

Proposal for key points of the Climate Agreement

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Foreword

We have taken the first steps, and have reached the first milestone. This is the proposal for the key points of the Climate Agreement, containing the results of four months of negotiations between more than a hundred organisations. It is a broadly supported answer to the question of how the Netherlands can achieve the targets agreed in the Paris Climate Agreement. In concrete terms: how can we reduce greenhouse gas emissions by 49 percent, and possibly even by 55 percent, by 2030?

The scale of this consultation process is unprecedented. There were five "sector platforms" with a total of more than a hundred participants, as well as two task forces with dozens of organisations, various working groups, support from many experts and contributions by citizens' initiatives.

All of these parties were looking for ways to reduce carbon emissions by as many tonnes as possible, a "hunt for tonnes", as Minister Wiebes put it. However, they were also working on keeping the transition affordable, providing support and making fair choices in terms of benefits and burdens.

The discussions were different for every sector platform, and their rate of progress was also different. Some of these platforms could build on what was already present in the Energy Agreement, whereas others had to start from scratch. Proposals that only related to the Dutch market were easier to formulate than proposals for sectors that operate internationally. Added to that, the parties' interests are substantial, and views were often miles apart.

This diversity is evident in the proposals as well. It is not yet a homogeneous package with proposals specified along similar lines. No decisions have been taken so far and the documents have not yet been signed. Even so, it is a very important milestone in an ongoing process. The key points presented here are supported by the parties to the platforms and form a basis for further specification in the second half of 2018.

The Netherlands Environmental Assessment Agency (PBL) and the Netherlands Bureau for Economic Policy Analysis (CPB) will check whether these proposals actually yield the desired "tonnes of reduction". As a result, the sector platforms may have to come up with different or stricter measures. That is part of this process.

Together with the results from the PBL and the CPB, this document presents the foundations on which the government can take the next step. After discussing this with the House of Representatives and with the parties involved, a new reality will be created. This in turn acts as a new basis for converting the proposals into concrete, verifiable and enforceable agreements.

All this is part of the steps we take towards a Climate Agreement. If everyone keeps up the pace, we will be sitting down at the table once again after the summer. I expect that we will be able to present a fully-fledged agreement in late 2018.

Ed Nijpels,
Chair, Climate Change Conference

Summary

In 2015, it was agreed in the Paris Climate Agreement that global warming should be limited to less than 2 degrees Celsius above pre-industrial levels. The aim is to limit global warming to 1.5 degrees Celsius. On 5 March 2018, 195 countries had signed the Agreement. This means that there is a global coalition of countries that will be limiting the risk of climate change.

The National Climate Agreement, the Dutch contribution to "Paris", has one central goal, which is to reduce greenhouse gas emissions in the Netherlands by at least 49 percent in 2030 compared to 1990. Additionally, the Dutch government's efforts in a European context could result in an even more ambitious target towards 55 percent.

Approach

During the past four months, the negotiations were held within five sector platforms: built environment, industry, agriculture and land use, mobility, and electricity. The organisations and companies invited to participate in the sector platforms are all capable of making concrete contributions to the transition within their sector. For specific subjects, parties outside the sector platforms were also involved.

Considerable attention was paid to the preconditions for a successful transition. For example, two task forces were set up to specify the Labour Market theme and the Financing theme in collaboration with the sector platforms. Experts were called in to get an idea of the spatial consequences of certain measures. Five well-attended meetings were organised throughout the country to collect questions and ideas, and interviews with citizens were used to map out how they would like to be involved in the specification and implementation of the Climate Agreement.

Key points per sector

This *Proposal for the key points of the Climate Agreement* contains the results of four months of negotiations. The results so far have been summarised in five sectoral working papers. Each working paper describes how the sector can contribute to the intended reduction in greenhouse gases. The working papers form the basis for this *Proposal for the key points of the Climate Agreement*.

The sector platforms focused on target situations and ambitions, the efforts put in by the various members of the platforms to realise these ambitions and the instruments required to achieve the 49 percent emission reduction by 2030. Each platform was also asked to map out the measures required for a 55 percent reduction.

The following table presents a summary of the key points for each sector platform. By presenting this proposal to the Minister of Economic Affairs and Climate Policy, these key points are also submitted to the PBL and the CPB.

Key points for the Electricity platform

Transition to a CO₂-free electricity system by accelerating the transition from fossil resources to renewable power generation.

GROWTH OF RENEWABLE ELECTRICITY: from 17 terawatt hours (TWh) to 84 TWh by 2030

- **OFFSHORE WIND ENERGY:** production of at least 49 TWh by 2030 (existing and new wind farms). Plans for further upscaling are being prepared and considered as the demand for electricity from the various sectors increases. The government will designate additional offshore areas in 2020, carefully weighing the interests involved, including those of nature and the fishing industry. Participants want to commit to a process to resolve ecological problem areas;
- **RENEWABLE ELECTRICITY ON LAND:** by 2030, 35 TWh will be generated through wind and solar energy. Local authorities will be given room to realise this ambition in a technology-neutral way. The national government is investigating options to make state-owned land available for the generation of renewable electricity.

IMPORTANCE OF EFFICIENT USE OF SPACE, SUPPORT AND PARTICIPATION

- **PARTICIPATION AND SUPPORT:** participation and support are essential for the energy transition and, by extension, for the feasibility of the plans to achieve it. It is desirable, therefore, to involve stakeholders closely in the development of plans and to allow them to participate financially where possible. Apart from having well-organised tendering processes, creating support among residents, by offering options for financial or other forms of participation, for example, is important to promote a successful roll-out. The ambition is to ensure 50 percent of new renewable production on land is owned by local stakeholders;
- **SPACE:** the available space should be used as efficiently as possible through multifunctional zoning, by bringing the supply of and demand for renewable energy as close together as possible, by looking for combinations of functions (including nature and landscape) and by incorporating specific qualities of an area;
- **REGIONAL ENERGY STRATEGIES:** the Regional Energy Strategies (RES) are used to structure the collaboration between public authorities and their social partners, and to promote acceptance of the energy transition in society at large. The RES aim to achieve careful spatial integration of renewable electricity generation that is acceptable to society whilst focusing on the required infrastructure.

MAJOR AMBITIONS FOR COST REDUCTION

- **THE POSSIBILITY OF NO MORE FUNDING AFTER 2025:** thanks to ambitious, concrete agreements on reducing production costs everywhere. The SDE+ subsidy scheme will remain available for renewable electricity options until the end of 2025. If required, alternative instruments other than subsidies can be considered after 2025 to safeguard investment security in a cost-efficient manner. An exploration of this will commence in 2021, focusing on aspects such as a supplier obligation and a further increase in the demand for renewable electricity;
- **CO₂ MINIMUM PRICE:** the national government is doing everything it can regarding CO₂ prices in a European and regional context. Five variants will be discussed during the meetings in autumn.

FLEXIBILITY AND SYSTEM INTEGRATION

- **BROAD AGENDA OF FLEXIBILITY OPTIONS:** the energy system of the future requires flexibility in the shape of demand control, storage, interconnection with other countries and controllable capacity. A broad agenda is being developed for network operators and public authorities to ensure that flexibility options will be made available on time and can be marketed;
- **SYSTEM INTEGRATION:** the expectation is that electricity generated from renewable sources will be used for (high-temperature) heat, in particular in the industry (power-to-heat). In due course, electrons will also be increasingly converted into sustainable molecules (power-to-X) for transport or storage or as feedstocks for industrial processes. For hydrogen, the focus is on a programmatic approach in collaboration with the industry and other parties.

Key points for the Built Environment sector platform

Getting started with the transformation, district by district, of 7 million houses and 1 million buildings into well-insulated houses and buildings, which we will heat with sustainable heat and in which we will use clean electricity or even generate it.

A DISTRICT-ORIENTED APPROACH

- **TRANSITION VISION FOR HEAT:** in 2021 at the latest, municipal authorities will draw up a transition vision for heat in a careful process with residents and building owners. For each district, the municipal councils will decide on the alternative energy infrastructure of that district in a district-based implementation plan. This provides a framework within which building owners, network operators, heat suppliers, municipal authorities and other parties take investment decisions;
- **GUIDELINE:** municipal authorities and stakeholders are supported by a guideline. It contains objective information based on transparent, validated factual data. This provides a clear reference for all stakeholders, as well as support for the social and political discussion in which the municipal council makes a decision.

FINANCING AND STANDARDS

- **TAX SHIFT:** increasing the tax on gas and lowering the tax on electricity will make insulation and sustainable heating more appealing. The shift will be structured in such a way that it eases the tax burden on households;
- **BUILDING-BASED FINANCING:** having a loan attached to the house rather than the occupant makes measures to improve sustainability more affordable;
- **STANDARDS FOR NON-RESIDENTIAL BUILDING:** The standards for non-residential building will be brought in line with the CO₂ targets for 2030 and 2050. Building-based energy consumption will be standardised based on the energy label. Non-building-based energy consumption will be standardised based on the Environmental Management Act (WMB);
- **STANDARDS FOR HOUSING:** For housing, the rule at the time of purchase will be that all the insulation measures that can be implemented with a positive effect are urgently offered to the buyer with an appealing offer, including financing options. Should this have insufficient effect, the standard could be made mandatory to a greater extent from 2030.

ENERGY SAVINGS AND SUSTAINABLE HEAT

- **COST REDUCTION:** the range of insulation measures and sustainable heat options available should be drastically increased and their prices should be lowered, together with the continuation of ISDE and SDE+. Construction companies, heat suppliers and installers are focusing on cost reductions of 15% to possibly 50% by 2030;
- **UPSCALING OF GEOTHERMAL ENERGY:** action plan for upscaling to 50 PJ geothermal energy by 2030 and more than 200 PJ by 2050;
- **THERMAL ENERGY FROM WATER:** water management companies expect to be able to supply 80 to 120 PJ by 2050. To this end, they propose carrying out a 3-year thermal energy from water programme from 2019 onwards and to make thermal energy from water part of a number of test beds in the 100 districts programme.

SUCCESSFUL START

- **NEW HOUSING WITHOUT NATURAL GAS:** parties are working towards achieving 75% of total new housing without natural gas in the period from 1 July 2018 to the end of 2021;
- **STARTER MOTOR:** by 2021, corporations aim to have transformed 102,500 existing houses to not use natural gas anymore.

Key points for the Industry sector platform

Transition to a circular industry that continues to compete internationally and whose greenhouse gas emissions are almost zero. Electrification, efficiency of processes and heat consumption and circular use of feedstocks are the major themes. CCS is required as a temporary solution to achieve the targets for 2030.

MAJOR THEMES

- **PROCESS EFFICIENCY AND HEAT CONSUMPTION:** focus on heat cascading, heat pumps, steam recompression, replacement of high temperatures with energy-efficient methods and utilisation of waste streams such as steam;
- **ELECTRIFICATION:** focus on high-temperature electric boilers and furnaces, electrochemical processes and drive systems;
- **FEEDSTOCK PROCESSING:** focus on hydrogen as a feedstock; changing and recycling of feedstock: CCU, biomass, mechanical and/or chemical recycling, waste2chemicals.

APPROACH: THREE PILLARS

- **INNOVATION:** joint investments in innovation, pilots and demonstrations, and upscaling within a long-term programmatic approach with clean technology and cost reductions;
- **TENDERING MECHANISM:** specification of a targeted tendering mechanism with which the most cost-efficient investments are achieved through competition;
- **INTERNATIONAL ENGAGEMENT:** active focus on agreements with other countries, allowing the level playing field to change in a favourable manner.

COMBINATION OF PUBLIC AND PRIVATE INVESTMENTS TO COVER THE COSTS

- **GOVERNMENT CONTRIBUTION:** A financial contribution from the government to the irrecoverable costs of the measures, which will rise from a total of €550m to €1000m per year towards 2030;
- **ADDITIONAL MEASURES:** if the programmatic approach associated with the indicative target of a 14.3 Mt emission reduction is in danger of not yielding the expected results in the next couple of years, the government could introduce additional measures for parties that do not contribute enough, subject to the firm condition that these measures suit the level playing field.

CARBON CAPTURE AND STORAGE

- **BRIDGING OPTION:** storage of CO₂ is not an aim in itself, but can offer the possibility to reduce CO₂ emissions in the short term, especially for essential sectors where no cost-effective alternatives will be available in the near future. The application of CCS should not get in the way of the process of making the industry more sustainable;
- **JOINT FACT-FINDING:** during the development of CCS, it is important that the investments made can also be justified over a longer period of time, both on a business level and from a social perspective. NGOs have their doubts about the usefulness and necessity of CCS and are worried about the risks. The industry understands the social concerns. For each project, this will have to be considered carefully in comparison to alternatives. The parties will prepare a further specification of this over the next three months based on joint fact-finding.

Key points for the Agriculture and Land Use sector platform

Transition to an internationally competitive agrifood sector that uses innovative methods to contribute to a sustainable food supply. Greenhouse gas emissions are minimised. CO₂ is captured in soil and vegetation.

AGRICULTURE

- **REDUCTION OF METHANE EMISSIONS IN LIVESTOCK FARMING:** Reduction of at least 1.0 Mt CO₂ equivalents by 2030 in livestock farming by means of:
 - **SUBSIDISED UPGRADING OF PIG FARMING:** buying of animal rights, sty modifications, innovation and manure valorisation;
 - **CHAIN APPROACH TO DAIRY FARMING:** chain approach, in which climate performance is measured at individual business level and shed modifications and animal feed lead to emission reductions.

LAND USE

- **PEAT GRASSLANDS:** area-specific approach aimed at achieving an emission reduction of 1Mt CO₂ on more than 80,000 ha by 2030 if possible, together with the parties involved and led by the provinces;
- **CARBON CAPTURE IN AGRICULTURAL SOILS:** emission reduction in arable farming and grassland soils by capturing organic matter in soils, with less soil disturbance, better fertilisation techniques and use of less fertiliser;
- **CO₂ CAPTURE IN NATURE:** increased use of sustainable (inland) wood in construction and smarter management of current forests in climate terms.

ENERGY

- **GREENHOUSE HORTICULTURE:** Through innovation, the use of geothermal energy and "New-Style Cultivation", and incorporation into regional energy networks, greenhouse horticulture aims to achieve an emission reduction of 1.8Mt by 2030 and a climate-neutral sector by 2040;
- **AGRICULTURAL VEHICLES:** specific energy savings through land-use measures, supplemented by targeted innovation for diesel replacement techniques;
- **SUSTAINABLE ENERGY:** expansion of sustainable power generation from wind, sunlight and local biomass in the agricultural sectors, subject to careful spatial considerations and social support.

FOOD

- **CLIMATE-FRIENDLY FOOD CONSUMPTION:** halving food wastage among consumers by 2030 and shifting the ratio between animal and vegetable protein in the human diet.

Key points for the Mobility sector platform

Transition to carefree mobility with excellent accessibility, optimum connections between modes of transport, high levels of traffic safety and zero emissions.

IMPROVED SUSTAINABILITY OF THE PHYSICAL INFRASTRUCTURE

- **CONTROL OF GOVERNMENT TENDER PROCEDURES:** strict tender requirements aimed at reducing the CO₂ footprint of vehicles and equipment, and at the necessity of circular feedstock use;
- **RESPONDING TO CHANGING MOBILITY REQUIREMENTS AND POSSIBILITIES:** investment programme aimed at improving accessibility and sustainability, especially by means of expanding infrastructure in major urban areas and better interconnection of national and regional networks. Reconsideration of the Multi-year programme for Infrastructure, Spatial Planning and Transport (MIRT) in connection with climate targets.

INCREASED SUSTAINABILITY OF GOODS FLOWS

- **LOGISTICAL OPTIMISATION:** programme aimed at logistical optimisation of goods flows with ICT support and chain cooperation;
- **IMPROVEMENT OF EFFICIENCY AND GREENING:** programmes aimed at greatly reducing physical movements in construction logistics; in 2025, zero emission zones in G30 (30 largest cities in the Netherlands) for vans and lorries; greening inland waterway transport.

USE OF MORE GREEN ENERGY THROUGH SUSTAINABLE ENERGY CARRIERS

- **ELECTRIFICATION:** electrification of passenger cars (business and private), vans, light transport (scooters, etc.), freight trains and (in due course) lorries. Accelerated roll-out of electric charging infrastructure and smart charging;
- **PUBLIC TRANSPORT BUSES AND GROUP TRANSPORT WITH ZERO EMISSIONS:** zero-emission public transport buses from 2030 and zero-emission target group transport from 2025;
- **BIOFUELS:** use of sustainable advanced biofuels as a transitional fuel for heavy road traffic, shipping and aviation;
- **GREEN HYDROGEN:** use of green hydrogen in transport in the medium to long term.

INCREASED SUSTAINABILITY OF MOBILITY CHAINS FOR PERSONS

- **OPTIMISATION OF EXISTING CAPACITY:** short-term measures for optimisation within the existing capacity through measures such as improved flow and transfer options between modes of transport: bicycle/public transport/car (hubs in rural areas);
- **BUSINESS TRAVEL:** application of top-10 measures from employer frontrunner policy, including improved use of clean modes of transport (public transport and bicycles) and promotion of electric transport. Various measures, both to support the employer approach and on a system level;
- **MULTI-TRACK APPROACH TO BICYCLE PROMOTION:** employers encouraging bicycle use, standards and the Environment and Planning Act (*Omgevingswet*), Mobility as a Service and chain approach, favourable tax treatment and infrastructural improvements;
- **BEHAVIOURAL MEASURES:** promotion of car sharing, driving more economically (New-Style Driving 3.0) and choosing the right tyres and tyre pressures.

