



PBL Netherlands Environmental  
Assessment Agency

# CLIMATE AND ENERGY OUTLOOK OF THE NETHERLANDS 2022

ENGLISH SUMMARY OF THE FULL DUTCH REPORT  
'KLIMAAT- EN ENERGIEVERKENNING 2022' (KEV)

**December 2022**

## Colophon

### **Climate and Energy Outlook of the Netherlands 2022 — English summary of the full Dutch report 'Klimaat- en Energieverkenning 2022' (KEV)**

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### **KEV consortium**

The Climate and Energy Outlook 2022 was created in a collaboration between PBL Netherlands Environmental Assessment Agency, TNO Energy Transition, Statistics Netherlands (CBS), Netherlands Enterprise Agency (RVO) and the National Institute for Public Health and the Environment (RIVM). Wageningen University & Research conducted the projections for livestock and arable farming and land use.

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# Summary

## About the Climate and Energy Outlook 2022

### ***Rationale and objective of the Climate and Energy Outlook (Klimaat- en Energieverkenning, KEV)***

The Dutch 2019 Climate Act requires PBL Netherlands Environmental Assessment Agency to publish an annual Climate and Energy Outlook. In these outlook reports, PBL describes past, present and future trends in greenhouse gas emissions and developments in the energy system in the Netherlands. It also describes the contribution of national climate and energy policies to these developments, and takes into account, insofar as possible, current developments in other policy areas that affect greenhouse gas emissions, such as nitrogen policy, as well as developments outside the Netherlands. The outlook report is used to verify projected developments against major national and European climate and energy targets.

### ***Unrest and shortages in energy markets lead to greater uncertainty in the projections***

This year's Climate and Energy Outlook is published in an exceptional context marked by great uncertainties. The geopolitical tensions resulting from Russia's invasion of Ukraine are leading to unprecedented anxiety and shortages on the energy markets. Prices of all fuel types have increased sharply and in Europe there are concerns about the security of supply of natural gas for the coming two winters. High energy prices are causing households to worry about their ability to pay the energy bill. High natural gas prices are leading several businesses to cease production. Rising inflation will have a decelerating effect on economic growth. These developments will have a major impact on the economy and the energy market in coming years.

This outlook report uses the expected energy prices for the coming years from an advice given by the European Commission to Member States in April 2022. The EC's advice is meant to be used in the Member States' national reporting in 2023 on matters such as projected greenhouse gas emissions (EC, 2022a). In the advice, the expected prices for the next few years are substantially higher than the assumptions we made for the Climate and Energy Outlook 2021. For later years, up to 2030, the price projections in the EC advice are also higher than the prices used in last year's outlook report. The estimated oil price for 2030 is 40% higher than in the 2021 outlook, for natural gas it is 60% higher and for coal 23% higher. The situation is so exceptional that the projected prices for natural gas and electricity in this year's outlook are completely outside the range used last year.

Due to the high natural gas prices, considerably less natural gas is being used, especially in the chemical and refining industries, and several companies that consume large amounts of natural gas or electricity have partially or completely shut down energy-intensive installations. For this year's projections, we assumed that in the next few years production will return to the level of recent years, but over the entire range we have taken into consideration that part of the production will remain at a lower level. High natural gas and electricity prices are expected to cause greenhouse horticulture to shift to less energy-intensive cultivation. With regard to the built environment, we expect a lower heating demand as people are trying to save money on heating. The higher oil prices

assumed in this report contribute to a more rapid growth in electric vehicles. In the uncertainty ranges, we have factored in the projected impact of further price deviations in 2030, from even higher to somewhat lower levels.

In September 2022, in response to the huge price increases, the European Union called for an emergency intervention in the European energy markets, and the Dutch Government has been working on a temporary price cap on natural gas and electricity since this year's Budget Day (20 September 2022). It was not possible to include these two recent developments in this year's outlook report, as they focus mainly on the short term and it is as yet unclear what the longer term effects will be of the geopolitical tensions and the higher energy prices. Due to the high energy prices, demand will fall and it will become interesting to develop new sources of energy, which means energy prices can be expected to decrease, over time, from today's high levels. But uncertainty about the way markets will evolve and the breadth and pace of price adjustments will remain.

### ***Further uncertainty from infrastructure constraints, labour shortages, material shortages, and issues around nature permits and nitrogen***

There are also other uncertainties that are becoming increasingly prevalent, such as the limited capacity of the electricity grid, a tight labour market and shortages of materials. In addition, the issues around nitrogen are posing a heightened risk of delays in new building projects, for example in the context of the energy transition. Building projects that emit nitrogen during the actual construction phase and those that are required to obtain a specific license under environmental and nature regulations are now making use of the 'construction exemption' for nitrogen. At the time of publication of the Climate and Energy Outlook, this legal move was under review in an appeal case before the Council of State. A ruling was issued on 2 November 2022.

This outlook takes into account a number of known limitations in the electricity infrastructure. These include constraints around the connection of an additional 10 gigawatts of offshore wind power in 2030 and 2031, constraints on infrastructure for industry, and on charging infrastructure for electric trucks and for charging stations, and the maximum feasible onshore generation of renewable energy in 2030 — provisionally considered to be 35 terawatt hours, following from research carried out by grid operators within the framework of the Dutch Regional Energy Strategies.

