reliability in an unambiguous manner (see, for example Pinon and Cuijpers 2006);
- Difficulties with the establishment of values and (marginal) costs, particularly over the long run (see Shuttleworth 2008);

- The impact on valuation of the need for coordination of complementary and dependent transactions, which is caused by the physical and site specificity of dedicated assets (Williamson 1983);[13]
- The presence of substitutes and the competition for services, like transport or storage, and the choe between regulated tariffs or market valuation (Brunekreeft 2005);
- The impact on the valuation of uncertainty and the dependency on external developments, like such as shifts in oil prices, environmental policy and technology development.

In addition – and partly as a consequence of these conceptual problems – all kinds of practical and unanticipated problems may arise, including principal-agent issues and business practices that invalidate earlier insights. Examples include:
- Strategic The strategic behaviour of owners, operators, customers, regulators and policy-makers;
- The struggle between the haves and the have-nots, with respect to access to specific facilities;
- Technological risk, such as the failure of technologies, or the emergence of new ones;
- The emergence of new substitutes for services, assets and commodities;
- Changes in all kinds ofvarious secondary rules on safety, the environment, spatial planning;
- Regulatory risk and the experimentation with different regulatory approaches in regulation.

As a consequence, the development and operation of new markets or service arrangements is by definition conceptually problematic and controversial. Obviously, new possibilities, authentic values and genuine objectives are 'discovered' in the process of regime change. Indeed, this is one of its main goals! However, emerging values, principles and practices are easily contested and disagreements can be – and are – strategically used by the various parties involved (and the concerned organisations) to defend their interests and objectives. This causes rivalry and distrust among the primary actors (i.e., the firms in the industry), the public entities (i.e., the ministries, the regulator and the TSOs) and the wide broad range of secondary actors (e.g., research institutes and consultants) that have emerged in the 'new' energy market, as is shown above.

Following their adoption, the Electricity and Gas Acts have been amended on numerous occasions, leading to a dense mass of supplementary legislation. The controversial process of energy sector liberalisation has politicised the actors so that public values have become contested (see chapter 5). The various actors have attempted to influence the process of restructuring via a variety of mechanisms, from interest group meetings, platforms and working groups, public hearings, parliamentary action, court cases, lobbying activities, applied academic work and consultancy studies, etcetera. Consecutive governments have considered it necessary to 'repair' the consequences of the process of restructuring, creating a

dense and complex set of regulations for the network operators and the industry (see chapter 2). This has further aggravated uncertainty, distrust and strategic behaviour among the participants (De Jong et al. 2005).

6.4 THE REGULATORY REGIME IN THE ENERGY SECTOR: STATIC EFFICIENCIES AND UNFORESEEN CONSEQUENCES

The regulatory and commercial framework has continued to evolve in a piecemeal fashion amidst controversy. It is by no means been finalised (Correljé 2005). Compared to access and tariff modelling regulation, the regulatory framework for the governance of network investments is much less developed, as will be shown below (Shuttleworth 2008). These transactions are being dealt with in an ad hoc manner, under a considerable degree of uncertainty and regulatory reservation. Moreover, it is in these infrastructure-related transactions that the problem of applying short-term economic efficiency principles – the basis of the current regulatory approach – emerges to its fullest extent. It is a vacuum of realistic rules and stable signposts for longer-term investment that is jeopardising the longer-term development of adequate infrastructural systems for an efficient, sustainable and reliable energy supply.

6.4.1 REGULATION OF TARIFFS AND NETWORKS INVESTMENT

As has been previously stated, the two state-owned transmission operators, TenneT and GTS, are regulated national monopolies. The distribution system operators (DSOs) are regulated public monopolies for their respective distribution areas. NMa/DTe's Network Companies Unit is responsible for their ex ante regulation, including tariff modelling and method decisions, the drawing up of protocols for network operators (e.g., setting out technical conditions and regulatory rules for accounting) and the assessment of quality plans. It is also responsible for monitoring network operator compliance with regulation.

Regulatory supervision is currently primarily directed at the system tariffs and quality issues, in relation to network access and the provision of ancillary and balancing services. The regional network companies are regulated via a yardstick system. By and large, this system determines a standard return, which should provide the network operators with a level of remuneration that allows them to cover their costs and to compensate the providers of equity and debt capital. In other words, there should be sufficient profit generated by the network operator to carry out the necessary investments to guarantee security of supply but without the consumer having to pay too much. DTe also monitors network quality.

DTe has a more indirect influence over investment strategies regarding the national gas and electricity transmission systems, through its power to accept or reject the network operators' proposals for the regulation of tariffs. The current regime dictates that transport tariffs for users should be based on historical costs – basically

for energy, maintenance and replacement and information technology – and a reasonable return on the capital invested in the network. The thus calculated level of costs establishes the allowable revenues to the network operator. On this basis, the user tariffs are set for a period of between three and five years. From period to period, the tariffs are lowered by a percentage considered reasonable by the regulator – the X factor.[14] Given a specific transport volume, the overall revenues should decline. However, given the objective of maintaining their profitability, the operators are expected to enhance their operational efficiency. As explained in chapter 1, this type of regulation is designed to reduce and redistribute the monopoly, which is typical of 'Type I' market failures (see Van Dijk 2008).

GTS and TenneT have a mandate to invest in network expansion, if that is deemed necessary and economically justified. Investment decisions are the management's responsibility. However, the system of revenue regulation implies that these new investments should be accepted by DTe in the so-called Regulatory Asset Base (RBA); the basis for the allowable revenues and user tariffs. Any expansion of the networks is evaluated by the DTe, on the basis of its economically efficient contribution to the supply of electricity or gas to the Dutch consumers.[15] If the decision is positive, the investment costs can be socialised in the tariffs. The TSO's board eventually checks the commercial justification of the investments, taking into consideration the returns on investment levels set by the Ministry of Finance.

Although there is scope within the current method of energy network regulation for the regulator to allow additional income to reward an 'exceptional' investment, this system is currently based on an ex post rather than an ex ante evaluation by the regulator. This is a consequence of the logic of the Energy and Gas Acts, which provide that the tariffs are based on a number of elements and that these relate to costs and benefits in a particular regulatory period. Hence, the costs for a large investment can only be taken into account if the benefits are also apparent and the regulatory system creates uncertainty as to whether the network operators (national and regional) will be allowed to claim a higher tariff and recoup the necessary investment by socialising these costs.

There are 'exceptional' situations in which investors, including TSOs and the DSOs, may opt for an exemption of their specific infrastructure investments from DTe tariff and access regulations. This essentially involves situations in which the investors consider the regulatory regime not appropriate considering the risks involved. Under certain conditions, shaped by the amount of risk involved and the potential infringement of competition, the national regulator may allow firms to engage in long-term contracts for the use of these facilities at unregulated or negotiated tariffs. These new investments in infrastructures involve LNG and storage facilities, as well as cross-border interconnectors where more than one regulatory regime is involved. The investment risk must be 'ring-fenced' and the costs, as well as the eventual revenues, accrue to separate companies set up for the purpose of developing the project. The exemptions granted by the regulator need to eventually be approved by the European Commission.

This particular regulatory and ownership pattern creates a complex principal-agent relationship between the TSO, the regulator, the Ministry of Finance and the Ministry of Economic Affairs and the customers of the TSOs, in which diverging objectives, values and criteria for justification easily conflict, as will be shown below. Investment decisions are primarily based on financial-economic criteria. Even if broader societal objectives like security of supply are pursued, regulatory scrutiny and approval will reflect criteria that are primarily market based and oriented towards the short-term objective of securing lower tariffs for Dutch consumers.

6.5 FUTURE ENERGY SECTOR CHALLENGES

6.5.1 CHANGING SUPPLY PATTERNS

Approximately 15 to 20% of the electricity consumed in the Netherlands today is imported. This situation is likely to be reversed in the future. Recent scenarios indicate that the country will continue to depend on electricity imports until circa 2011. But by 2014, the announced investments in coal-fired power generation and the consequent surplus generation capacity will transform the country into a net exporter, particularly in Europe's northwestern regional electricity market. TenneT will have a key role in this regional market but it has to invest substantially in additional interconnection capacity in order to capitalise on this position (TenneT 2007a and b). Two new interconnectors that will address this goal have recently been agreed upon.[16]

In the gas market, the Netherlands is a major gas exporter to other parts of Europe. Germany, Belgium, France, Italy and more recently the UK are some of its natural gas customers. Over the medium to longer term, however, this pattern will change because of the gradual decline in Dutch gas production, which will, in turn, lead to increasing external dependency. Declining output of high calorific (H) gas from off-shore fields is expected beginning in 2009. The subsequent flexibility in the production of low calorific gas (L) from the large Groningen field will also decline, despite the current large investments in compressors to maintain a sufficient peak production capacity. Eventually, the base-load capacity of the field will also be affected by this depletion. This implies that additional volumes of gas will have to be imported to supply the present L gas consumers, consisting mainly of domestic households and smaller commercial users.[17] Moreover, GTS is responsible for the adequate supply to foreign customers of Dutch gas in Germany, Belgium and France. In addition to the gradual increase in gas imports to satisfy the indigenous demand of Dutch consumers, increasing volumes of 'foreign' gas are being transported through the Dutch gas infrastructure to supply customers in other countries like the UK, Germany, Belgium and France.

The consequences of these developments for the proposed gas supply infrastructure are potentially far-reaching. First, a substantial increase in imports and the

transit of H gas will require considerable investments in gas import pipelines and LNG terminals and in the expansion of the main cross-country transmission network to accommodate these new gas flows. Moreover, to replace the current flexible indigenous production of gas to allow for the seasonal pattern of gas use, underground gas storage facilities must be constructed and connected to the network. The main challenge in this respect is the step-by-step development of the required facilities and the associated infrastructure in an environment where gas is still produced and exported, while gradually making the transition to an import-based system.

6.5.2 THE CHALLENGE OF CLIMATE CHANGE

Renewable energy, despite proclaimed government ambitions, currently supplies only 2% of total energy for the Netherlands. To reach the government's current objectives of 20% renewable energy by 2020, significant steps need to be taken. This implies major developments. But also the way renewable energy is used will have to be altered radically. Most of the renewable energy is currently used to generate electricity and some to produce steam and heat. Simple calculation shows that it is almost impossible to achieve the 20% renewable energy goal in the electricity sector. Given the fact that current electricity use represents approximately 30% of the Netherlands' primary energy consumption, two-thirds of the electricity production will have to be based on renewable resources! As most of the existing power plants will not be dismantled before 2020, the renewable capacity will have to provide most of additional power demand. If the average growth rate of about 2.5% annually over the past decade continues, demand will increase by circa 30% by 2020. Even if all of the new capacity were to be based on renewable energy sources, and despite the current plans for investments in coal-fired generation, the stated goal could never be reached. This has to do with the fact that it is still quite difficult to accommodate large influxes of wind and solar energy. Even the seemingly moderate objective of 20% renewable energy by 2020 will require radical measures in the power industry, but also in other end-user segments, like domestic and commercial space heating and hot water supply vDe Vries et al. 2008). An important issue in this respect is the future exploitation of the Dutch subsoil as a sink for CO_2.

Although these objectives may be ambitious, the policy and the instruments proposed thus far appear weak, when it comes to the staying power of traditional forms of energy supply. The prevailing focus on a reduction of direct supply costs in electricity and gas production and distribution via the market mechanism as a major instrument for coordination, more or less inevitably, paralyses a large-scale development of renewable alternatives. These will remain niches and pilot projects, as a consequence of economic, technical and institutional path-dependency and lock-in effects. Even a gradual transition towards a more sustainable future energy system is today in urgent need of a more complete vision, which is based on instruments and approaches that are effective as guiding posts.

6.6 EXAMPLES

6.6.1 THE GAS SECTOR

In response to the changing supply pattern (see paragraph 6.5.1 above), a substantial increase in imports and the transport of Hydrogen gas is foreseen, which, in turn, requires considerable investments in gas import pipelines and LNG terminals and the transmission network. Moreover, to replace the current flexible indigenous production of gas, allowing for the seasonal pattern of gas use, underground gas storage facilities must be constructed to accommodate the physical and economic implications of long-distance gas supply. As current gas fields in Russia will go in decline in the near future, new gas will have to be produced further away from the EU market. Moreover, in order to optimise the use of highly expensive production and transmission, the capacity available must preferably be subject to a high degree of utilisation. As a consequence, the required supply flexibility will have to be 'created' near the end-user market.

It is in the context of the future, which includes an enhanced import dependency on supply via long-distance pipelines and LNG imports and the particular characteristics of the existing Dutch gas infrastructure that the strategy of the Dutch 'gas roundabout' has emerged. This concept foresees the continued use of the existing Dutch infrastructure plus newly constructed LNG facilities, storage facilities and transmission pipelines into the future (Ministry of Economic Affairs 2006). This system, combined with a commercial infrastructure to trade and handle the gas flows, should allow the Netherlands to play a continued strategic role in the EU gas market, despite its gradually falling indigenous production. This 'flexport' approach should allow for greater security of supply in the North West European gas market, while continuing to create added value with Dutch assets (see Correljé 2006). The main challenge in this respect is the step-by-step development of the required facilities and the associated infrastructure in an environment where gas is still produced and exported, while gradually making the transition to an import-based system with the required flexibility. Nevertheless, we conclude that the Netherlands seems hesitant to embrace a clear role, as part of this vision, in realising this 'second life' of the Dutch gas system.

6.6.2 CONFLICTING POLICY AND REGULATORY OBJECTIVES

Examples of conflicting policy and regulatory objectives include the DTe's reluctance to set up a regulatory framework for interconnectors, entry and exit capacity at the borders, LNG facilities and transmission and transit pipelines. The DTe, in evaluating the infrastructure projects, looked primarily at the short-term tariff implications for Dutch consumers and did not consider the larger options and opportunities. This ignores the public interest involving a prolonged exploitation of the Dutch gas resources and longer-term security of supply, facilitated by a gas roundabout within the context of a Northwest European gas market.

Expanding the GTS network

Seen from the gas roundabout perspective, the 'national' role of GTS as a local Transmission System Operator should be extended towards a regional infrastructural facilitator in a broader market. The H gas network was to be expanded for a number of reasons. These included, firstly, a decline in production in the smaller Dutch fields, causing a rise in imports into the Netherlands and secondly, the enhanced need for transport into and through the Netherlands gas system. Indeed, the flows of gas through the GTS system are expected to increase, following the completion of the Balgzand Baction Line (BBL), new LNG terminals and possibly a new pipeline from Norway and the development of storage facilities. To examine the additional need for transmission capacity, GTS undertook an 'Open Season' procedure, collecting a significant number of parties interested in signing long-term capacity contracts. To secure the inclusion of the required investment in the regulated tariffs as a significant and exceptional investment, GasUnie asked DTe to recognise the need for the project and to provide an ex ante letter of comfort. In the course of 2006, GTS presented three scenarios to DTe, involving, firstly, a 'national' scenario, with a € 470 million investment, necessary to provide security of supply for Dutch consumers and meeting GTS' legal duties. A second – 'international' – scenario with a € 1.75 billion investment, would meet all foreseeable transport needs in full, while a third scenario, at € 1.27 billion would also meet all demands, but with less emphasis on transit. According to the scenario, about 40 to 50% of the new capacity would be used for transit (Gas Transport Services B.V. 2006).

