WRR

THE NETHERLANDS SCIENTIFIC COUNCIL FOR GOVERNMENT POLICY

WRR-Policy Brief 5

Long-term commitment for national climate policy in the Netherlands

Climate policy for the long term calls for a balance between political commitment and adaptive capacity. This policy brief recommends enhancing the institutional safeguards and long-term perspective in Dutch national climate policy. A Climate Act could legally determine a national emissions budget. A Climate Authority is necessary to ensure consistent implementation in various policy areas and at different levels of administration.

Albert Faber, Peter de Goede & Margot Weijnen

SUMMARY

Dutch climate policy currently lacks the clear long-term perspective that is required to provide direction, coherence and reliability to policy choices. In this policy brief the WRR proposes the establishment of an ambitious greenhouse gas emission budget in a national Climate Act. The Climate Act would also establish a Climate Authority for advice, signalling, coordination and dialogue. Important prerequisites are a public investment bank and reinforcement of the climate-related knowledge infrastructure.

A future-proof regulatory framework will provide local and regional authorities with the space to develop new technologies and business concepts. At the European level it is necessary to enhance the emissions trading system. Large-scale integration of renewable energy sources requires European coordination of electricity markets and of cross-border energy infrastructure.

There are no simple solutions for a complex, wicked issue such as climate change. There are many social, institutional and infrastructure-related obstacles. But with a balanced approach, offering a long-term goal that is enshrined in law and properly monitored, combined with political responsibility and social involvement, it will be possible to achieve ambitious goals.

The Netherlands Scientific Council for Government Policy (WRR) provides independent advice to the Dutch government and parliament on strategic issues that are likely to have important political and societal consequences on the longer term. The Council's science-based advice can open up new perspectives and directions, change problem definitions, set new policy goals, investigate new resources for problem-solving, and support social cooperation and cohesion.

WRR-Policy Briefs reflect from an academic perspective on important societal and policy issues, may provide knowledge-based input for the policy agenda, and can suggest policy options.

This policy brief is a translation of the Dutch WRR-Policy Brief *Klimaatbeleid voor de lange termijn: van vrijblijvend naar verankerd* presented by the Netherlands Scientific Council for Government Policy to Sharon Dijksma, the Dutch State Secretary for Infrastructure and the Environment, on the 13th of October 2016.

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"Why should I care about posterity?

What's posterity ever done for me?"

Groucho Marx

1 THE CHALLENGE: COMMITMENT FOR CLIMATE POLICY

Around the world the climate is changing as a result of greenhouse gas emissions caused by human activity. The signs of climate change are unmistakable and the speed with which this appears to be happening is putting pressure on the ability of societies worldwide to adapt.[1] In December 2015, 195 countries reached agreement in Paris on limiting the extent of global warming. "We have done our children and grandchildren a great service," said the Dutch State Secretary for Infrastructure and the Environment, Sharon Dijksma, after the negotiations had concluded.

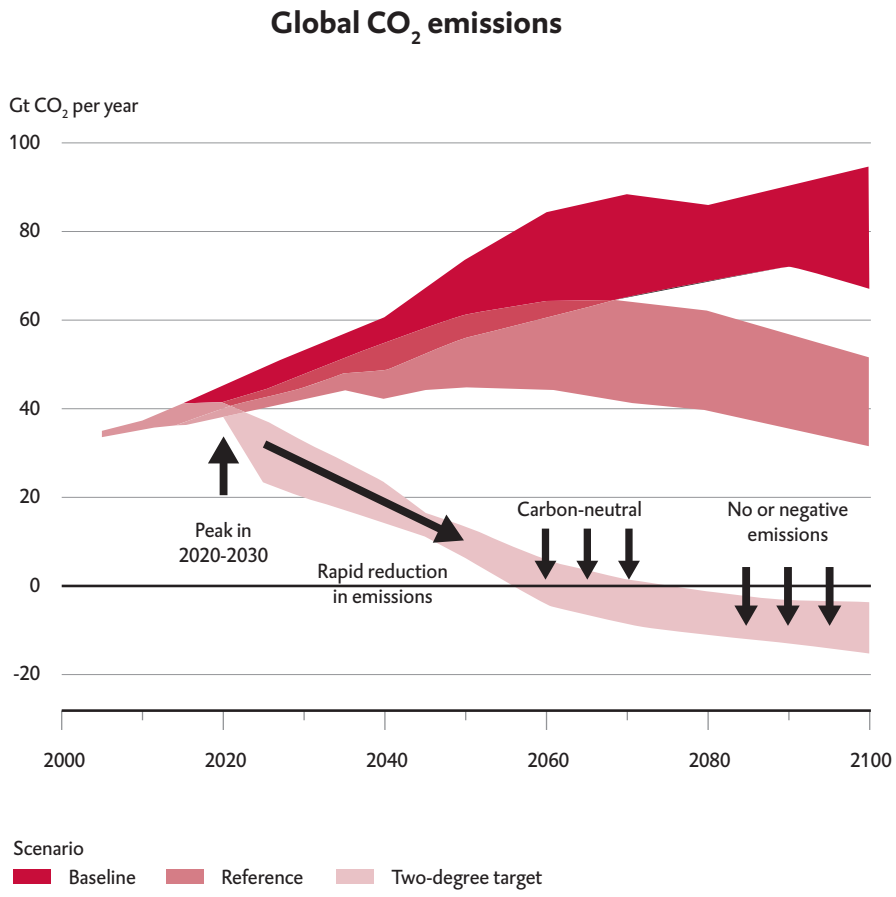
The Paris Agreement implies real commitment. The signatory countries have committed themselves among other things to formulate and periodically enhance national measures to limit the global temperature increase to well below 2 °C compared with the pre-industrial era, with a target maximum rise of 1.5 °C.[2] This represents a huge challenge, since current national policy commitments would still lead to a temperature rise of between 2.6 and 3.1 °C by the end of the century.[3] Substantial additional measures are therefore needed – including in the Netherlands. The question we address in this policy brief is thus: *How can the long-term aims of the Paris Agreement be assured in the national climate policy of the Netherlands?*

In this policy brief the Netherlands Scientific Council for Government Policy (WRR) advocates the introduction of a Climate Act, which lays down a long-term climate goal and establishes a Climate Authority to coordinate Dutch climate policy over the long term. The WRR proposes that this Climate Authority should advise on the interim targets to be met and on a consistent policy approach, both horizontally (between policy areas) and vertically (between administrative levels). Choices regarding spatial planning and infrastructure are of particular importance here, in view of their long-term effects on practices that are relevant to the climate. The proposed Climate Authority could also help to mobilise civil engagement. Finally, guaranteeing long-term objectives will require major investments that create value for society over the long term. In this context the WRR advocates the creation of a public investment bank and a reconfiguration of the knowledge infrastructure.

1. IPCC (2014).
2. "To hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels". The Paris Agreement will take effect following ratification by at least 55 countries that are together responsible for at least 55 per cent of world greenhouse gas emissions.
3. J. Rogelj et al. (2016).

A radical change is needed in worldwide greenhouse gas emissions.[4] Dutch greenhouse gas emissions are gradually declining: between 1990 and 2013 there was an 11 per cent reduction, and this decline is expected to reach 19 per cent (compared with 1990) by 2020.[5] However, this decline is not continuous, and in 2015 greenhouse gas emissions rose again by no less than 5 per cent compared with the previous year.[6] In order to meet the two-degree target, richer countries such as the Netherlands will have to achieve a cut in greenhouse gas emissions in the order of 80 to 95 per cent (compared with 1990), an ambition endorsed as a target by the European Union in 2011. To achieve an 80 per cent reduction in emissions by 2050, it is necessary to reduce the carbon intensity of the economy more quickly, with a reduction going from 2 per cent per year now to 6 per cent per year in 2030-2050.[7] An 80 per cent reduction may still be achievable with technological measures, but achieving a target of 95 per cent will demand substantial additional behavioural changes.[8] A radical reduction in global greenhouse gas emissions will be required in the short term if there is to be a realistic chance of staying below the 2°C target (Figure 1).[9]

Figure 1 - Scenarios that meet the two-degree target compared with scenarios without climate policy (baseline) and based on the national undertakings for 2020 emissions under the Copenhagen Agreement (reference)



Source: PBL (2016a).

4. There are several greenhouse gases, of which CO_2 (carbon dioxide) is by far the most important; approximately three-quarters (by weight) of the world's greenhouse gas emissions are made up of CO_2. However, other greenhouse gases (e.g. methane, nitrous oxide (laughing gas) and various fluorine-containing compounds) generally have a higher greenhouse effect contribution per unit of weight. Greenhouse gases are usually converted into CO_2 equivalents, based on their relative contribution to the greenhouse effect.
5. ECN et al. (2015).
6. Statistics Netherlands (CBS) (2016). Greenhouse gas emissions were 12 per cent lower in 2015 than in 1990.
7. P. Boot (2015a). The emissions intensity has declined since 1990: while the economy has grown by around 60 per cent, energy savings and structural shifts in the economy have meant that greenhouse gas emissions have declined, including for CO_2 (Statistics Netherlands (CBS) 2016).
8. Netherlands Bureau for Economic Policy Analysis (CPB) and Netherlands Environmental Assessment Agency (PBL)(2015).
9. See www.carbonbrief.org/analysis-only-five-years-left-before-one-point-five-c-budget-is-blown.