### ***Level of ambition has gone up with new climate targets***

The 2021 Coalition Agreement brought the ambition level of Dutch climate policy in line with the latest European ambitions. The national target for the reduction of greenhouse gas emissions by 2030 was 49% in 2019, was then moved up to at least 55% and now also includes emissions from land use. To achieve the target with sufficient certainty, the government intends to aim for an emission reduction of 60% by 2030 in the elaboration of its climate policy, so that even in the case of setbacks the 55% goal will not be at risk (EZK, 2022b). Experience shows that meeting climate and energy targets can be difficult. For example, the 2020 Urgenda target (target set after court case by the Dutch Urgenda foundation) aimed to achieve a 25% reduction in greenhouse gas emissions compared to 1990; in the end, the target was not achieved until in 2020, but this was in part the effect of mild weather and the effects of the COVID-19 pandemic. For 2021, however, preliminary figures are putting emissions slightly above the Urgenda target.

### **Climate policy programme still largely needs to be worked out in detail**

The government has outlined the Dutch climate and energy policy, which focuses on targets for 2030, in its *Draft Climate Policy Programme* of June 2022. With this programme, the government builds on the 2019 Climate Agreement and the arrangements laid down in the 2021 Coalition Agreement. For our projections, we had access to a preliminary version of the *Draft Programme* from 1 May. Based on the information it contains, we classified climate policies and other relevant policies into three categories:

- *Adopted policy* includes all climate policies implemented on 1 May 2022.
- *Planned policy* includes all climate policies that, by 1 May 2022, had been made public, had been officially announced in Letters to Parliament and that had been worked out in sufficient detail.
- *Proposed policy* includes policy plans and intentions that, by 1 May 2022, had been made public, but had not yet been worked out in sufficient detail.

The *adopted* and *planned policies* have been incorporated into the calculations for the outlook report and form the basis for most of its figures, tables and explanations. The *proposed policies* — those that are ‘on the agenda’ — were not specific enough to be included in the calculations. On 1 May, for example, we found that a large part of the latest national and EU plans had not yet been worked out in sufficient detail and, as such, in the report they fall in the category of *proposed policy*. Up until the summer recess of Parliament (8 July, 2022), ministries and other parties did have time to provide additional information. For some of the proposed policy measures, we made only general assessments of conceivable emission reduction impacts by 2030. For the other measures, we made no assessments because they did not have enough starting points to work from. Of the former set, we only considered the possible impacts on total greenhouse gas emissions rather than also the effects on other indicators, such as the share of renewable energy or the amount of energy savings.

## Findings

### **1) For the 1990–2030 period, emission reductions of 39% to 50% under adopted and planned policies, and up to 41% to 52% when including certain proposed policies**

Based only on adopted and planned policies, emissions are projected for 2030 to go down by 39% to 50% from 1990 levels (Figure 1, Main Table 2). This means that, to meet the 55% target, we still face the additional task of reducing emissions by another 5–16 percentage points, or 12–36 megatonnes of CO<sub>2</sub> equivalents (Figure 2). The estimated emission reduction of 39% to 50% by 2030 is slightly larger than projected in the outlook 2021, which stood at 38% to 48% (with both these reduction ranges including land use). The somewhat greater reduction presented in this year’s report is mainly due to higher assumed prices for energy and CO<sub>2</sub> and various policy effects.

In order for 2030 values to reach the upper end of the projected range — a 50% emission reduction — all controllable and non-controllable components in the stated range should bring about maximum emission reductions. This is not a likely scenario. A substantial share of the uncertainties mentioned earlier can only to a limited extent be reduced by government policy (i.e. they are not easily controllable). The uncertainties are related to matters such as the volumes of electricity imports or exports, economic growth, the weather, technological developments and the expected

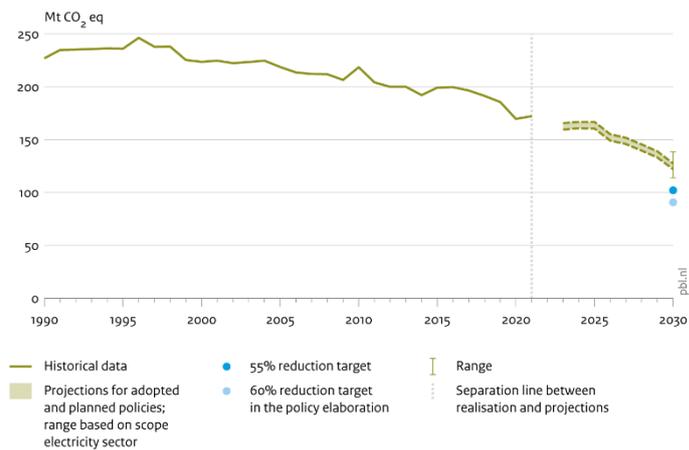
policy impacts, including how and to what extent policy measures affect behaviour or investments by households and businesses.