In September 2006, DTe declared that it could not legally provide such an ex ante letter of comfort, because the project would not be activated in the same year as the request. DTe, however, provided an informal opinion, stating that it would only accept part of GTS's investments and only accept a € 740 million investment as sufficiently justified, at that stage. In consultation with the Central Planning Bureau (CPB), DTe was not convinced of the societal benefits of the proposed scenarios and the cost estimates, while there was also uncertainty about actual levels of usage of the transport capacity for transit. In the final event, the € 740 million compromise was justified on the grounds that it would solve most of the immediate problems, while cost recovery was guaranteed on the basis of the outcome of the Open Season procedure. So there would be no risk involved for Dutch consumers. DTe left open the option to eventually accept the full € 1.27 billion investment, if GTS were to present a convincing case.[18]

GTS argued that this compromise was unworkable for several reasons. First of all, if additional investments had to be undertaken, above the minimum to meet its statutory duties, it would be efficient to do it immediately. Secondly, the new import capacity for domestic use and transit might be justified, as GTS had been able to sell the planned capacity by way of long-term contracts via the open season procedure and there was no risk that capacity would go under-utilised. Thirdly, the risk of losing potential foreign customers was significant, as GTS would not be able to guarantee these large users the transport capacity at the time

they would need it. An additional problem in this respect was that GTS was not allowed to offer them long-term contracts, at fixed tariffs. These aspects affected the eagerness of these parties to invest or participate in the LNG facilities and the proposed storage facilities, the operation of which would be dependent on the availability of transport capacity.[19]

In response, the GasUnie voiced its dissatisfaction with the Minister of Economic Affairs. In March 2007, the Minister responded by saying she recognised the difficulties as impediments to develop the gas roundabout to secure gas supplies over the longer term. She announced that she would develop a new, expanded framework for the regulation of GTS, to facilitate the necessary future investments in the network. This included the possibility to conclude long-term transport contracts at fixed tariffs, which would underscore € 1.1 billion investments by GasUnie, with the possibility of further expansion of the capacity if additional gas were to be transported from Norway to the Netherlands. Moreover, it was also decided that the Dutch tariffs would be raised if necessary, so that they would not be lower than those of foreign alternatives. Moreover, an increase in returns on investment was announced for new projects from a low of 5.5% pre-taxes, to 7% with a payback period of 20 years.

A new element that arose was that potential investment plans would have to be evaluated by the DTe in a quick test. If current tariffs were insufficient to cover the investments, the Ministry of Economic Affairs would have to re-evaluate the project via a broader Social Cost Benefit Analysis. These new rules must still be added to the Gas Act and to the new tariff regulations. These principles would have to be amended every five years, to adjust to contextual changes (see Tweede Kamer 2006-2007, 29023, no. 37). As such, even a quick test of single projects, may take too much time for the GTS and will only tend to exacerbate controversies regarding the details of the valuation procedures. Yet, it is possible that the societal Costs and Revenues approach (Maatschappelijke Kosten and Baten Analyse) could be turned into a continuous evaluation that takes advantage of the progress among the broader insights regarding gas and energy market developments and the associated reduction of uncertainty. This, however, could provide a framework for the establishment of a kind of continuous quasi-Long-Term Marginal Cost assessment, to be included in the regulations if adapted and adjusted.

This account highlights the divergence between the objectives of the regulator, DTe, the Ministry of Economic Affairs and the GasUnie. The first, operating in the 'Type I' market failure context of a consumer-driven short-term economic orientation, fighting tariff increases arising from the international transit of gas, clashed with the larger objectives of the latter two. The ministry has set a goal for the development of a new role for the Netherlands in the EU gas market over the longer term. GasUnie is actively seeking to position itself as an international gas transporter – as has been illustrated by the acquisition of BEB in northern Germany – and a facilitator of broader Dutch gas industry development. Its

expansion into the northwestern European gas market is a clear example of functional and territorial change in the gas system, which requires institutional change. This is illustrated by the investments of GasUnie – not GTS – in the Gate LNG re-gas facility along with Vopak and Essent, and in the acquisition of the former BEB gas network in the northern Germany. This, obviously, requires another perspective on the regulation because of the increased interactions with foreign customers and other infrastructure providers. Interestingly, the relation with the latter incorporates both the need to achieve a high level of *cooperation*, to facilitate the efficient movement of gas throughout the whole of the market, as well as *competition*, as they will provide shippers with alternatives for their transport demands.

6.6.3 UNDERGROUND STORAGE SYSTEMS AND TRANSPORT: WHERE NATURAL GAS AND CARBON MEET

Another illustrative case concerns the future development of the use of the Dutch subsoil for the storage of natural gas and CO_2 and the associated need to facilitate the construction of a transport infrastructure. Whereas the development of underground gas storage (UGS) and CO_2 storage are, thus far, treated as separate issues in the policy and regulatory debate, this case will illustrate that they are not. Decisions on the use of empty gas reservoirs, the development of the associated infrastructures and the governance of these are strongly related. This account shows the impact of the way in which struggles between different ways of conceptualisation of particular facets, like substitutes, access, competition, legal ownership and control, etcetera, cause uncertainties and delays in investments. It also shows how 'new' policy issues may become rather complex, as they connect activities areas, actors and bodies of rules that, so far, have existed in a relatively unconnected manner. Indeed, this often involves technical, economic and institutional coordination. The establishment of a regime for the conversion of (partly) depleted gas fields into underground gas storage facilities and their operation becomes an extremely complicated matter, particularly if a coherent vision is lacking.

The demand for natural gas varies over time. Demand is partly driven by factors that shift over the shorter term, like economic and other activities, the time of the day, week days and weekends, etcetera. In addition, however, there is seasonal variation that emerges as a consequence of the fact that natural gas is used as a fuel in space heating, in domestic households, public buildings and businesses, including greenhouse horticulture. Gas supply systems have to respond to both short-term shifts in demand, as well as to seasonal cycles. Seasonal flexibility can be defined as 'the prospects in the gas market for balancing the supply of gas and the seasonal variations in demand'. Meeting seasonal gas demands requires that relatively large amounts of gas be made available over the winter season, with a specific daily and hourly supply capacity. Approximately 25% of the annual average consumption of gas should be stored during summertime and be made available during the winter season (Clingendael International Energy Programme

2006). Obviously, the temperature-related use of gas and the relatively long duration of the heating season, reduce the opportunities for demand-side measures, with the exception of power producers that can choose between a number of different (i.e., gas, coal, nuclear) units.

The flexible provision of short-term (i.e., peak) gas and seasonal gas requires the construction of additional supply capacity, including the production of storage facilities and transport capacity. So, in addition to the costs of gas supplies as a *commodity*, there are the extra costs of the capacity investments. The question as to how the capacity investments are made and by whom and the way in which these extra costs are recouped from users are crucial issues in determining whether a gas system will develop the capacity needed to provide the required flexibility over the shorter and longer term. An additional argument to construct – even more – underground storage is to provide security of supply in cases involving up-stream supply problems (i.e., strategic storage).

The provision of seasonal flexibility close to the location of consumption is much more efficient than providing it near the gas well, as it reduces the need for additional transportation capacity. It is difficult to control gas production at large distances and adjust it to shifts in consumption. Aquifers and mid-sized gas fields are particularly useful for the storage of the larger volumes required to satisfy winter demand. The overall investment costs for this type of storage are high, because of the cushion gas needed to maintain working pressure. But the costs per cubic metre of storage in gas fields are lower than in smaller alternatives, like salt domes. As salt domes have a larger input and delivery capacity, they will be used mainly to supply daily and hourly demand variation of a shorter duration.

Currently, most seasonal flexibility in Lgas is supplied by adjusting the output of the Groningenveld, owned by the NAM, and a number of on-shore fields that are able to produce some swing capacity. For most on-shore and off-shore H gas fields it is less economic to produce flexibly. In addition to production flexibility, there are relatively smaller storage facilities, like the Alkmaar facility (owned by TAQA), the cavern storage facilities constructed by GasUnie and Nuon at Zuidwending and those of Essent and Nuon in Germany, which are used to provide peak supplies to the Dutch system.

As argued above, the future provision of sufficient short-term and seasonal storage capacity is a complicated issue, affected by a range of interrelated technical, institutional and economic factors. Potential investors are confronted with numerous fundamental uncertainties, the clarification of which requires that substantial decisions be made; the contours of the investment climate have to be set and credibly secured, otherwise the investment will not occur.

Three sets of factors play a role. First: lack of incentives. In the theory of competitive markets, the revenues of suppliers of flexibility, like UGS, are created by the differential between summer and winter prices for gas. In the current market,

seasonal flexibility is provided by means of Gasterra all-in contracts, in which an extra capacity charge allows users to purchase more or less gas within a certain time frame. As compared to the tariffs inherent to these contracts, the necessary investments in one's 'own' capacity may appear rather expensive. Moreover, in these all-in contracts there is no difference between the tariff for short-term flexibility and seasonal flexibility, whereas the costs incurred by new third-party investors for these different types of facilities show a significant differential. Costs for creating seasonal storage are considerably higher than for smaller facilities, because of the required cushion gas. Low tariffs will not justify the timely construction of new capacity or stimulate users to develop alternative means to handle their seasonable variation. However, given the need to gradually adjust to the new supply situation, in which storage will become increasingly important, there is a need for an approach that allows the several parties to 'discover' the value of flexibility (NMa/DTe 2007). These issues not only touch upon the actual values, but also on the underlying principles for the tariffs and the (policy) objectives. A case in point is the treatment of the required cushion gas as unproduced gas, or as a capital investment, in providing the necessary pressure in the UGS, as a substitute for extra compressor capacity.

Moreover, the question is whether storage is an essential facility a monopoly access to which should be regulated by DTe, or is it a potentially competitive activity, in which any firm can invest? Access regulation reflects the shorter-term objective to create a liquid market in which flexible gas would be provided at relatively low regulated tariffs, facilitating the entry of new traders, who will be able to supply their customers with competitively priced gas. But, such tariffs may keep the relevant parties from sufficiently investing in new storage capacity. In that sense, over the longer term, it may inhibit the development of the right type of capacity, at the right time. This would jeopardise not only the Dutch security of supply, but possibly also the development of storage capacity for foreign use, in the context of the gas roundabout. It is obvious that these different objectives relate to specific insights and interests among the several market parties, like traders, producers, TSOs, suppliers, etcetera, and their representative organisations. However, they also pertain to the different policy objectives and perspectives of the Dutch government, even within the Ministry of Economic Affairs. An important aspect is the way in which DTe will deal with requests for exemptions from the current access and tariff regulations and the timely construction of UGS to the GTS network. These decisions will be influenced to a large extent by the rules established by the European Commission, and influenced by European interest organisations.

Second: ownership and control over future underground storage facilities. This relates to both the desire to invest in UGS, as well as the accessibility of adequate fields to potential investors. Here again, different actors have different perspectives, suggesting different approaches and principles. Many of the Dutch fields are operated under licenses pertaining to the NAM, within the context of the Gasgebouw. Because of its ample access to flexibility, from Groningen and other

fields and its operation of the UGS in Norg and Grijpskerk, it can not be expected that the NAM is under great pressure to invest in storage capacity over the near term. The NMa, moreover, maintains that Gasterra has a dominant position in the supply of L gas flexibility; a situation that would invite tariff regulation, which, in turn, would reduce the interest of other parties.

There are other fields in the Netherlands that could serve as underground storage facilities, like Bergermeer, which has been converted into a UGS by TAQA. However, an important issue in this respect is the way in which interested parties can be given access to fields that are in the end-phases of their production and under what conditions this should occur. These rules depend on provisions in the Mining Act and new definitions of the notion of 'ownership' and the exploitation rights in the act. This also applies to the possibility of enforcing third-party access to existing UGS facilities, like Norg and Grijpskerk, or fields that *could be* converted but of which it could be argued that by some standard their potential capacity is not used to the fullest extent. The institutional framework for mining activities is currently under review. It is obvious that the future development of UGS capacity and the exploitation thereof will depend crucially on the way the Mining Act will be amended. This requires the development of a vision that deliberately takes into account the long-term character of this policy and the trade-off between satisfying short-term market interests, or the longer-term public values of a prudent exploitation of the Dutch subsoil. An evident element in this discussion is the relation between the development of a regime for CO_2 transport and sequestration, as will be shown below.

Third: who should invest and what incentives should be available? Besides Gasterra, not many Dutch parties may be large enough for these kinds of undertakings. Joint ventures run the risk of being prohibited from cooperating by the NMa. Foreign incumbents, like Gaz de France, Centrica, E.ON/Ruhrgas and RWE, may prefer – possibly upon the insistence of their governments – to create UGS in their home countries. Producers like Gazprom don't seem to be very welcome in downstream activities these days. In the US market, most of the UGS are constructed and operated by the regulated intrastate transport companies and not by the merchants and traders. However, these transport companies have leased chunks of capacity to these traders by means of long-term contracts. This requires a sound perspective on the acceptability of these long-term contracts and of the owner of the Dutch TSO, GasUnie's potential role in a joint venture with other parties.[20]

6.6.4 THE DEVELOPMENT OF CO_2 SEQUESTRATION FACILITIES

An attractive perspective for the reduction of carbon dioxide (CO_2) emissions while continuing to use fossil fuels, is the large scale development of CO_2 capturing and sequestration (CCS). CCS is often considered as the medium-term solution in reducing CO_2 emissions, until inherently sustainable forms of energy provision have become technically and economically feasible. In short, a CCS

system captures CO_2 emissions at power plants and industrial or other fossil fuel-consuming facilities, after which it is transported to geological sites, like depleted oil and gas reservoirs and aquifers, for permanent sequestration.

An evaluation of the development of the governance and regulatory system of the necessary infrastructure, in connection with the design of the trading schemes and the principles of valuation for CO_2 as the 'commodity', provides an interesting case of the way in which the infrastructure fits into the broader picture and among the favoured design principles of the CCS system. When we widen the perspective, we have to take into consideration that CCS will have to be coordinated with the activities and interests of the upstream oil and gas industry. This raises institutional as well as important economic issues.

The CCS solution in combination with phenomena like carbon trading schemes is highly topical, both in the EU[21] and elsewhere. It can be observed, however, that most of this attention is focused on the CO_2 pricing and trading schemes, including access and storage rights; monitoring and verification requirements; environmental and safety impacts; and the allocation of responsibilities and liabilities. In this respect, there is some attention for the interferences of CCS with the operations of the oil and gas industry, which eventually will have to provide the space for storage in abandoned oil and gas fields (Department of Industrial Primary Industries 2008). Yet, seldom is there any reference made to the design, the development and the exploitation of the pipeline infrastructure that will be required to move the CO_2 to the storages, after it has been captured at enery consuming facilities. Some studies of the costs of these systems have been undertaken (McCoy 2008), but it must also be acknowledged that public involvement might not be excluded in the realisation of this infrastructure. An EU Commission study commissioned by the ECN on the regulatory framework for CCS suggests that: 'Contrary to individual pipelines, the extent of realising entire networks could go beyond the interests and budgets of individual industries and it may thus represent a classical collective action problem'.[22] The ECN study addresses issues of ownership and control over the layout of such a network, its financing, operation and possible PPP arrangements for CO_2 transport infrastructure.

It is argued that 'the design or layout of a CO_2 pipeline network could be done by a public authority or by (cooperating) private parties. Private parties can readily decide on 1:1 connections between capture and storage location that they plan themselves. However, it is uncertain if efficiency gains through large "backbone" connections would materialise without public intervention. An additional argument for a public role might be that economically disadvantaged or remote areas could be linked to an EU-wide pipeline network.'

As regards the possible need for public funding, reference is made to the Trans-European Energy Networks (TENs). Community aid is allowed only on projects of 'common interest', promoting effective operations, the development of the internal (energy) market, the rational use of energy resources, the development

of less-favoured regions, the security of energy supply, and sustainable development in general.[23] The study raises two questions, namely, whether CCS operations in general or only a limited subset should be considered of common interest and, also, to what extent private parties will be able to finance the envisaged CCS demonstrations projects and the required pipeline infrastructure themselves. The financial position of utilities and oil and gas industries might need to be considered before scarce public resources are granted, while upper limits for public support would be set in conjunction with the TENs framework: 10% of total investment costs.

It is argued that pipeline infrastructure would be operated by a private entity, either the operator of the capture plant, the storage site, or a third independent party. The question is whether public ownership of a pipeline network would be imperative. Private parties participating in a Public Private Partnership for CCS pipeline infrastructure could take on responsibility for constructing, operating and co-funding the projects. But public parties could play a role in laying out a network across multiple borders of Member States in the EU, and provide some funding. Whether a network would need to be owned by the private or the public sector would need to be agreed to. The choice for any particular form of aid may be made on a case-by-case basis, depending on the viability of a particular project and the magnitude of required funding.