Cross-sectoral themes for the Climate Agreement

The key points per sector are highly interdependent. Discussions come together: technical, social, spatial and administrative.

The technical discussion is a discussion about sustainable electrons and sustainable molecules. The expected rate of electrification was discussed intensively. For the industry, the built environment and the mobility sector, electrification provides options for far-reaching emission reductions, if that electricity is generated sustainably. The development of demand from sectors partly determines which decisions are made within the electricity sector and the consequences of these decisions for public space and the energy system. The formulated ambitions depend on the demand arising from other sector platforms and will be tightened if the calculation by the PBL requires this.

Hydrogen is a key theme for which the Climate Agreement should lead to accelerated development. The parties envisage a broad use of green hydrogen as an energy carrier for mobility and transport, in the industry and the energy sector, and possibly also in the built environment. The shared expectation is that the application of hydrogen as a feedstock in the industry and as an energy carrier will mainly be scaled up after 2030. The proposal is to accelerate the development and roll-out of green hydrogen by means of a programmatic approach.

Sectors also depend on each other when it comes to the application of biomass for energy and as a feedstock. The discussion was held in the past couple of months and has not come to a conclusion. There is a broad consensus that biomass should be sustainable, but there are different views on the sustainability criteria to be set. In the long term, the application of sustainable biomass as a feedstock for materials and products is viewed as a priority. Sustainable, advanced biomass can also be used for heavy road transport, aviation and shipping, if there are no other options that make the use of biomass in these sectors superfluous. As long as sustainable biomass is still being used on a limited scale for these priority applications, biomass can also be used more widely under certain conditions.

Labour market and training

The energy and climate ambitions will be accompanied by a major shift of the labour demand to and within sectors involved in this transition. The implementation of the climate plans in these sectors requires tens of thousands of additional professionals. It will not always be easy to fill these additional vacancies. In addition, existing work will often have a change of character, so that other skills will be required. Furthermore, jobs will be lost during the transition. Responding to changing labour market requirements in a timely manner is therefore crucial to achieving the climate targets. It also offers opportunities for a more sustainable economy with future-oriented jobs from which more people in the Netherlands can benefit. With a view to this, the Labour Market and Training task force will, together with the sector platforms, further specify cohesive packages of measures for each sector platform in the second half of 2018. Measures are aimed at having enough qualified workers at the right time and absorbing job losses in a socially responsible manner.

Opportunities for market financing

Investments are required to achieve the energy and climate ambitions. A lot of money is available on the market to finance sustainability initiatives. However, projects and money fail to find each other too often right now. In the future, the Climate Agreement as a platform will offer an opportunity to bring supply and demand together. The Financing task force, with representatives from banks, insurance companies, pension funds and Invest-NL, has made a list of concrete starting points to improve the match between the supply and demand of financing. Recommendations have been presented to the financial sector, initiators from the

sector platforms and the government, and form the basis for the further specification and collaboration under the Climate Agreement. In the second half of 2018, the Financing task force will also issue recommendations on the financeability of concrete projects put forward by parties to the Climate Agreement.

Thinking along and joining in

The willingness of citizens to make a contribution to the transition is crucial. This willingness depends in part on previous experiences, local conditions, the social structure in the immediate vicinity and citizens' wallets, but also by the role played by public authorities. Citizens expect clear management and frameworks from the government, and room for their own initiatives. This was revealed by a series of interviews with about 200 citizens. They are not present in the sector platforms, but they will have to deal with the plans in due course and want to be actively involved in this, just like citizens sometimes are right now, e.g. through energy cooperatives. Citizens expect the national and local authorities to be trustworthy, implement a consistent policy and listen to them, e.g. regarding the location of wind farms. People realise how massive the task is and also that painful choices have to be made, but they do demand a proper substantiation, reliable information and that interests be weighed fairly and transparently. Finally, they demand a Climate Agreement that fairly manages the benefits and burdens, and powers.

Spatial task

The conclusion of the Climate Agreement will be one of the greatest tasks for spatial planning in the coming decades. A sustainable energy system requires space and is visible. Cities and landscapes will look different due to the transition. In the Netherlands – where every square metre already has one or more designated uses – this space is not automatically available. This makes a good spatial approach to the transition, including making spatial choices that can have a far-reaching impact, a necessary condition for achieving the climate targets. For this reason, spatial experts have been involved with the platforms' discussions on the Climate Agreement from the very start. Local authorities play a key role in this regard, as they are responsible for specifying the measures in the physical living environment. For the specification, spatial experts are requesting a focus on the spatial quality of the living environment, multifunctional use of space, a sensible link between resources and demand and a focus on different systems (temporarily) being used simultaneously.

Regional Energy Strategies

Regional Energy Strategies (RES) are important for achieving the ambitions from the Climate Agreement. Each RES is used to lay down the regional translation of the national agreements from the Climate Agreement. The aim of the RES is to achieve a careful spatial integration of renewable energy generation that is acceptable to society. The RES are also used to visualise regionally present (residual) heat sources and the need for infrastructure, and to match supply and demand. The RES lead to decision-making in the environmental policy (environmental vision, environmental plans, environmental programmes and environmental by-laws).

The RES are used to structure the collaboration between public authorities and their social partners. The aim is to develop a new form of collaboration, both between individual public authorities and with social partners. In this regard, the local authorities are responsible for the ultimate allocation of the climate task among the regions. In the second half of 2018, an allocation system will be developed with help from knowledge institutes, including the PBL. After the signing of the Climate Agreement, the formal start of a regionally supported RES will take place. In June 2019, a draft RES will then be finished in all the regions. If the sum of these strategies fails to match the nationally agreed ambitions, the allocation system that has

been developed will be applied to ensure that, by late 2019, the regional specification of the national task will have been allocated. In early 2020, the RES results will then be included in the environmental policy of the relevant authorities.

Conclusion

The key points are not finish lines. The discussions are still ongoing and will continue after the summer. This will first require the results of the calculation. These should provide an outlook on the expected CO₂ reduction of the proposed measures and instruments. The calculation could lead to confirmation or revision of the proposals, but could also help parties to make choices.

Most of all, the parties are looking forward to the government's approval. Government instruments determine the framework, and choices are ultimately combined in a single integrated cost picture. Many parties involved in the platforms have asked that this receive adequate attention. Primary authority for weighing this cost picture will be in the hands of the politicians. To ensure that sufficient progress is made after the summer, guiding choices are key. This *Proposal for the key points of the Climate Agreement* provides the content-specific basis for this.

1. Ambition and approach

In 2015, it was agreed in the Paris Climate Agreement that global warming should be limited to less than 2 degrees Celsius compared to the pre-industrial era. The aim is to limit global warming to 1.5 degrees Celsius. On 5 March 2018, 195 countries had signed the Agreement. This means that there is a global coalition of countries that will be limiting the risks of climate change.

A central goal

With the National Climate Agreement, the government has a central goal: reducing greenhouse gas emissions in the Netherlands by at least 49 percent in 2030 compared to 1990. Additionally, the Dutch government's efforts in a European context could result in an even more ambitious target towards 55 percent. The government is using this ambition to specify the Dutch contribution to the Paris Climate Agreement.

Recently, the Netherlands Environmental Assessment Agency (PBL) calculated the damage to the environment suffered by the Netherlands every year due to the emission of hazardous substances in the soil, water and air. This loss of welfare suffered by Dutch society totals 4.5 percent of the Gross Domestic Product (GDP). According to the PBL, the contribution to this loss of welfare from greenhouse gases causes €11.5bn in environmental damage per year. By reducing greenhouse gas emissions, the Netherlands can avoid significant costs.

Global and local

Climate change is a global issue. Not only the Netherlands is developing climate policy; our most important trade partners within and outside of Europe are also doing so. Collaboration with countries with similar views can help to accelerate things together and form a leading group ahead of the followers that will eventually also undergo this transition. In this way, climate policy creates opportunities for new business and employment.

The central goal of the Climate Agreement, reducing greenhouse gas emissions, affects everyday life. It affects how we live, how we move around, what we eat, the products we buy and how we earn our money. That is why the transition is primarily a social transition. Citizens and companies will have to make a series of decisions that will affect competitiveness and quality of life. These are not easy choices, and citizens and companies also have to rely on each other and on the government. A bundling of decisiveness, investments, knowledge and expertise is required.

Towards a Climate Agreement

The government is responsible for the conclusion of a Climate Agreement. In this Agreement, public authorities, companies and civic organisations will lay down agreements about each other's commitments and joint initiatives. In collaboration with the Social and Economic Council in the Netherlands (SER), the national government is facilitating the discussions between more than 100 parties in five sector platforms. Among all the ideas and proposals, a number of main themes can be recognised in the negotiations:

- *Eye for a broader, inviting perspective:*
This is about more than just reducing greenhouse gas emissions. The transition also offers opportunities for new business and for the quality of life.
- *A national agreement is given additional meaning in an international context:*
Climate policy means anticipating a changing world, but in the end, it will only succeed if the movement also gains momentum worldwide, starting with the EU.
- *Shared ownership is a condition:*
Everyone's contribution is necessary. That is why citizens and companies should be involved in all the phases from planning to realisation.

- *Limiting costs and allocating them fairly:*
Participants in the sector platforms have the task of keeping the costs as low as possible. The task of the politicians is to allocate these costs fairly.

Approach

During the past four months, the negotiations were held within five sector platforms: built environment, industry, agriculture and land use, mobility, and electricity. Each sector platform has formulated proposals that should allow them to achieve the intended greenhouse gas reduction at minimum.

The organisations and companies invited to participate in the sector platforms are all capable of making concrete contributions to the transition within their sector. The ministry responsible is also present in each sector platform. An independent chairperson has been appointed for each sector platform, and is responsible for ensuring that the discussions proceed smoothly. The chairpersons took the initiative to also involve people who can make a contribution regarding specific subjects, but who are not directly represented in the sector platforms.

The chairpersons shaped the negotiations held within their sector platforms as they saw fit. All platforms started with a mapping-out phase. This was used to exchange ideas and proposals, and to make a list of problem areas. Extensive discussions then followed about the conditions under which these ideas could be implemented and the instruments and financing required for this. Based on these discussions, each platform drew up a working paper stating the contribution from the relevant sector to this *Proposal for the key points of the Climate Agreement*.

Two task forces, "Financing" and "Labour Market and Training", were set up to work out these two themes in collaboration with the sector platforms. Both task forces have a chairperson with authority in the relevant field. Under their leadership, the task forces provided relevant knowledge and expertise and made preparations to integrate the measures relevant to their theme into a cohesive package.

The internal cohesion is safeguarded by the Climate Change Conference, consisting of the chairpersons from the sector platforms and a representative from the coordinating Ministry of Economic Affairs and Climate Policy. This Climate Change Conference is led by an independent chairperson who is responsible for the general progress and cohesion, and for strengthening administrative and social support. This Climate Change Conference has convened a number of times in a broad composition. The chairpersons of the task forces, local and regional authorities, civic organisations and youth representatives were also invited to these meetings.

Anyone who was interested, but did not actively participate in a sector platform or task force, was also given the opportunity to submit their ideas. Over the past few months, five regional meetings were organised for this in Breda, Zutphen, Groningen, Utrecht and Leiden. A total of about 800 people attended these meetings. Additionally, there were interviews with citizens on a smaller scale to get an idea of the wishes and concerns of citizens regarding climate change and climate policy. A total of about 200 people took part in these interviews.

Structure of the document

The key points discussed by the platforms so far are summarised in Chapter 2 of this *Proposal for the key points of the Climate Agreement*. These key points are supported by the members of the platforms and form a basis for further specification in the second half of 2018 based on the assessment by the government and the House of Representatives.

A number of subjects, such as hydrogen and biomass, require a cohesive approach involving several sectors. This is addressed in Chapter 3. The cross-sectoral innovation task will also be covered in this chapter.

Chapter 4 summarises the findings of the Labour Market and Training task force and the Financing task force. Chapter 5 discusses the transition from the perspective of citizens. Chapters 6 and 7 address the spatial consequences and the regional implementation strategy for climate policy. Together, these four chapters outline the preconditions for a successful transition, conditions that play a central role in the further specification of the key points in the second half of 2018.

2. Key points per sector

Within five sector platforms, public authorities, businesses, civic organisations and trade unions have formulated proposals to achieve the intended levels of greenhouse gas reduction. Each sector platform followed its own approach. The platforms also proceeded at different rates, as some can build on what is already present, whereas others are mainly facing new challenges. This is partly why not all sector platforms managed to draw up equally specific proposal packages over the past four months. This diversity will become apparent in this chapter, which summarises the proposed key points per sector. The proposals are supported by the participants in the platforms and the chosen formulations have been agreed with them. All in all, this chapter presents a multi-coloured palette of proposals, which will be further specified together this autumn. The work is not yet done.

2.1 Electricity

Between now and 2050, limiting climate change will require a CO₂-free electricity system. Among other things, this means that existing fossil sources of electricity must be replaced with renewable generation. This process is already in full swing, as large wind farms are being built offshore and citizens generate their own electricity using solar panels. This transition should be accelerated, also to be able to cover the additional demand for electricity generated from renewable sources as a result of electrification in the mobility, agriculture, built environment and industry sectors.

The transition towards a CO₂-free electricity system is "owned by everyone". This is crucial to maintain and improve social support. The transition is a joint task of citizens, market parties, public authorities, civic organisations and the world of knowledge and science. Collaboration with neighbouring countries is important here; after all, the electricity market does not stop at the border. This also presents an opportunity for the Dutch sustainable and innovative economy of the 21st century. The transition should be effectively connected to the entire energy system. This requires public authorities and network operators to integrate new sources of renewable electricity, and the use thereof, correctly and in a timely manner. Furthermore, clear rules must be established for the electricity market. This contribution will ensure that stimulation efforts will focus on the demand for renewable electricity rather than on its supply. Citizens can actively participate in new projects. Space and nature are used economically. The costs of the transition are kept as low as possible by using every opportunity for cost reduction.

The reliability of the electricity system must be guaranteed at all times when, by 2030, a large part of all electricity is generated with renewable means. An approach that offers scope for modification, flexibility and acceleration would be suitable here.

Key points

Basic 49 percent package and preparing for acceleration

The task at hand for the electricity sector is to reduce CO₂ emissions by at least 20.2 Mt by 2030. This is part of the government's general 49 percent reduction target for the Netherlands. On the Minister of Economic Affairs and Climate Policy's request, the government's intention to ban the use of coal for the generation of electricity is not part of the Electricity sector platform's contribution, but does count towards the target value of 20.2 Mt. In addition, the electricity sector will have to supply CO₂-free electricity to the other sectors due to electrification there. All of this requires a significant growth in the share of electricity from renewable sources.

Table: Ambitions for renewable electricity production by 2030

Production sources	Basic 49 percent package	Basic 49 percent package plus additional electrification	Acceleration package
	for 12 TWh additional demand	for 38 TWh additional demand	
Offshore wind energy	49 TWh	110 TWh	120 TWh
Renewable electricity on land (> 15 kW)	35 TWh		
Other renewable options	TBD*	TBD	TBD
Total	84 TWh	110 TWh	120 TWh

To illustrate: the TWh value is the installed capacity (in MW or GW) multiplied by the number of operating hours under full load; the number of operating hours under full load differs between solar, onshore wind and offshore wind energy. 1 TWh matches the total annual electricity consumption of a city the size of Den Bosch. 84 TWh is about 70 percent of our current total annual electricity consumption in the Netherlands and 110 TWh is about 90 percent.

**The system platform has estimated that, by 2030, the CO₂-free controllable capacity should be able to supply 15-40 TWh. Renewable options could be part of this. This will be further specified in autumn.*

Other renewable options could also include solar PV on roofs (solar PV on roofs has already been included in the PBL Baseline).

In the basic 49 percent package, the concrete ambitions have been specified and instruments assigned for renewable electricity production in 2030, with a total of 84 TWh of renewable electricity being produced (by way of comparison, renewable electricity production in 2017 was about 17 TWh). The assumption was used here that electricity consumption will have increased by 12 TWh¹ in 2030 compared to the unchanged policy due to electrification in other sectors. The basic 49 percent package with 12 TWh is the firm target for which an agreement has been reached.

The two packages that were mapped out in addition to the basic package prepare for two scenarios in which a greater production requirement occurs. This additional production requirement may arise from: (1) increased demand for electricity from other sectors (there are currently indicative figures from other sector platforms for a maximum of 38 TWh) and/or (2) an increase in the ambition level to 55 percent. The two packages are being prepared to ensure that, for example, plans for use of space and infrastructure are available. The

¹ The PBL cost document assumes an additional electricity consumption of 12 TWh due to electrification in other sectors.

calculation by the PBL in the summer will for the first time provide more clarity about the (instrumented) electrification demand to be expected from the other sectors. If required, the ambitions agreed for the Basic 49 percent package will be tightened.

Offshore wind energy

The Electricity sector platform proposes to increase the offshore production of renewable electricity. Towards 2050, a total growth of electricity generated from renewable sources of about (...) TWh (35-75 GW) will be possible. For 2030, at least about 49 TWh (i.e. a total of 11.5 GW) will be achieved. Further upscaling will be required if an additional demand for electricity generated from renewable sources occurs and the required additional offshore wind energy can be connected mainly at the coast.

The North Sea is being used for many other purposes. The government will therefore designate additional offshore areas in 2020 based on an integrated weighing of interests, including nature and the fishing industry. Participants in the Electricity sector platform are committing to a process to resolve ecological problem areas.