We can also consider those proposed policies for which it has been possible to estimate effects on emission reduction. If these policies were to be worked out and implemented in due time, it is conceivable that the effort would lead to a further decrease in emissions, with the reduction by 2030 ending up at 41% to 52% compared to 1990 levels. In that case, to meet the 55% target by 2030, the additional task would be to reduce emissions by another 3–14 percentage points, or 6–31 megatonnes of CO<sub>2</sub> equivalents (Figure 2). Point 3 of this section gives further information on all proposed policies, both those for which an assessment of emission reductions could be made and those for which no such assessment was possible.

Additional emission reductions in the period up to 2030 and beyond can be achieved with those proposed policy measures for which we were not able to make an impact estimate. If we take as a starting point the earlier emission reduction estimates made by the government in the Coalition Agreement, they would add up to less than 10 megatonnes by 2030. This contribution may be higher if Europe decides on the climate and energy proposals developed in the context of *Fit for 55* and *REPowerEU*, which will lead to the development of additional EU or national policies. However, a fuller picture cannot be given yet because the proposals are still being negotiated at the EU level.

It follows from the above that the current national policy efforts are not sufficient to fulfil, with a high enough level of confidence, the additional task of a 12–36 Mt emission cut, up to the 55% target. This means that, in addition to elaborating all the proposed policies, new policies will need to be developed and implemented, and that these efforts must lead to additional emission reductions before 2030.

**Figure 1**  
Greenhouse gas emissions, including land use



Source: Pollutant Release and Transfer Register (PRTR) — historical data; Climate and Energy Outlook 2022 — projections

**2) Indicative sectoral emission targets require significant policy efforts in each sector, nevertheless, together, they will not be sufficient to achieve the 55% emission reduction with certainty**

In the *Draft Climate Policy Programme*, the national emission reduction task for 2030 has been translated into so-called *indicative residual emissions* in 2030 for all the sectors under consideration (EZK, 2022). The government uses them as indicative per-sector emission targets, while emphasising that they are provisional and may be modified if new insights provide a reason to do so. When the indicative residual emissions for 2030 are added up, the resulting total comes out at 95–114 megatonnes of CO<sub>2</sub> equivalents. This would mean achieving an emission reduction of 50% to 58% compared to 1990 (Figure 2). Taken together, the indicative residual emissions per sector are not ambitious enough to achieve a 55% emission cut with sufficient certainty. The government's goal in policy development is to aim for a 60% emission reduction by 2030 and this too requires tightening up the targets for indicative residual emissions.

Comparison of the ranges of the projections that are based on adopted and planned policies with the range of indicative residual emissions shows that the projections for the electricity sector largely overlap with the indicative residual emissions (Figure 3, Main Table 3). However, the lower limit of the indicative residual emissions for the sector is not reached. In the industrial sector, the indicative residual emissions do lie within the projected emission range, but only come into view if the emission projections for the sector were to come out at the lower end of the range. The indicative residual emission targets that the other sectors would need to achieve are not yet within reach under the projections based on adopted and planned policies.

If the proposed policies for which we have been able to provide estimates are worked out and implemented in due time, it is conceivable that in all sectors, except the electricity sector, emissions by 2030 *will* come closer to the indicative residual emissions (Main Table 3). The electricity sector is the exception because its emissions toward 2030 are projected to grow due to increased demand for electricity resulting from the estimated impact of proposed policies in other sectors. The increase means that the electricity sector's conceivable emissions by 2030 will overlap somewhat less with the indicative residual emissions for 2030. A positive development is that emissions from the electricity sector are expected to decrease again in 2031 thanks to the completion of already planned additional offshore wind farms.

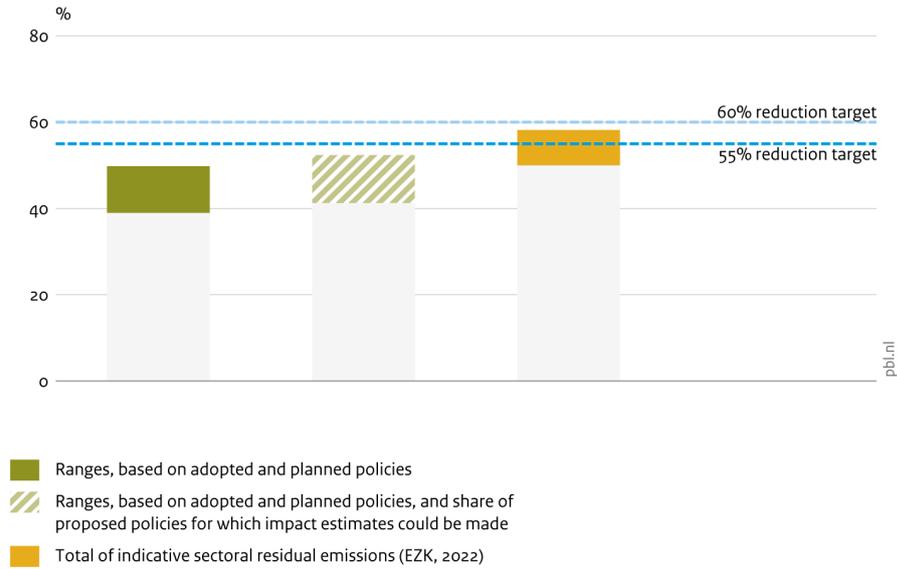
Turning to the other sectors, if the proposed policies for which estimates could be made are taken into account, we can see the following outcomes (Table 3): Industry — the emission projections will be lower, which means the indicative residual emissions are more in the middle of the projected range; there is, however, still a good chance that future emissions from industry could exceed the indicative residual emissions; Built environment and Agriculture — emission projections will still be completely above the corresponding indicative residual emissions; Mobility — the emission projections will reach the same level as the indicative residual emissions, but will not overlap; Land use — the emission projections will largely overlap with the indicative residual emissions.