Consideration of these marching orders for research makes it clear that the development of a framework of governance for the CCS infrastructure, i.e., the pipes, is still in a preliminary stage. This represents a clear contrast with the economic and institutional design of the trading schemes and the valuation of CO_2. Apparently, the role of infrastructures are considered to follow' the development of trade and valuation. Furthermore, it has also been suggested that private firms should become the prime movers in designing, funding and operating the systems. Only when there are pressing reasons – market failures – should a public role be considered. Indeed, the design principles from which the analysis originates, are essentially the same as the principles underlying the regulation of gas and electricity networks. It should be noted that, at the time, one of the arguments for regime change in these networks was that they had become mature systems, in which the problems of system development had been solved. This has not yet become a valid argument with respect to the CCS infrastructure.

This is all the more so because there seem to be numerous upstream and downstream uncertainties and risks involved for potential investors, which may reduce their appetite for investing in these systems.

Box 6.1 The Rijnmond area

The issues above are well illustrated by an enlightening study on CO_2 capture and sequestration in the Rijnmond area that addresses the infrastructure aspect from a local perspective (Hanegraaf, Santen and Knippels 2007). In addition to the usual arguments about the need for a robust system of emission trading, the study provides a SWOT analysis of the Rijnmond business case for a clean fossil energy system, incorporating CSS. Moreover, it also suggests specific roles for the several groups of actors, active at different institutional layers: the EU, the national government and local authorities and businesses. Whereas this study takes a local perspective, it nevertheless provides an insight into the complications, while it implicitly underlines our argument of a situation of splintered transactions.

Strengths: Local characteristics, such as the presence of potential storage capacity at less than 300 km from Rotterdam; a large number of emission points; the availability of low temperature heat to capture CO_2; the commitment of the municipality; the presence of a CO_2 network; and the location of the area, within Europe.

Opportunities: The EU and national objectives for emission reduction; the involvement of citizens and the political realm; rising oil and gas prices; improved conditions for firms to locate their businesses if there is a network in the area; the need for CSS as part of an EU energy strategy; and the generation of knowledge, economic growth and employment emerging from a competitive advantage in clean fossil technology. As such, these arguments unambiguously point to the classical leading role of infrastructure investment in generating local economic and social development and innovation. Interestingly, these opportunities represent cases of a 'public good', in which the revenues from infrastructures will be shared by all, without, however, justifying the investment, as such, among single and homogeneous actors.

Weaknesses: Willingness of private investors to engage in a network is seen as limited due to large initial investments; long payback periods; no firms that are seriously interested in capturing their CO_2 emissions; and no established rules for permanent CO_2 storage. These observations point to the fact that there is a circular lock-in situation, where the absence of infrastructures prevents trade, commercial and other aspects from evolving, and vice versa.

Threats: From the undeveloped market and trading system and the low price of CO_2, leading to sizeable business uncertainties. But another important cause for these uncertainties is the need for the alignment of a number of arenas that have thus far been functioning by and large in isolation from each other. The separate institutional frameworks of these arenas are maladapted or contradictory, in terms of the commercial, technical and legal rules and norms guiding the activities and the interests of the firms involved. CO_2 storage is not adopted in the emission trading system; there are no firms that are willing to invest in capturing CO_2; there are neither rules nor established commercial practices to reserve depleted oil and gas fields for CO_2 storage; and there may be competition with Underground Gas Storage (UGS), the position of which remains equally unclear. In essence, it could be argued that a clear definition of 'ownership' is still missing in this market. Unless this issue is settled, it is difficult to expect any significant investments. Indeed, without a network, even the need to lobby for the (re)establishment of clear rules is limited.

Without entering into the discussion on the validity of these arguments, a focus on the stakeholder analysis and the tasks assigned to the various actors underlines the fragmentation of the actor network, while providing clues about potential value conflicts between these actors. As indicated earlier in this chapter, many of these conflicts are about apparently neutral technicalities and norms – the actual meaning of which only becomes clear when parties have to behave accordingly and must then experience the consequences for their competitive position in the (emerging) market.

The developers of the Rijnmond plan have concluded that actions are necessary in the relatively short term. It is understood that a relatively large part of the initiatives essentially deals, firstly, with the establishment of commitment and trust among the parties; secondly, the achievement of agreements and certainty on the institutional framework, including the necessary rules for ownership and control, responsibilities, justification, technical and business norms and procedures; thirdly, planning and claiming future reservations for space, interconnections and other forward-looking elements of the evolving system; and fourthly, the facilitation of the expansion of the system towards other (types of) users (see Hanegraaf, Santen and Knippels 2007: 60-62).

It is also apparent that there is a multi-level structure of responsibilities and authorities, which trickles down from the EU to the local level of the businesses involved and their activities. The stakeholder analysis included in this report illustrates that a variety of firms, normally competitors for markets and sales, have to become allies. Their willingness to engage in an initiative like the Rotterdam CCS network is likely to be considered a risky venture, in which rivalry and uncertainty play a large role. It is, however, also apparent that the parties involved actively seek to establish some kind of level of common guidance in undertaking these investments, with a clear objective to coordinating their investments and the operation of the system. Under certain conditions, they may engage in the cooperative behaviour required to yield a collective good, as long as they are assured that their competitive position is not affected, relative to their rivals. This situation represents a typical prisoner's dilemma, in which the only way out is the establishment of some degree of trust, cooperation and certainty regarding future developments.

6.7 EXPERIENCES FROM ABROAD: AUSTRALIA

The experiences of two of the forerunners of liberalisation, the UK and Australia, illustrate that they are also wrestling with the same kinds of issues. A brief overview of the evolution of policy and institutional arrangements in Australia is interesting given that the Australian market is recognised as one of the most competitive and efficient in the world (see International Energy Agency 2005), but where ongoing concern remains as to how to meet future challenges of sustainable growth and the complex risks associated with the greenhouse challenge, which have further dictated the momentum of reform. Responding to these complex risks will be even more important given the size of the investment required to underpin future energy demand.[24]

The Australian experience demonstrates how institutional integration can have a direct impact on transmission investment, transferring certain crucial decision-making powers away from the regional or state regulatory level,[25] but without

affecting the ownership of network assets. It also shows why additional institutional and regulatory measures to secure transmission planning and investment have been required. Transmission is critically important in Australia due to the distribution of its population. Both under-investment and over-investment can undermine the advantages of commercial market integration.

Regime change in Australia

Liberalisation and privatisation in some, but not all, states has led to the creation of national bodies, including the National Grid Management Council (NGMC) which developed a National Electricity Code (NEC), which, in turn, was adopted at the state level. Private investors now dominate the network sector although government ownership is also present in a number of states. The states also incorporated two bodies, the National Electricity Code Administrator (NECA) and the National Electricity Market Management Company (NEMMCO), which operates the National Electricity Market (NEM).

The transmission network is regulated by the ACCC – the Australian Competition and Consumer Council. These institutional arrangements have since 2005 been further rationalised with the creation of the Australian Energy Market Commission (AEMC) and the Australian Energy Regulator (AER). As part of the ACCC, the AER should provide a consistent approach to economic regulation across the various states. Since January 2007, the Australian Energy Regulator (AER), functions as a one-stop shop, regulating the operation and development of the transmission and distribution systems for gas and electricity. It is also the economic regulator for the wholesale market and is responsible for enforcing the National Electricity Law and National Electricity Rules. The new legislation aims to increase certainty and reduce regulatory costs. The AER is committed to further minimising regulatory risk, through clear up-front requirements and consultative processes and a more prescriptive approach to revenue cap regulation.[26] The Energy Market Commission (AEMC) is engaged in regulation making and market development in the National Electricity Market and, since 2006, in the gas market as well.

The need for coordination

In February 2006, the Council of Australian Governments (COAG) established an Energy Reform Implementation Group (ERIG) to review certain elements of the operation of Australia's energy sector and to suggest further reforms supporting more efficient energy markets. In particular, ERIG was asked to report on reform recommendations for achieving a fully national transmission grid, including the most suitable governance arrangements. COAG aims to achieve a truly national approach to the future development of the national electricity grid, taking care of the interests of asset owners, and the need to promote investment in transmission services. ERIG figured that the goals of Australia's energy sector must be to ensure that investment in energy assets generates competitive returns, while the market and economic signals and incentives should permit all of the relevant efficiency dimensions to be sustained – the right amounts of investment at the right time, which encourages innovation in the energy sector. As such, Australia's

national energy market should be guided at the highest level, by broad policy objectives covering efficiency and reliability that are set nationally.

In its final report, 'Energy reform, the way forward for Australia' in January 2007 (Energy Reform Implementation Group 2007), ERIG stressed the importance of timely and efficient delivery of transmission services as crucial to meeting the emerging challenges posed by climate change and growing energy demand. Hence, the key policy question was how to ensure that the economic regulatory regime, incentives, pricing and approval processes would all work together with the overall planning and governance structures to achieve an efficient mix of generation and transmission investment in the future.

As such, it identified the need to improve incentives for both the efficient operation of the existing transmissions system, as well as the efficient investment in a nation-wide market context, together with the need to coordinate investment in the transmission system on a national basis. The lack of clear incentives to ensure an efficient development of a nation-wide transmission system has resulted in missed opportunities.

National Transmission Network Development Plan

Thus the report recommended the establishment of a National Transmission Network Development Plan (NTNDP), aimed at delivering the longer-term efficient development of the grid on an integrated, national basis. A project-by-project assessment should be made and stakeholders consulted prior to any major network augmentation project being constructed. This demonstrates that the most efficient alternative has been adopted to meet reliability standards, and deliver market benefits, while fitting under the umbrella of the NTNDP. The ERGIG considered that the potential benefits from better coordinated development of the national grid were sufficient to warrant the establishment of a national planning function. Two options were considered:

– a *National Transmission Planner*, as a strategic national planner to collate, analyse and disseminate information and deliver strong and well informed independent advice on efficient investment across the entire national market; or
– a *National Transmission Service Procurer*, as a not-for-profit corporate entity responsible for undertaking national planning, making augmentation investment decisions and procuring those services either by negotiation or tender.

The first option was recommended as it is more consistent with the current institutional and regulatory arrangements, and would maintain the current accountability of grid network owners for investment and operating performance, while complementing existing regulatory programmes. The National Transmission Planner would be incorporated into the NEMMCO and would be reviewed after 5 years to establish whether in addition to its advisory and coordination functions it should also be given powers to procure transmission services.

Furthermore, ERIG stressed the centrality of governance arrangements as a critical pre-condition for the continued improvement of the sector. As the Group stated, good governance principles – ensuring no conflicts of interests, clearly allocating responsibilities, getting incentives right – are easy to enumerate but difficult to implement. Although reforms instituted over the past two decades had proved effective, further refinement is needed so that independent and separate institutions can be held more responsible for planning, market operation, market regulation and the drawing up of regulations as well as sharpening the separation between these organisations and the political level in order to guarantee the independence of regulators from political interference. Hence, it recommended that the Ministerial Council for Energy (MCE) should be confined to broad policy making and detailed intervention in the regulatory sphere should be eliminated. At the same time, the regulatory authorities should not be engaged in strategic reviews – the political level, that is the MCE, should take responsibility for strategic review and evaluation, if necessary assisted by expert groups.

6.8 CONCLUSION

In this chapter, we have examined the nature of regime change and have illustrated how vertical unbundling and the provision of open access to the competitive parts of the industry has created a fundamentally different industry environment, involving new types of actors, like the network operators, the regulator, new entrants of a diverse nature in production, supply and trading activities and a large number of interest organisations.

We also addressed the changes to the pattern of governance and principal-agent relations resulting from regime change. As regards control and ownership, we showed that a hybrid pattern emerged. The operations of the private and public gas and electricity producers and (retail) traders are predominantly driven by the commercial logic of the market, despite continuing public ownership in many of these firms. The unbundled regional distribution networks are regulated, but yield significant revenues for their shareholding provinces and municipalities. Two, fully unbundled, publicly owned national transmission system operators are confronted with multiple principals, the Ministries of Economic Affairs and of Finance. The networks are also supervised by a single regulator, NMa/DTe, with extensive powers over the transmission and distribution, system operators' tariffs and access conditions. Supply and trade activities are also under NMa/DTe supervision, with a strong focus on competition issues in the wholesale market and on consumer protection.

Various components of energy policy making now fall under the responsibility of four different ministries. Sustainability issues, CO_2 trade, the promotion of renewable energy, security of supply, competition and regulatory issues, energy efficiency, the mining regime, etcetera, are being discussed at the local, the national, the European and the supra-national level, including the Kyoto and Bali agreements and relations with foreign suppliers.

Moreover, we have shown that a large number of associations and platforms have emerged to articulate and bundle the technical, economic and strategic insights and interests of the several groups of stakeholders in the energy sector, at the national and the international level. Those organisations provide vital, but also conflicting, input into the ongoing debates on the restructuring and regulation of the industry, the environmental challenge, consumer and business interests, security of energy supply, etcetera.

It was also illustrated how regime change has caused splintered transactions, both with respect to the split between the commodity, the transport and services that need to be delivered, and the long-term development of the systems. In the current context, every 'simple' commodity transaction involving the supply of electricity or gas to a customer requires a complex chain of associated tailor-made transactions for transport, handling and ancillary services. Regime change has introduced a different logic for the technical and economic coordination of the activities in the industry, which both short-term commercial transactions and its longer-term development. The negotiated agreements of the past have been replaced by the competitive logic of the market, bringing in commercial rivalry and economic incentives as predominant drivers for the behaviour of economic actors. This may cause difficulties and lead to transaction costs in the day-to-day execution of energy trade, requiring an interrelated set of commodity, transport and services transactions, involving several parties with differing objectives.

However, the framework for the governance of network investments is not yet well developed. The principle of actual historical cost underlies the regulatory rationale for revenue allowance, tariff setting and remuneration of existing infrastructures. The future expansion and adjustment of the networks requires the operationalisation of some notion of *long-run* marginal costs and revenues, given the specific objectives of network development and the evaluation thereof. It would reflect the investors' and users' perception of the value generated, as compared to the risk involved. As demonstrated, large practical and conceptual difficulties make it hard to reach agreement on these objectives, the investments required and the valuation thereof by investors, users and the regulator. Moreover, this process is characterised by fundamental uncertainties and the strategic behaviour of owners, operators, customers, regulators and policy-makers.

Within an environment of commercial and strategic rivalry and distrust among the firms in the industry, public entities like the ministries, the regulator and the TSOs, and the wide range of secondary actors, decision making on the development and operation of new infrastructures remains problematic and controversial. Emerging objectives, values and technical and commercial principles and practices are easily contested and politicised. For example, in the context of an energy system that is rapidly internationalising within the EU and beyond, it appears difficult to agree on the territorial scope of operations, transactions and regulatory intervention. Whereas a regulatory period of five years is considered too long as it blocks timely adjustment to changing market circumstances,

investors think it is too short, as it does not provide the certainty required for investments. Another subject of discussion is the balance between the wish to avoid imposing excessive risks on consumers through socialised tariffs, and exposing investors to regulatory risk.

Resort is taken to unpredictable exemption procedures for exceptional investments such as cross-border interconnectors. Lack of harmony is strategically used by the various parties involved (and their organisations) to defend their own interests and objectives. As a consequence, substantial network investments are being dealt with on an ad hoc basis, often driven by 'crises' and/or court cases, under a considerable degree of uncertainty and regulatory reservation. The basic regulatory focus on immediate cost reduction and the creation of competition is jeopardising the longer term development of adequate infrastructural systems for a sustainable and reliable energy supply.

This brief account of the energy sector has illustrated that the creation of an adequate investment climate requires the development of a broader view on the interrelationship of short-term competition and regulatory issues and the way in which these should be fine tuned, in order to achieve the right framework for future developments. Many of the decisions to be made in the future will be affected by current choice and approaches. The absence of a viable longer-term perspective and the prevalence of short-sighted ambitions will undoubtedly affect the freedom to effectively rearrange matters at a later stage.