Climate policy in the Netherlands is currently dominated by a short-term outlook. Although the Netherlands endorses 'low-carbon energy provision in 2050' as a long-term goal for which to aim,[10] current Dutch climate policy still lacks a firmly embedded long-term strategy. There is a strong emphasis on 'quick wins' and there are insufficient incentives for structural measures.[11] Sectoral climate objectives do not look beyond 2020, or in some cases 2030, which is a relatively near horizon for an issue such as climate change. These objectives are mostly formulated at the European level. Implementation for the energy sector and energy-intensive industry is pursued through the European system for emissions trading (the EU ETS). Mandatory national emission reduction targets are determined for all sectors that are not covered by the EU ETS.[12] The emphasis on short-term measures is further reinforced by a recent court ruling, ordering the State to intensify its policy efforts in the period to 2020.[13]

Maintaining course requires a long-term strategy. Too strong a focus on the short term can stand in the way of measures that are more efficient or have a greater impact in the long term.[14] Moreover, the lack of a long-term strategy is detrimental to the direction, durability and coherence of climate policy.[15] Already in 2012, the Dutch State Secretary for Infrastructure and the Environment stated that, "The most important thing is to arrive at a stable policy framework with broad-based support, which produces sufficient action to keep the long-term prospect of an 80 to 95 per cent reduction in CO_2 by 2050 within reach."[16] This task is also acknowledged in a recent Interdepartmental Policy Study (IBO) on the cost-effectiveness of CO_2 reduction measures: "To make its own contribution to the European climate goals, the Netherlands will soon have to draw up a climate policy based on a long-term view, in which the reduction percentages will have to be significantly higher than those currently being achieved."[17] This will enable implementation at a national level of the Paris Agreement and of the European decision that in 2019 all Member States will have to have in place a national climate and energy plan for 2030 (which also looks ahead to 2050).

The WRR notes that Dutch climate policy lacks a clear and ambitious long-term strategy. Such a strategy is necessary to give direction, coherence and durability to climate-related policy and investment choices.

10. Ministry of Economic Affairs (Ministerie van Economische Zaken) (2016).
11. PBL (2014a); OECD (2014a); Hoogervorst and Dietz (2015).
12. For an overview of the objectives, see: IBO (2016a).
13. The State appealed against the judgement, but the cabinet also indicated that it would begin carrying out the judgement. For an overview of all the documents relating to this case, see: https://www.rijksoverheid.nl/onderwerpen/klimaatverandering/inhoud/klimaatrechtszaak.
14. Dutch Central Bank (DNB) (2016); PBL (2016a); Gerlagh (2016).
15. Court of Audit (Algemene Rekenkamer)(2015); The Netherlands Council for the Environment and Infrastructure (Rli) (2015a); Energy research Centre of the Netherlands (ECN) et al. (2015); PBL (2016d).
16. From a letter from the State Secretary for Infrastructure and the Environment to Urgenda, dated 11 December 2012, quoted in the ruling of the District Court of The Hague (Article 2.7) on 24 June 2015 in the case of Urgenda v the State of the Netherlands (District Court of The Hague (Rechtbank Den Haag) 2015).
17. IBO (2016a: 12).

2 CLIMATE POLICY FOR THE LONG TERM

2.1 WHY IS A POLICY WITH A LONG-TERM PERSPECTIVE SO DIFFICULT?

A policy for the long term entails addressing goals with a long policy horizon, on the one hand firmly securing those goals, while on the other allowing for the potential to adjust course when necessary. This long-term perspective is currently lacking in Dutch climate policy, leading to a string of inconsistent, *ad hoc* policy measures. There are several general and specific reasons for the apparent short-term focus in climate policymaking.[18]

The short term generally weighs much more heavily than the long term in human cognition. The effect is a certain degree of short-sightedness. In rapidly changing Western societies, the present dominates our experiences: "time horizons shorten to the point where the present is all there is." [19] In this context, a slowly developing problem such as climate change can easily end up on the back burner. Furthermore, with an issue such as climate change, cause and effect are separated by a considerable length of time, so that we find it difficult to imagine the problem and it can even appear rational to postpone taking measures. The media have an important role to play here, because of the emphasis that is often placed on current affairs as opposed to slower, more fundamental developments that are much less visible in the short term.

Favouring the short term is also an intrinsic part of the way policy institutions are organised.[20] Thus, in the state budget cycle – in which income and expenditure are balanced annually by means of a cash accounting system – it is often politically more rational to concentrate efforts on cutbacks (or spending) that produce a rapid result, rather than to focus on structural investment for the long term.[21] An escape from this logic is sometimes offered through the setting up of special funds which act as 'patient capital' for commitment to the long term.[22] We also observe that investment decisions discount future costs and benefits in order to reflect risks and uncertainties, as well as the fact that people generally have a greater appreciation for goods and services in the present. As a result, investment projects that only deliver benefits in the long – or very long – term are at a disadvantage.[23] This is frequently the case for climate-related projects, and there has been heated debate among climate economists about the 'correct' level of discounting for these kinds of projects.[24]

Legislative and policy projects and processes can last longer than a government's term of office, so that after a change of government there is the danger of a policy being delayed in its implementation or even abandoned altogether. The many changes of government in the Netherlands in the 21st century have not had a positive effect on the continuity of policy.[25] Political considerations frequently promote a tendency to prioritise the short term, even when there are warnings at an early stage that there will be high costs in the future.[26]

18. An extended version of this section is provided in: De Goede (2015) (in Dutch). See also: Pollitt (2008); Meuleman and In 't Veld (2009); Oxford Martin Commission for Future Generations (2013); Howlett and Goetz (2014); Vink et al. (2016); Kruiter and Verhoeven (2016).
19. Quote taken from: Harvey (1990: 240). It is a popular topic among sociologists; see also, for example, the work of Manuel Castells, Zygmunt Bauman, Anthony Giddens and John Urry.
20. Coyle (2011); WRR (2013b: 347-357).
21. Van Schaik (2007).
22. However, funds can also be interpreted as a way of placing a specific issue outside the political sphere, because they run counter to the budgetary rule of the separation of income and expenditure, and thereby also impair the comprehensive and optimal consideration of all government expenditure. Moreover, funds are not immune to political reality, as they can be 'cleared out' or become 'contaminated' by inappropriate expenditure. See: Van der Bij (2011).
23. VROM (Housing, Spatial Planning and Environment) Council (2006). See also: Weitzman (1998).
24. For a more extensive treatment of discounting, see CPB (2015) and Werkgroep Lange Termijn Discontovoet (Working Group Long-term Discount Rate) (2015).
25. The Council for Public Administration (Rob) (2013).
26. EEA (2001; 2013).

Physical structures also lock us into unsustainable behaviour patterns. Our current social and economic practices are largely shaped by physical structures such as infrastructure and the built environment. On the one hand, infrastructure determines socio-economic dynamics and the associated consequences for the climate, while on the other it is itself also susceptible to the risks of climate change.[27] Moreover, infrastructure almost by definition has a long service life and therefore a long-lasting effect on the level of greenhouse gas emissions. Given the long service life of these physical structures with their determining effects, it is not easy to change our daily practices, such as the way we travel or our behaviour as energy consumers. The durability of the existing physical structures could therefore be an obstacle to effective climate policy.[28]

The Dutch economy is closely intertwined with fossil fuels, such as the country's own natural gas reserves. More than 98 per cent of Dutch households are connected to the natural gas grid, energy-intensive industries generate 12 per cent of Dutch GDP, and the Dutch national budget depends on fossil fuels for approximately 20 per cent of its income, through taxes and revenues.[29] The Dutch carbon complex deeply embeds economic, technical and social structures, making it extremely difficult to change. More than in many other European countries, a transition to a low-carbon economy in the Netherlands requires a break with path dependencies that have evolved over a very long period.[30]

Long-term policy is necessary and possible. Long-term policy has long had a bad name, due to its association with a high degree of state intervention and overly confident modernist planning.[31] This does not mean, however, that long-term policy can never be productive or that it is not necessary. We can also draw lessons from the past by adopting a more reflective approach, through structural awareness of negative effects, and by allowing room for society to be involved in its long-term interests.[32] The Netherlands has already made such a shift in its water safety policy, and this shows the feasibility of a policy that is both focused on the long term as well as adaptable to the unkowns of the future.[33]

27. Weijnen et al. (2015).
28. It has, for example, been estimated that the existing fossil- fueled energy and transport infrastructure will make a contribution to global warming of approximately 1.7 °C over the next 50 years. This means that the 2 °C target is in fact only achievable if the climate effects of all new infrastructure built worldwide is taken into account from now on and if existing infrastructure is substantially adapted or depreciated. See: Guivarch and Hallegatte (2011).
29. The Finance Ministry's dependence is the sum of direct gas revenues, energy taxes and revenues from tax on profits and payroll taxes by energy suppliers and energy-intensive industries. Share of GDP comprises the energy-intensive sectors: chemical industry, goods transport, greenhouse horticulture and the food industry (Weterings et al. 2013:8).
30. DNB (2016); Köper (2012).
31. Scott (1998).
32. Voß et al. (2009).
33. OECD (2014b).

2.2
WHY IS A CLIMATE POLICY FOR THE LONG TERM SO ESSENTIAL?

Long-term climate policy is a political responsibility. There is broad scientific consensus on the anthropogenic causes of climate change, although many questions remain about how, where and when the consequences of climate change will emerge. However, the findings of climate science do not automatically lead to specific policy choices. Long-term climate policy is very definitely a political and social issue in which a variety of views on humankind and world views play a role.[34] Moral, legal, geopolitical and economic arguments all come into play.

The responsibility of current generations towards future generations calls for clear moral frameworks.[35] Future generations do not have a predetermined legitimate claim to all or part of today's 'environmental capital'. The responsibility of current generations can be explained in terms of *fairness*: how can the costs and benefits be distributed between generations in such a way that many people, spread over generations, experience this as being fair and accept it? This provides a moral compass, but does not by itself give a clear direction for policy.[36] The responsibility towards future generations can also be explained in terms of *sustainability*: how can intergenerational entitlements be safeguarded within the existing system of government obligations?[37] Following an – often implicit – 'social contract between generations', there is a good argument for guaranteeing the handover of 'enough and equally good things' to others in the future (the so-called Lockean proviso, a feature of John Locke's property theory). In this light, it is important not to pass on to future generations any large intergenerational debts such as severe environmental pressure. Moreover, future generations must be equipped with the capacity to make well-considered choices of their own – in what might possibly be a very different world.[38]

There are several legal arguments for pursuing a long-term climate policy.[39] The Netherlands is bound by international and European agreements to reduce greenhouse gas emissions. For example, the Netherlands is bound by the United Nations Framework Convention on Climate Change (1992), which has been implemented in the Kyoto Protocol (1997) and the Paris Agreement (2015). These international agreements have been or will be translated into a series of European (long-term) objectives and agreements to which the Netherlands is also bound. Through the European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR) or through the Charter of Fundamental Rights of the European Union, a claim can be made for the right to a good environmental quality based on the human rights formulated in those documents.

