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PBL Netherlands Environmental Assessment Agency is the national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all of our studies. We conduct solicited and unsolicited research that is both independent and scientifically sound.

The KEV consortium
The Climate and Energy Outlook 2024 (KEV) is the result of collaboration between PBL Netherlands Environmental Assessment Agency, TNO, Statistics Netherlands (CBS), the Netherlands Enterprise Agency (RVO), and the National Institute for Public Health and Environment (RIVM). Wageningen University & Research (WUR) has, at the request of PBL, the projections for livestock farming, arable farming, and land use. PBL also consulted various consultants. In this publication, the integrated results have been incorporated and, therefore, it is not individually traceable which contribution belongs to which institute. Regardless, each institute bears its own responsibility, which we elaborate on below.

PBL has, as project coordinator, final responsibility for the KEV. PBL contributes to practically every aspect of the KEV and manages an important part of the KEV computational toolkit. PBL also contributes the more comprehensive analyses, including those about developments abroad or about the progress of the Climate Agreement. Finally, PBL has sole responsibility for the evaluative statements about policy that are included in this KEV.

CBS delivers and describes the data related to energy that CBS itself also composes. These include data about energy statistics, pricing statistics, and economic statistics.

TNO supports PBL with determining and indicating the projections. TNO also contributes knowledge about the various themes in the KEV, including the built environment, mobility, industry, gas- and oil refinery and greenhouse horticulture, energy savings, and renewable energy.

RIVM delivers all monitoring data from the emissions registration and also contributes to the projections for non-CO_2 greenhouse gas emissions such as methane, nitrous oxide, and F-gases from industry.

RVO has monitored and delivers data from various policy instruments concerning CO_2 emissions reduction, energy efficiency, and renewable energy (e.g. SDE++ and ISDE). This concerns information about the trends over the past few years, realised projections, and, where possible, about proposed activities.

Wageningen University & Research (WUR) sets up the projections, at the request of PBL, for livestock farming, arable farming, and land use.

Contents

Summary

Losing sight of the 2030 climate goal; additional policy with rapid effects is necessary

It is extremely unlikely that the Netherlands will reach the legally binding climate goal of 55% emissions reduction in 2030. With current implemented policy ('adopted and proposed'), we are on track for a reduction in greenhouse gas emissions of 44-52% in 2030, relative to 1990 levels. Calculable plans ('scheduled policy') contribute little to this: a net reduction of 45-52%. Only additional policy that can rapidly deliver reductions can bring the goal back in view. To reach the goal with a probability of 50%, an additional 16 megatonnes of emissions reduction is necessary by 2030; to reach the goal with an extremely high probability (95%), an additional 24 megatonnes of reduction is required.

Limited results due to setbacks in implementation and scrapped policy measures

The expected emissions reduction in 2030 in this Climate and Energy Outlook of the Netherlands (KEV) is 1-5 percentage points lower than the projected 46-57% determined in the KEV of last year, the KEV 2023. This is partly due to setbacks in implementation, such as delays in offshore wind farms and stagnation in the production of green hydrogen. Dutch political decisions of the past year have also led to lower expected reductions in emissions.

Numerous policies have been further developed over the past two years

Over the past two years, numerous plans have been worked out and developed into law (proposals) or legislation. Hence, significant progress has been made at the lower bound of the bandwidth (44-52%). This was 39% in the KEV 2022; this is now 5 percentage points higher.

European emission target ESR well within reach

The Netherlands is on track to meet its European emission target in the Effort Sharing Regulation (ESR) for the sectors built environment, mobility, agriculture, and small industry. These sectors have a cumulative emissions budget of 829 megatonnes for the period 2021-2030. In the projection, the Netherlands stays well below this figure with 781-819 megatonnes, which is partly due to the sharp decrease in emissions over the past two years because of COVID-19, higher energy prices, and the rapid growth in wind- and solar energy.

European goals on renewable energy and energy savings require attention

The European goal for renewable energy for the Netherlands has been raised significantly last year, from 27% by 2030 to 39%. The now projected 30-37%, therefore, is well below the target. The European goals on energy savings, equally tightened last year, also require more attention.

Insufficient emissions reductions on the way towards 2040 and 2050

This KEV also contains a projection for 2035 and a look towards 2040. These indicate that the speed of emissions reduction under current policy is insufficient to reach an indicative emissions reduction of 90% in 2040 in an EU context (as established by the European Commission), or to achieve climate neutrality by 2050.

Findings: Climate and Energy Outlook of the Netherlands 2024

The Dutch Climate Act decrees that PBL Netherlands Environmental Assessment Agency annually publishes a Climate and Energy Outlook (KEV). In the KEV, we outline the development of greenhouse gas emissions and the energy system in the Netherlands. This KEV 2024 is extensive, similar to the KEV 2022. Here, we present the individual projections for the policy categories of adopted, proposed, and scheduled policy. For the first time we express the probability of the Netherlands reaching certain climate and energy goals in a percentage. This way, we aim for an unambiguous and objective method of reporting. More information about the policy categories, an overview of the most important policy changes, and method of our calculations, can all be found in Chapter 1 of the main report (in Dutch). The most important key numbers are presented in Tables 1 and 2 at the end of these Findings.