In many aspects, timing and coordination are crucial to achieve balanced progress in the right direction. Lack of coordination, either by an effective market or by an adequate intervention on the part of the relevant public authorities, will mean that society will incur extra costs, either due to the lack of a technical, economic and institutional fit between the components of the energy sub-systems, or the fact that issues of equity will cause serious societal resistance against the necessary adjustments to the system. Postponing action may narrow the choice of effective instruments to realise these three objectives.

Lessons for other sectors?

The development and operation of infrastructures as natural monopolies – whether in energy or transport or water supply or flood management – will always require some degree of public intervention and regulation to meet public values in terms of an efficient exploitation. So, public decision making will always have a direct role in establishing the relevant economic and technical criteria. This offers an opportunity to influence the pattern of supply and demand of goods and services provided by the infrastructure in question, as well as the longer-term development of the infrastructure itself, in such a way that the broader public values associated with these vital goods and services can be safeguarded. With a relatively moderate encroachment of public authorities in the private or commercial domain, it may constitute a powerful tool to internalise the external effects of the sector in question. This, of course, can occur in combi-

nation with market-based instruments, like levies, tradable property or emission rights and subsidies, having direct economic impact in the way market actors evaluate specific transactions (Larouche 2008).

This way of looking at infrastructures – whatever the sector – is by no means new. However, it has the virtue of recapturing the traditional practice of publicly coordinating the parameters within which competitive markets with private actors are allowed to develop.

NOTES

1 Of course, the traditional EU natural gas industry was also international. However, it consisted on a set of separate, coordinated value chains from the suppliers to the consumer countries.

2 Most of the gas production concessions constitute a 50/50 public/private partnership, involving Energie Beheer Nederland (EBN) and a consortium of private firms. GasUnie – the single wholesale gas trader and exporter and owner of the national gas transmission system – was jointly owned by Shell and Exxon (50%) and the Dutch state (10%) and EBN (40%). In the up-stream gas production, national and export pricing practices were meant to yield the opportunity values, as set by the value of alternative fuels, like heating oil and fuel oil. A share of about 70% of the profits, or more, was transferred to the State, as the 'Gasbaten'.

3 TenneT transports electricity throughout the Netherlands, by providing access to the national high-voltage grid to electricity producers, regional grid operators and large consumers. Any party that meets a set of strict conditions can make use of the high-voltage grid. TenneT TSO B.V. carries out regulated activities. These are statutory tasks related to managing the national transmission grid and maintaining the required balance between supply and demand in the Dutch electricity grid. Several regulated activities of an operational nature are delegated to subsidiaries like TSO Auction B.V., which organises the auctioning of import and export capacity on the five cross-border connections. TenneT's main regulated services are: 1) the connection service, involving the management of the 23 connections to the Dutch high-voltage grid of a few large consumers, power generators, foreign grid companies and local grid companies; 2) transmission services, by providing access to the Dutch national high-voltage grid to market parties; and 3) system services, maintaining the electrical stability of the systems and handling unexpected demand fluctuations or supply disruptions. TenneT does not produce any electricity itself and does not 'own' the power – it merely makes the transmission grid available. See also: http://www.tennet.nl/english/tennet/organisation/services/services.aspx.

4 GTS is responsible for the management, the operation and the development of the national transmission grid on an economic basis. GTS main regulated services are: 1) to create and maintains connections to its about 50 'entry' and 1,100 'exit' points. At an entry point, the gas can be physically injected into the system. At an exit point, the gas can be physically removed from the system, to supply a regional gas network, a large consumer or an export station; 2) to provide and ensure sufficient transport capacity to its shippers; 3) to balance the grid; 4) to provide quality conversion and flexibility services. On behalf of its public tasks, GTS is responsible for security of supply issues, including peak-period delivery and supplier of last resort deliveries and the supply in extreme cold weather conditions. It also facilitates the small fields policy, which involves the extraction of natural gas from small fields. GTS is not allowed to carry out activities such as production, delivery or the purchase of gas by means of which it enters into

competition with other parties unless this relates to the performance of activities for its legally mandated tasks. See also: http://www.gastransportservices.com/corporate/518325.

5 The roles of these departments in energy policy making is supported and facilitated by a number of (national) research institutes, councils and other advisory bodies, like CPB, ECN, RIVM and the Energy Council.

6 Source: http://www.dte.nl/engels/about_dte/dtes_mission/Tasks/index.asp.

7 Besluit van 13 april 2004, houdende regels inzake voorzieningen in verband met de leveringszekerheid (Besluit leveringszekerheid Gaswet), *Staatsblad van het Koninkrijk der Nederlanden,* jaargang 2004, no. 170, The Hague: Sdu.

8 The NMa/DTe participates actively in the informal European Stakeholders Forums as well as the European energy regulators network (CEER) and the European Energy Regulators group (ERGEG), discussed above in chapter 4.

9 Via the Amsterdam Power Exchange (APX) and the Title Transfer Facility (TTF), APX Gas NL, while ENDEX provides power and gas futures trading.

10 The Dutch gas system connecting small consumers via the local networks and some regions in Germany and Belgium is geared to supply low calorific, Groningen quality, gas. It is sometimes necessary to convert H gas with a higher calorific value into Groningen gas, blending it with other gases or nitrogen.

11 GTS makes extensive plans to anticipate market developments, provide new services and invest in the provision of pipelines, compression capacity and the storage of natural gas. The company, therefore, studies problems affecting the main transport network and looks for appropriate solutions. GTS also advises the network owner, GasUnie, on possible adjustments and carries out preparations for new construction and maintenance projects in the transport network. GTS has a consultation procedure to gain information from the market players to plan effectively.

12 TenneT manages the 23 connections to the Dutch high-voltage grid. A connection consists of a transformer and a substation bay and most have grids of a lower voltage level. The DTe lays down the conditions under which connections with the high-voltage grid can be established. In principle, anyone can apply to TenneT for a connection, and TenneT is obliged to accept every application. The materialisation of the connection must be committed to paper by TenneT and the applicant in an agreement regarding the connection. It is not possible to derive a right from an application to connection unless the agreement of the connection has been signed by both parties.

13 Williamson identifies four dimensions of asset specificity: Site specificity, an asset available at a certain location and movable only at great cost; physical asset specificity, a specialised asset designed for a single purpose; human asset specificity, highly specialised human skills; dedicated assets, discrete investment in a plant that cannot readily be put to work for other purposes.

14 The current regulatory framework for transport tariffs for GTS is set out in a letter from the Minister of Economic Affairs (Tweede Kamer 2006-2007, 29023, nr. 37).

15 The planning criteria for the design of the TSO grids are set out in the Grid Code, which must be approved by the regulator. Since December 2005, the TSO must also publish a Quality and Capacity Plan, which must meet the criteria laid down

in relevant Ministerial regulations in relation to quality aspects for Electricity Grid and Gas Network management. The regulator is empowered to assess these plans. This planning process also applies to the DSOs (see Art. 4 EW and Art. 5 GW).

16 See: http://www.dte.nl/nederlands/elektriciteit/transport/openbaar_dossier_aanvraag_norned_kabel.asp (Norned) and http://www.ez.nl/content.jsp?objectid=152636&rid=148996 (BritNed).

17 Important uncertainties exist in this respect. There is the issue as to when production levels and the flexibility of Groningen will start to decline. This is a function of the geology of the field and investments by the NAM to maintain its capacity and the post-2016 production quota, as imposed by the government. Another intriguing question is whether the domestic consumers will have to modify their appliances to allow for H gas consumption, or whether H gas will be converted into L gas on a large scale.

18 'Informele zienswijze uitbreiding H-Gas transportsysteem', DTe, September 2006, letter from DTe and Gas Transport Services.

19 In addition to this dispute, there were conflicts between DTe and GTS about the method of revenue regulation for the transport tariffs and about the way in which GasUnie purchased and provided flexibility services to its customers. In 2006, these conflicts were resolved in court, in favour of GasUnie.

20 Indeed, GasUnie – not GTS – has invested commercially in the BBL pipeline to the UK, the cavern storage Zuidwending and a LNG gasification plant, with Vopak.

21 http://www.ecn.nl/en/ps/research-programme/transition-technologies/ccs-regulatory-framework/.

22 http://www.ecn.nl/en/ps/research-programme/transition-technologies/ccs-regulatory-framework/.

23 Articles 2, 3, 4 and 6, Decision 1364/2006/EC.

24 Government sources estimate that net electricity demand will rise from 186 TWh in 200??? to 284 TWh by 2020. The Australian Energy Networks Association (ENA) has indicated that energy network businesses (gas and electricity) invest approximately 5 billion Australian dollars annually.

25 As a confederation, regulatory competence for the electricity market is shared by the Federal (national) and state governments. Thus state regulators are primarily responsible for retail supply and distribution while the national government has jurisdiction over interstate trade.

26 Initial regulatory proposals are submitted by the regulated company which is expected to have all the supporting documentation in place in order to allow the AER to reach a rapid decision. It has been given extensive new powers including the power to gather information but, at the same time, there are new accountability mechanisms to ensure that information is gathered for bona fide regulatory purposes. The AER must produce an annual report of its activities as well as a more future-oriented analysis of 'the State of the Energy Market'.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION – THE CHALLENGES AHEAD

This report has established that the role which infrastructural provision must play in the future requires a new perspective which recognises their core, strategic role in facilitating wider economic and societal change. Among the future challenges that require vast investments are the transition to sustainable mobility, a knowledge-based economy as well as a low-carbon economy – all of the revised Lisbon agenda goals. These goals show that the infrastructures involved are not just important for the delivery of services such as gas, electricity, drinking water, transport or electronic communications. Infrastructures are increasingly pivotal for facilitating change and as such, in realising general, long-term collective public values for society at large. It follows that government strategy must now devote renewed attention to securing a facilitating, strategic role for infrastructures and recognise that investing in infrastructures is absolutely vital for achieving long-term public values.

This report, in this perspective, has also identified challenges and potential risks that are at least in part, intrinsic to the process of regime change examined in previous chapters. Specifically, as chapters 1 and 2 have emphasised, the essential focus of regime change has been i) on short-term and static efficiencies and ii) on the products and services delivered over the infrastructures, and not the infrastructures themselves. But in order to maintain a high quality of service delivery and, at the same time, meet these new challenges, a renewed focus on the role of infrastructures in not only serving consumer interests but also in meeting longer-term societal values including sustainability, mobility and innovation, is imperative. The enormous costs as well as the increasing urgency for large-scale investments to accomplish this process cannot be underestimated (for example, the IEA estimates for energy transport networks alone this is in the region of € 200 billion).[1] However, substantial investments in the trans-European infrastructures, that provide the true backbone for Europe's single market in transport, electronic communications and energy supply, figure high on the EU policy agenda. The challenges ahead, especially in climate change, require a transition of a magnitude that has brought EU Energy Commissioner Andris Piebalgs to speak of a 'Third industrial revolution'.[2] Given the key role of infrastructures in achieving this transition, the Council recommends the Dutch government to devote its urgent attention to securing and promoting relevant and strategic opportunities to ensure that the investment in infrastructures necessary to meet these challenges takes place in a timely, efficient and effective manner.

The Council believes that it is time to move the political debate on the future of infrastructures beyond ideological strife over the pros and cons of the classic paradigm of state control, public ownership and strategic shareholding. It is also necessary to shift gears in the policy debate beyond a limited focus on the merits of

sectoral regulation, to a political discussion about robust future solutions in the face of impending challenges. Yet this should not be seen as a plea for a return to a top-down industrial policy in which the various infrastructures are merely an instrument for achieving economic and social development. On the contrary, as stressed in this report, infrastructures deserve a focus in their own right.

This concluding chapter presents recommendations for developing a strategic policy framework for investment in infrastructures, and the necessary institutional arrangements to realise and implement this policy. Considering the analysis of the effects of regime change identified in this report, it puts forward recommendations for the foundations or pillars on which new institutional arrangements could be developed to secure optimal levels of investment in infrastructures and to accomplish a policy framework which will not only serve to maintain a high level of quality of service delivery in the short term but also the realisation of longer-term societal values.

7.2 REGIME CHANGE

Given the specific economic and technical characteristics of infrastructures, as diverse as water, energy, roads, dikes and electronic communications, some prudence in drawing general conclusions on the impact of regime change on each individual sector is called for. Moreover, sectors will inevitably face different challenges at different points in time. The depreciation period for investment in dikes for example is often spread over a period of 100 years, and for water pipes some 40 to 60 years, whereas, due to the speed of technological change, investments have a much shorter life span in the energy and particularly the electronic communications sector. What is also relevant is the fact that the processes of internationalisation have a divergent impact on the various sectors, so that the remaining scope for national manoeuvring varies.

As discussed in detail in this report, and in the accompanying WRR study *New Perspectives on Investment in Infrastructures*, in the last two decades, most infrastructures have been subjected to some degree of regime change as policy emphasis has shifted to the role of infrastructures to deliver goods and services in the consumer interest, concerns for greater efficiency, lower prices and enhanced consumer choice became the focus of attention.

Five often interrelated modes of regime change have been identified in this report: liberalisation, privatisation, internationalisation, unbundling and corporatisation. Liberalisation concerns the opening up of an infrastructure to allow for competition in supplying goods and services to consumers. Privatisation involves a transfer of ownership from the public to the private domain. Internationalisation refers to the processes involved in a transfer of functional operations and in some cases, governance aspects of infrastructures to a supra-national level. Unbundling concerns the splitting up of vertically integrated undertakings into functionally and sometimes legally separate units. Lastly, corporatisation

involves a trend towards the management and operation of publicly owned infrastructures according to commercial or market based 'principles'.

In virtually all of the national infrastructures, the impact of regime change can be identified, albeit, that these various modes of regime change have been introduced in the various infrastructures sectors at different times and to varying degrees. The original motivation behind regime change, often catalysed by European single market initiatives, was founded on the belief that the introduction of competition and market-based principles would lead to increased efficiency and hence lower prices, as well as freedom of choice for the end-user of the services provided over infrastructures. Although the accessibility and affordability of essential infrastructures are preconditions to that end, the primary emphasis in policy and regulation has been on service delivery. Indeed, with respect to service delivery, some studies show that important improvements have been made, for example, the creation of customer choice (energy and electronic communications) and efficiency gains in electronic communications, energy and public transport (Ministry of Economic Affairs 2008). Thus far, however, neither an academic nor a political consensus has been established on the definable merits or risks of regime changes. The different and often conflicting evaluations of regime change make it clear however, that regime change is not a clear-cut route with ready-made institutional solutions. This report does not seek to offer a final verdict on the merits of regime change. Its purpose is rather to stress that there is more to regime change than choice, service delivery and efficiency.

It is now evident from two decades of experience both in the Netherlands and elsewhere, that regime change is not a neat trajectory from A to B, but is a pragmatic process, instead, that is characterised by continuous but non-linear evolution and institutional transformation. Privatisation has been postponed or cancelled in some sectors (energy, airports); previous policies of structural separation may now be reversed (rail). Political debate about the merits of the privatisation of airports, harbours and railways, or the introduction of competition in road transport have continued unabated. Regime change has proved a journey to an unknown destination for many of the actors involved. Even in privatised sectors, industry is confronted with major uncertainties as to the impact of regime change on future investment (London Economics and Price Waterhouse Coopers 2006).

7.2.1 THE CHANGING ROLE OF GOVERNMENT UNDER REGIME CHANGE

The role of government has undeniably changed in many infrastructures, as the dominant role of the public sector as owner, planner, financier and operator of the majority of the national infrastructures has given way to market-based principles.

A principal contention of this report is that the very process of regime change has created fundamental dilemmas for future infrastructural provisions. This has been referred to as the 'mission paradox' (Larouche 2008). As part of the regula-

tory bargain at the root of regime change, the state has relinquished direct responsibility for the operation of infrastructures to a multitude of actors. At the same time, even if policymakers and regulators are increasingly required to let go of an infrastructure and allow it to evolve in response to customer demand and market forces, they must still be able to ascertain whether a sector performs in order to meet public policy objectives and to guarantee public values, in particular longer-term values. A strong market needs a strong state (Council of State Vice-President Tjeenk Willink in a hearing in the Dutch House of Representatives, May 2008).[3] The aggregation of individual private interests cannot be easily equated with the collective public interest. A process for establishing clear public policy objectives remains critical.