34. Hulme (2009); Machin (2013; 2015); I. Scoones et al. (2015).
35. For overviews of moral/ethical arguments, see: Bos et al. (2015); Davidson (2016).
36. Additionally, it is sometimes argued that we must not only relate to future generations, but also to the generations that came before us, whose legacy must not be squandered or destroyed at will, as stated by the conservative thinker Edmund Burke (1790): "[Society is] a partnership not only between those who are living, but between those who are living, those who are dead, and those who are to be born." On this subject, see Scruton (2013: 215-217).
37. WRR (1999).
38. This position fits in with what is called the 'capabilities' approach. See Sen (2009); Nussbaum (2012); Fehr-Duda and Fehr (2016).
39. Lawrence (2014).

There are also economic arguments for a long-term climate policy. This policy brief does not seek to provide a comprehensive economic overview,[40] but will briefly mention four important economic motives. First: postponing climate policymaking would mean that greenhouse gases would continue to accumulate, which would increase the likelihood of economic damage as a result of climate change. This could lead to higher costs and risks in the future and, eventually, to a greater policy challenge.[41] Second: climate change can lead to irreversible ecological effects, which over time will require reactive (in contrast to anticipatory) economic adaptations. Third: the Paris Agreement essentially puts a ceiling on the amount of fossil fuels that can still be burnt, meaning that in theory the remaining reserves no longer have any value.[42] This 'carbon bubble' may lead to major devaluations in economies that are heavily dependent on fossil fuels, such as the Netherlands. Policy commitment for the long term could provide the stable environment needed to allow businesses and households to adapt gradually rather than abruptly, thus avoiding excessive loss of value.[43] Fourth: climate policy can also bring significant benefits, through higher productivity or technological development.[44] This does not mean that a strict climate policy by definition implies economic opportunities: it is unavoidable that there will be economic losers. It is, therefore, important to develop prospects and strategies for a wide range of social and economic actors. A long-term strategy with clear interim goals can contribute towards achieving this.

Finally, there are also geopolitical considerations for pursuing a long-term climate policy. Climate change can add very significant pressures in matters of international security, with great potential for driving instability and conflicts. In this respect, climate change could well represent a threat to international peace and justice. This realisation has now worked its way into strategy and policy for international security.[45] For this reason, too, a long-term climate policy is of great importance.

40. For overviews of the connection between climate change, climate policy and the economy, see, among many others: Stern (2007); OECD (2009); Tol (2012); Global Commission on the Economy and Climate (2014); Risky Business Project (2014).
41. Acemoglu et al. (2012).
42. In any case a lot less, because extra measures are necessary to stop the concentration of greenhouse gases in the atmosphere from increasing, for example through carbon capture and storage (CCS).
43. DNB (2016); Carbon Tracker Initiative and Grantham Research Institute (LSE) (2013).
44. For an analytical overview of costs and benefits of environment policy, see: Hallegatte et al. (2011). For economic opportunities, see for example: PBL (2013a); Faber (2013); Dechezleprêtre et al. (2016).
45. Advisory Council on International Affairs (AIV) (2009); Ministry of Foreign Affairs (Ministerie van Buitenlandse Zaken) (2015); WEF (2016).

2.3 BASIC PRINCIPLES FOR LONG-TERM CLIMATE POLICY

There are thus many reasons to concentrate efforts on strengthening the long-term focus of Dutch climate policy. This policy brief applies five basic principles.[46]

First: the precautionary principle indicates that the vulnerability of people, society and the natural environment makes it necessary to deal with uncertainties in a proactive way.[47] This is not a plea for radical prevention and restraint, but for early warning detection of risks and uncertainties and for making sure they are laid open for discussion.

Second: climate policy for the long term is a political matter of temporal distribution. This means that costs, benefits, possibilities and risks must be distributed over time, without our knowing exactly where, when and how the consequences of climate change will emerge. A temporal distribution thus requires some moral consideration; it is explicitly a matter of politics. Delaying or deciding against action is thus also a political choice, at the expense of shifting costs and risks to future generations.

Third: government has a crucial role in shaping long-term climate policy. In the last few decades the governance model for environment and climate policy has gradually evolved towards a model with, generally, an increasingly important role for non-state actors.[48] However, the government retains an overarching system responsibility, a role that none of the other social actors could play. The government is the only actor that can organise the institutional structuring of policy processes. It can, for example, allocate certain powers and responsibilities to a specific body at some distance from politics and the administration, disassociated from the ephemeral daily political issues, as a kind of institutional commitment device. Furthermore, government drives infrastructural developments, in its role as owner, stakeholder or regulator of important infrastructures.

Fourth: long-term climate policy is not a task for government alone. The scale and urgency of climate change lead some authors to conclude that the problem cannot – or will not – be solved within the existing political and democratic frameworks.[49] However, this position fails to recognise the complexity of climate change as an issue that is deeply embedded in socio-technical and cultural structures. A wide range of different world views will clash not only over the nature of the problem, but assuredly also about the course of action that should follow. Climate policy for the long term is not a question of authoritarian or technocratic planning, but fundamentally a political issue, which requires the input and efforts of all society's diversity.[50]

Finally: long-term policy is a balancing act. For climate policy to be durable it is important that daily political squabbles do not distract from long-term strategic perseverance. Conversely, a fixation on the long term should not lead to political rigidity and lack of adaptive capacity in the face of changing circumstances, developing technologies and advancing knowledge.[51] Embedding long-term ambitions firmly within climate policy therefore calls for a balancing act between anchoring political (self-)commitment on the one hand and, on the other, allowing for adaptive capacity and flexibility. This requires a 'learning government', which recognises that blueprint policies cannot be applied to 'wicked' problems such as climate change.[52]

The WRR lists five basic principles for developing a long-term climate policy: the precautionary principle; climate policy as a political matter of temporal distribution; the key system responsibility of government; broad involvement of civil society; and a balance between anchoring and adaptive capacity.

46. For 'generation-aware' policy, see also previous WRR reports: WRR (1994) and WRR (1999).
47. WRR (2008b); Health Council of the Netherlands (Gezondheidsraad) (2008).
48. Driessen et al. (2012); M. Hajer (2003).
49. Shearman and Smith (2007); Beeson (2010); Blühdorn (2013); McKibben (2016).
50. Stirling (2015).
51. Walker and Salt (2006); Swanson and Bhadwal (2009); Adger et al. (2011); WRR (2014).
52. WRR (2006); Westley et al. (2006); Hajer (2011); Termeer (2015).

3 GUARANTEEING CLIMATE POLICY FOR THE LONG TERM

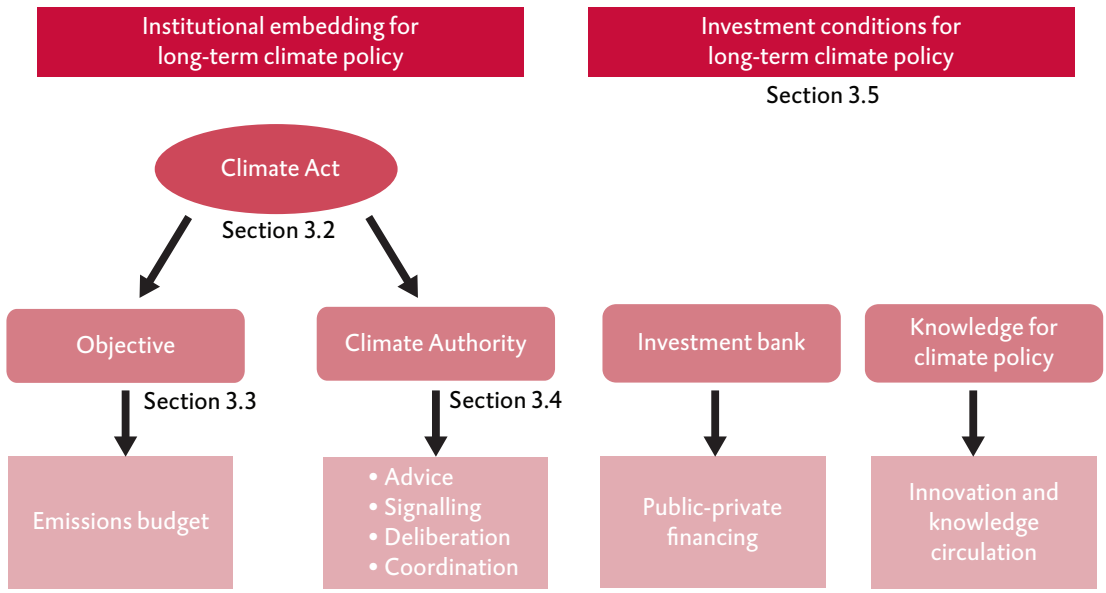
3.1 INSTITUTIONAL GUARANTEE FOR THE LONG TERM

Several countries have institutional 'ambassadors' for the interests and rights of future generations.[53] Sweden, for instance, has a Minister for the Future[54], Hungary an Ombudsman for Future Generations, the United Kingdom and Israel have a Committee for Future Generations, and Wales has a Commissioner for a Sustainable Future. These usually have an agenda-setting role in the public debate and sometimes also an advisory role in legislative processes. As a result, proposals are regularly made for the countervailing democratic power of future generations to be more strongly embedded in institutions.[55]

However, the interests and preferences of future generations are not immediately identifiable. It is principally the responsibility of the *current* generations to do justice to the interests and preferences of future generations. Securing the long term seems, therefore, to be better served by a well-designed climate policy in the present rather than by representing 'the voice of future generations' in specific institutions.