1) ***With an emissions reduction of 44-52% between 1990-2030, it is extremely unlikely that the Netherlands, based on adopted and proposed policy, will reach the climate goal of 2030; scheduled policy barely makes a difference***

The Climate Act has decreed a climate goal for 2030: a 55% decrease in greenhouse gas emissions by 2030, relative to 1990 levels (from now on: climate goal of 2030). Between 2022 and 2023, greenhouse gas emissions reduced from 31% to 36%, relative to 1990 levels. Part of this drastic reduction was merely temporary and primarily attributable to the high energy prices and extensive maintenance in the base metal industry. On the basis of proposed and adopted policy alone, the projected emissions reduction of greenhouse gases is 44-52% between 1990 and 2030 (Figure 1, Table 1). The probability that the Netherlands will reach the climate goal of 2030 is less than 5%; it is therefore extremely unlikely that this goal will be reached (Table 2).

When expressed in absolute emissions, the projected greenhouse gas emissions in 2030 are 110-127 megatonnes CO_2-equivalents. The climate goal of 2030 corresponds to an emission level of 103 megatonnes CO_2-equivalents. To have a 50% or 95% probability of reaching the climate goal of 2030, greenhouse gas emissions would have to be reduced by an additional circa 16 and 24 megatonnes CO_2-equivalents, respectively, compared to the projection for adopted and proposed policy for 2030.

Scheduled policy for which an effect on emissions could be quantified ultimately yields nearly no additional reduction in emissions. The projected emission reductions of greenhouse gases between 1990 and 2030 for this policy category is almost equal to the projection for proposed and adopted policy, namely 45-52% (Figure 1, Table 1). The probability of reaching the climate goal of 2030 stays the same, below 5% (Table 2). The fact that scheduled policy, when calculated, ultimately delivers nearly no additional reductions in emissions, is related to several contradictory effects. For example, scheduled measures deliver limited extra emission reductions in the fields of industry (e.g. extra implementation of customised agreements and extra budget for hydrogen), in the built environment (e.g. extra budget for the Investment Subsidy Sustainable Energy and Energy Savings (ISDE) and phasing out bad labels in public utility buildings), and land use (e.g. less grassland and more farmland due to the scheduled renewed derogation in the context of the Nitrates Directive).

These emission reductions are, however, annulled by higher emissions in mobility and agriculture as a consequence of scheduled measures, including raising the maximum speed to 130 km/h and the renewed derogation in the context of the Nitrates Directive. Moreover, increased electricity demand will lead to more domestic fossil electricity production and, hence, higher emissions in the electricity sector.

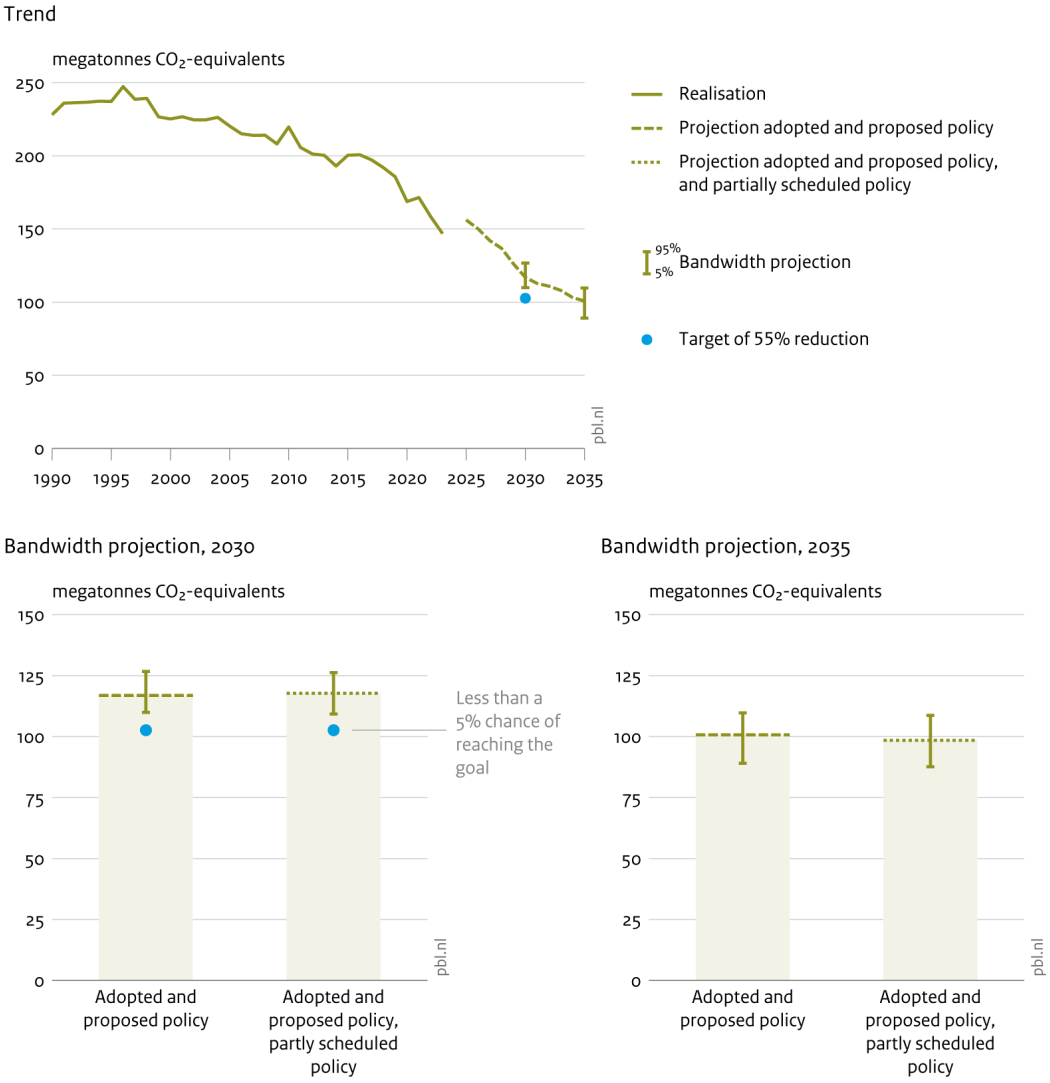
The most significant uncertainty for these projections is the structural uncertainty concerning the developments on the European electricity market. Other notable uncertainties are related to developments in industry and are being caused by variations in production volumes and the energy- and emissions intensity of production processes. Others include the sustainability efforts of Tata Steel, the area development of greenhouse horticulture, more economical heating behaviour by households, the development of the weather, economic growth, faster or slower investment behaviour by households, uncertainties in the implementation of emission reduction projects in industry, and the energy prices. A significant amount of these uncertainties can only be reduced (are steerable) to a limited extent by government policy.