A second dilemma is that, as a consequence of regime change, new and heterogeneous actors, pursuing different commercial objectives, are involved in decision making on investments: private, hybrid and new public actors have all entered the scene. Moreover, these actors operate on various levels (regional, national and European). Inevitably, decision making on investments takes place in a fragmented landscape, with the potential result that important investment decisions could be postponed if only as a result of the sheer complexity of the decision making process. The challenge now is to harness markets to deliver on externalities and public goods. This way of looking at infrastructures – irrespective of the sector concerned – is by no means new. It has the virtue, however, of recapturing the traditional practice of publicly coordinating the parameters within which competitive markets and a myriad of commercial actors should function.

7.2.2 REGIME CHANGE: FROM A 'TYPE I' TO A 'TYPE II'-STRATEGY

Regime change to a large extent has lived up to its objectives. It has led to freedom of choice for the consumer (for example, in the electronic communications infrastructure) and to increased efficiency, e.g., as the result of the introduction of a benchmark in the drinking water infrastructure. Efficiency levels in most infrastructures have increased, even if this is not always evident to the end-user when other factors have contributed to the final price (for example, rising oil prices and increased indirect taxation have overshadowed the impact of efficiency gains on the final price that electricity and gas end-users pay).

At the same time, the 1990s offered remarkably benign economic circumstances. In the energy sector, for example, there was considerable excess supply and fossil fuel prices fell to historically low levels. Inflation levels reached an all-time low as did the interest rates and the cost of borrowing. A regulatory system that was in effect an asset-sweating exercise, was right for the time, and delivered what the advocates of liberalisation had demanded – low prices. But twenty years on, the limitations of the first stage of regime change are becoming apparent (see, for an assessment of the impact in the different sectors, Ministry of Economic Affairs 2008). First of all, the regulation of most natural monopolies is based on a methodology that creates a bias towards short-term interests at the expense of

long-term investment requirements[4] (Better Regulation Taskforce 2003; Chang, Koski and Majumdar 2003; Burns and Reichmann 2004; Alesina et al. 2005 and Guthrie 2006). Static efficiency measures, risks undermining public values such as accessibility, affordability, reliability as well as wider economic and societal concerns, including environment and public health may not be sufficiently secured through the regulatory mechanisms, at the goal of which is the maximising of static efficiencies. Gradually the realisation is beginning to dawn that in infrastructure utilities it is investment and the quality of the capital stock that is significant – and having enough of it.

The process of regime change remains incomplete, despite the benefits that it has delivered in a more benign economic environment in terms of efficiency gains and increase of the choice for the consumer. The new agenda is about externalities and the public goods of network provision – security of supply, sustainability and innovation. The initial drive of regime change has been tailored to address a) the improved functioning of the market; b) increased efficiency and c) improvement of the service delivery for the national consumer. In this report, these are referred to as 'Type I' public values. 'Type II' public values, on the other hand, refer to long-term public values that are not associated with today's consumer but involve the interests of the (future) society at large. These 'Type II' values run the risk of being inadequately addressed in the current institutional regime because there are no real stakeholders involved as yet. These 'Type II' values comprise of two categories: the values that are inherent to the service that is transported over infrastructures, such as long-term security and adequacy of supply and even the costs thereof. But of equal importance are the values connected to the multiplier effect of infrastructures, meaning that infrastructures are important for the economic, cultural and social development of a society, such as innovation, sustainability or public health.[5]

These are the market failures which also currently matter at this time and not just monopoly and market power, or so-called 'Type I' market failures. What is now needed is a strategy that effectively addresses these new 'Type II' market failures. The second stage of regime change must resolve these problems, and in this stage it is the return of policy that matters.

7.3 PUBLIC VALUES IN INFRASTRUCTURES

The public values to be pursued in this second stage of regime change are not easily defined. The challenge of the first stage of regime change was by comparison, more clear-cut. The short-term goals of enhanced efficiency could be realised through specific regulatory mechanisms (see Van Dijk 2008). The second stage of regime change constitutes an altogether more complex challenge. Not only will long-term and sometimes contradictory, public and private interests have to be reconciled, but a policy strategy for infrastructures will also need to embrace a multitude of public values – values that are not always easy to specify or quantify in unambiguous terms. Moreover, they are increasingly dynamic and their priori-

tisation may shift over time, as the recent resurgence of sustainability concerns has shown. Governments need to respond to and facilitate these dynamics, but without losing direction or allowing policy to become volatile, as this may create mistrust and uncertainty and will, in turn, undermine investor confidence in the longer term (see below). In the context of 'Type II' market failures, a strategic policy framework in which substantive public values can be articulated and balanced becomes an imperative.

Although government responsibility in many cases may be considered the appropriate response (and defining and balancing public values is first and foremost a political prerogative), the Council is fully aware that both market failures and government failures have contributed considerably to public value failure in the past (Bozeman 2007). Van Dijk (2008: 8) and Ten Heuvelhof (2008) have argued in the accompanying WRR report that in publicly owned or controlled infrastructure organisations pressure from the capital market on the company to hold down capital and operating costs is often absent; the soft-budget constraint (i.e., the absence of a risk of bankruptcy) undermines this process. Moreover, the risk of political opportunism to adapt policy in the interests of insider constituencies may deflect cost containment strategies. Finally, and as we noted in chapter 2, regulatory tinkering or ad hoc solutions can compound uncertainty and distrust as to the feasibility of realising a return on sunk capital in the longer run.

In full cognisance of the well-recognised risks of government failure, on the one hand, and given the risks of 'Type II' market failures (i.e., the ineffective or inefficient realisation of long-term values), on the other hand, the Council recommends the elaboration of a policy framework and related institutional arrangements to facilitate long-term investment, based on three broad pillars. This approach is not intended to elevate the state as the exclusive guardian of public value. Instead, the role of the state is to ensure that the necessary institutional arrangements are in place to deliver these values.

7.4 A NEW ACTOR AND A MULTIPLE-LEVEL CONSTELLATION: CONSEQUENCES OF THE DIAGNOSIS

7.4.1 HETEROGENEOUS ACTORS AND MULTIPLE LEVELS

An important if often neglected consequence of the process of regime change in certain sectors at least, is the emergence of splintered arenas, especially where strict functional and legal unbundling has become the rule – as in energy and rail transport infrastructures. Different actors are responsible for different elements or stages in the decision-making chain, with the result that investment decisions may well be either delayed or abandoned because of the sheer complexity of the actor setting. This changed actor constellation, as discussed in chapter 3, has important consequences for the role of the state. The key position enjoyed by government in a heterogeneous actor and multi-level constellation enables it to function, even in infrastructures as diverse as electronic communications or rail

transport, as a 'network manager of the heterogeneous actor and multi-level networks' (Teisman 2008; Larouche 2008). A primary task of government should, therefore, be to monitor whether and where interests diverge and to take precautionary measures (for an explanation of these measures, see section 7.5).

Internationalisation poses different challenges. With regard to Europeanisation, the issue regarding to what extent it is still possible to pursue policies at the national level is often raised. Surely, this is a highly relevant issue as EU legislation often curtails the national scope in infrastructural decision making. Uncertainty may arise with respect to the nature of EU involvement. It is therefore vital to understand the various ways in which the shadow of the EU influences domestic infrastructure decision and policy making. It must be emphasised here that the European Union does not pursue full-fledged infrastructure policies. However, by establishing frameworks of conditions, the EU is highly influential when it comes to decision making at the national level, which is – still – the dominant jurisdiction when it comes to infrastructure investments, planning, distribution of costs, and the broad balancing of public values which is a political process. In many infrastructures, however, technological and physical integration of infrastructures may, now or in the near future, be further advanced than the requisite governance mechanisms to reflect the division of responsibilities between the national and EU level of political authority. De facto a *'governance gap'* may arise.

Moreover, at the EU level, the groundwork for important decisions is laid within relatively closed networks of experts bringing together national regulatory authorities, such as ERG or ERGEG (WRR 2007). Generally, this has proved a successful mechanism for bringing together expertise from both the EU and the Member States. The possibilities for a peer review, learning from the experiences of other Member States, as well as for a horizontal cooperation between the Commission and domestic policy-makers are greatly enhanced. Nevertheless, the external accountability of such networks (especially political accountability) is significantly hampered when decision making takes place on the fringes of the public domain. This, in turn, requires a different policy response than one simply based on attempts to retain or regain national sovereignty. As explained below, in section 7.5, the role of the national state should strive to foster new checks and balances in the form of appropriate accountability mechanisms. The essay by Lavrijssen and Hancher (2008) describes various ways of enhancing accountability through the creation of multi-level and hybrid legal and political mechanisms, including hybrid accountability networks, increased transparency and strengthened procedural rights for the various stakeholders involved.

7.4.2 DISTRUST AND UNCERTAINTY, RISKS AND REWARDS

The emergence of multiple and heterogeneous actors – multiple agents and principals – as well as hybrid public-private actors can itself generate distrust and uncertainty, especially in terms of who will reap the rewards or bear the future

risks of investment requirements. Under conditions of competition there is of course no guarantee that every investment will prove profitable – an element of risk is inevitable. Uncertainty is also inevitable if sectors or parts thereof are left to market, but a certain degree of mitigation could be required and could be achieved (Larouche 2008). As the Council has underlined in this report, in the face of indecision and uncertainty as to the future direction of regime change, as well as uncertainty as to how investment risks and rewards are to be allocated, the default political and regulatory approach is often one of non-decision or a preference for ad hoc, pragmatic solutions (ad hoc and temporary exemptions from regulatory regimes or regulatory holidays, for example) to ensure certain major investments are realised (see also chapter 6). But ad hoc solutions, which favour certain actors and the avoidance of commitment to a long-term strategy for a particular sector, create unnecessary uncertainty for other actors and for their own investment plans (Larouche 2008) and can lead to sub-optimal levels of investment (Shuttleworth 2008).

7.4.3 INVESTMENT AND ITS FUNCTIONS

The term 'investment' is used in this report in a generic sense and, as such, extends to the different investment phases in the lifecycle of an infrastructural asset: from maintenance schemes, to the extension or upgrading of existing infrastructures as well as large scale innovative investments. Investment in infrastructures is characterised by its long lead times and high sunk costs and this is what sets the sector apart from many other sectors. This has a particularly important consequence in that many future decisions about the use of infrastructural assets will be affected by current choices and approaches. The absence of a viable longer-term policy perspective and the prevalence of short-sighted ambitions will undoubtedly affect the freedom to effectively rearrange matters at a later stage.

In many aspects, timing and coordination are crucial to achieve balanced progress in the right direction. Lack of coordination, either by effective market mechanisms or by an adequate system of regulatory intervention will impose extra costs on society, either due to the lack of a technical, economic and institutional fit between the constituent parts of the overall infrastructure, or due to the fact that issues of equity will cause serious societal resistance to eventual adjustments at a later stage. Postponing action may considerably narrow the choices of effective instruments available to policy-makers to realise longer-term values and objectives.

Timing and coordination are, in turn, dependent on the execution of a variety of key functions. Chapter 2 distinguished the following functions: Information (analysis, signalling trends, providing prognoses); role of expertise broker (generation of solutions, development of alternatives); developing a vision (decision making: evaluation of alternatives, risk assessment); agenda setting; goal setting; political decision making; development of principles, laws and norms; investment and finance; project planning; monitoring; refereeing. An important

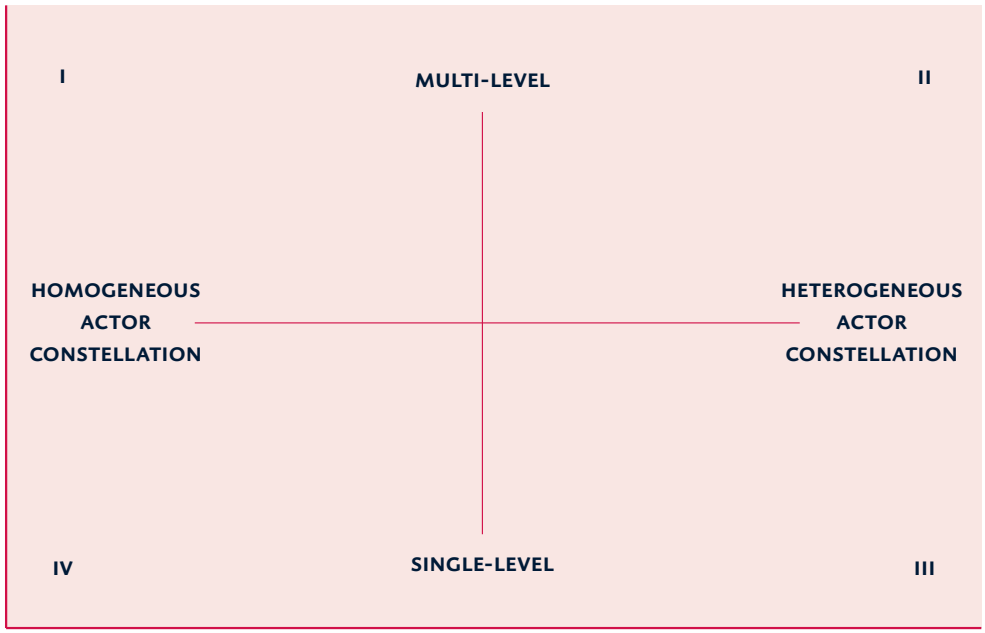
distinction between maintenance and extension investments, on the one hand, and system innovation, on the other, is that the role of the expertise broker and the development of a vision is likely to be more crucial in the latter category than in the 'business as usual' categories.

7.4.4 DIFFERENT EFFECTS IN DIFFERENT INFRASTRUCTURES

The impact of the multiplication and diversification of actors as well the multiplication of functional and governance levels will obviously vary depending on the infrastructure in question. Figure 7.1 aims to capture this divergence, and distinguishes the sectors on the basis of two axes: x: homogenous and heterogeneous actor constellation and y: single/multiple levels. This report has identified these dimensions as decisive in understanding the consequences of regime change for future investment in infrastructures. Regime change has led to a new, heterogeneous constellation of actors and a re-alignment of roles in delivering infrastructures – including a re-positioning of the role of the state (chapter 3). Regime change may also imply, depending on the sector that crucial stages of decision making on the planning and realisation of an investment are spread across multiple levels (chapter 4).