"Rien n'est possible sans les hommes, rien n'est durable sans les institutions" ("Nothing is possible without people; nothing is durable without institutions"), said the European politician Jean Monnet. This chapter provides an overview of institutional and legal arrangements for climate policy with a long-term horizon (Figure 2).

Figure 2 - Overview of institutional arrangements and investment conditions for ensuring long-term climate policy



53. For an overview, see: De Goede (2015). See also: Gesang (2014); United Nations (2013).
54. Full title: Minister for Strategy, Future Affairs and Nordic Cooperation.
55. Read (2012); Schinkel (2012).

3.2
CLIMATE LEGISLATION

Many countries have already embedded their climate objectives and the associated institutional arrangements in specific climate legislation (see box 'Climate legislation in other countries'). In the Netherlands, too, there are regular calls to introduce a 'climate law'.[56] However, without further specification this call for climate legislation is not very informative.[57] The challenge is to determine a long-term objective, combined with an arrangement for decision-making on appropriate interim targets.

Legal embedding of a long-term goal is an important signal of political commitment that contributes towards the predictability of governmental policy.[58] Legal safeguards are, after all, more binding than an approach based on sectoral agreements or self-regulation.[59] Section 3.3 elaborates on what a long-term climate goal might be.

In addition, a Climate Act must provide the institutional arrangement for long-term climate policy. The emphasis should be on determining administrative processes and institutional checks and balances. Section 3.4 examines the recommended establishment of a Climate Authority as part of the institutional arrangement.

The WRR advocates the introduction of a Climate Act, which specifies a long-term objective for reducing greenhouse gas emissions and which provides the institutional arrangement for implementing climate policy over the long term.

Climate legislation in other countries[60]

The **United Kingdom** has had the 'Climate Change Act' since 2008.[61] This law stipulates a target of an 80 per cent reduction in emissions by 2050 (compared with 1990) and establishes the institutional framework to ensure commitment to this task, and to implement policy for adaptation to climate change. The *Committee on Climate Change* (CCC) proposes, on the basis of cost-effectiveness, a 'carbon budget' every five years over the whole period up to 2050. This proposal requires parliamentary approval.[62] The CCC publishes regular progress reports, to which British government is obliged to respond.[63] For large projects the CCC publishes 'consistency checks', assessing consistency with the climate objectives.

56. Already in 2008 various environmental organisations advocated such a move; see goo.gl/HtR7lH. Last year the Council for the Environment and Infrastructure advised that a national target of an 80 to 95 per cent emissions reduction (compared with 1990) in 2050 should be laid down in law (Rli 2015). A Climate Act proposal is presently under consideration in parliament on behalf of the Green and Social-Democratic parties.
57. See M. Peeters and N. van der Grijp (2010: 21).
58. Regarding normative values in legislation, see Waldron (1999). Specifically for climate, see Peeters (2009). The plea for legal obligations in climate policy also comes to the fore in the Oslo Principles on Global Climate Change Obligations. See goo.gl/DMmhVb.
59. WRR (2013a).
60. For overviews, see: Peeters et al. (2012); Notenboom and Ybema (2015); Fankhauser et al. (2015); Grantham Institute (2016).
61. Boot (2015b); PBL (2016b).
62. Or it can be rejected on the basis of sound arguments, but this has not happened so far. In March 2016 the CCC published the proposal for the fifth budget period (2028-2032), with a greenhouse gas reduction of 57 per cent at the end of the period. This target was approved by the British government in June 2016.
63. Climate Change Act, section 37: The Secretary of State must place before Parliament a response to the points raised by each report of the Committee under section 36 (reports on progress).

The **Finnish** Climate Act[64] has been in place since 2015. It has a reduction target of 80 per cent by 2050 (compared with 1990) for greenhouse gas emissions from both ETS and non-ETS sectors. Unlike the British example, the Finnish Climate Act does not use emissions budgets or strict interim targets, but instead the Finnish government has to draw up and monitor policy plans for the long and medium term as well as for climate change adaptation. The independent Finnish Climate Panel provides scientifically informed advice on the policy plans, but the Ministry of Employment and the Economy is responsible for policy implementation and for meeting the targets. It reports on this annually to the Finnish parliament.

Denmark has had a Climate Act since 2014, which provides a more process-oriented institutional framework for the transition to a 'low-carbon society' by 2050. An independent scientific body has been set up to advise the Danish government in this matter and to monitor progress and the way the policy is implemented.[65] **France**'s approach is to lay down targets for reducing emissions in legislation, but as part of a broader energy transition law, which was adopted in 2015. **Ireland** has had a Climate Act since 2015, but it only sets out an administrative process and, as in Denmark, sets no specific target. In **Norway**, a Climate Act that follows the British example is currently going through parliament. Outside Europe, **South Korea**, **Mexico** and **Vietnam** have enshrined their climate aims in law.

3.3 LONG-TERM CLIMATE GOAL

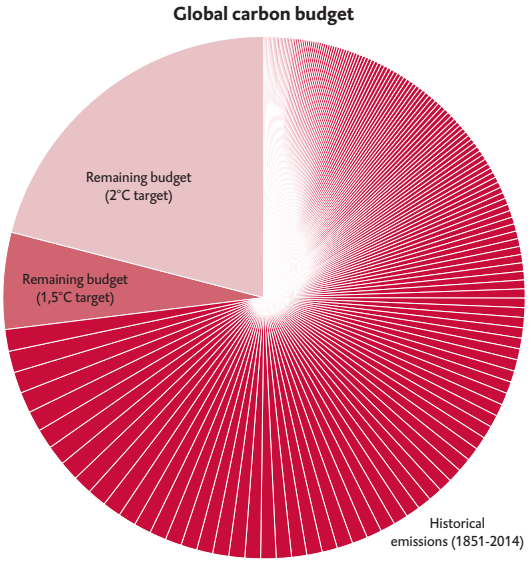
A Climate Act should specify an emissions budget for greenhouse gases as a long-term objective. A maximum temperature rise of 2 °C corresponds to a worldwide reduction in greenhouse gases of 50 per cent compared with 1990; for developed economies such as the Netherlands this implies an emissions reduction of 80 to 95 per cent.[66] These percentages only acquire real meaning when expressed in terms of an 'emissions budget' – the total amount of greenhouse gases that can still be emitted within the constraints of a 2 °C target (Figure 3).

In order to be reasonably certain of staying within this limit, a global budget of 600-1,200 billion tonnes of CO_2 has been calculated. That is not very much: current annual CO_2 emissions are in the order of 35-40 billion tonnes, and without additional policy, cumulative emissions will be around 4,200 billion tonnes by the end of the century. At the current rate of emissions, the budget for staying under 2 °C will be used up in approximately 25 years.[67] In all likelihood this means that a large share of fossil fuel stocks will have to remain in the ground.[68] A global emissions budget can be translated into a national greenhouse gas emissions budget. This 'single goal' approach leaves the temporal distribution of the budget as the key variable for policymakers.[69]

64. For information on the Finnish Climate Act, see goo.gl/wPtaqK. For an explanation and background, see: Pölonen (2014); Kymenvaara (2015).
65. Danish Council on Climate Change (not dated).
66. IPCC (2014).
67. The range depends on the method used. See Van Vuuren (2016) for an overview of estimates and their consequences.
68. McGlade and Ekins (2015); Jakob and Hilaire (2015). The only option for still being able to use these reserves is the capture, use and long-term storage of CO_2 (CCUS: carbon capture, utilisation, and storage). As yet there are only limited possibilities for the productive use of CO_2 in industry (as a solvent) and in greenhouse horticulture (as a fertiliser). Negative emissions are also conceivable through the combination of CCS with biomass fuels.
69. A quick calculation based on a linear decline in the current emissions level by 80 per cent in 2050 produces a national emissions budget of approximately 3,900 Mtonnes, which is approximately 21 times current annual emissions.

A budget approach requires the development of a temporal distribution strategy: the portion of an emissions budget that is used now is no longer available for use later. In addition, a budget approach underlines the fact that over the long term, climate change does not depend on emissions at a specific moment in time, but on cumulative emissions over a longer period.[70] It therefore makes sense to take measures sooner rather than later, particularly if there is a long lead time before such measures become effective. A long-term budget approach therefore combines safeguarding a challenging long-term ambition with administrative flexibility. However, interim targets are also sensible, in order to provide grip for political and administrative direction. This is consistent with the British approach, where emission budgets are determined for five-year periods.

Figure 3 - Historical carbon budgets compared with remaining budget for 1.5 °C and 2 °C targets



Sources: Gütschow et al. (2016); Gieseke and Meinshausen (2016).

An emissions budget should be technology-neutral. The question may arise of whether – in addition to reducing CO_2 emissions – additional long-term targets are necessary, for example with respect to energy savings or for renewable resources. Different countries approach this issue in different ways.[71] The United Kingdom and Finland have a single greenhouse gas emission reduction target of 80 per cent by 2050, whereas countries such as Denmark, Germany and France have set additional targets, for example for the share of renewable energy and for energy saving. However, working with multiple targets can produce inefficiencies and counterproductive interactions, for example between CO_2 emissions trading and renewable energy policy or energy saving policy.[72] Moreover, it would imply the legal predetermination of specific technology choices. A single emissions reduction target is by contrast essentially technology-neutral and does not predetermine technology choices that will have to be made politically. Moreover, a single target leaves more room for adjustments when these are deemed necessary, for example when dealing with unforeseen social and technological developments in the future.[73]

The WRR advocates legislating for a single, ambitious target for a reduction in greenhouse gas emissions, expressed in terms of a national emissions budget.