To ensure the indicative residual emissions are met in all sectors, it is necessary to fully implement at least all adopted and planned policies. In addition, all proposed policies — whether or not we were able to estimate their impact — need to be worked out to their fullest extent and implemented as soon as possible. As mentioned above, the EU climate and energy proposals, still under negotiation, also imply additional emission reductions for the Netherlands toward 2030, but all details were not yet available. For some sectors, new national policy will be required if we are to

have sufficient certainty achieving the lower limit of the current indicative residual emissions. As stated earlier, the current indicative residual emissions for all sectors taken together are not yet ambitious enough to achieve an emission reduction of 55% with sufficient certainty.

**Figure 2**

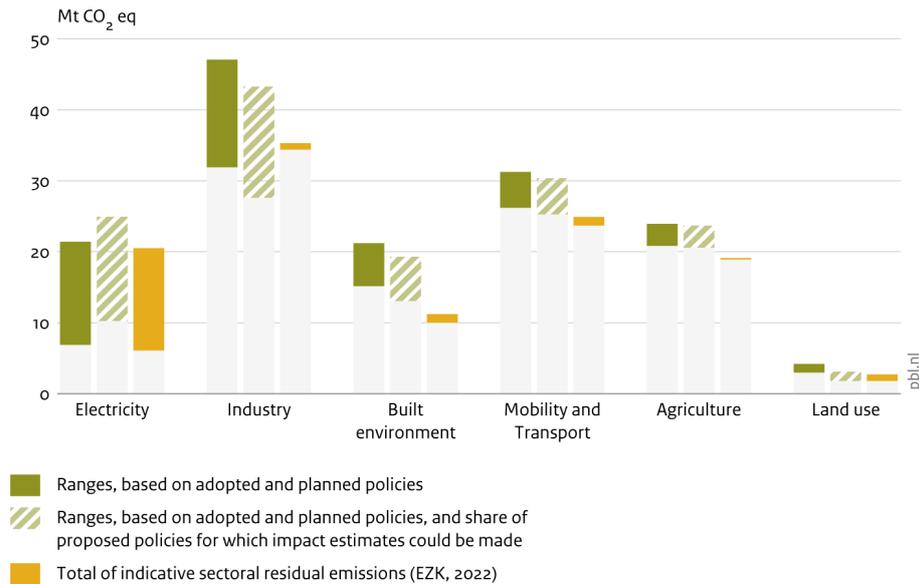
**Projections of greenhouse gas emission reductions, indicative residual emissions and national targets, including land use, 2030**



Source: Climate and Energy Outlook 2022; EZK, 2022

**Figure 3**

**Greenhouse gas emission projections and indicative residual emissions per sector, 2030**



Source: Climate and Energy Outlook 2022; EZK, 2022

### 3) **Major share of climate plans still lacking sufficient detail**

This outlook report must conclude that a large share of the most recent national and EU energy and climate plans have not yet been worked out in sufficient detail and, therefore, fall in the category of *proposed policies*. We were able to make a preliminary estimate of the conceivable emission reduction impact by 2030 for only some of these proposed policies. No estimate could be made for the remaining ones, because the policies did not provide enough starting points to work from.

The most important proposed measures for which an impact estimate for 2030 could be made are expected to be implemented in industry and the built environment. In the industrial sector, this concerns matters, such as the budget from the Climate Fund that has been set aside to fund tailored agreements with large emitters, and efforts to promote the use of green hydrogen in industry and refineries. For the built environment, this concerns measures including the definition of standards for hybrid heat pumps, performance agreements with housing corporations after the repeal of the landlord levy, and making public facilities more sustainable. The proposed measure pertaining to the 'green gas blending requirement for the built environment' has not been assigned to the built environment sector, but it is used as a factor in the range for the national total that takes into account those proposed policies for which an impact estimate has been made. Green gas is blended into the natural gas grid and also leads to reduced emissions amongst consumers in other sectors.

For the sectors of mobility and transport, land use and agriculture, smaller contributions are projected to be made to emission reduction by the share of the proposed policies for which an impact estimate could be made. The policy measures include the abolition of the vehicle tax exemption for company vans, subsidies granted under the national cessation scheme for livestock farms, strategies to combat peatland emissions and measures included in the forest strategy.