Figure 7.2 aims to provide an indicative 'snapshot' of the historical/critical and current position of the various infrastructures. The dotted lines (which depict the position of the sector some twenty years ago) illustrate the diverging dynam-

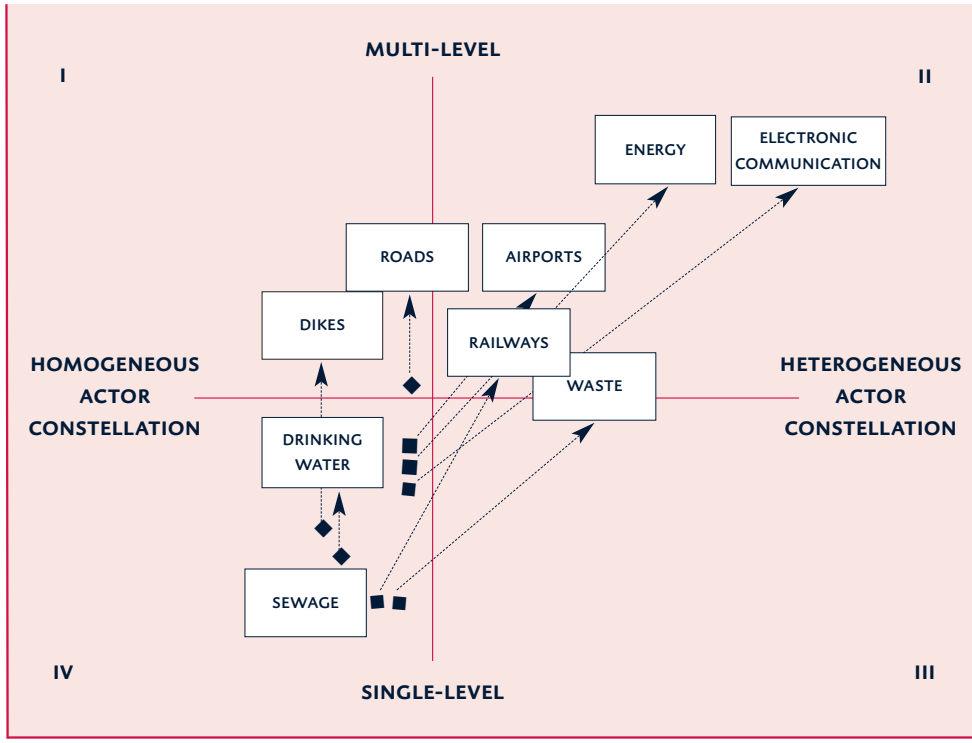
Figure 7.1 **Infrastructures in the quadrant of homogeneous and heterogeneous actor constellation: single and multiple levels**



ics in the position of the different infrastructures, a divergence which is part to be attributed to the outcome of deliberate policy choice, but may also be due to changing technological characteristics of infrastructures. The choice of unbundling or vertical integration, for example, has a direct impact on the number and types of actors in infrastructures. But technological factors also influence the available options: in electronic communications, for example, competition between infrastructures is possible but this is not the case with dikes and roads, where the potential for competition between infrastructures is obviously limited. (For an elaboration of the relation between governance and technical characteristics, see also Knops 2008.)

Given the substantial differences between the infrastructures, recommendations with regard to the scope for, and form of a strategic policy framework reorientation (section 7.5) to secure long-term investments in infrastructures – can be matched to each of the four quadrants. It is in this context that this report has examined the parameters necessary to secure long-term investment, both in terms of the legacy of regime change in the sector concerned and regarding the future challenges which the relevant infrastructures will be required to meet.

Figure 7.2 **Infrastructures in quadrant of homogeneous and heterogeneous actor constellation; single/multiple levels.**[77]



7.5 TOWARDS A STRATEGIC POLICY FRAMEWORK: REDEFINE, REALIGN AND RECALIBRATE

As the subsequent sections of this chapter make clear, the requisite strategic policy framework to secure long-term investment in physical infrastructures must take account of the legacy of regime change and the challenges and opportunities that the process itself has created. In order for policy to be effective, the resulting institutional architecture must obtain commitment from all the relevant stakeholders on the one hand and also generate a high level of trust among them on the other. It must therefore be conceived and executed as a joint exercise – as opposed to a hierarchical one – which is capable of channelling discussions and insights into a vision on future infrastructural requirements between the various stakeholders but without prioritising specific interests, technologies or even methods of evaluating performance. The foundations for such an approach are based on three pillars:

- Defining (and redefining) functions, roles and responsibilities;
- Realigning goals and resources through joining-up and connecting actors and levels; and
- Recalibrating risks and rewards through the elaboration of appropriate checks and balances.

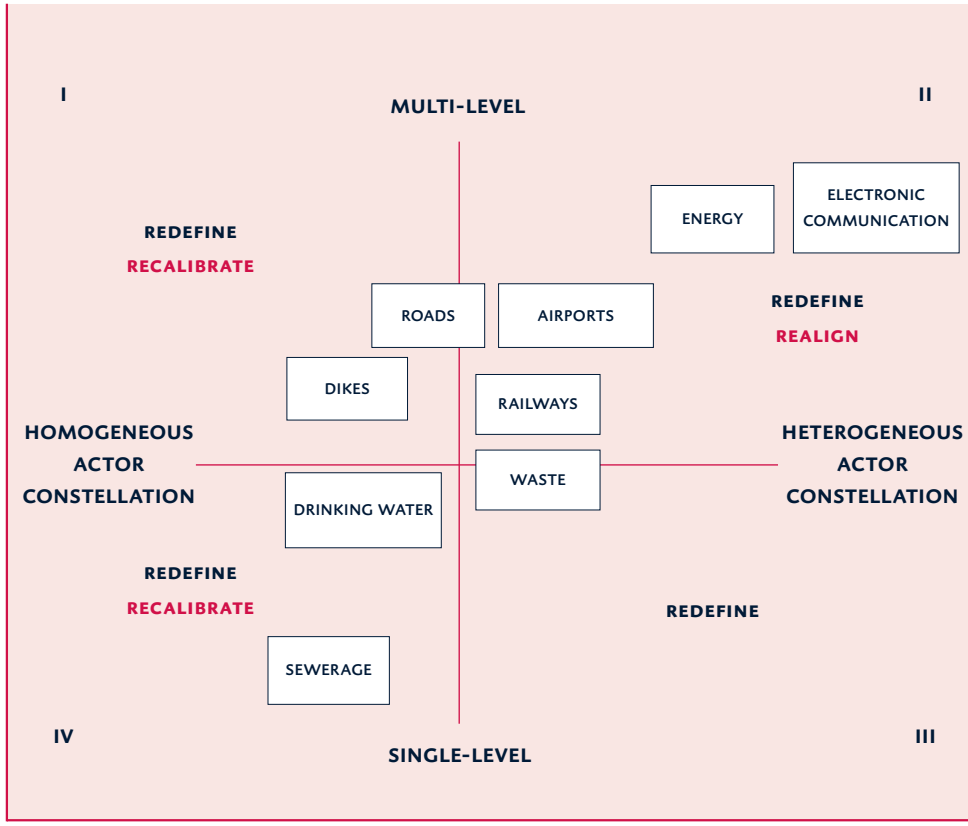
An approach based on a clear allocation of roles avoids blurring of interests and reduces uncertainty and distrust. The broader, joined-up dimension provides a better guarantee of wider input and of a richer but more flexible repertoire of instruments to realise longer-term objectives. If relevant checks and balances are properly recalibrated this should ensure incentives, and, where necessary, that checks or controls can remain in place over the longer term.

The Council recommends that in the design of a robust strategic policy framework, reliance should be placed on these three pillars. But the emphasis on any one of these three pillars for crafting an individual sectoral policy framework may vary depending on the quadrant (Figure 7.1) in which a particular infrastructure is situated, as illustrated in the following schematic diagram.

7.6 PILLAR I: DEFINING AND REDEFINING ROLES AND RESPONSIBILITIES

A robust strategic policy framework requires the clear recognition and proper allocation of roles and responsibilities to the various actors involved to avoid default reliance on hierarchical, top-down interventionism. It is equally necessary to ensure a clear allocation of roles and responsibilities for implementation and for the constant evaluation of this process in order to engender commitment and trust. Finally, the allocation of new roles may be necessary to address the specific consequences of regime change in certain sectors. In this regard, the Council puts forward a series of recommendations for allocating responsibilities between government, regulators and industry at the different stages of policy formation, implementation and evaluation.

Figure 7.3 The three pillars of the strategic policy framework depicted in the quadrant



7.6.1 THE ROLE OF GOVERNMENT

Given the consequences of regime change, as analysed in this report, a return to direct state intervention in investment decisions is no longer a realistic or fruitful option in the liberalised sectors. An inherent feature of the process of regime change has been the separation of institutional and operational functions albeit to varying degrees across the different infrastructures; in general, industry actors are no longer in a position to dictate regulatory choices while national policy-makers and supervisory authorities (or regulators) are unable to dictate operational choices – including major investment decisions. According to the principles on which regime change are generally based, these latter decisions should be left to the sector, irrespective of whether it is publicly or privately owned.

Nevertheless, a frequently heard political plea is for a return to the old paradigm of top-down planning and state-controlled monopolies or even 'national champions' that can produce and deliver long-term sectoral objectives. However, to conclude that this approach would be either desirable or possible is to ignore the fact that infrastructures have in many sectors become not only a global good as opposed to a national or local tool for industrial policy, but also an important, stable and pre-

dictable source of revenue for private investors as well as public shareholders, who may, in turn, be responsible for at least partly financing new investment.

Chapters 4 and 6 have illustrated that, in many sectors, these investment decisions have to be made in an economic context which transcends national borders and national interests. State-owned infrastructure companies are also global actors. As the role of infrastructures has changed and, with it, the role of the network operators, their interests have not necessarily been synonymous with national interests (see Shuttleworth 2008). It would therefore be overly simplistic to expect these companies to act as mere instruments of government policy and passively deliver the social and economic objectives dictated by it.

Finally, the complexity of the heterogeneous actor multiple level constellations exacerbates the problem of asymmetrical information – given their operational responsibilities – the infrastuctures themselves are the primary locus of detailed economic as well as technical knowledge and expertise. Full stakeholder involvement is now necessary to ensure both the quality and eventual success of any longer-term institutional arrangements for infrastructural provision.

7.6.2 THE ROLE OF MINISTERS IN THE EVOLUTION OF SECTORAL ROAD MAPS

Given these factors, the Council contends that the evolution of sectoral road maps should be conceived primarily as a form of strategic dialogue and partnership between the relevant stakeholders. In order to minimise the uncertainty caused by political opportunism and ad hoc government intervention, the Council recommends that the primary role of ministers should be to ensure that national policy strategies for major infrastructure development are drawn up and revised at regular intervals. These strategies could be prepared in the first instance by a panel of independent advisers who would, in turn, draw on the expertise of a wide range of stakeholders, and who would provide informed and non-partisan advice on the objectives to be met and the options for meeting them. The organisational structure developed by two quite diverse European platforms that seek to stimulate innovation and investment that are vital for major economic transitions (the European Zero Emission Platform and the Commission's Innovative Medicines Initiative) can serve as a useful illustration. Both platforms have been set up to produce a robust strategy, based on a deliberative method, and with the aim of facilitating a major system innovation. The working method embraces parties from multiple levels (both EU and Member States), and combines input from market parties, universities as well as regulatory and administrative expertise. In this way, policy-makers have access to diverse sources of expertise and a broad range of views is guaranteed.[7]

7.6.3 THE ROLE OF INDEPENDENT REGULATORS

The process of regime change has generated new institutions with specific roles and functions. In a number of sectors, the phenomenon of the specialised

economic regulator has emerged. The establishment of regulatory agencies is advocated as a useful solution in meeting the challenges of the future. The Raad voor Verkeer en Waterstaat, for example, has recently recommended the creation of a national road authority (NMa) with explicit powers to draw up capacity plans and stipulate priority investment goals (Raad voor Verkeer en Waterstaat 2007).

The Council would also stress that the achievements of regime change to date should not be overlooked. Independent regulators such as OPTA and the various specialised regulatory chambers of the NMa (DTe and the Vervoerskamer) are able to mobilise information more effectively than government agencies, provide centres of specialised expertise and have also become centres of epistemic authority in their field and among their peer groups. They provide a source of information to the public that is less mistrusted than information provided by government and by commercial actors themselves. They provide a more stable institutional and legal setting for those they regulate. As part of the process of establishing their own legitimacy, they also have an incentive to inform the public and the regulated firms about the reasons for their actions and to follow procedural disciplines that may not be followed by government agencies. After a decade of developing their work they have achieved credibility with the public and with their peers.

Ad hoc, government-imposed solutions to address wider public concerns regarding, for example, security of energy supply, risks a return to political opportunism and the spectre of non-transparent departmental interference. This would undermine the independence of the relevant sectoral regulator as well as creating uncertainty at the industry level, which could, in turn, deter investment. At the same time, the Council recalls that in the Dutch approach to sectoral regulation, the powers of the regulator have traditionally been limited to implementing policy, and to supervising the economic performance of the various actors in a particular sector. In other words, these regulators have a narrow remit; they are economic and not technical regulators. In so far as they are entrusted with the task of safeguarding public values, this is largely concerned with protecting primarily individualised public values, including affordability and accessibility for the consumer or user by keeping tariffs down. These sectoral regulators have neither an express mandate to give priority to wider or more collective public values such as sustainability or innovation in infrastructures, nor indeed do they have the power to mandate investment (see chapters 5 and 6).

7.6.4 NEW ROLES FOR REGULATORS?

In the Council's view, in the sectors where they are already well established such as electricity, gas and electronic communications, and more recently, transport, the institution of the independent regulator has led to a clearer demarcation between political and regulatory authority that enhances regulatory stability, creating a better climate for investment, and, with it, the realisation of longer-term public values. At the same time, there is a growing risk that the roles and

responsibilities of established regulators are becoming blurred. It is tempting for existing regulators to become involved more deeply in the size and composition of the investment programme of regulated firms than was originally envisaged in the constitutive legislation, for example, in the energy and electronic communications sector.

The Council has recommended that the relationship between regulators and responsible ministers should be re-considered as a target for re-alignment if the former are entrusted with the implementation of broader public value tasks, including explicit responsibility for 'Type II' public values. In the Council's view, regulators must continue to play a valuable role in the development of a strategic, long-term perspective. However, so-called 'regulatory tinkering' must be avoided. Merely adding on a broader range of duties and powers to the existing regulatory structure is not a solution. A radical expansion of the powers and duties of economic regulators does not fit easily into the Dutch constitutional model – in which these regulators would have strictly circumscribed legal powers, and their duties are primarily confined to the implementation of policy. In the absence of a clearly designed set of duties, or government guidelines, sector-specific regulators would be left to make trade-offs between various public values which involve strategic, policy choices. This would transform the role of the regulator into a policy-making institution. It could lead to a blurring of roles, which would enhance regulatory uncertainty and possibly discourage rather than promote major new investment. If regulators are to assume a broader set of responsibilities for achieving social and economic objectives this must be under clear political guidance, regularly amended based on consistent monitoring processes, and stipulating how, as a matter of principle, trade-offs should be made.

7.6.5 NEW ROLES IN SYSTEM COORDINATION

As several contributors to the WRR Study that accompanies this report argue, and as the energy case study in chapter 6 has confirmed, an unforeseen or unintended 'victim' of regime change has been system coordination. The processes of unbundling, together with technical and economic market integration have led to splintered transactions. There is frequently no single actor or level in a position to predict the impact of any one transaction on overall infrastructure provision. The analysis of regime change in the energy sector in chapter 6 suggests that certain roles and functions that are necessary to secure investment in infrastructures may be particularly difficult to secure given the current constellation of heterogeneous actors with divergent if not conflicting interests. The role of an information broker or network monitor could well prove pivotal for the development of a robust sectoral strategy.

Monitoring investments

None of the infrastructures examined in this report, have had investments monitored and assessed in a systematic or structured way, although the national power and gas transmission network operators are now required to publish medium-

term investment outlooks. In those infrastructures where investment is monitored, this is primarily done through indirect measurement of the quality of service and interruptions in service delivery (e.g., drinking water, gas and electricity). Measurement of quality is necessary, but not sufficient. The quality of service delivery can only reflect the *current* state of infrastructures. Investment in infrastructures is a long-term issue. If current maintenance proves insufficient, this will only be measurable in a decline in service quality after two or three decades.

In some infrastructures, the absence of external monitoring may not cause problems if the market parties compete to construct new infrastructures to meet demand for new services or infrastructures, for example, in electronic communications where depreciation periods are also relatively short. Even for infrastructures with long depreciation periods and where a natural monopoly exists, there is an incentive for the infrastructure holders to invest in order to maintain the profitability of their operations over time. However, that incentive is potentially insufficient to guarantee 'Type II' public values. For these non-competitive national monopolies, the Council recommends obligatory external monitoring of the quality and the level of investment.