The ambition is to reduce the production costs of offshore wind energy to 3-4 ct/kWh by 2030. The existing tendering system will remain in place. The national government will safeguard the timely upscaling of infrastructure and grid connections. The costs for connecting the offshore grids will be paid using the grid tariffs, just like the land-based grids. In autumn, we will make further arrangements to limit the grid costs, both onshore and offshore, to minimise the costs for citizens and companies.

Renewable electricity on land

Opportunities for increased production of electricity from renewable sources will also be seized on land. A richly varied, mainly local, renewable electricity system is being planned for 2050, first of all with onshore wind energy and solar PV towards 2030. The ambition is to achieve a production of about 35 TWh by 2030. A technology neutral assignment is used in this context. The goal is to allow municipalities and provinces to set up a good, supported plan with the Regional Energy Strategies (RES) within criteria regarding cost-efficiency, intended scope, spatial integration and (impact on) the energy system. The associated additional wind or solar capacity is not predetermined. In late 2019, it will be clear how the regions are implementing the national task.

Having well-organised tender procedures and creating support among residents, by offering options for financial or other participation, for example, support and promote a successful roll-out. The ambition here is to transfer the ownership of 50 percent of new renewable production on land to the local area. The national government is investigating options to make state-owned land available for the generation of renewable electricity.

The ambition is to reduce the production costs of onshore wind energy from an average of 6.3 ct/kWh in 2018 to 4.9 ct/kWh or less in 2024 and 3-4 ct/kWh in 2030. For solar PV, the ambition is to reduce the costs from 10.7 ct/kWh in 2018 to 5.6 ct/kWh or less in 2024 and 3-6 ct/kWh in 2030.

Just as for offshore wind energy, participants in the Electricity sector platform are committed to a process to address problem areas in the field of space, nature and landscape. Network operators will be given room to work ahead, allowing network development, production development and electrification to match up.

Flexibility, market model and system integration

The sustainable electricity system of the future has greater variation in supply and demand. Security of supply and provision must be permanently safeguarded. This requires more flexibility, in the shape of demand control, storage, interconnection with other countries and controllable capacity. One important aspect for the further development of a healthy market

for flexibility is that prices reflect scarcity and that there is a level playing field between the various flexibility options, allowing the owner of flexibility to maximise the return on its value. In the next couple of years, all flexibility options should become available on time. To this end, a broad agenda is being developed for network operators and governments. Even though the imbalance in 2030 between the supply and demand of electricity will lead to challenges within a single day, the sector platform assumes that this can be resolved by the market through a combination of flexibility options available at that time. In cases where the supply of renewable electricity (wind and solar) is limited for a protracted period, non-weather-dependent power from other sources will be required, which should be increasingly CO₂-free after 2030.

The nature of the current market model makes it a good basis for specifying the systemic task until 2030 in a cost-efficient manner; it is also in line with European laws and regulations. Constant monitoring of long-term supply security will be part of the transition.

Sustainably generated electricity will have to be integrated properly into the sustainable energy system of the future (system integration). That task is essential for the success of the transition. The expectation is that electricity generated from renewable sources will be used for (high-temperature) heat, in particular in the industry (power-to-heat). In due course, electrons will also be increasingly converted into sustainable molecules (power-to-X) for transport or storage or as feedstock for industrial processes. For hydrogen, the focus is on a programmatic approach.

Pricing and subsidies

In addition to a good market model, a successful transition to a sustainable electricity system requires an effective and cohesive package of instruments and measures. In this context, effective control of the transition requires good market stimuli. Market structure, pricing and standardisation are leading, whereas subsidies are selective and temporary. The national government is doing everything it can regarding CO₂ prices in a European and regional context. With regard to the national minimum CO₂ price, the participants in the Electricity sector platform have formulated five variants for further specification, which will be used for the discussions in autumn.

The participants in the Electricity sector platform are committed to a further reduction of production costs, which will decrease the reliance on SDE+. The actions required for this will be specified in close consultation. It has been agreed that SDE+ will be available for renewable electricity options until the end of 2025. In 2021, we will launch a study into possible alternative instruments that will enable us to continue safeguarding investment security for the period after 2025 with a view to achieving the ambitions agreed for 2030 and beyond. Various instruments – not being subsidy instruments – will be considered here, including a supplier obligation and continuing to boost the demand for renewable electricity.

Specification

As described above, concrete steps will be taken in autumn with regard to renewable electricity on land, offshore wind energy, system integration and instrumentation. In addition to this, concrete agendas will be proposed for network operators and governments in the field of system integration with the aim of creating a better picture of the flexibility market, including possible barriers in laws and regulations, which will allow measures to be taken to improve the accessibility and operation of the market, to make flexibility options available and to optimise investments in networks.

The spatial task and the associated administrative arrangements will be largely specified through the development of regional energy strategies. The RES give regions the opportunity to tangibly invest in their task regarding an environmental policy for more renewable electricity (renewable electricity and renewable heat) as they see fit, with participation by

citizens being a fundamental part of this. In late 2019, it will be clear how the regions are implementing the national task.

As part of the tangible specification of the knowledge and innovation task, a Knowledge and Innovation Agenda (KIA) will be developed. In order to create sufficient volume, three priority areas have been designated, matching the Dutch strengths and concrete needs of the transition: large-scale generation, system integration and spatial integration.

2.2 Built environment

We are on the brink of a major renovation. The transformation of our 7 million houses and 1 million buildings, most of which are not very well insulated and almost all of which are heated with natural gas, into well-insulated houses and buildings that we heat with sustainable energy and in which we consume clean electricity or even generate it ourselves.

Climate change is a key reason for this renovation. There is more, however. We want to be able to stop natural gas extraction in Groningen as soon as possible. Additionally, we could all do with lower energy costs and more comfortable houses.

In order to achieve the climate targets, almost all buildings in the Netherlands will have to be renovated. This means rendering about 50,000 existing houses sustainable per year in 2021 and reaching a rate of 200,000 per year well before 2030. In that case, we will jointly be able to reduce CO₂ emissions by 3.4 Mt in 2030 compared to the reference scenario.

Such a renovation is a massive task, but we have until 2050. We can do this, provided we take on this task in a structured manner and improve all the preconditions.

Furthermore, the renovation can be affordable for everyone, provided we can lower the costs through upscaling and innovation, and can ensure that the monthly costs of the loan you will be taking out for the renovation do not exceed the benefits for your energy bills. Wherever this is not possible, we will have to use other forms of support to ensure that house and building owners receive support for the modifications. After all, in order for this task to succeed, everyone will have to participate.

Key points

District-oriented approach

A structured approach means a *district-oriented approach*. Municipalities play a crucial role here. Together with residents and building owners, a careful process will have to be completed to determine the best solution for each district, for when houses are no longer heated with traditional CH boilers. The solution may differ from one district to the next. Houses close together, built before 1995? In this case, district heating will often be the solution. Newer houses in a district built further apart? In this case, all-electric could be better. For many districts, the natural gas network will remain in place until after 2030. Insulating and burning less gas with a hybrid boiler will then be a sensible temporary solution. However, the technical condition of the houses is not the only factor; the wishes of the residents and challenges in the district other than energy supply are just as important for the results.

By the end of 2021, municipalities will adopt a transition vision for heat, laying down the time frame in which districts will be rendered more sustainable. Following consultations with building owners, the municipal council will ultimately decide on the precise future energy supply for each district. As a result, everyone will know where they stand well in advance.

Municipalities, residents and building owners will be assisted in this by a *guideline*, set up by the national government and co-governments, which explains the consequences of certain choices for each district based on objective data. The regional connectedness of choices – e.g. the use of heat sources in the region – will be laid down in regional energy strategies. In this context, municipalities will collaborate with provinces, water boards and network operators in Energy Regions. The guideline and associated knowledge and information are managed and provided by the *Expertise Centrum Warmte* expertise centre for heat.

Financing and standards

No matter how prosperous, a district-oriented approach cannot succeed without vastly improving the financial and other preconditions for rendering houses and buildings more sustainable.

Insulation or heat pumps should lead to greater savings on energy bills, allowing a greater return on these investments. We can realise this by lowering taxes on the utilities we want to make greater use of, i.e. electricity, and increasing taxes on the ones we want to use less, i.e. natural gas.

A first step will be possible in 2020 by increasing the price of natural gas by 5.5 ct/m³ and lowering that of electricity by 2.7 ct/kWh. Further steps are desirable and required. Several variants are possible here. Calculations show that adding 20 ct/m³ for natural gas and taking off 7.34 ct/kWh for electricity makes insulation and sustainable heating options much more appealing. If this shift is combined with an increase in energy tax relief of 81 euros, a neutral to positive effect on purchasing power is achieved for all income groups.

Apart from having more breathing space from energy bills, more appealing financing is required, with the monthly costs of the loan not exceeding the savings on the energy bills. The national government intends to make building-based financing possible through an amendment to the Civil Code. Under the right preconditions, banks will be committed to developing appealing building-based financing options with long terms and low interest rates, and therefore lower monthly costs. The financing of owners' associations will also be further expanded, including via the Dutch Municipal Housing Incentive Fund (SVN). In the further specification, there will be room for financing models other than those stated above, through which it will be possible to finance house owners, taking away their worries.

The standards for non-residential building will be brought in line with the CO₂ targets for 2030 and 2050. Building-based energy consumption will be standardised based on the energy label. The underlying calculation system will be improved, ensuring that it reflects actual energy consumption more closely.

Non-building-based energy consumption will be standardised based on the Environmental Management Act. The coming period will be used to collect data on the actual energy consumption of companies, which will serve as input for the new standards that will enter into force by 1 January 2021. Making a clear distinction between building-based and non-building-based energy consumption will clarify to the owner, consumer and enforcer who is responsible for the required investment. Between tenants and owners, there are several options to make further arrangements to shift from a split to a shared incentive. These kinds of arrangements will be standardised and encouraged.

For housing, the rule at the time of purchase will be that all the insulation measures that can be implemented with a positive effect will be urgently offered to the buyer with an appealing offer, including financing options. Should this have insufficient effect, the standard could be made mandatory to a greater extent from 2030. Further efficiency improvements to heating installations will also be encouraged.

Energy savings and sustainable heat

The goal to heat all houses in a sustainable manner can only be achieved if the supply of insulation measures and sustainable heat available is drastically increased and if the price is lowered. To this end, the parties have made arrangements about an increased and more appealing supply. Construction companies, heat suppliers and installers are committed to steady cost reductions of 15 percent to possibly 50 percent by 2030.

Construction companies and installers can deliver on their commitment by ordering, standardising and scaling-up invitations, e.g. through a district-oriented approach or major house owners, such as corporations. Heat suppliers will be able to supply under more appealing conditions if risks, such as the 'filling-up risk', are lowered and a market regime is introduced that encourages innovation, cost reduction and sustainability. A concession system for heat distribution networks will be specified for this as part of the district-oriented approach. The distribution of costs will also be considered, among other things, for the gas networks and heat transport networks.

One of the alternatives to be significantly scaled up to increase the supply of sustainable heat is geothermal energy. The geothermal sector's ambition is to grow from 3 PJ now to 50 PJ by 2030 and 200+ by 2050. The conditions include further investment by the national government in mapping out the subsoil in the Netherlands, the participation of EBN in geothermal energy projects for knowledge development and professionalisation and a robust SDE scheme for heat sources until 2030. The development of sustainable flexibility in supply and demand to supplement the basic geothermal burden is also required, e.g. through upscaling of green gas or hydrogen.

Additionally, water management companies want to offer thermal energy from water as a heat source and expect to be able to supply 80 to 120 PJ with this by 2050. A lot of experience still has to be gained for this. To this end, the parties propose carrying out a 3-year thermal energy from water programme from 2019 onwards and to make thermal energy from water part of a number of test beds in the 100 districts programme.

A successful start

The district-oriented approach will be shaped from 2021 and the amendments to legislation will also require some time. However, we are unwilling and cannot wait that long to start the transition. The parties have therefore agreed to start rendering newly built houses and suitable existing houses and buildings more sustainable as soon as possible.

The legal obligation to connect newly built houses and utility buildings (<40 m³/h) to the natural gas network will be scrapped on 1 July 2018. However, many plans are already in development. The parties have therefore agreed to ensure that the projects in development will also be delivered without natural gas as much as possible. The agreements will apply from 1 July 2018 and will run until the end of 2021. The parties are working towards achieving 75 percent of total new housing without natural gas in the period from 1 July 2018 to the end of 2021.

Corporations are providing existing houses/housing blocks in geographic clustering around existing heat networks with a minimum purchase guarantee. Corporations are collaborating with municipalities for this and are willing to modify their plans to enable a roll-out that is as district-oriented as possible. A few case studies have already been prepared for this. For another part of the corporation houses, hybrid heat pumps or (ground-source) heat pumps, collective or otherwise, offer an appealing alternative. These will allow a total of 17,500 houses to be rendered independent of natural gas in 2019, 30,000 in 2020 and 55,000 in 2021. This will allow corporations to act as a *starter motor* for the transition.

During this government's term, corporations will be able to accelerate the energy transition in the built environment by means of the starter motor. Furthermore, corporations will be able to achieve half of the CO₂ reduction for existing housing in the built environment by 2030 as defined in the government's objectives. The corporations will do this under the inextricable condition that the room for investment for corporations in the longer term is brought in line with the affordability task, the building task and the sustainability task on the road to being energy neutral by 2050. To this end, further arrangements have to be made in 2018 in the

specification of the climate agreement, partly regarding the required performance. Corporations believe that this should lead to a significant decrease in tax pressure.

To facilitate the starter motor in particular, 50 million of the reduction to the landlord levy in 2019, 2020 and 2021 agreed in the Coalition Agreement will be used in a targeted manner in the short term, specifically for the first movers. Furthermore, the resources for the energy transition in the built environment, which will become available from the climate budget in 2019, 2020 and 2021, will be partly used for test beds for districts without natural gas that link up with the starter motor. The combination of these measures will remove the operating shortfall and will allow the starter motor to run from 1 January 2019 onwards.

Specification

The major renovation will succeed if we are willing and able to jointly carry the required efforts and costs. The parties believe that this will be possible under these basic agreements. The next six months will be used to further specify these agreements and lay them down in concrete arrangements. Key focal points in this regard are the precise structure of the energy tax, the cost reduction for sustainable heat combined with the continuation of SDE and ISDE after 2020, the standardisation of utility buildings and houses, the scope and resources provided to municipalities for their role in the district-oriented approach and the financial possibilities of corporations to increase the sustainability of their houses.

2.3 Industry

In 2050, we envisage the Netherlands as a country with a thriving, circular and globally leading industry, where greenhouse gas emissions are almost zero, where biomass, CO₂, waste streams and waste gases are used to create feedstocks for the chemical and other sectors, or fuel for aviation or shipping. Where plants use electricity, geothermal energy, green gas and hydrogen for their energy requirements. Where the industry helps to absorb fluctuations in the electricity production of solar and wind farms. And where we recycle waste heat in the industry or use it to heat residential areas, or reuse it in greenhouse horticulture. This and advanced digitisation have fundamentally changed value chains and production methods – we are making sustainable products through sustainable processes.

It is important to shape the transition pathway towards 2050 in such a way that the task of reaching almost zero CO₂ emissions is achieved and that, at the same time, the competitive position of the Dutch business community in the world remains intact. As a result, the focus is on a more sustainable world, while the innovative and efficient manufacturing industry continues to contribute to employment and welfare. This will be an appealing and imitable example for other countries. The Netherlands is already an innovative country, where the industry is at the forefront of sustainable companies; we want to maintain and utilise that position.

Accelerating the transition may provide opportunities for companies in the Netherlands, as this will allow them to prepare faster and better for the new economy and to market this knowledge advantage internationally. However, acceleration poses risks if the costs of the transition endanger the competitive position in the short term and similar policies take much longer to be implemented in other countries. We require economic growth with a "level playing field" to maintain our level of welfare and to allow the transition to succeed. Nevertheless, apart from building new industry and renovating existing industry, the phasing out of business activities that do not fit inside the transition towards CO₂ neutrality should also be taken into account. Furthermore, it would be pointless for the climate if production were to move away from the Netherlands and be replaced by the import of products from abroad that are not produced as cleanly.

To achieve the climate targets of the Paris Agreement, the industry is being asked to achieve emission reductions of another 14.3 Mt² on balance by 2030, to arrive at an emission figure of 35.7 Mt³, as indexed by the PBL, which was assigned to the industry. The Dutch industry is facing a massive challenge to achieve these targets, and this requires a supporting policy. Over the past 25 years, the Dutch industry has already reduced greenhouse gas emissions by more than 31 Mt (approx. 35 percent), despite its substantial growth during this period.⁴ It is already one of the most CO₂-efficient industries in the world. However, the easy options have now been achieved and the difficult and more expensive measures will follow.

Key points

Measures the industry can take to save on CO₂

A successful transition requires significant investments from companies and long-term programmatic collaboration between individual companies and between companies,

² The total reduction is 19.4 Mt, 5.1 Mt of which is to be reduced through existing policy and 14.3 Mt through additional policy.

³ These figures are based on an annual economic growth of 1.75% for the entire Dutch economy; this could be much higher for subsectors and individual companies. If the industry's growth deviates significantly from the growth in the baseline, the task should be reviewed.

⁴ It should be noted here that emission reductions during this period mainly consisted of non-CO₂ emissions and that CO₂ emissions remained almost the same (source: National Energy Outlook 2017).

infrastructure managers, knowledge institutes and governments. The optimum approach will be different for each region. This requires area-specific measures in order to realise projects. Government control over and timely availability of affordable infrastructures, the creation of new value chains, a stable legal framework that encourages long-term investments and sufficient customisation and financing instruments for the various subsectors and business strategies are crucial here.