Additional emission reductions can still be achieved in the period towards 2030 and beyond with those proposed policy measures for 2030 for which we were *not* able to make an impact estimate. They include measures such as the National Programme for Rural Areas, greening of passenger transport and travel behaviour, the BnG road user charging scheme for private motor vehicles and vans, adjustments to energy taxes, the integrated package of measures to make greenhouse horticulture more sustainable, the tightening of the EU Energy Efficiency Directive (EED), parts of the tightened European Renewable Energy Directive (RED) and the tightening of the EU Emissions Trading System for buildings and road transport (ETS-BRT).

If we rely on earlier reduction estimates in the government's Coalition Agreement to assess those proposed measures for which no impact estimate could be made, we find that the emission cuts add up to less than 10 megatonnes of CO<sub>2</sub> equivalents by 2030. Neither the Coalition Agreement nor this outlook report could present a full picture of all the possible impacts of EU proposals, such as the *Fit for 55 package* and *REPowerEU*. This is because the EU proposals are currently (November 2022) still in various stages of negotiation between the European Council and the European Parliament. The EU proposals will ultimately also lead to measures in the Netherlands that are expected to produce additional emission reductions towards 2030.

The proposed policies for the electricity sector focus more on the longer term, toward 2040 and beyond. They include further expansion of offshore wind farms, the subsidy scheme for CO<sub>2</sub>-free natural gas-fired power plants, an extension to the operation of the Borssele nuclear power plant,

and the possible construction of new nuclear power plants. We have not made impact estimates for these measures in this report.

#### **4) Current target of ESR sectors within reach; new EU proposal means additional efforts are required**

The *Effort Sharing Regulation* (ESR) controls emissions in the Netherlands generated by activities not covered by the European Emissions Trading System (ETS) for large, energy-intensive industry and the electricity sector. This concerns emissions by small industries, including waste management, the built environment, and mobility and agriculture, which we refer to here as the *ESR sectors*.

The current 2030 ESR reduction target for the Netherlands is 36% compared to 2005 levels. As part of the *Fit for 55* package, the European Commission is proposing to increase this target to 48%. In addition, the ESR sets an annual emission cap between 2021 and 2030 for each Member State; the cap is lowered over time and averaging of emissions over time is allowed. This means the binding tasks for the Member States actually amount to keeping to a maximum cumulative budget for the given period. The current cumulative budget for 2021–2030 is 903 megatonnes of CO<sub>2</sub> equivalents but the European Commission's proposal to tighten the cap cuts this down to a cumulative budget of 839 megatonnes of CO<sub>2</sub> equivalents.

From this outlook report, it follows that the current ESR target for 2021–2030 is well within reach, as the projected cumulative ESR emissions under adopted and planned policies come to 865 megatonnes of CO<sub>2</sub> equivalents (Main Table 3). However, the figure is not low enough to achieve the more stringent ESR target the European Commission is putting forward for the Netherlands. If the target does go down to 839 megatonnes of CO<sub>2</sub> equivalents, the country will be facing the additional task of reducing another 26 megatonnes of CO<sub>2</sub> equivalents in the period up to 2030.

In this report, the projections for cumulative emissions by the ESR sectors are almost 39 megatonnes lower than in last year's report. This is explained by higher assumed energy and CO<sub>2</sub> prices and various policy effects that reduce emissions between now and 2030.

If all the proposed policies and any new policies (see Finding 1) were to be developed and implemented in a timely manner, emissions in the ESR sectors would also decrease. The cumulative nature of the target means the sooner measures are developed and implemented, the greater their contribution will be to achieving the target under the ESR Directive. According to EU regulations, the Netherlands may also offset a share of the additional ESR task of 26 megatonnes between 2021 and 2030 with emission credits from land use corresponding to the same period. The projections in this outlook report puts these land-use credits at 8–11 megatonnes of CO<sub>2</sub> equivalents.

We conclude that the expected additional ESR task has become substantially smaller since the outlook 2021, but that there still is a chance that part of the task will remain unfulfilled if proposed policies and any new policies are not worked out and implemented in a sufficiently timely manner.

## 5) **Share of renewable electricity growing faster than before; increase in renewable heat insufficient**

Based on domestic consumption of renewable energy, the share of renewable energy in total energy consumption in the Netherlands was 11.5% in 2020. The European 2020 target set for the Netherlands was 14%, but thanks to an administrative purchase (statistical transfer) of 49 petajoules from Denmark, the Netherlands secured the remaining 2.5% and still achieved the EU target (see Main Table 5). In 2021, the percentage was between 12.0% and 13.4%. The exact figure cannot be calculated, yet, due to uncertainties around the application of sustainability criteria for biomass laid down in the revised European Renewable Energy Directive (REDII). Depending on the use of those criteria, part of the biomass used in 2021 may not contribute to the share of renewable energy.

The Renewable Energy Directive (REDII) aims to raise the share of renewable energy in the European Union to 32% by 2030. In the Integrated National Energy and Climate Plan 2021–2030, the Netherlands has announced that it aims to attain a share of renewable energy of at least 19.6% by 2025 and at least 27.0% by 2030. In these projections, based on adopted and planned policies, the share grows to 21% by 2025, and increases further by 2030 to a rounded 31% [26–34] (Main Table 5). In this report, the 2030 share is about 5 percentage points higher than in the outlook 2021. The share of renewable energy is increasing faster than before due to policy adjustments introduced last year, particularly with regard to allowing the construction of additional offshore wind farms. This means the indicative target for 2030 is now more likely to be achieved, compared to the projections in the Climate and Energy Outlook 2021.