External monitoring of investment may take various institutional forms. The Australian approach, discussed in chapter 6, may provide a useful precedent in the Dutch context. A national network monitor has been recently introduced in the Australian electricity sector. This organisation is equipped with the necessary technical expertise and resources for identifying major maintenance and investment requirements and for drawing up technical plans and mapping out potential investment requirements. The Australian national monitor is independent of both politics and industry. The former is important with regard to reducing the chance of political opportunism, and the latter is important since broader interests are reflected in network planning and monitoring. The Council recommends that the introduction of a public network monitor in the Dutch context, especially for those infrastructures where competition between networks is not possible due to natural monopoly characteristics, should be investigated. Depending on whether the physical network is local or transnational (drinking water is largely local, while electricity is transnational) a regional or European monitor for physical networks could also be considered. Irrespective of the eventual institutional form which might be given to this type of monitoring function, it should be stressed that the network monitor is intended to fulfil a signalling function – identifying where and when major investments or large-scale maintenance are required. However, it will be for the other actors in the sector – the industry, the regulators and eventually government – to decide how investment is to be made and how it should be financed.

7.6.6 AVOIDING BLURRING OF ROLES AND INTERESTS

Even in sectors which have only undergone a limited degree of regime change, such as corporatisation, and the introduction of commercial incentives into what

remains an essentially publicly owned and managed but hybrid organisation, a re-allocation of roles may be necessary to ensure the realisation of longer-term investments by, for example, entrusting monitoring and refereeing to external bodies. In the drinking water sector, for example, there is no obligation on the part of public owners to re-invest the substantial profits which have resulted from re-organisation and the introduction of efficiency-based norms over the past five years. The introduction of an external monitoring or refereeing role may be a useful mechanism to counter the disadvantages of hybridity and to directly address the merits of ploughing back profits into new investment in infrastructures, as compared to diverting these financial resources to other public interest objectives (Karré 2006).

Explicit attention to allocating clear responsibilities for monitoring and refereeing may ensure that the heterogeneous, and often hybrid actors and organisations engaged in infrastructure provision are guided by multiple longer-term incentives in the public interest, and not only short-term commercial goals.

7.7 PILLAR II – REALIGNING GOALS AND RESOURCES: EXPLORING WAYS TO JOIN-UP AND CONNECT ACTORS AND LEVELS

An emphasis on joint action and horizontal coordination is required to devise as well as implement and monitor sectoral strategies to ensure their full success. The Council places a premium on realising the full potential for joint action at the various stages of the process of designing and operationalising a strategic perspective. This, in turn, will provide greater certainty and clarity for the various actors involved with the infrastructures and engenders trust and commitment.

The process of joining-up or re-connecting encourages and improves coordination across and between the different splintered arenas. It brings in different stakeholders with different views from different positions on the transaction chain, creating openings for an alignment of competing interests. It facilitates a horizontal but structured debate between the different actors in such a way that a coherent perspective evolves, counteracting splintered transactions. With this in mind, recommendations have been put forward for aligning the goals and resources at different stages of evolution, implementation and monitoring of sectoral strategies.

7.7.1 JOINED-UP ACTION AT THE POLITICAL LEVEL

In sectors in which competition between networks is not economically feasible, the Council recommends a joint mapping approach in which the parties involved (ministries, regulator and service providers, system users and organisations representing final customers) together map out the uncertainties and risks by, for example, outlining scenarios that all parties regard as possible and realistic. The process in which parties map out the uncertainties and risks could be moulded in

the form of a joint and widely supported real-options analysis, accompanied by a robust longer-term cost-benefit analysis. This type of approach ensures continuity as opposed to 'one shot' future perspectives that are liable to require change at every new occasion. The parties should negotiate the various parameters and links in this analysis. In relation to this, analyses of the positive and negative external effects of the different available options should also be conducted, both qualitatively and quantitatively. The corresponding uncertainties, risks and opportunities should further be identified and, where possible, quantified in a process in which these stakeholders are actively involved.

7.7.2 JOINED-UP ACTION AT THE REGULATORY LEVEL

Joined-up action can take various institutional shapes and guises. At the regulatory level, the Council considers that maximising various ways of 're-connecting' actors and levels can be an important guiding principle for regulators and regulations to be able to realise their long-term perspectives, and for securing a coherent and consistent approach to monitoring and evaluation of the objectives they seek to promote.

At present, national regulators do not regularly share their experiences in the developing or monitoring principles of best practices. An effective platform for such a process of exchange could take a variety of forms. The House of Lords in the UK has recommended the creation of a formal Joint Regulator Group with a permanent Secretariat in order to promote a platform for 'joined-up thinking' on cross-sectoral regulatory issues – be it on the merits of structural separation in different infrastructures or the evolution of best practices. Regulatory learning in general could be enhanced. The Council considers that a 'joined-up' process could offer a platform for assessing and monitoring different options for new approaches to infrastructural regulation and for the further development of infrastructure-specific regimes. For example, in certain of the more liberalised infrastructures such as electronic communications, a clear commitment not to engage in particular responses may prove a useful way forward as opposed to relying on the standard discussion of the pros and cons of ex ante regulatory measures versus ex post competition control (Larouche 2008). The Council, therefore, recommends the investigation of the feasibility of such a Joint Regulatory Group for the Dutch context.

Similarly, a joined-up regulatory process could be deployed to assess the advantages and disadvantages of formal as opposed to informal regulatory instruments. The latter may be preferred because they offer the necessary flexibility to react to continuous evolution, for example, through corporate governance norms (see, for example, the Walker Working Group 2007 and Stout 2007). At the same time, these types of mechanisms lack transparency and offer little accountability to a wider body of stakeholders. In the Council's view, if these informal mechanisms are combined with periodic external reporting requirements to a body such as a Joint Regulatory Group, as recommended above, this could counter their perceived shortcomings.

7.7.3 CONFERRAL OF CONCURRENT POWERS

The conferral of joint powers or the possibility of jointly investigating certain issues across sectors may also enhance the potential for joined-up action. This may allow sectoral regulators to take a more proactive role in dealing with certain novel issues or new challenges. A concurrency initiative could be developed to examine whether and to what extent a critical transaction involving private equity investors could lead to risks of over-gearing, which might threaten long-term investment and/or the capacity for innovation. Sectoral regulators such as the NMa's energy supervisory chamber or transport supervisory chamber (DTe/Vervoerskamer) do not have the necessary expertise or available resources to make detailed financial assessments of financial strategies. The AFM, on the other hand, has the requisite resources, experience and expertise in the financial markets. By pooling their expertise in specific cases, these agencies could operate more effectively and offer a more robust assessment of the issues in question. The example provided by the joint consultation launched by the two British sector-specific regulators OFWAT (for water) and OFGEM (for energy) on options for financing long-term investment, is a useful illustration of the productive use of concurrent powers. The collaboration between the two regulators has now led to a new, more dynamic and robust approach to incorporating investment costs and quality regulation into energy and water tariffs, on the one hand, and to a more refined approach based on a menu of regulatory contracts to suit particular investment challenges, on the other (OFWAT and OFGEM 2006; Tutton 2008 and Holt 2007). Examples of conferral of concurrent powers in the Dutch context are the collaboration between the DTe and the Toezicht op de Staatsmijnen,[8] as well as the collaborations since 2001 in the financial sector (Mooij and Prast 2002: 23).

7.7.4 MULTILEVEL JOINING-UP

For the Council, it is vital that any approach to evolving a strategic policy framework recognises the value of the output that new, transnational networks offer to national policy-makers to formulate a more structured, and at the same time, a sufficiently flexible approach, to learn from experience in other sectors and from other countries, and to establish a clear, stable framework for assessing and evaluating best practices. Comparative assessment is too often only carried out on an ad hoc basis (for example, the '*ad hoc groep marktwerking'*, Ministry of Economic Affairs). This task of aligning the output of transnational networks to review national goals could be entrusted to the Joint Regulator Group as proposed here.

7.7.5 LEARNING FROM BRUSSELS?

Institutional developments within the European context may inspire other methods for multi-level joining-up exercises. As explored in chapters 4 and 6, several types of transnational 'networks' have emerged, including regulatory or administrative networks, networks of experts as well as stakeholder forums or networks (see also Lavrijssen and Hancher 2008). However, national policy-makers and

parliament currently still tend to rely on limited opportunities for contact with the infrastructures through their national regulators, while, in turn, national regulators tend to focus on national organisations of stakeholders.

Clearly, the potential for national bodies to capitalise on the experience, expertise and insights emanating from the evolving transnational networks of regulators, experts and stakeholders, and deploy it at a national level remains unexplored territory and deserves serious attention. Aligning the competing output of these various networks and identifying optimal national solutions requires an approach which goes beyond one-directional delegation. It is not enough that the Dutch ministry sends a representative to the European Energy Regulators Group (ERGEG), for example, and that the national transmission system operators, TenneT and GasUnie, participate in the relevant stakeholder networks (see chapters 5 and 6). This also means that the governance approach should not be simply one of 'double delegation; – see chapter 4 (drawing on Thatcher and Coen 2008) – delegating the realisation of certain national goals for coordination at the European level through these networks. The Council would instead stress the opportunities for government, as a manager of physical 'network of networks' to harness the deliberative processes developing within these transnational networks, as described in chapter 4, to interactively enrich both policy formation and regulatory policy at the national level.

A strategy based on realignment contributes in various ways to the realisation of 'Type II' public values. A structured link between regulators and ministries helps to increase policy stability and coherence. Moreover, realigning contributes to the elaboration of a joint vision, not just by state actors, but all actors that are relevant regarding investments in infrastructures. The joint risk mapping exercise contributes to the mobilisation of support and commitment, and the resulting shared vision should extend over a longer period than just one cabinet term. In this way, private actors can, where necessary, be encouraged to finance long-term investments. Confronted with similar challenges, the British House of Lords, in its recent report (House of Lords 2007), recommended that ministers and regulators should confer on the main policy goals for a period of 15 years.

7.8 PILLAR III – RECALIBRATING CHECKS AND BALANCES

The third and final dimension of the Council's approach to devising and operationalising a robust strategic policy framework revolves around the necessary substantive and procedural checks and balances, to ensure that longer-term objectives are realised in practice, but without sacrificing flexibility. It follows that the process of redefining roles and aligning goals and resources may need to be supported by an adequate system of checks and balances, which can ensure a fair and transparent allocation of investment risks and rewards. In particular, careful attention should be paid to the requisite incentives for the various parties involved to commit to new investment. To mitigate the inevitable regulatory uncertainty and risk that attends major system innovation, the Council advocates

that urgent attention should be given to recalibrating incentive mechanisms and instruments.

Moreover, although joined-up action and the institutionalisation of horizontal linkages and regulatory learning has considerable potential, any process with no hierarchy and no agreed solutions can degenerate into a conference. Sabel and Zeitlin thus add that this type of governance approach will be more effective when there is an unattractive 'penalty default', i.e., something worse that happens if the more experimental forms of governance discussed above fail. This can include a 'destabilisation regime' in which the direction of policy creates a search for alternatives 'by, in effect, terrorising stakeholders into undertaking a search for novel solutions' (Sabel and Zeitlin 2007: 39).

The Council has recommended the introduction of a network monitor in non-competitive sectors. This institution is not, however, expected to determine political or regulatory policy or choices nor will it be entitled to impose costly requirements on investors. Its primary role is to signal where gaps or threats to the system are likely to materialise. But, in order to arrive at a coherent response to dealing with identified lacunae and attendant risks, the right incentives structures and even penalty defaults, must be in place to stimulate the necessary level of investment. An appropriate regulatory framework may therefore also be required, again depending on the infrastructures concerned, in which ex ante incentives for additional investment are balanced with ex post optimisation of access rights for third parties to the new capacity which has benefited from these incentives. The dilemmas surrounding the development of large-scale gas storage facilities, vital to meet the challenges of external energy dependence and security of supply could be addressed in this way (see chapter 6).

7.8.1 A NATIONAL SUPER FUND FOR INFRASTRUCTURES?

As this report has highlighted, certain exogenous developments are likely to put enormous financial pressures on infrastructures in order to meet the challenge of the transition to a low carbon economy. New incentives may be necessary to mobilise the requisite capital investments. A state-sponsored investment fund – a super fund for investment in infrastructures – could be created to ensure that critical investments are realised on time, as foreign examples have shown (Norway being the most cited European example). Priming financial funding from this super fund could be made available, for example, to finance the economically unfeasible aspects of a large project, or to provide start-up or bridging financing for a particular project. This approach to public financing is common practice in the Japanese transport sector, for example (Teisman 2008).

The proposed super fund could be financed from FES sources, but this fund should not be dedicated solely to public infrastructure projects as is presently the case, or linked to a particular ministry. The current basis on which the FES is operated and the manner in which available funds – budgeted at over € 16 billion

for the period 2007-2010 – has been heavily criticised – and is ripe for reform (Raad voor Economische Adviseurs: Tweede Kamer 2005-2006, 30560, no. 3 and Centraal Planbureau 2006).

Instead, the current FES could be transformed into an independent investment fund, and operated more efficiently as a revolving investment fund. The Council considers that there is also considerable potential to put this type of mechanism to greater use as a way of providing investors with re-assurance that, if as a result of unavoidable policy changes to address new or urgent issues, they will still receive adequate compensation for any sunk or 'stranded' investments (see also Shuttleworth 2008). In other words, individual investors should not be expected to shoulder the financial risks of any legitimate alteration or amendment to a long-term sectoral strategy, which is beyond their control. The presence of a safety net of this type can enhance trust and commitment.

7.8.2 STRATEGIC PUBLIC SHAREHOLDINGS

Although the present policy of the Dutch government is to exercise its shareholding rights in companies in which it still maintains a financial interest with restraint (Wilkeshuis 2008; De Pree 2008 and Kenniscentrum voor ordeningsvraagstukken 2006), this policy is now being actively re-considered (Tweede Kamer 2007-2008, 24036, no. 345).

The Council believes that the eventual (re-)deployment of strategic public shareholdings must also be evaluated in the context of regime change as analysed in this report. Now that neither the government nor the entity which it owns or controls through a strategic shareholding are necessarily major players in any one sector, the added value of a strategic shareholding as a means to achieving public objectives is doubtful, especially considering the limitations imposed on the exercise of 'golden shares' by the European Court of Justice. In this respect, the Council fully subscribes to the conclusions put forward in the recent report published by the Kenniscentrum voor ordeningsvraagstukken (2006). Even if there are certain, legitimate policy objectives, which justify the continued option for the government to control or veto certain company decisions that might put those policy objectives at risk, a strategic shareholding is only one of a number of mechanisms that can be employed as a form of check (see chapter 5). Regulation may be seen as a potentially less restrictive and more transparent means of achieving public policy objectives, especially if carried out by an independent regulatory authority. If strategic shareholdings are used as a means to influence or direct investment policy, this may come at the expense of company performance and overall value (see for an extensive analysis, Oxera 2005).

At the same time, it may also be acknowledged that the retention of public shares may also provide the government with a right to be well informed as a shareholder, and to have access to valuable sources of information in sectors where new actors are emerging – for example, those sectors that are now actively

targeted by foreign sovereign wealth funds (Maasvlakte II being a topical example). There exists, as yet, no specific regulations in this area, and indeed, appropriate regulations in the globalised financial environment may prove difficult to implement. In this type of context, government participation on a horizontal basis, but on an equal footing with other shareholders, could provide an important potential check, for example against the risk of over-gearing or asset stripping (see Melody 2008).

Finally, participation by a state-owned company in new ventures can also be used to serve commercial objectives, and can prove to be a useful mechanism for encouraging major new investments. For example, existing public companies could be encouraged to participate in new investments or new infrastructures. The involvement of EBN in investing in gas storage facilities or CO_2 infrastructures could offer both secure financing and longer-term commitment to the development of large scale facilities. This, in turn, reduces the threat of regulatory risk for other interested investors (see chapter 6).

In any event, as the Council has stressed, if strategic shareholdings are to be actively used in any sector, then the blurring of roles and responsibilities should be avoided. A strict separation between policy and business objectives should be maintained. In this respect, it supports recommendations for suitable, transparent protocols to be drawn up between the Ministry of Finance (as shareholder) and the functional Ministers responsible for policy issues. Nevertheless, the Council is of the opinion that supervision by an independent regulator with an extended mandate to address 'Type II' public values is a preferable alternative to strategic shareholdings, given that transparency and accountability can be more effectively guaranteed.