The Dutch industry is now being asked to do more than is being done in other countries, and this will affect its international competitive position (level playing field). The industry can see that there are enough projects to get rid of the required tonnes and is willing to invest in this on a large scale. The preliminary estimate is that this will require cumulative additional investments by the Dutch industry of about €15 to €20 billion⁵ until 2030. These investments are often high-risk and are currently not profitable from an industrial perspective, but from a national perspective, it would be socially cost-effective to make these investments. This justifies compensation for the irrecoverable costs within an internationally level playing field,⁶ as indicated in the Coalition Agreement. On the other hand, the industry could also benefit from a faster transition, through which an advantage can be achieved over competitors abroad, which explains why the industry itself is also investing in the programmatic approach to this transition.

The initial calculations point towards irrecoverable costs of up to €1 billion per year in 2030. It requires a joint effort to keep these costs as low as possible; we will be doing so by means of:

1. **joint investments** in innovation, pilots and demonstrations, and upscaling within a long-term programmatic approach with clean technology and cost reductions. The scale of this programmatic approach is about €300m per year. Based on existing regulatory frameworks, this will require a government contribution of about €150m from the climate budget;
2. **specification of a targeted tendering mechanism** through which the most cost-efficient investments can be achieved through competition;
3. **active focus on agreements with other countries**, allowing the level playing field to change in a favourable manner (ETS as a leading instrument, other measures in other countries).

Many of the technologies required for the transition are not yet available on a large scale, which makes it difficult to estimate their costs. Through innovation and pilots, investments are being made in technologies such as green hydrogen, CCU, biorefining and heat pumps, which can already be applied before 2030 where possible and will definitely play a key role after 2030. Until that time, a reduction in Dutch emissions will mostly have to be realised through energy-efficiency, encouragement of electrification in the industry and – where required – (offshore) CCS. Carbon capture and storage will be performed as an intermediate step in the transition, but is also a first step towards carbon capture and utilisation in the circular economy (CCU).

⁵ To be further substantiated

⁶ The term level playing field requires further elaboration

Role of CCS in the transition

Among the projects proposed by the various regions are a number of CCS projects. The industry has pointed out that it considers CCS a necessary instrument for reducing CO₂ emissions in the short term, but the industry also understands the social concerns regarding the use of CCS. NGOs have their doubts about the usefulness and necessity of CCS and are worried about the risks.

The storage and capture of CO₂ is not an aim in itself, but can offer the possibility to reduce CO₂ emissions in the short term, especially for essential sectors where no cost-effective alternatives will be available in the near future. The application of CCS should not get in the way of the process of making the industry more sustainable; during the development of CCS, it is important that the investments made can also be justified over a longer period of time, both on a business level and from a social perspective.

As a result, this will have to be considered carefully for each project in comparison to alternatives. For such a reflection, the government, the science community, civic organisations and the industry consider a wide range of aspects, such as cost-price development, risks, applicability over time, CO₂ reduction and the contribution to the energy transition as a whole. Based on joint fact-finding,⁷ the parties will prepare a further specification of this over the next three months.

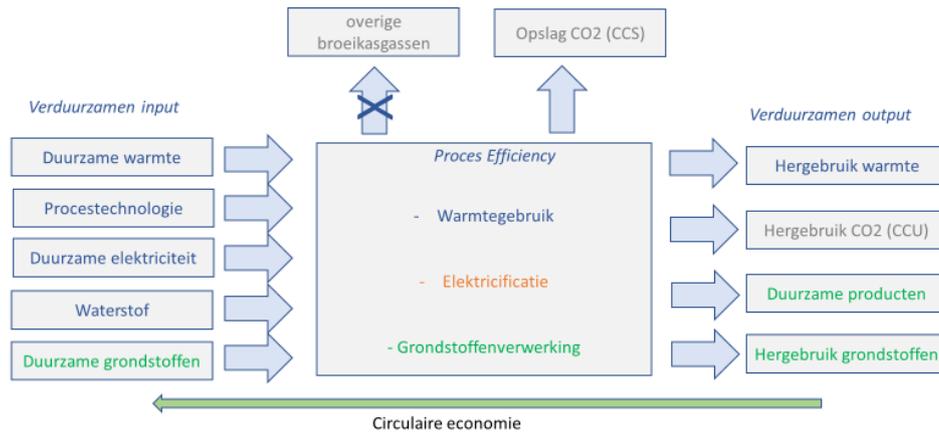
The working groups of the Industry sector platform have specified plans of how the transition can be given practical shape; this could be done along a number of tracks, as shown in the picture below:

- making use of sustainable resources and technology (sustainable electricity, hydrogen, ultra-deep geothermal energy and feedstocks);
- supply of sustainable products and recyclable heat, carbon and waste materials;
- capture and storage of CO₂ to accelerate emission reductions and as a step towards CCU, as a result of which this measure will no longer be required in due course.

Within the gates of the industry, processes are structured differently, allowing sustainable feedstocks, electricity and heat to be used efficiently.

⁷ This will be an open, transparent, but confidential process under the independent leadership of the Industry sector platform's chairperson

Process diagram for circularity and industry's role in it



Concept wg 25% - 5 juni 2018 (v2)

The major themes of the transition are:

- **process efficiency and heat consumption**: heat cascading, heat pumps, steam recompression, replacement of high temperatures with more energy-efficient methods (membranes, centrifuges, heat pumps, heat boilers, focus on maintaining combined heat and power systems, etc.) and utilisation of waste streams such as steam;
- **electrification**: high-temperature electric boilers, electric furnaces, electrochemical processes (incl. electrolysis for green hydrogen) and drives (motors, compressors);
- **feedstock processing**: hydrogen as a feedstock; changing and recycling of feedstock: CCU, biomass, mechanical and/or chemical recycling, waste2chemicals (blue hydrogen as a transition technology towards green hydrogen). These are often scope 3 measures, which can yield key emission reductions.

The themes are found in the following overview of the tasks regarding innovation and pilots.

Roadmap	Roll-out until 2030	Pilots with impact after 2030	Innovation pathways towards 2050
A. Reduction of energy demand	BAT, mechanical vapour recompression, HT heat pumps (up to 120°C), heat recovery from flue gases, efficient separation processes, advanced process monitoring/control	process innovation (PI) heat pumps (HP, >120°C) energy-extensive separation and drying processes, Digitisation – Industry 4.0	heat pumps (>150°C) HTH system approach, new product and production chains, modular and flexible production
B. Increased sustainability of supply: heat	Bioheat (for >250°C), geothermal energy (CG with HP), firing of furnaces with hydrogen	Heat storage, geothermal energy (UDG),	Metal fuels, HTH system approach
C. Increased sustainability of supply: electricity	Increased flexibility of existing electrochemical processes, power-to-heat (furnaces, hybrid boilers), production of green H ₂ , drives (motors, compressors)	Cost reduction of H ₂ electrolysis, electrochemistry with H ₂ , hydrogen storage, electrochemical CO ₂ activation, plasmolysis (incl. CH ₄), electrocracking	Electrochemical processes for base chemistry and fuels, photoelectrochemistry
D. CO₂ capture and storage	Expansion of CCS infrastructure, CCS at reformers, specific streams, steel industry (Hisarna) and refining, offshore storage, safety & monitoring of reservoirs, blue hydrogen	Direct carbon fuel cell	BECCS, direct air capture of CO ₂
E. Circular feedstocks and products a) Recycling of product and waste streams	Recycling of industrial waste gases, increased recycling of metals and building and industrial waste, CO ₂ capture in building materials, mechanical recycling of plastics, waste to chemical intermediates, waste incineration plants	Steel gas to chemistry, CCU for synthetic hydrocarbons (fuels and plastics), chemical recycling of polymers	Circular process & product design
F. Circular use of feedstocks and products b) Biobased feedstocks	Improved availability of biomass, existing biobased processes and materials	Functional replacement with biobased chemistry	Biorefining for feedstocks and fuels
G. Restructuring of the industrial landscape and the energy infrastructure			
H. Institutional, economic, social and organisational innovation			

Hydrogen and Power2heat

We share the ambition with the Electricity sector platform to develop a programmatic approach for **hydrogen**. The aim is to accelerate the reduction of the investment costs for electrolysis, to allow green hydrogen to play a key role in the future. This programmatic approach will at least consist of the following elements:

The government sets a roadmap for the development of green hydrogen towards 2030.

Supply and demand of hydrogen should increase at the same rate as much as possible. The supply of green hydrogen is closely related to the development of sustainably produced electricity and the industry's demand for green hydrogen at a competitive price.

The green hydrogen coalition's ambition of achieving 3 to 4 GW by 2030 requires major investments in innovation and pilots, which could partly come from the climate budget.

To be able to take concrete steps in building up a Dutch hydrogen market and reducing CO₂ emissions in the Netherlands in the short term, the expectation is that it will be possible to utilise blue hydrogen, preferably for industrial use.

Power-to-heat is a collective term for the conversion of electricity into steam and heat. Power-to-heat means, for example, that electric boilers, electric furnaces and heat pumps are used to meet the heat requirements of the industry. The potential and applicability of electrification often differs for each subsector and process; customised solutions and pilots for large-scale application in primary processes are required. This is mainly the case where it involves fundamental changes to production processes, such as the integration of electric furnaces.

Investments in electrification may have an effect on the need to integrate infrastructure; further joint or individual fact-finding will be required to determine the roadmaps more precisely with regard to technology that still requires innovation and pilots, the price at which this can be done and how risk mitigation can be handled here.

If an industrial production site not only includes electric boilers and heat pumps, but also an alternative system to supply heat, this constitutes a hybrid system. It will be possible here in some cases to buffer electricity or heat. A hybrid system can function both on natural gas and on electricity. The switch option creates a significant flexibility option for the electricity system.

Parties within the Electricity sector platform and the Industry sector platform have agreed that they will jointly work out this proposition this autumn (joint fact-finding) to determine its technical merits and relevant market effects.

It will be possible to achieve the target for 2030 with the following projects, clustered by region (see table below). This is not a blueprint, but a first draft of an adaptive process, in which we will have to check from time to time whether changing circumstances should result in different choices.

Measure/Technology	Avoided CO ₂ in 2030 (estimate)	Average costs Euro/tonne CO ₂ on top of ETS	Costs in 2030 M euro/year	Scope 2 and 3
Process efficiency ⁸	2 Mt	10 – 70	80	Approx. 30 Mt of waste heat; it is unknown how much this contributes to scope 2 emission reduction
Electrification and hydrogen	4 Mt	70 – 150	440	
Recycling, CCU and biobased chemistry	1 Mt	10 – 150	30	Contribution to foreign emission reductions of approx. 1.5 to 2 Mt (CCU and recycling)
Laughing gas reduction (N ₂ O)	1 Mt	20 – 30	30	
CCS	7 Mt	50 – 70	420	0.5 Mt of CCU in greenhouse horticulture
Current policy ⁹ (F-gases and process efficiency)	5 Mt	Profitable		
Total	20 Mt		1000	
Innovation pilots and demos			300	

For this to be successful, a clever mix of several policy instruments will be required:

- **legal frameworks, adequate spatial plans and licensing:** stable long-term policy – also regarding energy savings – based on which investments can be made, clear targets, a fair allocation of obligations, benefits and burdens, room for growth, timely granting of permits, clear carbon accounting principles and monitoring based on predetermined and accepted rules, adequate supervision and scope for experimentation;
- **customised agreements** to be able to fit in with the natural moments and the market/technology-specific, specific regional facilities and conditions that companies have to deal with;

⁸ Process efficiency mostly involves electrification, whereby the energy required is less than for the original process

⁹ Harmonisation and further specification of the existing policy to boost process efficiency is required to promote its specification in order to make the intended savings/process efficiency possible

- **long-term agreements** on a national and/or regional level to offer individual companies guidance regarding the time frame within which they have to implement measures and provide the government with a guarantee that the measures will be implemented. The combination of subsidies and agreements is exactly what makes the desired customised approach possible;
- **an adequate set of financial instruments:** a financial contribution from the government to the irrecoverable costs of the measures, which will rise from a total of €550m to €1000m per year towards 2030;¹⁰
- the current overview of possible projects in all the clusters shows that the target can be achieved for average costs per tonne of CO₂ reduction that are highly appealing in comparison to other platforms.
If, however, the programmatic approach associated with the indicative target of a 14.3 Mt emission reduction is in danger of not yielding the expected results in the next couple of years, the government could introduce **additional measures**¹¹ for parties that do not contribute enough, subject to the firm condition that these measures suit the level playing field;
- availability of **financing options and risk sharing** through INVEST-NL and others;
- availability of sufficient **affordable and sustainable electricity**;
- **good market regime and timely availability of new and modified infrastructures** (under government control); this includes "recycling" of "old" (natural gas) infrastructure;
- **focus on European and international frameworks:** market regime, subsidies, regulation, accounting and the (NW) European ambitions, as well as the elimination of restrictive rules concerning ETS accounting, the use of European (development) funds, the EIB, etc.;
- sufficient resources to accelerate **innovation** and to learn from **pilots**: expansion of the climate budget and specific budgets for mission-driven innovation;
- **working population** with a sufficiently high level of education: use of industry, the education sector and government to reduce the shortage of well-trained personnel.

Specification

In order to have a final agreement by the end of 2018 to which the industry can commit with confidence and, more importantly, to which the industry can really contribute, a lot still needs to be specified. This includes:

- further specification of the measures and plans in the various regions and by the various subsectors (chemistry, refining, technological industry, metal, paper, glass, cement, food, waste processing, ICT, oil & gas exploitation, building materials, etc.) in order to start concrete programmes with these;
- the parties wish to develop CCS through a programmatic approach,¹² which requires a clear picture of the best choices regarding the issues stated in the footnote;
- further specification of the combination of instruments used to shape the incentive for the transition (including scope 2 and 3 measures) through standardisation, customisation and financial incentives; there are parties that want to include a minimum price for CO₂ in the specification of financing instruments. The effects of the CO₂ price will have to be studied in greater detail;
- further specification of the generic rules in legislation in relation to the scope for customisation; based on a clear legislative framework, there should be room in a transition for matching specific conditions and natural moments of change;

¹⁰ This amount still needs to be specified exactly.

¹¹ These additional measures do not apply if the target is in danger of not being achieved due to the failure of parties other than the industry that play a vital role in the development of projects.

¹² To be able to apply CCS and (in due course) CCU, several choices still have to be made. This involves matters such as the allocation of roles and costs between private and public parties the transport and storage of CCS, the long-term liabilities regarding the storage of CO₂ and the link between the development of CCS and the decommissioning of existing oil and gas infrastructure.

- further specification and definition of the terms level playing field and irrecoverable costs;
- further specification of how growth and new entrants to the markets can be facilitated fairly without affecting the target for 2030;
- clear arrangements on monitoring, (carbon) accounting and the valuation of cross-border projects;
- specification of market regime, control and investment plans for the required additional and modified infrastructures, focusing on regionally specific facilities and areas of expertise;
- structuring of the grid tariffs in a way that rewards companies financially if they contribute to the grid balance;
- preparation and specification of a programmatic organisational form, in which mission-driven innovation and pilot programmes can be shaped in a cohesive agenda for the industry (including the systemic issues that go beyond sectoral boundaries);
- additional boost for the Technology Pact and for workplaces where innovation and education come together for "life-long learning" to eliminate the lack of well-trained personnel that is an issue on the employment market;
- the development of an investment climate monitor.

2.4 Agriculture and land use

Kermit the Frog, a fictitious character from the TV series *The Muppet Show*, once exclaimed, "It is not easy, being green". This could be seen as a pessimistic reflection of this proposal for the key points of an agreement from the Agriculture and Land Use sector platform that has not yet been drawn up. We, the participants in this sector platform, are proud of what we view as a half-time score, a half-time score for public consultation with followers, society, members, sponsors or whoever else wants to talk about it with us.

We believe that we can provide you all with a set of robust building blocks for specification. This set of building blocks is based on the strengths of the relevant actors and sectors, building on the past and still setting off on a new course. This course provides sufficient direction by steering towards targets, takes into account both ambitions and challenges and is robust enough to present to you all. We are very eager to work this out, after political guidance and decision-making.

In this interim balance towards a Climate Agreement, we are showing you the state of affairs regarding the specification of cues provided by the government. Have we done exactly what we were asked to? We would like to say "of course", but we have also gone a few steps further, based on the connection and based on necessity. We have made a connection with the specification of themes from the circular economy, with the energy system, the international footprint of production and also the biodiversity task and existing environmental qualities. This was always based on the conviction that the parties represented in this platform are also part of the solution.

Key points

The participants in this sector platform view the climate task as an underlying mandatory precondition to the guarantee – already issued and delivered previously – to provide enough healthy, affordable and safe food every day, robust and appealing natural areas and an appealing and liveable countryside. We do not view the climate task as an "additional public target, which has to be quickly taken care of and which makes business harder", but rather as a catalyst for innovation.

The parties in the platform consider an emission reduction target for agriculture and land use of 3.5 Mt CO₂ equivalents by 2030 feasible and will make every effort to:

- invest in this with concrete instruments in an agreement to be drawn up;
- provide a 10 percent higher target contribution to the possible increase of the general reduction target from 49 to 55 percent;
- explore the possibilities to provide an additional effort worth 1.7 Mt in land use.