In its *Fit for 55* package, the European Commission proposes a revision of the Renewable Energy Directive (REDII). This involves, amongst other things, raising the binding target for the share of renewable energy at the EU level from 32% to 40%, by 2030. For the Netherlands, the European Commission calculates a 36% share of renewable energy by 2030 as a cost-effective contribution to *Fit for 55*. This contribution may end up even higher if the proposal from *REPowerEU* is adopted, which aims to raise the EU target for renewable energy to 45% by 2030.

The more stringent 36% target of the *Fit for 55* package falls outside the range in our projections for 2030 based on adopted and planned policies, and, as a result, we do not expect it will be met. In 2031, however, the share of renewable energy will increase sharply. This is because new offshore wind farms are scheduled to become operational in 2030 and 2031. As a result, the expected share of renewable energy will stand at 36% in 2031, practically the same as the 2030 cost-effective contribution that the European Commission has calculated for the Netherlands. To ensure the 36% share is attained in 2030, in all probability renewable technologies other than offshore wind will have to be considered. After all, it does not seem likely that the schedule of the wind farm projects can be brought forward. It might be possible to ensure that certain proposed measures, such as the green gas blending requirement, contribute further to the expansion of renewable energy towards 2030, but this report does not make any estimates in this regard.

In these projections, based on adopted and planned policies, the share of renewable electricity increases to 85% by 2030. This is higher than projected in the 2021 report, in which the share still stood at 74%. The increase is mainly due to the new offshore wind farms, but also to growing expansions of solar power and onshore wind power.

While the decarbonisation of electricity supply is rapidly progressing, in heat supply and transport fuels progress is relatively slow. The share of renewable heat is expected to grow from 8% in 2021 to 14% by 2030. At 0.7 percentage points per year, the increase in renewable heat is lower than the target set in the Renewable Energy Directive (REDII), which aims for an annual increase of 1.1 percentage points. In the revision of REDII in the framework of *Fit for 55*, the European Commission proposes to turn the current indicative target for renewable heat into a binding commitment at Member State level. Even though electricity consumption for heat is increasing due to the use of heat pumps and electric boilers in buildings and industry, the contribution of electricity remains limited to a few percent of the total final energy consumption for heat. In the projections, 85% of the final energy consumption for heat in 2030 still consists of natural gas, residual fossil gases and fossil-based heating.

The share of renewables in energy consumption for domestic mobility increases from 7% in 2021 to 15% by 2030. At present, about 90% of the renewable energy used in transport comes from biofuels. However, the increase toward 2030 lies mainly in the use of renewable electricity. In 2030, the estimated electricity consumption for domestic mobility is nearly 3 times higher than in 2021, and an increasing share of that consumption is renewable. The share will double between 2021 and 2030 and the use of biofuels will also increase toward 2030. By 2030, biofuels will account for about 9% of energy use in mobility and transport, up from 6% in 2021.

This increase in the use of renewable energy in domestic mobility and transport is a result of the rapid electrification of road traffic and the mounting obligation to supply renewable energy for transport. Fuel suppliers are required to ensure an increasing proportion of the energy they supply to transport is from renewable sources. The annual obligation levels are set to increase from 17.5% in 2021 to 28% by 2030. These percentages are higher than the physical shares mentioned above because, under Dutch regulations (emissions accounting), double counting of some biofuels is allowed and renewable electricity in road transport is counted by a factor of 4.

## **6) Current targets for energy consumption and saving not met; revision EED means even more energy saving is needed**

Under Article 3 of the European Energy Efficiency Directive (EED), EU Member States are required to set indicative targets for their national energy consumption by 2030. Added together, by 2030, EU energy consumption must be reduced by 32.5%, compared to the reference scenario. As to Article 3, the Netherlands is aiming for a primary energy consumption of 1,950 petajoules and a final energy consumption of 1,837 petajoules, by 2030. The targets focus on actual energy consumption and do not cover non-energy use (i.e. the use of energy carriers as a resource in production processes). Final energy consumption is consumption by end users in the built environment, industry, agriculture, mobility and transport and aviation. Primary energy consumption is final energy consumption plus own consumption and conversion losses in the energy sector, such as in electricity power plants and refineries.

In the projections, based on adopted and planned policies, the target value for primary energy consumption will not be achieved; the corresponding range runs from 2,061 to 2,416 petajoules. The target value for final energy consumption, however, may be within reach and is projected at 1,850 petajoules [1,729–1,974 range] by 2030.