70. Van Vuuren et al. (2016).
71. For an overview of policy and objectives in surrounding countries, see Notenboom and Ybema (2015).
72. Court of Audit (Algemene Rekenkamer) (2015); DNB (2016).
73. M. Camps (2016); Rli (2015a: 29, 58-59); Kupers et al. (2015: 35).

3.4
CLIMATE AUTHORITY AS GUARDIAN OF THE LONG TERM

A Climate Act should establish a Climate Authority to act as guardian of climate policy over the long term. This Authority should fulfill the following four functions:

- The Climate Authority provides solicited and unsolicited advice on long-term climate policy, and more specifically proposes to government and the Dutch parliament periodic emissions budgets that are aligned with the long-term climate target *(advisory function)*;
- The Climate Authority identifies and signals technological and social developments that are relevant to long-term climate policy progress. It reports to parliament *(signal function)*;
- The Climate Authority identifies and analyses productive and counterproductive interactions between long-term climate policy and other policy areas, as well as between different administrative levels *(coordination function)*;
- The Climate Authority stimulates and organises public dialogue about long-term climate policy and its implementation *(deliberative function)*.

The Climate Authority will have to maintain at some distance from daily political affairs, but its establishment is most definitely a political decision. There are a number of institutional options for this kind of authority. One example that the Netherlands is already familiar with is the institutional figure of the Delta Programme Commissioner, who advises, coordinates and directs on matters of water safety, while the state secretary (or minister) retains political responsibility.[74] We can also learn from the British Committee on Climate Change or the Finnish Climate Panel.[75] Independence, impartiality, expertise and authority are of great importance. Moreover, there are few policy areas or sectors of society that are not affected by climate policy. The Climate Authority should, therefore, consist of multiple members, who collectively draw on a wide range of expertise and knowledge. The Climate Authority should not have administrative powers of its own. Ultimately the course of climate policy is a matter of politics. The Authority would operate as a catalyst, at an appropriate distance from politics.

The WRR proposes the establishment of a Climate Authority, with the mission of keeping Dutch climate policy on course by giving advice, signalling, coordinating, and stimulating public dialogue.

The primary role of the Climate Authority is to propose periodic emissions budgets. This role can be compared with that of the British CCC: the Climate Authority publishes periodic advice specifying which part of the long-term emissions budget may be 'spent' in a particular budget period. This advice should carry considerable judicial weight, with the government only able to deviate from it based on evidence-based arguments and with parliamentary approval. In addition to this specific advisory function, the Climate Authority will also provide solicited and unsolicited advice on other subjects that are relevant to climate policy.

74. This caused the Council of State to comment that "the transfer of tasks to a civil servant, without his also being granted powers, does not require any legal regulation" (Council of State 2009).
75. With the observation that institutional constructions must always be weighed against other possibilities. For example, in the Sustainable Coastal Development Committee (Staatscommissie voor Duurzame Kustontwikkeling), also known as the Second Delta Committee ('Tweede Deltacommissie'), various institutional arrangements have been considered, such as a Delta Plan Bureau, a (permanent) Delta Council and (temporary) Committees, a Delta implementation body (zbo), a Delta Supervisor, a State Authority for the Delta, a Delta general directorate and a Delta minister (Van Twist et al. 2013).

In order to monitor policy progress, the Climate Authority must be able to call on support from existing institutions such as the Netherlands Environmental Assessment Agency (PBL) and the Netherlands Bureau for Economic Policy Analysis (CPB). It is crucial to understand that monitoring by the Climate Authority implies more than just determining the extent to which targets are being reached. Signalling implies recording and placing on the agenda technological and social developments that have an influence on the effectiveness and efficiency of the long-term climate policy. To make this possible, a robust, high-quality knowledge infrastructure is important (see section 3.5).

The Climate Authority should provide authoritative advice on interim emission targets. It signals and advises on specific subjects and developments.

The proposed Climate Authority, in dialogue with stakeholders from civil society, works to establish climate agreements for specific sectors. More than half of greenhouse gas emissions in Europe are not covered by the European system for emissions trading (EU ETS). National climate policy will primarily target these sectors. The EU has proposed an emission reduction for the Dutch non-ETS sectors of 36 per cent by 2030 (compared to 2005). The non-ETS emissions include emissions of the greenhouse gases nitrous oxide and methane in the agricultural sector, methane emissions during the production and transport of natural gas, and CO_2 emissions by households and small and medium-sized enterprises. Transport, services and the public sector are also not covered by the ETS. It is a heterogeneous set of emission sources, which requires a diverse package of policy strategies covering a wide range of technical reduction options.[76] In all cases it is important to eliminate any uncertainty regarding the target for 2050 and the interim targets.

The Climate Authority can play a key role in establishing recurrent sector-specific climate agreements. Such agreements should specify an implementation agenda for a given budget period. They would mobilise input from a wide range of stakeholders, and in this regard the Climate Authority could facilitate dialogue and commitment in line with the overall long-term climate objective. The Dutch consensus-based governance model offers numerous instructive examples (see box 'The Energy Agreement and the Energy Dialogue').

Periodic, sector-specific climate agreements are of great importance in securing the involvement and commitment of society in long-term climate policy. The Climate Authority facilitates dialogue and commitment in line with the long-term objective of the Climate Act.

76. Ros and Daniëls (2015).

Dialogue, accords and civic involvement

The national Energy Agreement (2013) is a social accord committing over 40 stakeholders and representatives, including the Dutch government, to accelerate the use of renewable energy and promote energy-saving in the Netherlands. The parties to the Energy Agreement have committed voluntarily to contribute their efforts towards achieving a range of specific goals, mostly for 2020. The Energy Agreement is the result of a consensus-orientated negotiation process supervised and facilitated by the Social and Economic Council of the Netherlands (SER). The networks formed in this process can be built upon in order to establish future climate agreements.

The 'Room for the River' *(Ruimte voor de rivier)* programme provides another telling example of civil-society involvement in major policy decisions. The programme involved a so-called 'replacement decision', in which stakeholders were given the opportunity to put forward alternatives for implementation proposals to prevent river flooding. The alternatives were considered against a transparent set of criteria, which is seen as a major factor in the success of the programme.[77]

A comprehensive public dialogue may be fruitful for the establishment of such accords. The Dutch government already experiments regularly with this instrument. For example, the Ministry of Economic Affairs has organised a wide-ranging 'Energy Dialogue' as a means of piecing together the national Energy Agenda (2016), a policy plan for the coming decade or so. Public dialogue is a valuable instrument for creating support and extending the range of solutions, but it is not without risks. A dialogue may prompt resistance, for example because it has insufficient administrative support or because it does not fully reflect the urgency of the policy task. This places great demands on the design of the dialogue.[78]

The Climate Authority provides consistency checks between long-term climate policy and other policy areas. A number of other policy areas are closely connected with climate policy. This is especially true of policies relating to spatial planning, infrastructure and the built environment. These policy domains determine for the long term the physical conditions for economic and social activities (see box 'Consistency between climate policy and other policy areas'). However, achieving consistency between different policy areas is no easy matter. It requires the balancing of a range of legitimate policy goals, such as accessibility, security of supply, affordability, landscape values, and many others. A key task of the Climate Authority is to carry out consistency checks, to ensure that long-term climate considerations are explicitly taken into account in other areas.

77. Andersson Elffers Felix (2013). In the case of 'Room for the River', the invitation went out specifically to the regions as the most important stakeholders.
78. Van Est and Van Waes (2016). For a local variant of an energy dialogue in the city of Utrecht see Meijer et al. (2016).

Consistency between climate policy and other policy areas

Consistency between climate policy and other policy areas is of crucial importance. For instance, long-term climate objectives are often not taken fully into account in **spatial planning and development** policy.[79] The Board of Government Advisors (CRa) notes a "preoccupation with the short term (the satisfied citizen) and the lowest costs (the most frugal solution)" in spatial planning projects.[80] However, the impact of spatial planning decisions taken in the present carries far into the future, while climate adaptation and mitigation recurrently pose new challenges for planning and development.[81] It is therefore important to have in place consistency checks, explicitly designed to take long-term implications of and for climate policy into account in spatial planning policy. The National Vision for Spatial Planning and Policy (Omgevingsvisie), scheduled for publication in 2018, could be the right instrument for recognising such consistencies over the long term.[82] Moreover, at the spatial planning level a lot more use could be made of available knowledge about climate change adaptation and mitigation. Currently, this often happens at a late stage, without alignment with the planning process.[83] Strengthening the role of the Netherlands Commission for Environmental Assessment could be useful in this respect.

Similar issues play a role in **infrastructure development**. Infrastructure investments are generally very relevant with respect to climate issues. A proactive climate strategy could prevent infrastructural lock-in into unwanted system configurations, which would require much more expensive adjustments in the future.[84] Presently it seems that the level of climate awareness in vital infrastructure sectors is still relatively low, at least with respect to climate change adaptation. For this reason, tight management and an explicit division of responsibilities are advocated.[85] Sometimes the Dutch government, in its role as owner and manager of infrastructures, can itself define and develop long-term climate goals and means to achieve them. For example, Rijkswaterstaat, the agency for the development and maintenance of much of the Dutch public infrastructure, has set a target of making the principal road and waterway networks energy-neutral by 2030.[86] In other infrastructure sectors the government maintains a greater distance, as stakeholder or regulator.