The 3.5 Mt of CO₂ equivalents is strict and has been subdivided as shown in the table below. Here, the ambition of the sector platform participants has also been made concrete, whereby the achievement of the ambition does depend on the achievement of the conditions set or achievement by other platforms. When performing the calculation, the PBL will define the ambitions more clearly in relation to the expected achievement and conditions set. Based on an initial estimate, the public and private investments for the period until 2030 that (local) governments and (family) companies are expected to have to cover total around €2 to €4 billion for this partial proposal alone. This concerns the total investments, both profitable and unprofitable, for 12 years. The PBL can specify these more precisely when performing the calculation. In addition, some of the measures will lead to higher operational costs or lower proceeds, which are not included in the above investments.

Theme	Objective	Formulated ambition & measures
Remit		
Methane & livestock farming	1 Mt	Methane reduction ambition: 1.1 Mt CO2 eq: - pig farming: 0.3 Mt through voluntary termination and buying up rights, as well as sty modifications; - dairy cattle farming & dairy: "Animals and Feed" and "Manure Storage and Fertilisation": 0.8 Mt methane in CO2 eq. Laughing gas reduction: 0.2 Mt
Smarter land use ¹³	1.5 Mt	Total ambition: 1.8 – 2.0 Mt: approx. 1.0 Mt peat grassland; 0.5 Mt farmland outside peat grassland; 0.3-0.5 Mt forests, trees and natural areas.
Greenhouse as a Source of Energy	1 Mt Additionally	1.8 Mt: <ul style="list-style-type: none"> energy savings, incl. through "new-style cultivation"; CO2 and sustainable heat system (incl. new geothermal energy sources); modernisation of greenhouses & regional approach; electrification & frontrunner approach.
Total	3.5 Mt	4.9-5.1 Mt
Other climate effects		
In terms of quantification, not administratively assigned to the Agriculture and Land Use climate sector platform, but still achieved thanks to efforts from partners in this platform.		
Climate-friendly consumption		Measures that count indirectly: <ul style="list-style-type: none"> less food wastage; increased consumption of vegetables and fruit and greater share of vegetable protein.
Other ambitions with climate effects		Energy: <ul style="list-style-type: none"> energy savings and generation of renewable energy; reduction of greenhouse gas emissions by farming vehicles. (Not quantified here to prevent counting them twice.) Reduction of use of fertiliser produced with fossil fuels. Effects from abroad: Reduced import of palm kernels and soy.

Agriculture

The first pillar is Agriculture. In our densely populated delta, the future belongs to agriculture if the agricultural sector remains dynamic and economically healthy, and if the burden on the environment does not exceed the self-recovery capacity of the environment: soil, water, air. A key term here is closing the cycles on a company and regional scale. The transition required for this makes up the framework in which a contribution is also made to limiting greenhouse gas emissions. The associated approach is characterised by integrated chain management, with a focus on freedom of choice and innovation, but also the individual accountability of

¹³ The climate and land use theme is so new that the knowledge base is "thin", and care should be taken not to overestimate or underestimate when quantifying the climate effects for this theme

entrepreneurs. In some cases, the techniques desired for this still require commitment before proceeding with the practical introduction.

Land Use

The second pillar is Land Use. The way in which the land is utilised and the soil is used has major consequences for the emission or storage of greenhouse gases.

Use of the soil that matches its natural characteristics as much as possible and the processes associated with this will lead to sustainable use of minerals and organic materials. It should be noted that, for this theme, there is still considerable uncertainty about the sustainable and other effects of measures; intensification of practical knowledge, e.g. via test projects and pilots, is highly important in this regard.

Measures that can be implemented in agriculture include keeping land green with catch crops or green manure for a more substantial part of the year, limited tillage, agroforestry and integration of landscape elements. Peat grasslands can be rewetted, sometimes with technical measures, and sometimes livestock farming will have to adapt to this and other forms of cultivation will be introduced. The management of forest and natural areas will be modified if required; not only will biodiversity and recreational targets be achieved, but climate targets as well. Types of nature, including certain types of forest, that store a lot of carbon will be expanded; deforestation will be discouraged. The products released while managing nature, forests and landscape (wood, reed, grass, etc.) will be optimally used to ensure that they contribute to reducing greenhouse gases. In urban areas, along infrastructure and in rural areas, more trees and vegetation will be planted.

Energy

The third pillar is energy consumption. Energy consumption in the agriculture and land use sector is largely related to greenhouse horticulture. The parties are committed to making greenhouse horticulture climate-neutral, if possible as early as 2040, and in doing so build on the Innovation and Action Programme for Climate-Neutral Greenhouse Horticulture ("Greenhouse as a Source of Energy"), with a strong focus on "integration in the regional energy strategies". The transitional approach used consists of agreements on long-term goals and ambitions and a maximum allocation for greenhouse gas emissions. The development of new and more energy-efficient cultivation and greenhouse systems will run in parallel to the modification of cultivation conditions and cultivation practice and/or the development of more climate-robust crops in order to allow crop production that is at least the same, or greater if possible. Agriculture (arable and livestock farming), more so than horticulture, has potential for generating sustainable energy.

Food

The fourth pillar concerns consumption. The parties believe that climate-friendly consumption by citizens requires a long-term behavioural change, resulting in less food wastage, greater consumption of vegetables and fruit in the Netherlands and vegetable protein making up a larger share of total protein consumption. This is viewed as one of the key factors of long-term climate policy, also in a global context, where meat consumption still rises by 1.2 percent per year.¹⁴ At the same time, through use of materials in the built environment, increased use of wood as a substitutional material and acceptance of a changing landscape, citizens and consumers will also be experience the effects of the transition and be able to accelerate it.

Innovation

The fifth pillar is innovation. The task of achieving a climate-friendly economy by 2050 is a massive one, and numerous innovations are required to implement this transition in a responsible and affordable manner. The demand for climate-friendly technologies in the market is often still insufficient.

¹⁴ Source: FAO-OECD

According to the parties, major system changes are required to make the transition to a climate-friendly economy possible, and this requires integration of many different technologies, as well as changes to the required infrastructure, the associated business models and other roles for the parties involved. For this reason, several themes are given in the innovation pillar for practical demonstrations and the use of pilots. Implementation will be partly based on knowledge sharing programmes and communication.

Policies aimed at phasing out fossil options or tightening the standards policy create a strong market demand. If market parties are insufficiently encouraged to invest in necessary techniques and their development, additional support may be temporarily provided by the government. Finally, multi-year government commitment to various innovation programmes aimed at the medium to long term may contribute to an effective use of both private and public resources in innovations.

The strict targets and stated ambitions require a huge effort from all actors involved. This is partly due to the huge uncertainty (to be reduced) about measures to be taken, both regarding greenhouse gas reductions and the associated costs and investments. A successful implementation would require investment security and a solid and broadly accepted monitoring system. This will therefore be the focus of the specification, with all the partners inquiring into each other's (synergy) options for "collaborating".

Specification

At its core, the transition is a social change. This change requires contributions from citizens, workers, companies, knowledge institutes, trade unions, civic organisations, local authorities and the national government. Each of these parties will need to contribute based on their own role and possibilities. Citizens, workers and companies can contribute by means of concrete initiatives to reduce greenhouse emissions in sectors and regions, and on a local level. This can be done through investments or by changing their behaviour, which means exchange of knowledge, training and communication are useful tools in this regard. Coalitions of companies develop breakthrough projects together with public authorities, other stakeholders and knowledge institutes, such as the Greenhouse as a Source of Energy project, in which sustainable innovations are applied on a large scale. In regional processes, landowners and public authorities provide solutions that enjoy broad levels of support in order to optimise the climate performance of agriculture and land use. Together with public authorities and the business community, social partners make arrangements on work and training, and on the management of social consequences in the transitioning sectors. Public authorities create the required conditions and preconditions in regulations and financing, using process control and communication and connecting parties, allowing entrepreneurs to seize the opportunities available to them. This results-oriented implementation has been initiated with the Energy Agreement, and will be intensified in the Climate Agreement.

Our motto during the platform discussions was always: we have never done this, so we think that we can do it.

This requires commitment, inspiration and acceptance from many, both young and old, including individuals and collectives, farmers, urbanites and villagers, the education sector and NGOs. Respect for various positions is likewise required to keep track of our goals – our contribution to a new and sustainable food system and land use as part of an ecologically well-functioning landscape, embedded in the demands and wishes for the future – in the face of numerous concretisation issues.

2.5 Mobility

Carefree mobility for everything and everyone in 2050. Zero emissions and excellent accessibility for both young and old, poor and rich, the able-bodied and the disabled. Affordable, safe, comfortable, easy and healthy. Smart, sustainable, compact cities with an optimum flow of people and goods. Beautiful, liveable and easily accessible areas and villages, with mobility acting as the link between living, working and leisure time.

The Mobility sector platform is pursuing the vision described above by focusing on an integrated approach to the mobility system, where all modes of transport and infrastructure are optimally developed and utilised and all modes of transport are clean, which not only meets the provisions of the Paris Agreement, but also makes a significant contribution to reducing other damage to the environment.¹⁵

Our approach consists of actions that focus on:

- **being cleaner:** the shift from using fossil fuels to electrically driven vehicles and vessels is key in making the mobility sector greener. This is already technically feasible for motorbikes, passenger cars, delivery vans and buses, and will therefore make a substantial contribution to the intended CO₂ reduction. The government's aim is therefore to ensure that all new passenger cars are emission-free by 2030. Heavy goods transport still requires innovations to allow electrification using batteries or fuel cells;
- **being smarter:** optimisation of streams, improved use of transport capacity on roads, waterways and railways, sharing of vehicles, etc.;
- **being different:** modification of mobility behaviour, with regard to easily switching between modes of transport, journey times (avoiding rush hours), economic driving style and travelling less (working from home).

Three crucial developments

The Mobility platform has formulated proposals to achieve a CO₂ reduction of at least 7.3 Mt by 2030. In the short term, a lot can be achieved by focusing on matters such as electric passenger transport, promoting the use of public transport and bicycles and making the fuel for freight transport by road, water and rail more sustainable. The proposals focus on these three developments, and we are exploring the possibilities for demonstrating appealing and innovative mobility case studies for carefree and clean mobility in the short term, in consultation with the members of the platform.

To ensure that our transport system remains clean and to implement the transition to "carefree mobility" by 2050, three developments are crucial:

- **a mission-driven multi-year knowledge and innovation programme** aimed at a mobility system in which the mobility needs are organised as efficiently as possible, with the ultimate goal of having emission-free mobility by 2050. Examples of this include further development of battery and charging technology, electrification of heavy transport, the development of cost-effective conversion techniques for hydrogen, sustainable advanced biofuels (including synthetic kerosene) and developments in the field of logistics and mobility services (Mobility as a Service);
- **a programmatic and adaptive approach**, in which all the parties will be cooperating in gathering knowledge, planning scenarios, monitoring relevant developments, formation of visions and opinions on priorities and optimum use of available resources. The focus should be on mobility rather than the mode of travel;
- **an integrated design for future-proof funding for the mobility system.** This relates both to the way in which we generate income through (vehicle) tax and ticket sales, and

¹⁵ The PBL has calculated that, in the Netherlands, the mobility sector makes the greatest contribution to environmental damage: over €12bn in 2015; the total environmental damage in our country that year was €31bn.

to how we make social investments in infrastructure (Mobility Fund). The Mobility platform's vision includes a system in which the users of the mobility system pay "for its use and the pollution they generate". This will allow the mobility system to be optimally used and will allow us to provide incentives that improve the balance between supply and demand, and encourage "polluters" to "be cleaner". Pilots for gaining experience with alternative forms of transport and payment in accordance with the coalition agreement are useful in gathering more knowledge about this.

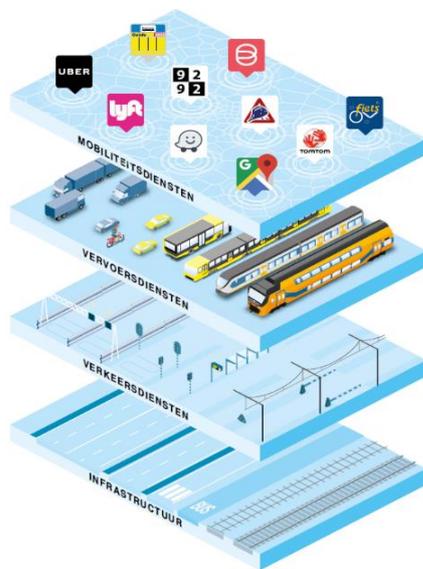
Sector target

The target for the mobility sector is not to exceed CO₂ emissions in the amount of 25 Mt in 2030. Based on current emissions and the expected mobility developments, this means CO₂ emissions will have to be reduced by at least 7.3 Mt by 2030, as an interim target towards the national target of reducing CO₂ emissions by at least 95 percent by 2050 compared to 1990. As the Paris Climate Agreement provisions for shipping and aviation are mainly international in nature, only the emissions within the Netherlands, such as those from airport operations, general aviation and domestic flights, fall under the national target. By now, negotiating platforms have also been set up for shipping and aviation, and ambitions, targets and actions are being formulated. These are being used to prepare an ambitious approach for sectors that have a major climate impact.

To achieve its targets, the Mobility platform is dependent on a number of factors, such as the availability of biomass for sustainable advanced biofuels and sustainably generated electricity. Successfully integrating electric transport into electricity grids and the possible necessity to increase grid capacity also play a role.

Key points

For the classification of the measures aimed at cleaner, smarter and different mobility, the



breakdown of the mobility system into various layers, as also used by the Council for the Environment and Infrastructure (Rli), is used as a framework for analysis (see figure)¹⁶:

- Layer 1 – **physical infrastructure** - this involves measures that affect the foundation of the mobility system, both to increase sustainability in the short term through tendering processes and to allocate the right investment for future mobility in the long term.
- Layer 2 – **traffic services** – this involves measures for optimum use of the infrastructure, e.g. by means of usage allocation, timetables and traffic handling.
- Layer 3 – **transport services** – this relates to measures that make both passenger and freight transport more sustainable by utilising sustainable energy carriers. This affects the transport itself, but also the preconditions, such as refuelling and charging infrastructure.
- Layer 4 – **mobility services** – includes measures to make personal mobility more sustainable, such as behavioural measures to motivate people to travel in a different way. Examples include providing better insight into the various modes of travel available, giving employers a key role in their employees' choice of transport and promoting concepts such as the "new-driving style", the best tyres and car sharing.

¹⁶ Council for the Environment and Infrastructure (2018) Advice *Van B naar Anders: Investeren in mobiliteit voor de toekomst* [From B to Different: Investing in mobility for the future], The Hague.

Every layer of the mobility system is important, and the effects are interrelated. An employer's approach aimed at a reduced CO₂ footprint from business travel can be combined with the use of zero-emission buses, which in turn affects what kind of infrastructure is required. The location, among other things, determines which measures are suitable. The possibilities for cities are different from those for rural areas, and facilities have different levels of accessibility.

Measures

The table below visualises the subjects and possible measures that were discussed by the Mobility platform. The table indicates that the minimum required reduction of 7.3 Mt CO₂ is feasible. The table provides an initial indication of the CO₂ reduction potential for each layer. In view of the government's intention to increase the reduction target at the European level to 55 percent, the Mobility platform views it as its task to elaborate the ambition as much as possible.

Many measures are inextricably linked. The Mobility platform's motto is: everything and everyone is required. Everyone needs to take action. As the *effects* of many measures are still not sufficiently known, the measures were not listed in order of priority. The background document of the Mobility platform contains a further explanation of the subjects included in the table.

Subject	Possible measures
Layer 1: Infrastructure <i>Indicative reduction potential of approx. 2 Mt</i>	
Sustainable government purchasing and tendering processes	Strict tender requirements aimed at reducing the CO ₂ footprint of vehicles and equipment, and at the necessity of circular feedstock use.
Sustainable public transport/Bicycles fit for growth/Mobility as a Service	Investment programme aimed at improving accessibility and sustainability by expanding infrastructure in major urban areas and organising better interconnection of national and regional networks: Randstad bottlenecks, light rapid transit, cycling networks, public transport hubs and international rail travel inside 700 km. Also: reconsideration of MIRT in connection with climate targets. A parallel policy is required.
Layers 2&3: Transport services & resources Increased sustainability of goods streams: greening and optimisation <i>Indicative reduction potential of approx. 3 Mt</i>	
Logistical optimisation	Focusing on fewer movements in the Environment and Planning Act (<i>Omgevingswet</i>), building permits and awarding of contracts. ICT coupling platforms and distribution hubs at urban peripheries.
Efficient building logistics in urban environments	Including sustainability requirements in tendering processes and permits.
Efficient use and greening of mobile equipment	Including sustainability requirements in tendering processes and permits; towards hybridisation/electrification of mobile equipment.
Intensification of emission-free urban logistics.	In 2025, zero-emission zones in G30 for delivery vans and lorries.
Greening of inland shipping	Towards electric and diesel-electric inland shipping, blending of sustainable advanced biofuels during the transition phase and logistics chain optimisation.