Article 7 of the European Energy Efficiency Directive (EED) obliges the Netherlands to save 924 petajoules of energy cumulatively over the 2021–2030 period. Only savings that can be attributed to

Dutch policies may be included here. *Cumulative* means that savings are to be added together over the years. As a result, the sooner a measure is introduced, the more it contributes to achieving the objective. The estimates based on adopted and planned policies indicate that energy savings are unlikely to be large enough to achieve the Article 7 objective. The range of expected energy savings runs from 721 to 939 petajoules (Main Table 5), thus the target of 924 petajoules only narrowly falls within this range. However, it may be difficult to also underpin these savings with monitoring data. In this outlook report, the energy savings pertaining to Article 7 are lower than in last year's report. Because of the higher CO<sub>2</sub> prices in the European Emissions Trading Scheme (ETS) and the higher energy prices up to 2030, a smaller share of the expected energy savings in industry may now be considered a result of national policy.

While it is expected that the current EED targets will possibly not be achieved, the *Fit for 55* package and the *REPowerEU* plan are proposing a further tightening of the energy consumption targets in their revision of the EED. In *Fit for 55*, the Article 7 target for cumulative savings in the Netherlands could come to 1,292 petajoules, a sharp increase by 368 petajoules and the proposals may also include more stringent rules about the types of savings allowed to be taken into account. Although negotiations on the proposals have not yet been completed, it is already evident that the revised EED means that policymakers are going to face the task of having to achieve even greater energy savings in the period up to 2030.

# Main Tables Climate and Energy Outlook 2022 (data on adopted and planned policies)

**Main Table 1**  
Economic growth and energy prices<sup>1</sup>

	2005	2020	2021*	2030	Low prices 2030	High prices 2030	Range 2030
<b>GDP<sup>2</sup> (index 2021=100)</b>	81	95	100	116			107–129
<b>Oil price<sup>3</sup> (USD/barrel)<sup>4</sup></b>	72	45	71	117	89	136	
<b>Natural gas price<sup>3</sup> (EUR/m<sup>3</sup>)<sup>4</sup></b>		0.13	0.31	0.37	0.21	0.45	
<b>Coal price<sup>3</sup> (EUR/t)<sup>4</sup></b>	71	58	94	81	60	120	
<b>Wholesale price electricity (EUR/MWh)<sup>4</sup></b>	56	33	103	73	50	93	
<b>CO<sub>2</sub> price (EUR/t)<sup>4</sup></b>		26	53	110	87	149	

<sup>1</sup> Historical data on prices provided by Statistics Netherlands (CBS): <https://www.cbs.nl/nl-nl/maatwerk/2022/13/marktprijzen-energie-2000-2021>. CBS does not have historical natural gas prices for 2005.

<sup>2</sup> Projections: CPB Central Economic Plan 2022 (CEP) (CPB, 2022a), CPB Actualisatie Verkenning middellange termijn tot en met 2030 [actualisation medium-term outlook] (CPB, 2022b).

<sup>3</sup> Projections: Recommended parameters for reporting on GHG projections in 2023, unpublished document shared with Member States, 26 April 2022 (EC, 2022).

<sup>4</sup> Constant prices 2021.

\* Preliminary data.

**Main Table 2****Total greenhouse gas emissions<sup>1,2,3</sup>**

	1990	2020	2021*	Projections 2030	Range of projections 2030	Range of projections 2030 including share of proposed policies for which the impact could be assessed
<b>Total (Mt CO<sub>2</sub> eq)</b>	227	170	172	122–128	114–139	108–133
<b>Total carbon dioxide (CO<sub>2</sub>) (Mt CO<sub>2</sub> eq)</b>	168	142	145	98–104	91–115	
<b>Total other greenhouse gases (Mt CO<sub>2</sub> eq)</b>	59	27	27	24	22–24	
<b>Reduction in greenhouse gas emissions, compared to 1990 (%)</b>	0	25	24	44–46	39–50	41–52
<b>Target reduction in greenhouse gas emissions<sup>4</sup> (%)</b>					55	55

<sup>1)</sup> The emission calculations are based on the GWP values in IPCC's *Fifth Assessment Report (AR5)*.

<sup>2)</sup> The 2030 ranges in the 'Projections 2030' column are due to the high level of uncertainty in the projections of electricity generation (in particular, with regard to future developments abroad, fuel prices and CO<sub>2</sub> prices).

<sup>3)</sup> The data also include land-use emissions.

<sup>4)</sup> The 55% target was set in the Coalition Agreement. To ensure achievement of this target in case of setbacks, the Dutch Government is aiming slightly higher in its elaboration of policies, namely for a 60% reduction.

\* Preliminary data.