7.8.3 PROCEDURAL CHECKS AND BALANCES

As the previous section 7.6.3 has indicated, the evolution of a joint strategic road map would mean redefining the roles of supervisory authorities, regulators and the polity – i.e., government and parliament. This process will also result in better checks and balances. The Council has suggested that the duties of regulators/supervisory bodies may need to be more clearly spelled out. If an expansion of the economic regulators' duties to include the realisation of more open-ended public interest objectives is deemed necessary, then the scope of the regulator's powers should be circumscribed by legislation, and accompanied by clear guidelines issued by ministers in accordance with legislation. In the Council's view, the interests of citizens and general public should be defined and promoted by the government and parliament and not regulators. However, the Council is not implying that the government should have a monopoly here. An enhanced, independent role for end-users and consumers should also be considered. Stand-alone consumer representation bodies are more effective than those linked to a regulator.[9]
Finally, the Council recommends that a more robust approach to procedural

checks and balances should also require 'joined-up' thinking at ministerial and parliamentary level. A regular joint ministerial evaluation of the functions of sectoral regulators for example, would be far more effective than the present monitoring system, which is confined to periodic and limited statutory reviews of the sectoral regulators by outside consultancy firms. A clear mandate on regulators to render a more strategic account of their activities to a joint ministerial body and a joint parliamentary committee, to which stakeholders could also make their views known, would be a preferable approach. Moreover, the Council would stress that more attention should be given to regulatory impact analyses and to the development of suitable indicators and benchmarks. In this respect, the emergence of trans-European regulatory networks can offer a wealth of comparative information which can be used in the national context.

7.8.4 MULTI-LEVEL CHECKS AND BALANCES

The Council recognises that devising adequate checks and balances on multi-level arenas are especially problematic. Very little attention is currently paid to this aspect by policy-makers. But if responsibility for approving long-term investment plans as well as individual investment decisions shifts to a European body – as has been proposed with respect to the new electronic communications and energy agencies (see chapter 6) – serious and urgent consideration must be given to this dimension as well.[10] There is also a pressing need to devise better and more open processes of accountability. This could be a task for the Joint Regulatory Group, recommended in section 7.7.2 above. This body could be charged with ensuring that the national sectoral regulators obtain a clear mandate for any decisions to be adopted at the European level and that they would, in turn, be required to report back on how final decisions have been implemented.

Adequate checks and balances are required to ensure that investment in infrastructures can be optimised, in terms of timing as well as costs, taking account of the multi-level and heterogeneous actor constellation that is (or will be) the new reality in numerous infrastructures. It is in this setting that the broader social and environmental or 'Type II' public values increasingly associated with infrastructure provision must be realised, and in which new conflicts of interests between competing actors must be addressed.

7.9 TIME TO INVEST

This report has identified major challenges for the future with regard to securing long-term investment in infrastructures. A strategic reorientation of current institutional arrangements is required in order to address long-term public values. In designing a new strategic policy framework the three pillars (redefine, realign, recalibrate) developed in this final chapter are of vital importance. But given the considerable variations across the different infrastructures, the

deployment, scope and relative weight given to each of the pillars will differ depending on the sector.

With the recommendations put forward in this report, the Council aims to contribute to the development of a strategic policy framework capable of realising both the interests of today's national consumer and long-term societal values. The recommendations elaborated in each of these three pillars, do not provide a ready-made institutional blueprint for all infrastructures. This report contends, however, that major challenges for future long-term public values such as innovation, sustainability and long-term availability and accessibility of infrastructures cannot adequately be addressed by market-based solutions alone. A robust policy framework, and secured through targeted regulatory intervention, will still be required to shape the market environment and to ensure that the best possible signals and risk-sharing tools are available. The necessary process of reform must reflect a clear recognition that it is now time to invest in national infrastructure policies as well as in the nation's infrastructures.

NOTES

1 Institute of European Affairs, Address by Commissioner Andris Piebalgs, 21 March 2006, available at: http://iea.com/images/managed/events_attachments/IEAPiebalgs.pdf.

2 'Nuclear Energy within the climate change and energy security debate', Speech at the First European Nuclear Energy Forum, Bratislava, 26 November 2007, available at: http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/749&format=HTML&aged=1&language=EN&guiLanguage=en.

3 NRC *Handelsblad*, 'Tjeenk Willink: Sterke markt vereist sterke staat', 21 May 2008.

4 This point is elaborated in Van Dijk in his contribution to the WRR Study *New Perspectives on investment in Infrastructures* (2008).

5 It is true that the multiplier effect is present in many sectors of the economy, think of agriculture or financial services – but because of the scale effects and network effects, there is a risk of market failure which justifies treating infrastructure extra carefully.

6 In Figure 7.2, the infrastructures studied in this report are positioned in four quadrants. Their position on the x-axis is derived from chapter 3, where homogenous, hybrid and heterogeneous actors in investment decisions were described. The characterisation of infrastructure goes beyond the issue of the formal ownership of the physical infrastructures. It relates to the degree in which heterogeneous actors influence investment decisions in practice. The position of the infrastructures on the y-axis is derived from chapter 4 that described degree of levels involved in infrastructure investment decisions. Here, both formal and informal, technical and political issues formed the basis.

7 See http://www.zero-emissionplatform.eu and http://www.imi-europe.org.

8 'Samenwerkingsprotocol NMa/ DTe en SodM', *Staatscourant*, 25 May 2007, 99: 23.

9 House of Lords report on UK Economic Regulation, 2007.

10 It is clear that the role of national courts in reviewing regulatory decisions is likely to be eclipsed, but, at the same time, a transfer of more far-reaching reviewing powers to the European courts is by no means obvious (Lavrijssen and Hancher 2007).

ANNEX CHARACTERISTICS OF THE PHYSICAL INFRASTRUCTURES: AN INDICATIVE INVENTORY

Sector	Depreciation period	Natural monopoly?	Mode of regime change	Characteristics infrastructure manager
Sewerage	40-60 years[1]	++	none	municipality
Drinking water	60 years	+	corporatisation, benchmark	drinking water company
Waste (waste incineration)	10-15 years	-	in some instances, privatisation through private equity and corporatisation	for most incinerations: municipality, but also public corporations and private companies
Dikes	100 years	++	corporatisation and liberalisation through outsourcing	RWS
Roads	30-100 years	+/-	corporatisation and liberalisation through outsourcing	VW and provinces and water boards (and, in some instances, public private partnerships)
Railways	33 years	+/-	unbundling and some degree of liberalisation through concession	ProRail
Airport(s) (Schiphol)	variable[2]	+/-	liberalisation (competition between airports) and corporatisation and internationalisation	Schiphol
Electricity	30-50 years[3]	national grid: + regional grid: +/-	unbundling, liberalisation, corporatisation	TenneT, local distribution companies
Gas	40 years[4]	national and regional pipelines: + practical monopoly in gas storage and conversion	unbundling, liberalisation, corporatisation, internationalisation	GasUnie Transport Services (GTS), local distribution companies
Electronic communications	variable[5]	- - -	privatisation, liberalisation, corporatisation, internationalisation (no unbundling)	network operator

ANNEX CHARACTERISTICS OF THE PHYSICAL INFRASTRUCTURES: AN INDICATIVE INVENTORY

Sector	Ownership of infra	Supervision (investment)	Dominant regulating level of investment
Sewerage	municipality	municipality	no direct regulation of investment
Drinking water	drinking water company	not directly (VROM inspects quality of service and quality of drinking water)	EU (water directives) and VROM (water quality) but no direct regulation of investment
Waste (waste incineration)	various (municipalities, public corporations and private companies)	VROM and provinces	national and increasingly EU (for requirements of incineration)
Dikes	state-owned VW/ water boards	(VW)/water boards	national and European (water framework directive)
Roads	state owned (VW) and provinces and municipalities and water boards (and in some instances public private partnerships)	VW and provinces and municipalities and water boards	national and European, but latter very limited
Railways	state-owned (VW)	Inspectie voor Verkeer en Waterstaat/NMa	national
Airport(s) (Schiphol)	State owned and Amsterdam and Rotterdam	Schiphol Group	EU and national
Electricity	TenneT = state owned; LDCs = provinces and municipalities	NMa/DTe (investment supervision indirectly)	EU and national
Gas	GTS = state owned; LDC's = provinces and municipalities	NMA/DTe (investment supervisions indirectly) and Ministry of Finance	EU and national
Electronic communications	telecom company all private* (one cable company Essent still part of LDC)	OPTA	EU and national

NOTES

1 Economically 40-60 years, but technically 60-80 years (sometimes 30 years, and sometimes even over 100 years).

2 According to Anne Graham, The British Airport Authority works with a depreciation period for runways of 100 years, the Aeroports de Paris with a period of 10 to 20 years (Graham 2001). The Schiphol Group makes use of a depreciation period of 15 to 60 years (runways), 30 to 60 years (platforms), 20 to 40 years for other infrastructures such as tunnels, roads, parking, etcetera. (Schiphol Group 2006).

3 Sometimes only 20 years.

4 40 years for tubes (below surface), 20 years HTL net, 55 years RTL net.

5 KPN works with 5-30 years for plants and equipment (KPN 2008). See also Ernst & Young (2003).

ABBREVIATIONS

ACCC	Australian Competition and Consumer Council
ACER	Agency for the Cooperation of Energy Regulators
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AFM	Netherlands Authority for Financial Markets (Autoriteit Financiële Markten)
APX	Amsterdam Power Exchange
AVR	Rotterdam Waste Services (Afvalverwerking Rotterdam – Van Gansewinkel)
BBL	Balgzand Baction Line
BEB	Mining Companies Elwerath and Brigitta (Bergbaugewerkschaffte Elwerath und Brigitta)
CCS	CO_2 Capturing and Sequestration
CEER	Council of European Energy Regulators
CEFIC	European Chemical Industry Council (Conseil Européen des fédérations de l'industrie chimique)
CEPT	European Conference of Postal and Telecommunications Administration (Conférence Européenne des Postes et Télécommunications)
CIWIN	Critical Infrastructure Warning Information Network
CO_2	Carbon Dioxide
COAG	Council of Australian Governments
CPB	Netherlands Bureau for Economic Policy Analysis (Centraal Plan Bureau)
DDP	Directly-Deliberative Polyarchy
DSO	(regional) Distribution System Operators
DTe	Office of Energy Regulation (Dienst uitvoering en toezicht Energie)
EASEE	The European Association for the Streamlining of Energy Exchange-gas
EBN	Netherlands Energy Management Company (Energiebeheer Nederland B.V.)
EC	European Commission
ECB	European Central Bank
ECN	Energy Research Centre of the Netherlands (Energieonderzoek Centrum Nederland)
ECJ	European Court of Justice
EFET	European Federation of Energy Traders
ENA	Energy Networks Association
ENBIN	Association of Energy Network Operators in the Netherlands (Vereniging van Energie Netbeheerders in Nederland)
ENDEX	European Energy Derivates Exchange
EPCIP	European Programme for Critical Infrastructure Protection
ERA	European Regulatory Agencies
ERG	European Regulators Group for Electronic Communications Networks and Services
ERGEG	European Regulators' Group for electricity and gas

ERIG	Energy Reform Implementation Group
ERN	European Regulatory Networks
ETMA	European Telecom Market Authority
ETSO	European Transmission System Operators
EU	European Union
FERA	Federal European Regulatory Agencies
FES	Economic Structure Fund (Fonds Economische Structuurversterking)
FNV	Dutch Trade Union (Federatie Nederlandse Vakbeweging)
GB	Great Britain
GIE	Gas Infrastructure Europe
GTS	Gas Transport Services
H	Hydrogen gas
HTL	Main Transport System (Hoofdtransportleiding)
IEA	International Energy Agency
IFIEC	International Federation of Energy Traders
IGU	International Gas Union
IRA	Independent Regulatory Agency
KPN	Dutch Royal Telecom (Koninklijke PTT Nederland)
LDC	Local Distribution Company
LNG	Liquefied Natural Gas
MCE	Ministerial Council for Energy
NAM	Nederlandse Aardolie Maatschappij BV
NEC	National Electricity Code
NECA	National Electricity Code Administrator
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NGMC	National Grid Management Council
NGO	Non-Governmental Organisation
NIRA	National Independent Regulatory Agencies
NL	The Netherlands
NMa	Netherlands Competition Authority
NOGEPA	Dutch Oil and Gas Exploitation and Production Association (Nederlandse Olie en Gas Explotatie en Productie Associatie)
NRA	National Regulatory Authorities
NS	Netherlands Railways (Nederlandse Spoorwegen)
NTNDP	National Transmission Network Development Plan
OECD	Organisation for Economic Cooperation and Development
OEI	Optimal Energy Infrastructure programme
OFGEM	Office of Gas and Electricity Markets
OFWAT	Office of Water Services
OGP	International Association of Oil and Gas Producers
OPTA	Independent Telecommunications Supervision and Compliance Authority (Onafhankelijke Post en Telecommunicatie Autoriteit)
PVDA	Dutch Social Democratic Party (Partij van de Arbeid)
PPP	Public Private Partnership
RAB	Regulatory Asset Base

REA	Council of Economic Advisers (Raad van Economisch Adviseurs)
RIONED	Stichting Riolering Nederland
RIVM	Netherlands Institute for Health and Environmental Issues (Rijksinstituut voor Volksgezondheid en Milieu)
RPI	Retail Price Index
RTL	Local Gas Transport System (Regionale transportleiding)
RWE	Rhine and Westphalia Electricity Network (Rheinisch-Westfälisches Elektrizitätswerk)
RWS	Directorate-General for Public Works and Water Management (Rijkswaterstaat)
SEP	Samenwerkende Elektriciteits Productenten
SER	The Social and Economic Council of the Netherlands (Sociaal-Economische Raad)
SODM	State Mines Supervision (Staatstoezicht Op De Mijnen)
SP	Socialist Party (Socialistische Partij)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAQA	Abu Dhabi National Energy Company PJSC (Public Joint Stock Company)
TEN	Trans-European Energy Networks
TEN-E	Trans European Networks in the field of electricity and natural gas
TenneT	Dutch Energy Transmission Systems Operator
TEN-T	Trans European Networks in the field of transport infrastructures
TEN-TEA	Trans European Transport Network Executive Agency
TSI	Technical Specifications for Interoperability
TSO	Transmission System Operators
TTF	Title Transfer Facility
UCTE	Union for the Coordination of Transmission of Electricity
UCTPE	Union for the Coordination of Production and Transmission of Electricity
UGS	Underground Gas Storage
UK	United Kingdom
US/USA	United States of America
USSR	Union of Soviet Socialist Republics
VEMW	Association for Energy, Environment and Water (Vereniging voor zakelijke Energie- en Watergebruikers)
VINEX	Fourth Spatial Planning Report (Vierde Nota Ruimtelijke Ordening Extra)
VOEG	Dutch Traders Association (Vrijhandels Organisatie voor Elektriciteit en Gas)
VROM	Ministry of Housing, Spatial Planning and Environment (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer)
VW	Ministry of Transport, Public Works and Water Management (Ministerie van Verkeer en Waterstaat)
WRR	Scientific Council for Government Policy (Wetenschappelijke Raad voor het Regeringsbeleid)

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Infrastructures

All sectors of the Dutch infrastructures have undergone a degree of commercialisation, liberalisation or privatisation over the last ten to twenty years. Where in the past the infrastructure landscape was dominated by public monopolies, the ownership and management of infrastructures is today shared by several public and private sector players. The original goals of this 'regime change' have in many cases been achieved: greater efficiency, a greater focus on the customer and more choice for consumers.

The question is whether this emphasis on current consumer interests allows enough scope to achieve long-term objectives which affect the whole of our society: innovation, long-term availability and sustainability of infrastructures. This is of crucial importance for economic and social development, which is coming under increasing pressure due to the combined impact of the exhaustion of natural resources and climate change.

The transition to a sustainable future demands substantial investment in infrastructures, which cannot be taken for granted in the present situation. The WRR has investigated how these investments could be safeguarded in the long term, whilst retaining the efficiency of the infrastructures.

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