Layer 3: Means of transport and services Use of more green energy through sustainable energy carriers Indicative reduction potential of approx. 8 Mt	
Electric passenger cars in consumer and business markets	Formula E-Team package of measures. Until 2025, tax compensation for operating shortfall. Various measures can be used: Private motor vehicle and motorcycle tax, vehicle tax, additional tax liability relief, travel allowance, environmental investment credit, VAT exemption, purchase subsidy, parking policy, environmental zones, etc.
Electrification of light transport (scooters, etc.), delivery vans and lorries	Including a master plan for electric delivery vans for accelerated replacement of diesel vans.
Zero-emission public transport buses	Implementation of administrative agreement: all public transport buses emission-free by 2030.
Electrification of freight trains	Replacement of 150 diesel locomotives.
Target group transport	Municipalities administrative agreement: zero-emission target group transport in tendering processes from 2025.
Electric charging infrastructure	Formula E-Team package of measures, including accelerated application and development process for charging infrastructure, financial incentives (e.g. lowering the energy tax on charging stations), integration in Buildings Decree and roll-out of smart charging.
Sustainable biofuels	Biofuels platform: renewable energy share of 33% by 2030. By levying tax on CO ₂ (level playing field), through price support (based on Renewable Fuel Units), by encouraging investments by private parties and by supporting multifunctional feedstock chains (Top Sector Policy).
Green Truck fuel	Aiming for the highest blend of sustainable advanced biofuels for lorries. Various options to bridge the price difference with fossil diesel: higher blending obligation, duty differentiation for transport fuels. Use of kilometre charge (MAUT) to reduce additional costs.
Bio-LNG	Bio-LNG platform: for heavy road traffic and shipping. Measures: continuation of temporary duty refunds, upscaling of production and further development for inland shipping.
Hydrogen filling stations and fuel cell EV	Development and roll-out plan for electric vehicles with fuel cells. Government support required in starting phase. Various tax-related measures to promote the purchase of fuel-cell cars.
Layer 4: Mobility services Increased sustainability of personal mobility: avoidance, reduction and variabilisation Indicative reduction potential of approx. 3 Mt	
Sustainable public transport and Mobility as a Service (MaaS)	Short-term measures for optimisation within the existing capacity through measures such as improved flow and transfer options (hubs in rural areas).
Increased sustainability of business travel	Top-10 measures from frontrunner policy for "Better Utilisation and Travelling Differently" employer's approach, including promotion of electric transport. Measures both to support employers and on a system level.
Encouraging bicycle use	Multi-track approach: employer's approach to encouraging bicycle use, standards and Environment and Planning Act, MaaS and chain approach, tax treatment and infrastructural preconditions.
Choose the best tyre/tyre pressure	Behavioural measures to save on fuel and CO ₂ through tyre choice and tyre pressure.
New-Style Driving 3.0	Actions aimed at behavioural changes that lead to more economical driving.
Car sharing	Agreement on public transport locations and spatial planning policy.

An integrated and future-oriented approach creates economic opportunities. The electrification of transport provides opportunities for improved utilisation of the energy system, e.g. by using car batteries for grid balancing and buffering ("smart charging"). In the field of charging infrastructure, Dutch companies have a leading global position; they also set the international standards. There are also economic opportunities for the development of electric buses, inland shipping vessels and lorries, as well as for technologically advanced applications in the automotive sector. The use of advanced forms of sustainable biofuels and green hydrogen also provides opportunities to accelerate industrial applications. By offering scope for

experiments and innovations, the Netherlands will be able to develop into a test bed (living lab) for sustainable mobility.

Specification

The key precondition for a successful transition to a sustainable mobility sector is a *consistent and adaptive long-term approach* to create a collaboration and investment climate that inspires confidence. If this climate does not inspire sufficient confidence, the parties to the applied transition policy will not be willing to make high-risk investments that only yield a return in the long term. The announced Climate Act (*Klimaatwet*) is the legal framework for this. Additionally, such a long-term approach suits the five-year programmes that every EU Member State has to make as part of the Integrated National Energy and Climate Plans (NECPs).

The programme of measures cannot be prepared until a better picture is available of the CO₂ effects of specific measures, the cost-effectiveness, side effects and financing. The extent to which the potential CO₂ reduction can actually be realised and the priorities associated with this will become clear once the PBL has performed the associated calculation and it has been assessed by the government and the House of Representatives.

A transition is a long-term and fundamental change process. All the instruments we can apply must make a contribution to bringing about this change. Standardisation is a highly effective way to reduce CO₂ emissions; as the emission requirements become stricter, our means of transport will become cleaner. The focus on ongoing standardisation in Europe remains crucial. In addition, the Netherlands can create a climate that encourages this transition through national regulations (e.g. with regard to blending) or local environmental zoning. A clear future perspective and ambition are key with regard to encouraging the market to comply with the future requirements.

In addition, the transition from the existing mobility system to the new mobility system requires an investment: tax incentives or subsidies can bridge the initial operating shortfall or the "discomfort" brought about by having a new system. These incentives can be gradually phased out once the costs have been reduced due to market volume and the service/quality level has increased. Vehicle tax constitutes a significant source of income for the national budget, which will have to be taken into account when setting up and designing the tax system. Achieving carefree mobility also requires additional investment funds for the construction and/or optimisation of infrastructure.

Finally, the parallel policy is a highly important factor in the mobility dossier; the environmental visions and the environmental policy create a framework for the use of space and the environmental quality requirements in areas. This determines the future supply and demand of mobility and defines the area requirements.

In the assessment of the proposals and the policy instruments available for these, we will not only assess the CO₂ reduction, but also the broader social benefits, with regard to air quality, health benefits, safety, accessibility of facilities, social inclusion and economic potential in relation to the social costs, for example. In addition, issues such as the availability of personnel and the impact of the chosen financing on purchasing power, which is important for the affordability of mobility, play a role as well.

All in all, the work is not finished by a long shot. Political decision-making and administrative support, together with the support of society, are required to make a successful transition to a sustainable mobility sector possible. Following the PBL calculation, the members of the Mobility platform will also discuss their contributions to the follow-up process. They will do this based on the shared ambition of continuing the initiated process after the summer, with the aim of formulating a set of measures in the final quarter of 2018 that carries broad support, matches the sector's targets and contributes to a solid Climate Agreement.

3. Cross-sectoral key points

In this chapter, we will focus on a few key points that are important to the interplay between sectors. The central theme here is the interplay between electrons and molecules (containing carbon). We are currently still highly dependent on natural gas and petroleum for electrons and molecules. Towards 2050, this fossil carbon source will be replaced with electrons from solar and wind energy and carbon molecules of organic origin. The sector platforms discussed hydrogen and biomass against this background. For the specification of these subjects, the interdependency between sectors is so great that they are basically facing a joint task.

3.1 Electrification

For the industry, the built environment and the mobility sector, electrification provides options for far-reaching emission reductions, as long as that electricity is generated sustainably. This requires major investments in the electricity sector. These investments will only be possible if a sufficient level of security can be provided. Timing and volume are essential in this regard: supply and demand will have to develop simultaneously within the context of the market developments in the countries around us. The ambitions of the electricity sector depend on the demand originating from other sector platforms. It will not be possible to clarify the actual investment task until the PBL has performed its calculation.

With a growing share of electricity generated from renewable sources, the supply will increasingly follow a weather and season-based pattern. About 70 percent of electricity production is expected to be weather-dependent by 2030. There will be times when the amount of renewable energy available covers more than 100 percent of the demand, just like there will be times when the demand has to be almost fully covered by sources other than weather-dependent renewable power due to unfavourable weather conditions. The demand for flexibility will rise dramatically, and it is vital to set up sufficient flexibility options in a timely manner.

The Electricity sector platform discussed flexibility within the electricity system in the shape of storage, interconnection with other countries, regulating power and demand control. In addition to this, the conversion of electricity into gas (and vice versa) offers additional options for linking a surplus supply of one energy carrier to scarcity of the other. Furthermore, linking the electricity system to heat networks will provide additional options for the useful application of a temporary surplus production of renewable energy.

In the further specification of proposals for key points, the integration between electricity, gas and heat should be considered.

3.2 Hydrogen

Hydrogen plays a key role in the transition towards a climate-neutral society. The distinction between green, blue and grey hydrogen is important in this context. Grey hydrogen is produced with natural gas. CO₂ is released in this process. If this CO₂ is captured and stored, it is then called blue hydrogen. Green hydrogen is produced with electricity generated from sustainable sources (solar and wind). At present, we are mainly producing grey hydrogen, but we are striving to introduce a green hydrogen economy in the future.

For years, hydrogen has been produced worldwide on a large scale for many industrial applications, in particular ammonia production and oil refining. Furthermore, hydrogen is used for the production of high-temperature process heat in industrial boilers and furnaces. More recently, work has started on the use of hydrogen as transport fuel. This will allow vehicles, trains, mobile equipment and probably also vessels to become fully electric in combination

with fuel cells. Hydrogen becomes liquid under pressure and can then be stored in a compact form for various applications. In due course, hydrogen could take over the role of natural gas for low-temperature heating in houses and buildings. Furthermore, hydrogen can be highly valuable for the storage of electricity and energy transport from offshore wind farms to the shore. It can also be relatively easily transported and buffered in pipelines and stored in tanks. In due course, hydrogen could therefore play a key role in improving the flexibility of the electricity system (storage and CO₂-free controllable capacity).

Broad use of hydrogen as an energy carrier for mobility and transport, in the industry, the energy sector and possibly also in the built environment, presents realistic opportunities to achieve a large-scale reduction of CO₂ emissions and at the same time facilitate the transition to sustainability by building a future-oriented infrastructure. According to expectations, large sections of the current natural gas system should be usable for this, which could limit the costs. The process will also benefit from a strong knowledge infrastructure that has been built up in the field of natural gas.

The shared expectation is that the application of hydrogen as a feedstock in the industry and as an energy carrier will mainly be scaled up after 2030. The "Outlines of a roadmap for hydrogen" document from TKI Gas and the "Hydrogen as an essential building block for the energy transition" manifest from the Hydrogen Coalition show that there is a large potential demand for hydrogen in the Netherlands.

We share the ambition to accelerate the development and roll-out of green hydrogen by means of a programmatic approach. The aim is not only to lower the costs for renewable electricity, but also to accelerate the reduction of the production and investment costs for electrolysis, to allow green hydrogen to play a key role in the future.

Additional knowledge is required on the potential, demand development and options for cost reductions in order to make good arrangements that enjoy broad support on the development of the hydrogen market in the Climate Agreement later this year. We invite the PBL to share the latest national and international insights on the future of hydrogen with us when performing the calculation. In collaboration with the industry and other network managers, Gasunie will map out the potential and demand for hydrogen and hydrogen infrastructure. At the same time, they will engage in "joint fact-finding" together with participants of the Industry platform and scientific experts. One of the questions addressed at this time will concern the desired growth rate of the capacity for electrolysis towards 2030. The participants in the hydrogen manifest estimate its potential at 3 to 4 GW. All of this should contribute to a good decision-making process on the further specification of the programmatic approach.

3.3 Biomass

Biomass is used as an energy source in all sectors. Wood pellets are used as a replacement for coal in electricity production, biofuels are blended in with regular fuels in the mobility sector, animal manure is fermented in the agricultural sector for the production of biogas and woody biomass is used as a heat source in the industry and the built environment.

However, this use of biomass has been the subject of debate for years. There appear to be fundamentally different opinions about (1) the criteria biomass has to meet to be sustainable, (2) the question whether enough sustainable biomass is available and (3) the contribution of biomass to the reduction of greenhouse gas emissions. Some mainly see opportunities regarding the use of biomass, while others mainly point out the risks.

The use of biomass for emission reductions towards 2030 and 2050 was discussed by the sector platforms, but this did not result in concrete and broadly supported proposals. The Climate Change Conference has set up a temporary task force to ascertain whether any

shared starting points can be defined that will help the specification of concrete proposals that enjoy broad support in the second half of this year.

Sustainable biomass

The basic assumption is that the use of biomass should be associated with retention of biodiversity, soil quality and natural cycles, and should not lead to social malpractice and undermining of native cultures. Biomass should therefore be sustainable.

Currently, legal sustainability criteria only apply to specific biomass streams and applications. Additionally, many parties voluntarily use private certification schemes. Within the context of the new European Directive on renewable energy (REDII), steps will be taken towards harmonisation of sustainability criteria for (promoting) the use of biomass in the energy sector and for mobility. Harmonisation at European level will provide companies with the required clarity, but once RED II has entered into force, the parties could still find grounds to require additional sustainability criteria.

Availability of sustainable biomass

There is a difference of opinion on the potential availability of sustainable biomass worldwide. According to some, sustainable biomass is a scarce feedstock, and will be even more so once the global demand for biomass starts growing in the long term. Others point out the unused potential of materials such as pruning waste and biotic waste streams. They see opportunities to make use of that potential and reduce greenhouse gas emissions as a result.

The Netherlands is obviously not the only country that wishes to limit greenhouse gas emissions through the use of biomass. This gives rise to the question of what share the Netherlands should receive out of the globally available sustainable biomass. Opinions differ regarding the answer to this question. Based on the principle of fairness, it has been put forward that sustainable biomass and other scarce feedstocks should be distributed fairly, e.g. based on population size or gross domestic product. Another viewpoint is based on the functioning of the market and the international requirements for fair trade practices (WTO). In the latter vision, trade relations determine the volume of the feedstock stream processed by a country.

Even though opinions on the availability of sustainable biomass for the Netherlands differ, the parties do agree on the necessity of initiatives to increase the supply of sustainable biomass. These are initiatives that contribute to:

- making existing biomass streams more sustainable;
- gaining access to underused biomass potential, including via production and processing chains;
- increasing the production of sustainable biomass.

Priority applications of sustainable biomass

One basic assumption for the long term is that two applications deserve priority during periods when sustainable biomass is scarce:

1. the use of sustainable biomass as a feedstock for materials and products, e.g. as a replacement for petroleum and natural gas in the chemical industry. If these materials and products are recycled at the end of their service life, this will constitute almost permanent CO₂ storage in materials;
2. the use of sustainable advanced biofuels for modes of transport for which hardly any low-CO₂ alternatives are available, in particular heavy road transport, aviation and shipping. This is considered a bridging option, as long as there are no other options that make the use of biomass in these sectors superfluous.

As long as sustainable biomass is still being used on a limited scale for priority applications, biomass could also be used more widely as a bridging option. The following conditions have been put forward in this regard:

- Biomass should meet strict sustainability criteria, which are enforced.
- The bridging option should promote the supply of demonstrably sustainable biomass.
- The bridging option should promote the development of the priority applications stated. In this way, the multifunctional utilisation of sustainable biomass based on the principle of cascading can make the business case for the application of biomass as a feedstock profitable.
- When viewed along the entire chain, the contribution to the reduction of greenhouse gas emissions through the use of sustainable biomass should be maximised.

One side note to the latter condition is that there is a difference of opinion about the emission reductions achieved through the use of sustainable biomass. It has been agreed at an international level that emissions caused by combustion of biomass can be considered climate-neutral, as long as the existing sustainability criteria have been met. In practice, the net greenhouse gas emissions when using biomass as a fuel and feedstock depend on many factors. Uncertainty about actual emission reductions when viewed along the entire chain is currently limiting support for the use of sustainable biomass for electricity generation, green gas, low and high-temperature heat and biofuels.

Specification

So far, the debate on which sustainability criteria biomass will have to meet has not resulted in a consensus. The task force has therefore pushed for the development of a workable sustainability framework. This would allow the government to provide a guideline to all sectors where biomass is used as a fuel or feedstock.

When specifying the key points of the Climate Agreement, the parties will be able to anticipate limited availability of sustainable biomass in the short or longer term by:

- taking initiatives that increase the supply of sustainable biomass;
- using biomass as a feedstock rather than, or in combination with, the energy application;
- taking into account the greenhouse gas emissions actually avoided when viewed along the entire chain.

3.4 Towards an innovation agenda under the Climate Agreement

Across all sectors, the task to reduce emissions imposes substantial demands on the innovation capability of businesses, research institutes, civic organisations, public authorities and society as a whole. Commitment is required from all parties involved, as well as a holistic approach in relation to the three distinct tracks. This should result in a balanced and forward-looking package of measures that will enable us to achieve the climate ambitions. Creating focus and momentum will be key in this regard. The integrated approach will target:

- large-scale roll-out of proven techniques and measures that enable cost-effective CO₂ reduction in the short term, but for which there is currently no fully-fledged market;
- facilitating the further development of innovations by means of pilot projects and demonstrations that could help reduce emissions in the Netherlands and offer cost-effective options in the medium term (the period up to 2030);
- further research into the development of innovative solutions that could make a substantial contribution to the transition in the Netherlands between 2030 and 2050.

Sectoral innovation tasks

The sector platforms have submitted proposals with regard to their contribution to the emission reduction target and have outlined the knowledge and innovation tasks that will emerge in the period up to 2050. Those tasks will not exclusively relate to entirely new

solutions, but cover the entire innovation process – from basic and applied research to large-scale application. Indeed, the proposals of the sector platforms should promote fast, large-scale application of promising innovations and should ensure that their introduction onto the market does not founder as a result of restrictive market conditions or regulations.

A detailed description of the knowledge and innovation tasks within the sectors is provided in the working papers of the sector platforms. These will be worked out in greater detail in the second half of 2018.