**Main Table 3**  
Greenhouse gas emissions<sup>1,2,3</sup> per sector, in Mt CO<sub>2</sub> eq

	2021*	Projections 2030	Range of projections 2030	Range of projections for 2030, including share of proposed policies for which the impact could be assessed <sup>4</sup>	Indicative residual emissions 2030
<b>Total<sup>4</sup></b>	172.2	122–128	114–139	108–133	94.9–113.5
<b>Electricity<sup>5,6</sup></b>	32.7	8–13	7–21	10–25	6.1–20.5
<b>Industry<sup>7,8</sup></b>	53.2	41	32–47	28–43	34.4–35.3
<b>Built environment<sup>8</sup></b>	24.5	18	15–21	13–19	10.0–11.2
<b>Mobility<sup>9</sup></b>	30.5	28	26–31	25–30	23.7–24.9
<b>Agriculture (including greenhouse horticulture)<sup>8,10</sup></b>	27.1	23	21–24	21–24	18.9
<b>Land use<sup>8</sup></b>	4.3	3.7	3.0–4.2	1.8–3.1	1.8–2.7
<b>EU ETS sectors</b>	74.1	40–45	33–55		
<b>ESR sectors (formerly ESD)</b>	93.8	78.6	74–83		
<b>Cumulative ESR sectors 2021–2030</b>		865			
<b>36% EU target cumulative ESR sectors</b>		903			
<b>48% suggested cumulative target ESR sectors</b>		839			

<sup>1)</sup> The emissions here were calculated based on the GWP values in IPCC's *Fifth Assessment Report (AR5)*.

<sup>2)</sup> The ranges shown for the 2030 projections, and then for total emissions, emissions in the electricity sector and ETS sectors, illustrate the high uncertainty in the projected electricity generation (in particular, future developments abroad and fuel and CO<sub>2</sub> prices).

<sup>3)</sup> The indicative residual emissions are included in the Draft Climate Policy Programme, *Ontwerp beleidsprogramma Klimaat* (EZK, 2022b).

<sup>4)</sup> The reduction impact of the 'Green gas blending requirement' was taken into account in the total range of projections including the share of proposed policies for which an impact estimate could be made. The impact, therefore, could not be assigned specifically to the built environment; see text.

<sup>5)</sup> The sectoral ranges do not add up to the total national range for 2030 because the total takes into account the interactions between uncertainties in the sectors.

<sup>6)</sup> Production, distribution and trade in electricity, natural gas, steam and refrigerated air.

<sup>7)</sup> Industry (including blast furnace plants), water companies and waste management, refineries, coke furnace plants and oil and natural gas extraction.

<sup>8)</sup> Excluding mobile equipment.

<sup>9)</sup> Including mobile equipment.

<sup>10)</sup> The projections for agriculture are lower than in the 2021 outlook report. This is mainly due to the estimated additional reduction in energy consumption in greenhouse horticulture.

\* Preliminary data.

**Main Table 4**Energy consumption<sup>1</sup> in petajoules

	2005	2020	2021*	2030	Range 2030
<b>Primary energy consumption according to CBS definition</b>	3,366	2,946	3,024	2,711–2,753	2,555–2,911
<b>Primary energy consumption according to energy saving (EED) target<sup>2</sup> definition</b>	2,935	2,444		2,219–2,261	2,061–2,416
<b>Final energy consumption according to CBS definition</b>	2,037	1,750	1,804	1,686	
<b>Final energy consumption according to energy saving (EED) target<sup>2</sup> definition</b>	2,264	1,906		1,850	1,729–1,974
<b>Gross final energy consumption<sup>3</sup> according to the renewable target (RED) definition</b>	2,301	1,944	2,010	1,878	1,556–2,195

<sup>1)</sup> The ranges for 2030 are due to the high level of uncertainty in projections of electricity generation.

<sup>2)</sup> According to Eurostat definitions for the calculation of energy savings under EED Article 3 (historical data for 2021 not yet available). Available from Eurostat under 'Europe 2020–2030'.

<sup>3)</sup> According to Eurostat definitions for the calculation of the share of renewable energy.

\* Preliminary data.

**Main Table 5**

## Renewable energy (RED) and energy saving (EED)

	2005	2020	2021*	2030	Range 2030
<b>Renewable energy (PJ)<sup>1</sup></b>	57	223	241–269	577	491–627
<b>Gross final-energy consumption (PJ)</b>	2,301	1,944	2,010	1,878	1,556–2,195
<b>Renewable energy share <sup>2,3</sup> (%)</b>	2.5	11.5	12.0–13.4	31	26–34
<b>Renewable energy share including statistical transfer<sup>4</sup> (%)</b>		14			
<b>Targets renewable energy share (%)</b>		14		27	
<b>Cumulative energy saving EU Article 7 (PJ)<sup>5</sup></b>					721–939
<b>Cumulative target EU Article 7 (PJ)</b>				924	
<b>Primary-energy consumption EU Article 3 (PJ)</b>				2,219–2,261	2,061–2,416
<b>Primary-energy target EU Article 3 (PJ)</b>				1,950	
<b>Final-energy consumption EU Article 3 (PJ)</b>				1,850	1,729–1,974
<b>Final-energy target EU Article 3 (PJ)</b>				1,837	

<sup>1)</sup> Petajoules.

<sup>2)</sup> Excluding statistical transfer of 49 PJ.

<sup>3)</sup> Due to uncertainty about biomass sustainability criteria a range is given for 2021. In the projections it is assumed that this uncertainty no longer exists.

<sup>4)</sup> In view of the failure to meet the 2020 renewable energy target, the Netherlands agreed a statistical transfer of 49 petajoules with Denmark for 2020.

<sup>5)</sup> The energy savings made in agreement with Article 7 concern the cumulative savings over the period 2021–2030.

\* Preliminary data.