Although there are wide differences between the sectors with respect to their dynamics and systems for investment planning, in practice different types of infrastructure are becoming increasingly interwoven, a development driven to a great extent by motives relating to sustainability and climate policy. One example combines mobility, energy and ICT in a pilot scheme for electric vehicles in the Utrecht district of Lombok. This scheme aims to investigate to what extent expensive grid capacity extensions can be avoided by using the batteries of electric cars as storage for solar-generated power. This interdependence between infrastructures requires coherence in investment planning, not only between infrastructures but also at different levels of scale.[87] The Multi-annual Programme for Infrastructure, Spatial Development and Transport (Meerjarenprogramma Infrastructuur, Ruimte en Transport, MIRT) provides for coordination between investments in the infrastructures for passenger and goods transport, water safety and freshwater supplies, but does not provide a coherent investment programme for infrastructure in the Netherlands in a wider sense, and often fails to take proper account of long-term social developments.[88] In contrast, in many Anglo-Saxon countries it is common practice to periodically set up a national infrastructure plan

79. Rli (2015b); CRa (2015).
80. CRa (2015: 3).
81. PBL (2016c).
82. The Netherlands Council for the Environment and Infrastructure (Rli) advises that the National Environmental Planning Strategy should be deployed for four integrative tasks: energy transition, climate change adaptation, improving the spatial-economic structure, and transforming the rural environment (Rli 2015c).
83. De Groot and Koomen (2010).
84. Schoenmaker and Van Tilburg (2016).
85. Gilissen et al. (2015).
86. Ministry of Infrastructure and the Environment (Ministerie van Infrastructuur en Milieu) (2016b).
87. J.W. Hall et al. (2016).
88. IBO (2016b).

that takes account of long-term public goals and covers both public and private investment plans for all economic (and often also social) infrastructure.[89] Such a national infrastructure plan offers a framework for coordinating (in time and space) the substantial investments needed to facilitate a climate-proof and low-carbon economy with respect to infrastructure.

A third important policy area that specifically impinges on national climate policy is the **built environment**, which determines to a high degree the energy consumption of residents and other users. Regulations for new construction have contributed to the steady improvement in energy quality of Dutch homes since the 1990s, and from 2020 onwards new buildings will have to be virtually energy-neutral. This goal is much harder to achieve for existing housing stock. So far, current policy has not succeeded in tempting large numbers of homeowners, other residents and housing associations to invest in far-reaching improvements in energy performance. An important factor here is the lack of coordination between the system stakeholders: builders, residents, financiers, clients and regulators have great difficulty in liaising with each other on making the built environment more sustainable.[90] A more active and binding approach is required here, emphasising a clear goal for the long term, guidance in bringing together the parties involved, ever-stricter quality standards and sanctions for those who fail to meet them.[91] Here, too, the Climate Authority could play a coordinating role.

It is of course not the responsibility of the proposed Climate Authority to make specific choices regarding spatial planning and infrastructure. The Climate Authority should focus primarily on ensuring alignment and consistency with the long-term climate policy, with the aim of preventing counterproductive interactions. The Climate Authority could also play a role in organising strategic debate about future-proofing the interconnected infrastructure system in the Netherlands, paying particular attention to types of infrastructure with a major impact on the climate, such as those for natural gas and transport fuels. In this way the Climate Authority can contribute to improved policy consistency for the long term.[92]

The Authority can also play a significant role in other relevant sectors. In many sectors there is great scope for technological development, which can be facilitated and accelerated through innovation, regulation and regulated scope for experiments (e.g. transport and mobility), but win-win opportunities are not always readily available. Sometimes tougher policy choices will be required, including reductions in economic volume and scale (e.g. agriculture). Wide-ranging public debate will be needed in such cases.

The WRR advises that long-term climate considerations be taken into account in all relevant policy domains. The proposed Climate Authority could facilitate this process through 'consistency checks'. For specific sectors, interim targets will be set for the period 2020-2050, stemming from an emissions budget established for the long term.

89. See for example https://www.gov.uk/government/collections/national-infrastructure-plan for the National Infrastructure Plan (2010) of the United Kingdom, with all updates and implementation reports since 2010. Canada and Australia also periodically produce a national infrastructure plan.
90. Faber and Hoppe (2013); PBL (2014b); Van Doren et al. (2016).
91. See also the arguments by Derksen (2016) and Van Soest (2016). Moreover, based on the deals arising from the Energy Agreement there is now a move towards a more binding approach, on the one hand by enforcing existing regulations more firmly, and on the other by tightening up the regulations themselves.
92. Gerlagh (2016).

3.5 INVESTMENT CONDITIONS FOR LONG-TERM CLIMATE POLICY

Mitigating climate change and adapting to its effects require substantial investments. This is not simply a public or private matter, as no single party – including government – can bring about a transition on its own. In many cases there will be a need for public-private investment.[93] At the climate conference in Paris it was agreed to set up a *Green Climate Fund*, which aims, starting in 2020, to make 100 billion US dollars available each year to developing countries to help fund climate change adaptation measures.

At the national scale a public investment bank could be instrumental in freeing up private capital for tackling societal problems with a distant time horizon.[94] A public investment bank provides substantial funding for projects that are as yet of insufficient commercial interest, but that will generate crucial social value and revenue in the longer term. It could hence boost innovation, create advantages of scale and mobilise private capital through co-funding.[95] In addition to existing subsidies and fiscal measures, an investment facility could foster additional climate investments and create greater synergy between public and private funds. In addition, such an investment bank would offer enhanced opportunities for associating with the European Fund for Strategic Investments ('Juncker fund'), which is based on national co-funding.[96]

Unlike most other Western countries, the Netherlands no longer has a national investment bank.[97] The German Kreditanstalt für Wiederaufbau (KfW), in particular, is an interesting model, due to its public function, its size and the funding model, which operates through commercial banks and serves both large-scale and small-scale projects. It is worthwhile considering such a construction at least for climate-related investments, not least in order to gain better access to European funds.

For additional funding of long-term climate policy, the WRR suggests considering the establishment of a public investment bank.

Mitigating climate change and adapting to its inevitable effects require a range of technical and social innovations. This will require not just investments, but also an appropriate ecosystem for knowledge and innovation, in which the importance of interdisciplinary and transdisciplinary knowledge is emphasised and the involvement of the various stakeholders is increased.[98] This knowledge model drives systematic knowledge development and innovation, focused not only on technological options for – the connection between – mitigation and adaptation to climate change, but also on the dimensions of human behaviour and governance.[99]

93. WRR (2012a).
94. NIA (2015). See also Van Tilburg (2016).
95. Canoy and Van Toledo (2011).
96. NIA (2015).
97. This means there is a lot to be learned from other countries. For an overview, see: Oliver Wyman/De Brauw Blackstone Westbroek (2016).
98. H. van Latesteijn (2015). See also, among others, the WRR-Reports Lerende overheid (Learning government) (2006), Innovatie vernieuwd (Innovation renewed) (2008a) and Naar een lerende economie (Towards a learning economy) (2013).
99. WRR (2014b); Rli (2014).

For the long term it is therefore important for the Netherlands to invest effort in strengthening the climate-relevant knowledge infrastructure. In particular there is a need for a stronger focus on the front end of the innovation chain for renewable and low-carbon energy technologies, and for strengthening the intermediary linkages in the knowledge model for climate policy. At the front end of the innovation chain, only 100 million euros was invested in innovation in renewable energy technologies in 2016, compared to an investment of 1.4 billion euros in deployment of new technology.[100] An improved intermediary function primarily aims to drive the circulation of knowledge between research institutes and society at large.[101] There are a number of ways in which this function can be developed. Enhanced cooperation between knowledge institutes and societal stakeholders is of key importance. Lessons can be learned from projects such as 'Kennis voor Klimaat' (Knowledge for the Climate)[102] and from the 'Topconsortia voor Kennis en Innovatie' (Top Consortia for Knowledge and Innovation') (TKI's).[103]

The WRR advocates strengthening the innovative and linking functions in the knowledge infrastructure for climate policy.

100. Sustainable growth study group (Studiegroep Duurzame groei) (2016).
101. WRR (2013b), specifically Chapter 8.
102. BSIK knowledge project, 2008-2014, see www.kennisvoorklimaat.nl/. In the past, the Netherlands has had several wide-ranging and well-evaluated research programmes, such as the national research programme for global air pollution and climate change (nationale onderzoeksprogramma voor mondiale luchtvervuiling en klimaatverandering, NOP). This programme was implemented in two stages (1989-1995 and 1995-2001).
103. It is clear that a great deal of climate-relevant research is also carried out under the aegis of the TKIs, specifically in the top sector Energy.

4 POLICY CONSISTENCY BETWEEN ADMINISTRATIVE LEVELS

Consistency and reliability are of great importance for long-term climate policy, not only in relation to associated policy areas (see section 3.4), but also in relation to the various administrative levels. Consistency across different levels of administration requires coordination, both with local and regional authorities and at European level. Here, too, there is a key task for the Climate Authority.

4.1 ALIGNMENT WITH THE EUROPEAN SYSTEM FOR EMISSIONS TRADING

The system for emissions trading is the cornerstone of European climate policy. Since 2005 the European Emissions Trading System (EU ETS) has been the most important policy instrument for reducing greenhouse gas emissions. The EU ETS works according to the 'cap and trade' principle: based on a fixed ceiling for CO_2 emissions, emission rights are placed in circulation and can be traded in a market. The EU ETS encompasses the energy and energy-intensive industry sectors and, since 2012, also the aviation sector. The EU ETS covers 45 per cent of total greenhouse gas emissions, in Europe as well as in the Netherlands. In the Netherlands there are 450 participating companies, 20 per cent of which are responsible for 90 per cent of total Dutch ETS emissions.[104] When the EU ETS was launched in 2005, emission rights were allocated free of charge, but since 2013 all emission rights for the electricity sector have been sold by auction. For industry the allocation of free emission rights is being phased out gradually, and by 2027 all emission rights in the EU ETS will be auctioned off.