Cross-sectoral innovation tasks

A number of innovation tasks will contribute to emission reductions across several sectors. A joint approach in relation to these cross-sectoral innovation tasks will create opportunities for acceleration and cost reduction. Based on the proposals submitted to date, the relevant innovation tasks, which are closely linked to the cross-sectoral topics listed in this section, are as follows:

- **Hydrogen** (green/blue) would be a suitable energy carrier for the transport and storage of electricity from sustainable sources (green) and climate-neutral electricity (blue). This is important for mobility (fuel for various modes of transport), industry (feedstock and fuel), the built environment (heat supply) and electricity (flexible and robust energy system). Hydrogen is also a key resource for the production of renewable feedstocks and fuels (P2X).
- The **biobased economy** will contribute to the reduction of greenhouse gas emissions through the replacement of fossil resources and fuel with plant and animal materials. The biobased economy brings together various sectors – agrifood, chemistry, construction, the energy sector and the logistics industry. New technologies will be applied (including various forms of biorefining and biotechnology), new value chains will be developed and new formats for cross-sectoral cooperation will be created.
- **System integration** (electricity, gas and heat) is an interdisciplinary challenge due to the fact that intermittent sources of renewable energy take up an ever greater share of the energy mix, whereas the share of fossil fuels is becoming smaller. In addition, transport, industry and the built environment will increasingly become electrified. This will raise questions such as where to use which energy carrier and at what scale evaluation and optimisation should take place. These in turn will lead to technological challenges (including system optimisation, storage and conversion, demand-side response, electrification, smart grids and digitisation), as well as societal challenges (e.g. the wishes and behaviour of end users, other market models and collaboration).

The challenge in terms of social innovation, although different in scope, is no less important. More than anything, the transition impacts how we live and travel, how we eat, what products we buy and how we earn a living. Dutch citizens are being asked to fundamentally overhaul the way they think and act in each and every sector. This social dimension is addressed in the crossover programme of the Creative Industry, ICT and Energy Top Sectors and must be developed further in the Climate Agreement and the envisaged innovation programmes. Key factors in this regard are future-oriented design and identifying what is needed to ensure that sustainability becomes self-evident. Research and experiments will need to show if and how design methods that are used to good effect in other sectors can also be applied in order to fulfil our climate ambitions.

Going forward

The innovation tasks identified by the sector platforms and the cross-sectoral innovation tasks will form the basis for an integrated knowledge and innovation agenda that will be developed in the second half of 2018. This agenda will cover the entire innovation chain – from fundamental and applied research through to market deployment. The agenda will define society's demand for research, development and innovation and will enable knowledge institutes, ministries and companies to incorporate the innovation tasks arising from the

Climate Agreement into their programmes without taking over responsibility. This requires a monitoring system for assessing whether the conditions for an effective innovation system are in place or whether adjustments are required. The innovation challenges create a need for a type of adaptive policy that responds to the dynamics of technological and social innovation, but which does not compromise on a stable and predictable articulation of the demands emerging from social missions.

4 Task forces

4.1 Labour market and training

The pace of and support for the energy transition are heavily dependent on the labour market and on training. Achieving the climate goals requires tens of thousands of additional professionals who are already hard to find. By contrast, workers in conventional industries will see their jobs lost or at risk, or will struggle to keep pace with all the changes. If targeted policy succeeds in making the energy transition a more attractive (investment) proposition, the transition will offer the Netherlands a wealth of opportunities, the first of which is a more sustainable future. Another will be the chance to lead the way in an innovative economy with future-oriented jobs from which more people can benefit. Failure to achieve this will significantly slow down the pace of the transition and drive up costs.

For the energy transition and climate policy to succeed and gain public support, it is crucial to capitalise on the economic and employment opportunities of this process, to deal promptly with possible bottlenecks on the demand side and to tackle social risks in an appropriate fashion. All of this requires integrated labour market policies.

Basic principles

The Labour Market and Training task force will provide advice to the sector platforms and the Climate Change Conference regarding targeted agreements and implementation programmes. The task force will review sectoral proposals using an integrated framework and contribute long-term solutions to the Climate Change Conference on this basis.¹⁷ The advisory report on Energy Transition and Employment prepared by the Social and Economic Council will underpin this framework.¹⁸ The starting principles and seven recommendations set out in the report will therefore be pursued by the task force in full:¹⁹

- Employers have a responsibility to help workers prepare for changing professional requirements. Workers must try to adapt to such changes to the best of their ability. Educational institutions must respond to the changing needs of the labour market when educating new talent, training workers and entrepreneurs and initiating innovation. A proactive response requires early and direct involvement of social partners in the sectors and regions.
- In view of the public interest and its role as a key driving force, the national government has a particular role and responsibility to fulfil through job placement services, investment in life-long training and additions to existing sectoral and other plans.
- Additional funds and other resources are required for the purpose of facilitating adjustment processes in relation to the labour market, education and training and enabling customisation. This will also create opportunities in areas requiring a sound approach and/or lacking in adequate social infrastructure. In these ways, the national government can contribute to a "fair transition".
- Where the selection and timing of measures is concerned, it is recommended to consider the adaptability of labour markets as well as future trends in the supply of and demand for education and training programmes.
- New and existing jobs must be of an adequate standard in terms of employment conditions, labour relations and working conditions.

¹⁷ Engagement letter for the Labour Market and Training task force, 28 March 2018.

¹⁸ Government strategy on the climate agreement, 23 February 2018. House of Representatives, 2017-2018 session, 32 813, No. 163.

¹⁹ Social Economic Council (SER) (2018) Energy transition and Employment. Opportunities for a sustainable future. Advisory report 18/03.

Seven recommendations for an integrated approach to the labour market

- integrated human capital agendas featuring coherent and widely supported labour market agendas for the medium and long term, which also address social impacts. Similar to the care sector, a plan may comprise national agreements and regional action plans;
- translation of national and sectoral agreements into regional economic agendas, with regional initiatives together leading to the achievement of national targets. It is also necessary to connect regional labour market and employment policies with sectoral activities (collective labour agreements, education & training and social plans);
- flexible, modular and responsive education programmes that are embedded in a strong, positive learning culture and build on good initiatives and structures that are already in place;
- an inclusive approach that includes agreements to make better use of the available labour potential. This includes, for example, increasing the number of hours worked and promoting women's participation in the labour market, as well as offering opportunities to people with occupational disabilities, who can take on more complex work as a result of new technology;
- creating good terms of employment, working conditions, labour relations and employee participation, as well as the social infrastructure required for this, in new and existing subsectors that play a role in the energy transition;
- improving information regarding regional and sectoral labour markets and better insight into the future needs of the labour market. This information is necessary, amongst other things, for systematic monitoring of the effects of measures per climate platform and for carrying out a practical impact analysis. In addition, it will be necessary for the task force to carry out or commission research into the impact of the energy transition on labour productivity within the sector;²⁰
- compensating for job losses in a fair and inclusive manner by preparing workers in good time for job loss, facilitating their development and mobility and mitigating employment-related and social consequences in an appropriate manner wherever existing facilities are insufficient. In its advisory report, the Social and Economic Council (SER) proposes a consultation between the government and social partners on the manner in which the national government should fulfil its social responsibility in terms of ensuring sufficient funds – a coal fund – for a socially responsible solution to the employment-related and social consequences faced by workers in the extensive coal chain who risk losing their jobs as a result of the closure of coal-fired power stations. Such tailor-made measures for a specific category of workers would ensure a coherent approach.

Strong, innovative and effective partnerships

The scope of the challenge calls for a joint, long-term commitment across the sectors. *All participants* in the climate platforms must deliver a contribution and work together in strong, innovative and effective partnerships. This requires a dynamic and coordinated link-up between high-quality initiatives and existing structures within the regions and sectors (such as the Top Sectors, the Technology Pact, the Industry Coalition, the Construction Agenda, *GroenPact* and Education Agreements). In order to ensure the energy transition continues apace, it is essential to drive technological and social innovation forward. The approach in the area of education and development must dovetail with efforts in the context of the circular economy. Alignment must also be sought with the wider approach being implemented by the government, social partners and the Social and Economic Council (in its role as the key driver of life-long development), in collaboration with educational institutions, stakeholders, sectors and regions. Authorities could assume a far greater role at a local level than they do at present, including in areas such as information provision, activation, collaboration, good

²⁰ Current technologies appear to render energy production more labour-intensive, as more workers are needed to produce our electricity and heat. Technological innovation must prevent a loss of welfare by offering smarter methods of implementing the energy transition.

employment practice and sustainable procurement. Again, effective coordination is crucial to ensure that the sum of regional initiatives matches the national goals.

Phasing is a key area for attention. Finding and training thousands of new workers is an urgent requirement in the short term, as is the mitigation of social risks and safeguarding job quality. However, addressing these aspects alone will not be sufficient. A sustainable reduction in the quantitative, qualitative and regional mismatches on the labour market demands efforts to coordinate job opportunities, attractive employment propositions and continued development of workers and businesses. To achieve this, the technical and social innovation of the energy system should go hand in hand with the development and (anticyclical) schooling of workers. In this regard, ensuring that any temporary solutions in response to shortages do not result in the suppression of sustainable long-term employment is crucial. Long-term investment will create scope within the labour market to cope with the extended transition phase.²¹ The challenge to include future generations in this process begins with the education provided today.

A coherent approach must include a keen eye for dilemmas. On the one hand, the aim will be to help workers in declining professions find other work in good time. On the other hand, workers will still be required for operating coal-fired power stations until their closure, maintaining the gas network, etc.

Challenges for the individual sector platforms

The five sector platforms have each contributed (and continue to contribute) solutions that could help in developing an approach to tackling the challenges they face.

The **industry** sector has identified a great shortage of well-trained staff, particularly in the installation and maintenance sector and in manufacturing. Another challenge will be how to include workers and employers in the changing nature of the work. The oil and gas exploration and supply industries will be impacted by job losses. The aim of the sector platform is to focus on greater direct and lateral inflow, business investment in workers, more flexible education and innovative regional collaboration.

In the **electricity** sector, network operators and parties in offshore wind in particular face worker shortages, which is causing project delays. In these and other areas where new sectors are emerging, attention also needs to be given to working conditions (health and safety). Job losses will impact coal-fired power stations and may affect gas-fired power stations as well. The challenges revolve around labour mobility, "life-long training" and compensating for job losses.

Businesses in the **built environment**, including network operators, installers and construction companies, draw their incoming workers from the same pool as the electricity sector. The fast pace of innovation also requires continuous development of the current workforce. The challenges call for a cross-sectoral approach and smart use of the workforce. Innovative work processes and technological, social and process innovations need to receive a boost in order to resolve capacity issues, whilst being mindful of workmanship, working conditions and employment conditions. The regional energy strategies provide a reference point for the approach in relation to the labour market.

The shortages faced by the **mobility** sector mainly relate to the installation of the 2.8 million charging stations for electric cars (the number currently stands at 133,000). Greater efficiency is possible by installing charging infrastructure as part of sustainability improvements in buildings. E-mobility gives rise to a second challenge in terms of an

²¹ The government's temporary boost to the energy transition is creating additional jobs. However, it is currently difficult to predict whether there will also be additional employment over the long term.

increased focus on IT competency and new technical skills for car mechanics. Safety aspects must also form part of this. The goods transport sector may see job losses in the longer term.

The **agriculture and land use** sector does not expect to see any major worker shortages or surpluses, although the nature of the work will change drastically and a higher level of training will be needed in some instances. The challenges in this regard will revolve around including workers in what are often small businesses, renewing education and actively promoting dissemination of knowledge.

Specification

The Labour Market and Training task force will focus on the second half of 2018, during which period each sector platform is set to develop, and prepare calculations for, a more specific climate approach. The task force, in its capacity as commissioning party, wishes to make an active contribution to the preparation of calculations in order to generate a maximum amount of actionable information. The task force will use this and other information (such as that published by the Employee Insurance Agency), as well as the ongoing dialogue with the regions and sectors, to map out the social consequences and will then:

- a) in collaboration with (groupings of) sectors and regions, agree specific actions and implementation programmes for the labour market and training in relation to the desired energy solutions; and
- b) recommend long-term solutions to the Climate Change Conference for an integrated approach linked to these energy solutions and their implementation.

The objective is for each climate platform to create a specific sectoral/regional implementation agenda, with a cross-sectoral approach as appropriate. This will include a joint, substantiated agenda for the labour market, which defines a transition perspective, actions and resources for each stakeholder and links between national/sectoral activities and activities at decentralised/regional level. The task force will support the climate platforms in the formulation and elaboration of coherent agendas. A number of cross-sectoral labour market and training tasks will be relevant in this regard:

- **the task to attract new workers in large numbers.** Businesses are experiencing ever greater difficulty in attracting technically trained graduates from senior secondary vocational education and universities of applied sciences (in areas such as installation, construction, manufacturing, ICT and energy). One aspect of this task will be to appeal to other groups and increase mobility, including between sectors;
- **the task to provide timely, effective and social provisions if there is a risk of job losses.** A large number of workers in declining professions will be able to transfer to sectors facing shortages if there is pro-active intervention with high-quality retraining and job placement. In the unfortunate event that work cannot be found for all individuals affected by job losses resulting from the transition, it will be essential to provide appropriate provisions (similar to the coal fund) for those who have no agreements, facilities or schemes they can rely on;
- **the task to boost development of workers, businesses and education** in areas where occupations are set to change drastically (including installers, agricultural workers and car mechanics). This calls for a strong learning culture, which enables individuals to learn in the workplace, through an accessible learning infrastructure that offers flexible, responsive programmes and includes a greater focus on certificates and recognition of prior learning (RPL innovations). To this end, the technical education sector has need of more resources, adequate numbers of teachers (some of whom could also be employed in the private sector), increased collaboration with businesses and flexibility in national frameworks. There is also a desire to develop more creative methods to better serve and involve new groups, such as holders of a residence permit. At present, workplace learning and available training opportunities do not sufficiently reflect the needs of a learning and changing labour market;

- **the task to safeguard the social infrastructure within each sector.** The energy transition will lead to the creation of new sectors and subsectors where organised consultation and agreements on employment conditions, labour relations and participation between social partners are either non-existent or limited. It will be important for social partners to set up the required infrastructure in these sectors as well;
- **the task to use innovations in order to make work manageable in sectors suffering shortages.** Technological and social innovation will not only create opportunities for involving new groups, including those further removed from the labour market, but will also provide scope to ease current workloads through the use of machines and robots. Innovation of the energy system must therefore be combined with involving and developing both workers and job seekers. This means the shop floor must also be included in changes and adaptations in organisational culture. In addition, it will be important to find smarter ways of organising tasks split across sectors around the available human resources.

In the coming months, the task force will work with the sector platforms, the Social and Economic Council and other stakeholders to define the various items in greater detail.

4.2 Opportunities for market financing

Investments will be required in order for the energy transition to succeed. A lot of money is available on the market for financing sustainability initiatives. However, projects and money fail to find each other too often right now. In the future, the Climate Agreement as a platform will offer an opportunity to bring supply and demand together. The Financing task force, which brings together representatives from banks, insurers, pension funds and Invest-NL, has looked at what would be needed to achieve this.

Over the past years, it has often proved difficult to adequately match the financing needs of project initiators with the financing options available from market parties (banks, insurers, pension funds and asset managers). From the perspective of finance providers, the following obstacles play a role here:

1. There is an information gap between project initiators and investors as regards financing arrangements and the role expected of investors.
2. Investors want to see a clear goal on the horizon and clear direction in major projects.
3. Some of the investments required for the energy transition are insufficiently profitable or not profitable at all at this time and/or carry a risk that exceeds or is perceived to exceed the acceptable level.
4. The pre-competitive risk/return profile of some projects excludes conventional financing options.
5. Many projects have too small a scale to be viable for financing.

Project initiators often find it difficult to establish whether a project might be viable for financing and which parties they might turn to for financing. Financial institutions will only consider their own interests when assessing the financeability of a project, and not those of other parties.

Recommendations and specification in the second half of 2018

In the second half of 2018, the Financing task force will issue recommendations on the financeability of concrete projects from the Climate Agreement platforms, using the financing guide that has been developed. In addition, there will be active collaboration with project initiators to develop tailor-made solutions as needed.

The task force has also identified specific starting points for creating a better match between the demand for and supply of financing. Recommendations have been submitted to the financial sector, initiators who are also members of the platforms and the government. They have laid the basis for further specification and collaboration within the context of the Climate Agreement.

The financial sector must better align its offering to needs and map climate effects

The task force urges the financial sector to work towards the further development of cross-sectoral forms of financing. Enhanced coordination between banks, insurers, pension funds and asset managers with regard to the forms of financing they can offer will bring the offering closer to the financing needs of initiators involved in the energy transition.

Financial institutions are also advised to measure, externally report on and consider the climate effects of all investments when shaping their investment policy. This would be a sensible strategy to limit the risk of future losses on what are known as "stranded assets". The majority of Dutch banks and a number of insurers have expressed their aim to establish the climate footprint of their entire investment portfolio. It is important that this be taken up more broadly, and the Financing task force is reviewing how this might be achieved.

Initiators who are also members of the platforms must ensure sufficient scale

The ability of market parties to offer financing hinges on sufficient scale. Achieving sufficient scale through clustering forms part of the structuring efforts that are required before projects can obtain finance. Another part of this is having a clear overview of the risks, the return and the type of financing being sought.

Banks, insurers, pension funds and asset managers are unable to provide financing unless the risk/return profile is in line with market conditions. The task force has prepared a financing guide in order to offer assistance in identifying the right type of finance provider for a project. The government might have a role to play where initiators are unable to bring about clustering themselves. Provision of transparent coordination would create scale and ensure the risks are insurable. The lack of a clear revenue model means this role will not automatically be taken up by a market party.

The government must establish a robust framework and consider broadening the remit of Invest-NL

Whether projects and initiatives in the context of the Climate Agreement are viable for financing by market parties depends heavily on external factors, including future developments in energy prices, CO₂ prices and future provision of subsidies under the SDE+ subsidy scheme. In more general terms, this means financeability depends greatly on the robustness of the future prospects to be created by the government and the Climate Agreement. The national government will need to take a clear lead in order to embed a sustainable and consistent approach, which in turn will be crucial to building long-term commitment.

To be able to accelerate the flow of private financing to sustainable projects, it also appears necessary to ensure the remit of Invest-NL is clear and complementary to the market. Blended finance, which involves combining different financing instruments (such as loans, guarantees and/or equity) with subsidy instruments, will be key to increasing the financeability of high-risk propositions. The proposed Invest-NL fund could play an important role in such financing arrangements, provided it is given a fitting mandate and will not be tied to the risk/return requirements applied by commercial finance providers. This means the mandate as currently proposed needs to be broadened.

5 Civic participation

The Climate Agreement will touch upon all aspects of life – housing, transport, food, the products we buy and the way we earn our living. From a citizen's perspective, the transition is not a series of individual decisions, but an issue that impacts on their and their children's quality of life and on other aspects of their direct environment.

Many of the proposals in relation to the Climate Agreement discussed within the sector platforms will have an impact on cities, towns, districts, dwellings and workplaces. The manner in which citizens will deal with this impact will in part be determined by other issues present at those levels. Citizens' readiness to make their own contribution to the transition will depend as much on previous experience, local circumstances and the social infrastructure around them as the financial implications, if not more so. This means participation will be critical to the feasibility of the Climate Agreement.

Whereas individual citizens will not be able to participate in the sector platforms discussing the national Climate Agreement, they will in time come across the plans and projects. This is why efforts over the past months have also included fostering civic participation. By this, we mean consultation or active engagement of citizens, such as offering them an opportunity to be part of or participate financially in local projects or asking their advice or input for the planning phase that precedes such projects. Another option is for the government to consult with citizens when developing policy at a national level.

At the initiative of the Climate Change Conference, the National Platform for Public Participation in Environmental Policy (*Nationaal Platform Burgerparticipatie bij Omgevingsbeleid*, NPBO), in collaboration with the *Buurkracht* initiative and climate agency HIER, organised interviews that were attended by a total of just under 200 citizens. The aim was to better understand the wishes and concerns of citizens regarding climate change and climate policy, and to establish specifically the manner in which citizens would like to be involved in the further elaboration and implementation of the Climate Agreement.

The interviews revealed that citizens are aware of the enormity of the task and that painful choices will be part and parcel of this. Although not everyone accepts the need for change or is willing to make an active contribution, large groups of citizens have already taken action themselves. Active participation by citizens unlocks a wealth of knowledge and experience and increases the chances that individuals will develop a sense of ownership with regard to the plans. Citizens expect the government to provide leadership and frameworks and to simultaneously allow scope for own initiatives.

Concerns and wishes

Citizens expect local and national authorities to show themselves to be reliable, pursue consistent policies and listen to them. This holds true for a wide range of policy domains, but in particular for policies leading to interventions in the living environment. Any failure on the part of a government to meet those expectations gives citizens cause for frustration, which can turn into outright mistrust. This is the experience of citizens who feel their objections to a wind farm have not been taken seriously, as well as that of community cooperatives who do not feel that they are being supported in the implementation of sustainable energy projects.

The necessity of a transition is widely acknowledged. However, whenever this leads to difficult choices for citizens in their own environment, they set high demands with regard to the quality of the planning and policy process. They call for proper substantiation, reliable information and transparent assessment of interests. Citizens' readiness to take action themselves drops off rapidly if they get the impression that arguments do not add up, information is one-sided and the weighing of interests is based on double standards.

A third wish that emerged clearly from the interviews with citizens is that the Climate Agreement must manage the benefits, burdens and powers fairly. This frequently heard call for fairness is multifaceted. For example, citizens feel that any burdens should be shared fairly between them and businesses. For many, it is inconceivable to many that large-scale users pay relatively lower prices for their energy and that the aviation and shipping industries are out of scope. The same applies for subsidies granted to individuals who "could afford to pay out of their own pockets". However, fairness is just as much about the equitable distribution of financial benefits and burdens as it is about the division of powers. To be able to gain a sense of ownership about climate plans and projects, citizens ask that they are promptly included in a professional planning process and that they are given decision-making powers subject to appropriate limits. As was noted in one of the interviews with citizens, "many will only want to participate if they can have a say".

Active role in specification and execution

The transition requires the participation of citizens in order to succeed, and many are keen to take up an active role in the implementation of the Climate Agreement. To make this possible, the right conditions must be put in place when the Climate Agreement is developed further, as scheduled for the latter six months of this year. Three conditions can be determined on the basis of the interviews.

The first is that the Climate Agreement must provide a robust policy framework that establishes goals and generic preconditions for the Netherlands as a whole and that simultaneously offers sufficient flexibility for customised implementation at a local level. Together with provinces and municipalities, the national government could set quantitative climate goals for 30 regions in our country, based on a transparent process and reliable information. It would then be up to the authorities, businesses, organisations and citizens in the regions to determine in mutual consultation how those goals could be achieved.

The second condition concerns the coordinating role with regard to the transition at local and regional level. Many citizens consider municipal authorities a natural fit for this role, although they do place a number of demands on the manner in which they would fulfil the role. One of these is that the municipal authorities should work with citizens' initiatives and other active players in society as a reliable partner, based on clear rules and a transparent division of roles. Active citizens also expect their municipal authorities to offer them support for their initiatives. Their willingness to act on a voluntary basis will go a long way, but more will be needed. Municipal authorities also ought to invest in competencies and knowledge, so that civil servants continually improve their ability to deal with active citizens and social resistance.

A third condition is that the focus of local approaches should be on individual citizens and the local community in a town or district. A consumer-oriented approach for energy savings and sustainable energy in a district can lighten the load for individual citizens, but will do nothing to reinforce social networks. These networks play a critical role in building continuity and pace into the transition. Community spirit and shared ownership can be enhanced by involving local residents at all project development stages – the formulation of specific plans, the selection of the location and the financial underpinning. With this in mind, the Electricity sector platform, for example, has set an ambition that half of the local wind or solar-based production should be owned by the local community. The arrival of community wind farms is proof that even financially complex and radical projects are feasible, provided the community as a whole benefits.

Specification

There will be a follow-up to the interviews with citizens in the second half of this year, guided by the following proposals:

- The Netherlands Institute for Social Research will be involved in order to better incorporate the socio-cultural aspect of the transition in planning.
- Provisions will be created to offer local support to citizens in the form of funds or knowledge, in order to make their contribution to and participation in the planning and projects more effective.
- Insights from these interviews with citizens will be translated to a civic participation strategy for regional energy strategies, district-oriented approaches and local and regional energy projects.
- A broad public campaign will be developed to highlight the urgency of the transition and offer encouragement and perspectives for action to groups of citizens who are not convinced of the need for action or who are unsure how to take action.

6 Spatial task

Spatial planning experts have been participating in the sector platforms from the outset, and with good reason. The Climate Agreement will be one of the greatest tasks for spatial planning in the coming decades. The transition will have a significant impact on physical living environments. The space requirements of a sustainable energy system are greater than those of a fossil-based system, and different systems will be in operation alongside each other for an extended period. The visible presence of renewable energy will also be greater, as cities and landscapes will look different due to the transition. As a result, people will be directly able to see and experience the transition in their living environment.

Effective spatial planning – above and below ground, as well as onshore and offshore – will be critical to the climate and energy transition. This is necessary, on the one hand, to ensure the transition is properly shaped from a spatial planning perspective – the right balance must be struck with other interests, and consideration must be given to the quality of the living environment and public support. On the other hand, there is a need to find sufficient space for the transition and to combine it with other challenges. In the Netherlands – where every square metre already has one or more designated uses – this space is not automatically available. This makes a good spatial approach to the transition, including making spatial choices that can have a far-reaching impact, a necessary condition for achieving the climate targets.

Local authorities play a key role in this area, as they are responsible for specifying the measures in the physical living environment. They will also take a leading role in the Regional Energy Strategies (RES), which represent the regional approaches for the challenge around onshore electricity production (locations and networks) and the heating transition in the built environment in particular. Local authorities will also be responsible for incorporating spatial aspects in environmental visions at provincial or municipal level, environmental by-laws and environmental plans.

Spatial links between the sector platforms

Spatial designers acting as independent experts for the sector platforms have visualised the spatial effects of the proposed measures and illustrated by way of spatial designs how the climate and energy transition can be combined with other social tasks in the living environment.

The spatial analyses prepared by the experts point to a number of interconnections, which have been addressed in the process to date. An example is electrification in mobility, the industry and the built environment, which represents a significant challenge for the Electricity sector platform. This reinforces the need for proper spatial integration of production, storage and transport. However, consideration should also be given to the space that will be required for electrification in the remaining sectors. The Electricity sector platform bases its evaluation of measures on spatial principles, which include ensuring that land use is conservative and serves multiple purposes wherever possible, bringing supply and demand together and combining tasks.

It has also become apparent that a region-specific approach will need to be adopted. Each region differs in terms of its characteristics, history, stakeholders and way of interacting with the local area. A region-specific approach will be crucial in the context of the Agriculture and Land Use platform, in view of the fact that a significant number of measures are closely linked with region-specific characteristics. In the built environment, spatial variation in aspects such as building characteristics, densities and available resources will be key in determining local problem-solving approaches. Possible solutions will therefore vary from district to district. A district-oriented approach also offers opportunities to combine the transition with challenges

such as climate adaptation, rising urban density and greening, as well as the challenges in connection with mobility, including the charging infrastructure and the associated energy supply. Where electricity is concerned, the district-oriented approach will identify space for production, storage and transport in combination with other spatial challenges, with a focus on spatial quality.

As regards further specification, the independent spatial experts have requested that specific attention be paid to the following topics:

Assure spatial quality

Spatial quality is not just a question of aesthetics, but a guarantee for a good quality of life in cities and landscapes that need to accommodate substantial climate and energy tasks as well as several other uses of and tasks in the living environment.

Recommendation: incorporate spatial quality in the specification of the Climate Agreement from the outset and assess each choice and measure in terms of spatial quality.

Seek out promising combinations

There are various promising opportunities for combining the climate and energy transition with other tasks. For example, changes in agricultural functions, such as matching crops to the soil, forestation and creating wetland habitats, could be combined with the production of renewable energy. Energy storage and/or grid upgrades for electrification in the built environment, mobility and the industry could be combined with other tasks (in urban areas).

Recommendation: ensure that, in the specification, links are made between the measures themselves and with other tasks. Seek out promising combinations with matching instruments.

Development of a sectoral or cross-sectoral strategy for spatial resources

The spatial implications of incorrect use of resources could be major. If residual heat from the industry is used to heat the poorly insulated offices of a random, sympathetic owner, this could mean a nearby greenhouse complex would need to be electrified, which would result in a corresponding claim on space for the required energy production and energy infrastructure. Consideration also needs to be given to the use of biomass. The domestic supply is limited and imports would take up a great deal of space (a large number of ships in harbours, storage and transport throughout the Netherlands, in addition to the impact in the country of origin). This means use should be focused on areas such as the industrial sector and the shipping industry, where there are no viable alternatives.

Recommendation: develop a nation-wide resource strategy, together with regional and local resource strategies. In these strategies, focus on matching resources and demand from the perspective of the entire chain (and specifically include the space required for generation, storage and transport).

Time frame in relation to spatial planning

The transition will not be linear in nature and developments will not follow in perfect chronological order. Fossil-based, sustainable and hybrid systems will overlap each other in time. This means extra space will need to be allocated in harbours and other areas. Moreover, a successful transition in the period leading up to 2050 requires that the initial foundations for the period after 2030 (such as large-scale expansion of networks) must be laid before 2030 and also that some system choices must be made now, for example with regard to the building of heat infrastructure. Failure to take this decision now might mean that, if districts have (in part) switched to all-electric by 2030, they may no longer have cost-effective options to install any district heating that might be needed to achieve the 2050 goals.

Recommendation: assess all measures in connection with the Climate Agreement against the 2030 goals as well as the 2050 goals. In doing so, focus on the spatial implications of having different systems in operation alongside each other, documenting space allocations and making system choices in good time.

Specification

Once the PBL has published the outcomes of its calculations, the spatial aspect of the Climate Agreement must be defined in a greater detail as a topic within the Climate Agreement, within the National Environmental Vision and in close coordination with the elaboration of the Regional Energy Strategies (see Chapter 7).

7 Regional strategies

Regional Energy Strategies (RES) are key to implementing the ambitions in the Climate Agreement. They are instruments for facilitating community involvement in spatial integration. The objective of the RES is to achieve careful spatial integration of renewable energy generation that is acceptable to society, whilst focusing on the required infrastructure. The RES are used to structure the collaboration between public authorities and their social partners, and to promote acceptance of the energy transition throughout society.

The RES will lead to decision-making in the environmental policy (environmental vision, environmental plans, environmental programmes and environmental by-laws). The contribution of social partners will be essential in this context, not only in terms of awareness-raising and acceptance, but also to be able to make optimum use of the knowledge, implementation positions and capabilities of the various parties. Consequently, the energy transition also presents an opportunity to promote democracy and social cohesion in the Netherlands.

What will the RES cover?

The RES will have a solid foundation in knowledge for a proper fulfilment of their strategic function. RES will include:

1. an overview or analysis (offering a rationale for the supply) of:
 - the region's current energy consumption and CO₂ emissions;
 - infrastructure plans, also in relation to networks, and current projects in the region;
 - spatial and other potential for renewable energy (production, storage and infrastructure);
2. potential for and supply from sustainable heat sources;
3. potential for and supply from renewable electricity generation;
4. overview of the implications for infrastructure, in close collaboration with network operators;
5. regional approach in relation to goals set at national level, such as the generation of renewable electricity on government-owned land.

The RES are used to lay down the regional approach, specification and translation of the national agreements from the Climate Agreement. The focus will be on the spatial integration of the demand for and supply of energy, and in particular the heat supply, energy infrastructure and storage in the region, as well as the task in connection with renewable energy generation. These strategies will therefore show the greatest overlap with the Electricity and Built Environment sector platforms. However, common aspects will also exist in relation to Mobility (charging infrastructure) and Agriculture and Land Use (renewable energy generation and peat grasslands). Regions will be free to consider a range of sectors in the RES.

The RES serve as input for spatial planning development at provincial and municipal level (instruments based on the Spatial Planning Act (Wro) and in future the Environment and Planning Act), as well as for water policy programmes set by water boards. Use of spatial planning principles will ensure attention is given to spatial quality at an early stage.

The RES will take account of the interaction with related social tasks highlighted in the Inter-Administrative Programme (IAP): climate adaptation, the circular economy, the home building challenge and rural prosperity.

Process for further elaboration

The regions will work together to meet the national climate challenge.

In the area of renewable electricity, development of an allocation system will begin in 2018, supported by the PBL and other knowledge institutes. This system will be put into action if it is found in the summer of 2019 that the RES, when taken together, fall short of the target. However, rather than waiting until this time, we will already begin preparations in the autumn of 2018. Responsibility for the ultimate allocation of this task rests with regional authorities.

With regard to the built environment, the RES will be used to visualise (residual) heat sources and the need for infrastructure within the region, and to match supply and demand.

In formulating the RES, a working structure will be set up to involve the relevant parties (network companies/network operators, the energy sector and green partners) at regional and national level. The working structure will be tasked with monitoring progress and identifying and addressing obstacles. Authorities and social partners at national level will also be able to hold each other to account with regard to progress, outcomes and preconditions. Administrative escalation will take place in the working structure. The escalation mechanism will be laid down in specific detail and supplemented as appropriate in 2018. The working structure applicable to the RES will become part of the governance of the National Environment Vision for the spatial frameworks and the governance of the Climate Agreement as far as other topics are concerned.

If any trade-offs need to be made between the reliability and affordability of the energy supply, spatial quality and other local or national interests, the authorities involved in the process will be responsible for arranging consultation.

Building up knowledge and competency will be of critical importance. Authorities must be able to rely on a clear and professional knowledge infrastructure comprising calculation methods and data sets. Objective, targeted knowledge and accessible and reliable expertise can prevent unnecessary disputes with regard to the facts and ensure strategies are quantifiable and comparable. Knowledge at several levels is necessary with regard to energy use and saving potential, the guidelines for the built environment, and the spatial potential, costs and integration possibilities for renewable energy. Organising this knowledge is a key element of the systemic responsibility of the national government.

Planning

The preparations, division into regions and analyses will commence in September 2018. In addition, uniform countrywide principles (data sets and energy models) will be elaborated in tandem with the arrangements required for that purpose in the Climate Agreement, so that it will be possible to quantify and compare the RES. The relevant parties (network companies/network operators, the energy sector and green partners) will be included in this at regional and national level.

Different government authorities will also work together to develop a draft National Environmental Vision (NOVI), which will list guiding principles in relation to spatial planning.

After the signing of the Climate Agreement, the development of regionally supported RES will be officially launched through the adoption of a "preliminary memorandum". This will include the definition of uniform countrywide principles by the executives of municipalities, provinces and water boards, and decisions regarding the regional challenge in the context of the RES.

In June 2019, each region will have completed a draft RES. If the sum of the RES fails to match the nationally agreed ambitions, the allocation system that has been developed by the local authorities will be applied to ensure that the regional specification of the national task will have been allocated by late 2019. If efforts prove unsuccessful, use will be made of an

allocation system developed by the local authorities in cooperation with the PBL and other knowledge institutes.

In early 2020, the RES results will then be incorporated in the environmental policy of the relevant public authorities. In autumn, discussions will be held to discuss how and at what pace the outcomes of the RES can be incorporated into the environmental policy of the government. Evidently, the RES should not give rise to delays with regard to initiatives that are already in line with existing spatial policy. Where required, temporary policy frameworks will be developed to prevent this.