The amount of emission rights (the emissions ceiling) will decline by 1.74 per cent annually between 2013 and 2020. For the trading period from 2021 onwards, the aim is to achieve a reduction of 2.2 per cent per year, which implies that by 2030 the participating sectors will have cut emissions by 43 per cent (compared with 2005) – a relatively modest reduction considering the long-term goal of at least an 80 percent reduction by 2050. Moreover, while European greenhouse gas emissions are gradually declining, the possibility cannot be ruled out that at the national level the emissions within the trading system will increase. For example, emissions of greenhouse gases in the ETS sectors in the Netherlands rose by nearly 6 per cent in 2015 compared with the previous year, almost entirely due to newly built coal-fired power plants.[105]

This does not mean that the EU ETS is not effective. At the European scale, the ETS is an economically efficient way to limit CO_2-emissions.[106] For this reason it is increasingly being emulated in other countries,[107] which offers long-term prospects for integration of emissions markets. Moreover, the EU ETS is a good example of an adaptive policy instrument: the first trading period was used deliberately to experiment and to learn; the system was then expanded to include more countries and sectors, there was a shift from national emissions ceilings to an EU-wide ceiling, and now that ceiling is gradually being lowered. Emission rights are now largely auctioned off and the allocation rules have been harmonised for those allowances that are still allocated without charge.

104. IBO (2016a: 20).
105. European Union Transaction Log (EUTL). See also Statistics Netherlands (CBS) (2016).
106. Ellerman et al. (2014).
107. World Bank (2016).

Nevertheless, the EU ETS is often perceived to be a failure. The most important criticism is that the price of CO_2 emission rights is far too low to be effective as a stimulus to climate-friendly investment and innovation.[108] Due to this low price, the EU ETS also fails to function as a brake on investment that is considered undesirable from a climate point of view, such as the construction of new coal-fired power plants. In order to arrive at a CO_2 price within the EU ETS that will encourage the investment or divestment behaviour that society wants, it will be necessary to eliminate the excess emission rights permanently from the market. In 2013, 900 million tonnes of CO_2 emission rights were removed from the market,[109] and a further lowering of the emissions cap is desirable for the next trading period (2021-2030). However, major investments in innovative technologies for cutting CO_2 emissions require not just a strong price incentive and limited volatility in the price of emission rights, but also a long-term policy reliability. The 2030 time horizon may be too short to offer such reliability for longer-term investments. Furthermore, the relatively modest effort made in the short term means that a much bigger task is left to be tackled in the future. Total reduction costs are likely to be lower in a scenario of an incrementally decreasing emissions cap, as opposed to a slow decrease in the period until 2030 and a (necessary) rapid decrease in the period thereafter.

The quickest way to strengthen the EU ETS is by setting a minimum price when auctioning emission rights. When there is sufficient demand for emission rights, the price will be determined by the market. However, if demand for emission rights is low (or supply is high) the market price will also be low. Under these conditions a minimum price should apply. Given the functioning of the market this would imply that fewer rights will be auctioned than are available. The advantage of a (well-calibrated) price floor is that it reduces the price volatility of CO_2 emission rights, so that companies are more likely to be encouraged to invest in structural emissions reductions.[110] Reducing investment risks leads to lower capital costs, which in turn makes it possible to reduce emissions more quickly and makes it more attractive to invest in developing innovative reduction options for the long term.

In addition to price recovery, expanding the market for emission rights is an important route for ETS reform. The Netherlands already plays an active role in the European debate on strengthening the EU ETS and can make efforts to extend the EU ETS to other sectors in order to encourage trade and push up prices. If adequate pricing is achieved, the quality of supervision by the national emission trading authorities will be very important in ensuring there is confidence in the EU ETS. In this context it is of major importance that the monitoring and verification of emissions be harmonised across Europe and that acts of fraud are vigorously prosecuted. At present, there is a lack of harmonisation with regard to enforcement, for example due to inconsistency in imposing sanctions on parties that produce more emissions than they can offset with emission allowances. The WRR therefore underlines the importance of further European harmonisation of national supervision practices, up to and including enforcement of regulations.[111]

108. See, among others, Fallman et al. (2015): "When it comes to the long-term effectiveness, there is consensus that a stronger price signal is needed to provide incentives for investments in the sustainable transition to a low-carbon economy." (p. 13).
109. Initially with the intention of auctioning these rights later in the third ETS trading period (2013-2020) (known as backloading). These emission rights have now been taken into what is called the market stability reserve; they will only be placed on the market once the emission rights surplus has decreased sufficiently (to below 400 million tonnes). However, recent research shows that the current design of the market stability reserve carries great risks of increasing the price volatility of CO_2 emission rights (Richstein et al. 2015a).
110. Richstein et al. (2014).
111. Fleurke and Verschuuren (2015); Verschuuren and Fleurke (2015).

Structural measures to reinforce the EU ETS are necessary in order to ensure a stable framework to encourage climate investments with a long time horizon. It is crucial to provide clarity on the organisation and aims of the EU ETS beyond 2030. There is an urgent need for a price floor in emission rights auctions. Expanding the market to other sectors and countries could also help to strengthen the EU ETS. Furthermore, attention must be paid to reinforcing European harmonisation of the way rules are enforced by national emission trading authorities.

Strengthening the ETS is incompatible with a national or European CO_2 tax. If there is no agreement on strengthening the ETS at the European level, the Netherlands could, in an extreme scenario, consider adopting additional national measures for the ETS sectors. The United Kingdom and France currently follow this route and have taken – or are in the process of taking – national measures to set a price floor for emission rights, or to tax greenhouse gas emissions. However, such measures come at the expense of a level playing field for companies in those countries, as they bear additional costs in comparison to companies elsewhere under the ETS. Overall emissions do not decrease, since emission rights can still be purchased elsewhere in Europe, a shift known as the 'waterbed effect'. This would not only further undermine confidence in the EU ETS, but would also diminish the effectiveness of measures to arrive at a higher price level within the EU ETS.[112] National CO_2 pricing measures also have cross-border effects on the European electricity market.[113]

The EU-wide introduction of a tax on CO_2 emissions as an *alternative* to the EU ETS is not a credible route either. There is not only no formal basis for tax measures at the European level, but more importantly the political configurations mean there is no more likelihood of finding a consensus for an effective tax measure than for achieving credible EU ETS reforms. Given the institutional framework that is already in place, we conclude that strengthening the EU ETS is preferable to additional tax measures at the national or European level.

Other national policies to reduce emissions could be at odds with the EU ETS. Emission rights that become available through investments in renewable energy or from closing coal-fired power plants can, in theory, be used elsewhere in Europe.[114] From a climate policy perspective this is not in itself a problem, provided the emissions from the European ETS sectors remain below the ceiling that has been set. However, this 'waterbed effect' undermines confidence in the EU ETS. In addition, a temporal waterbed effect may also arise, as unused emission rights in the present (e.g. due to closure of power plants) may be saved up for use in the future.[115] This could be avoided by removing emission rights from the market at the same time as national investments or divestments are made.[116] It is preferable for the emission rights that become available not to be added to the market stability reserve, but to be removed definitively from the market. Clearly, this will come at additional costs.

The WRR discourages tax measures at the national or European level to stimulate the CO_2 price or to set a price floor in the market, since such measures will undermine the ETS pricing mechanism. Adjustment of the ETS emission ceiling is the preferred mechanism to correct for CO_2 emission reductions that follow from national stimulation measures.

112. PBL (2013b); see also Ministry of Infrastructure and the Environment (2016a).
113. Richstein et al. (2014).
114. In theory this effect becomes greater when the CO_2 price is high; at the current low price, it is expected that the waterbed effect will be moderate.
115. Ecofys (2016).
116. Richstein et al. (2015b); Court of Audit (Algemene Rekenkamer) (2015).

National pricing measures to encourage emissions reductions in the ETS sectors are generally detrimental to the EU ETS pricing mechanism. The Netherlands should consider carefully before following in the footsteps of the United Kingdom and France, since it would essentially imply a shift to the national domain of emission rights price-setting. However, there may be a justification, particularly if structural reforms of the EU ETS are considered to be out of scope in the near future. In the short term, national measures could bring the risk of higher costs, carbon leakage and relocation of business activities, but in the long term they could significantly abate investment risks for reduced emission technologies. If the EU ETS pricing mechanism fails to become an effective driver for investment, countries that have national pricing measures in place could have some advantage in accommodating higher prices for emission rights.

4.2 STRENGTHENING INTEGRATION OF THE EUROPEAN ENERGY SYSTEM

The long-term objectives of a climate-friendly energy system require reinforced European integration of national energy markets and networks, especially in electricity provision. The larger the share of variable renewable sources in the energy system, the greater the challenge in guaranteeing the long-term reliability of electrical power provision in Europe. In order to incorporate solar and wind energy smoothly into the electricity system, it is necessary to average out fluctuations in electricity supply and demand over as large an area as possible. This calls for an expansion or intensification of cross-border links that allow access to energy storage facilities and flexible electricity demand elsewhere in Europe. The Netherlands is already highly interconnected and this will increase further in the coming years. In addition, the Netherlands has successfully promoted cooperation with the other North Sea countries in order to improve the coordination of future offshore wind farm construction. With the development of a cross-border North Sea network, the interconnection and market integration of the North Sea countries can be significantly improved.[117]

These developments underline the fact that the Netherlands is part of a European electricity market and a European electricity network. However, this has also introduced vulnerabilities. If other countries are slow to invest in cross-border connection capacity, the Netherlands could suffer damage from disruptions in the European network. It is therefore recommended that the development of the trans-European electricity and gas infrastructure, currently mainly a matter of bilateral decision-making by national network operators and regulators, be carried out at EU level. The initial steps towards better planning and harmonisation of cross-border connections have already been taken in the *Third Energy Package* (2013). This provides a formal mandate to the organisations of cooperating national (and some regional) transmission system operators for electricity[118] and gas[119]. *The Third Energy Package* has also created a European agency for cooperation and coordination among national regulators in the energy sector.[120] It should be noted here that the time horizon of the current European network development plans is only ten years. Given the long preparation and construction times of investment projects relating to national and cross-border energy infrastructure, a planning horizon of at least a few decades is desirable.

117. Political Declaration on Energy Integration between the North Sea Countries, 6 June 2016, see: https://www.rijksoverheid.nl/documenten/convenanten/2016/06/06/political-declaration-on-energy-cooperation-between-the-north-seas-countries.
118. Regulation (EC) No. 714/2009.
119. Regulation (EC) No. 715/2009.
120. Regulation (EC) No. 713/2009.

The WRR supports the move towards European planning of the trans-European electricity and gas infrastructure, but advocates a significant extension of the planning horizon of network development plans.

The current structure of the European electricity market cannot be maintained over the long term. In order to guarantee security of supply in a climate-friendly energy system that includes a high share of renewable sources, changes in the structure of the European electricity market will be necessary. In the current energy-only market model, payment is made for energy, but not for keeping production capacity at the ready. As a result, the electricity price falls as the proportion of renewable energy sources in the electricity production mix rises. On the German wholesale market, the electricity price already drops regularly below zero. These circumstances make it increasingly difficult for all producers to recover their investment and operating costs; this also applies to photovoltaic power stations and wind farms. Over time this can be detrimental to investment adequacy, and thus to supply security.

Several countries in Europe have already introduced capacity mechanisms to guarantee supply security, for example by introducing a capacity market or by maintaining strategic reserves. However, such national measures may cause further fragmentation of the internal European electricity market.[121] It is therefore important, specifically at the European level, to ensure that over the long term there will be sufficient investment in new production capacity, including in renewable energy sources. This does not in itself mean that one single capacity mechanism has to be implemented at EU level, but the Netherlands should at least strive for coordination of national capacity mechanisms in north-western Europe.[122]

In order to guarantee sufficient investment in both renewable and other types of production capacity for the long term, the introduction of some type of long-term contract will be required. The WRR advises against the unilateral introduction of a capacity mechanism at the national level. It is preferable to have coordination at EU level, and at least in north-western Europe.

121. ACER (2013).
122. Here, agreement on the capacity margins is needed, among other things. If these are too large, they hinder trade, at the expense of the economic advantages of the European electricity market. On the other hand, it is risky to depend structurally on electricity imports, given that the peaks in demand by the north-western European countries are strongly correlated, as are the supply peaks of electricity generated from variable renewable sources. As regards selection of a suitable capacity mechanism, a capacity market would be a better choice than a strategic reserve, in view of the fact that the effectiveness of a reserve declines sharply in line with an increasing proportion of renewable sources in the electricity production mix. See Bhagwat et al. (2016).

4.3 ROOM FOR INNOVATION AT LOCAL AND REGIONAL LEVEL

Coordination with the local and regional administration level is necessary for a climate policy for the long term. Many local and regional authorities complement national policy by pursuing policies to encourage renewable energy and climate projects. Above all, they play a key role in managing or accommodating developments in the sectors that are outside the emissions trading system but that are together responsible for more than half of Dutch greenhouse gas emissions. It is therefore crucial to involve local and regional government in climate policy. Furthermore, local and regional authorities have been given more room for policymaking in the areas of spatial planning, infrastructure and the built environment for the benefit of local or regional environmental quality.[123] There are thus important opportunities here for decentralised climate policy. For example, mobility and the built environment alone are on aggregate responsible for more than half of Dutch energy consumption and for approximately one third of Dutch greenhouse gas emissions.[124]

Local and regional authorities can play an important role in offering space to experiment and innovate, taking account of local circumstances and initiatives. Tailor-made regulations and room for policy experiments can, for example, be useful for developing energy-efficient building concepts, creating new infrastructure, integrating new revenue models, or prioritising cleaner transport concepts. Stricter local or regional emission standards can help to provide incubator space for innovations and experiments. Such activities require proper alignment with national policy, including a clear system of responsibility (see box 'Space to experiment and innovate at the local and regional levels'). Here again the Climate Authority could come into play, by using consistency checks to promote coherence between different administrative levels.

Space to experiment and innovate at the local and regional levels

There are many ways for local and regional governments to find space for experimentation and innovation. One example of local innovation is the development of smart grids, which use ICT services to match the fluctuating supply of distributed solar and wind power production with flexible options for power demand. Local and regional governments can help to create policy space for experimenting with – and upscaling – smart grids. This naturally requires proper oversight of consumer interests such as affordability and privacy.[125]

There are also many decentralised initiatives that tap into the great potential for local and regional sustainable heat provision. Here, there are major geographical disparities: options such as biogas, geothermal energy and residual heat are not available to the same extent everywhere. To accommodate this variety of heating sources and infrastructures in future heating provision, a legal connection right for heating would appear to be a more future-proof alternative than the development of infrastructure-specific rules according to the current logic.[126] With a legal connection right to heating, the current obligation to connect households to the natural gas grid could lapse, creating regulatory space for cost-effective, tailor-made solutions. This would enable the development of local and regional alternatives to the natural gas grid, as part of a national vision for the future of the gas infrastructure.

123. Ministry of Infrastructure and the Environment (Ministerie van Infrastructuur en Milieu) (2012).
124. ECN et al. (2015); PBL (2016a).
125. Lavrijssen (2016).
126. Sustainable growth study group (Studiegroep Duurzame Groei) (2016).

Current network regulation is still insufficiently tailored to the non-centralised development of smart grids and new types of infrastructure. Thus, smart grid projects are sometimes at odds with the existing network codes (which contain, among other things, connection rules, rules for capacity allocation and tariff systems). Whereas the gas and electricity networks are strictly regulated with a view to the vulnerable position of consumers, there is no clear regulatory framework for alternative energy networks (for heating, for example), which are developed in a competitive market. This creates great uncertainty among consumers, investors and developers of alternatives, and hampers investments that are desirable from the point of view of long-term climate policy.

Room to experiment at a local and regional level requires commitment. The purpose of experimentation is ultimately to develop a structural ability to learn, in order to be able to scale up successful projects, but also to have the possibility to change course when projects are not successful.[127] National government has a crucially important role to play here, by linking promising projects in the region, and by contributing to scaling up where necessary and possible. At least as important is the organisation and stimulation of the 'knowledge circulation' between knowledge institutes and society that was referred to in section 3.5.

The WRR emphasises the importance of creating space to experiment at the local and regional level for innovative climate and energy practices.

Local and regional authorities can accommodate bottom-up initiatives. There is no lack of commitment to improving the living environment among citizens of the Netherlands.[128] Groups of citizens show great enthusiasm for actively supporting, or investing in, energy saving, renewable energy, clean mobility and other measures that help to make the living environment more sustainable. Here local or regional government can not only offer the citizen tailor-made solutions, but can also channel initiatives from citizens, mobilise knowledge, offer a communication platform, and thus help local initiatives to grow into a 'movement' with an effect that reaches beyond the local level. The challenge for local or regional government is always to link the relatively abstract climate policy goal with policy goals that can fire the enthusiasm of its citizens; consistency between policy areas possibly plays an even greater role at the local and regional level than at the national level. For this reason it is important for national government to use its overarching system responsibility to create a framework that is clear and consistent across policy areas. This provides local and regional governments as well as citizens with the operating space required for climate actions on the ground.

127. See e.g. Dewulf and Termeer (2015); Swanson and Bhadwal (2009).
128. WRR (2012b); Hajer (2011).

5 FROM NON-BINDING TO FIRMLY EMBEDDED

The WRR notes that Dutch climate policy lacks a clear and ambitious long-term strategy. Such a strategy is necessary in order to provide direction, coherence and reliability in climate policy. However, developing a long-term strategy for climate policy is difficult, as it faces many social, institutional and infrastructural barriers.

A long-term strategy for climate policy would benefit significantly from a clear framework of climate legislation. Such legislation would need to define a single, ambitious target for greenhouse gas emission reduction, expressed in terms of a national emissions budget. This could be achieved with a Climate Act, which also provides for the establishment of a Climate Authority to advise, signal, coordinate and stimulate deliberation in relation to climate policy for the long term. The Climate Authority would thus act as a process facilitator and as a guardian of periodic climate agreements. However, ultimate responsibility for climate policy would remain with government. Improved coherence between policy areas is of great importance, as key elements of current climate policy are very fragmented. The proposed Climate Authority could identify inconsistencies in policy and encourage coherence, specifically in policy for spatial planning, infrastructure and the built environment.

In addition, improved alignment is needed between the different levels of administration. At the European level, this alignment is closely linked to the structure of the system for emissions trading, the cornerstone of European climate policy. The emissions trading system would benefit from a clear long-term strategy for the period after 2030, to ensure that efforts to implement policy are not passed on to later generations. It is necessary to strengthen the EU ETS in order to push up prices and thus encourage investments for the long term. An effective way of doing this would be to set a price floor when auctioning off emission rights. This is primarily a European strategy, with limited opportunities for complementary national policy. Strengthening the emissions trading system is preferable to introducing additional tax measures at the national or European level, unless this route proves to be fruitless.

At the European level it is also essential to strengthen the integration of national energy markets and networks. Furthermore, the rapid growth in renewable energy sources requires corrections to be made to the electricity markets in Europe, in the form of capacity mechanisms.

With respect to the alignment of national and local policies, national government has the task of designing a future-proof regulatory framework, which – while taking account of consumer interests – provides space for experimenting with new techniques, norms and business models. In practice there are already many examples of local or regional developments of smart grids, new transport concepts and alternatives to natural gas as a source of heating.

For climate-related investment projects that only produce returns over the longer term, a public investment bank could be instrumental in reducing investment risks. An investment facility such as this could ensure more synergy in the deployment of public and private funds, and provide access to the European Fund for Strategic Investments (EFSI).

For the long term, it is crucial to commit more resources to the early stages of the innovation chain for renewable energy, energy savings and neutralising greenhouse gas emissions. This involves not only technology, but also human behaviour and governance. It also requires greater coherence and coordination of the knowledge infrastructure that is relevant to climate issues. Work needs to be done to improve knowledge circulation between knowledge institutes and between these institutions and their societal environment.

The principal aim of the WRR's recommendations is for politicians and administrators to commit to a clear and ambitious long-term strategy. There are no simple solutions for a complex problem such as climate change. But with a balanced approach, offering a long-term goal that is enshrined in law and properly monitored, combined with political responsibility and social involvement, it will be possible to achieve ambitious goals.

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