Scheduled policy for which this KEV could not make a projection can still potentially help solve remaining challenges for 2030. It is, however, necessary to further develop such policy and implement it on time. An overview of this part of scheduled policy is provided in Table 1.4 in Chapter 1 in the full report (in Dutch). According to the Climate Note by the Dutch Cabinet, scheduled policy for which no projection has been made in this KEV can help resolve only a fraction of the remaining challenges.

If the Cabinet does decide to formulate additional policy to try and increase the chances of reaching the climate goal of 2030, lead time must be taken into account: the period of time between the making of a political decision and the eventual emission reductions as a consequence of that decision. This lead time differs per measure and can quickly amount to several years (Stremler & Boot 2024). Additionally, it is important for long-term sustainability to already start taking measures to support this, even if they do not directly affect the climate goal of 2030.

Figure 1

Emission of greenhouse gases



Source: Emission registration (realisation); KEV projection 2024

2) *More policy has been formulated over the past two years, delivering 2-5 percentage points emission reductions in comparison to the KEV 2022 on the basis of adopted and proposed policy*

When comparing the emission projections of the KEV 2024 and KEV 2022, it is evident that more policy has since been further developed, which therefore fits into the policy categories of adopted and proposed policy.[1] Whereas the KEV 2022 still projected an emissions reduction with adopted and proposed policy between 1990 and 2030 of 39-50%, the KEV 2024 projects a reduction of 44-52%. This is an increase of 2-5 percentage points. In other words, the projected emissions are 4-12

[1] Unfortunately, we cannot make this comparison with the KEV 2023 since it did not include a separate projection for proposed and adopted policy alone.

megatonnes CO_2-equivalents lower than in the KEV 2022. The largest changes take place in the sectors mobility, built environment, and industry (see Figure 3).

The additional reduction in the sector mobility, for example, is due to the fact that there is more adopted and proposed policy aimed at stimulating zero-emission road vehicles and zero-emission mobile machinery. This is particularly on account of national fiscal measures such as the scrapping of the exemption of the vehicle registration tax (bpm) for delivery vans which operate on fossil fuels; the differentiation of the truck tax according to CO_2 emissions; and the higher return of net proceeds of the truck tax for the sustainability of the transportation sector. European CO_2 norms for new trucks have also been tightened. On top of that, the proposed implementation of the Renewable Energy Directive (RED III) leads to more blending of biofuels and the emissions trading system for, among others, road traffic, the built environment, and non-ETS1-industry (ETS2) lowers the growth of traffic volumes. In the built environment, the use of heating pumps by households and the service sector is rapidly increasing. There are also effects of additional performance agreements with housing associations, the actualisation of acknowledged lists of measures in the context of the energy savings obligation, and extra budget for the subsidies on sustainable societal property (DUMAVA). In the industry sector we anticipate, as a consequence of the CO_2 tax and subsidies, among others, that the capture and storage of CO_2 and the application of green hydrogen will increase.

The most important adjustment in the electricity sector is the observed delay in the rollout of offshore wind farms and the projected increase in the net use of electricity. The effect of this is primarily observed at the lower bound of the emissions bandwidth, which is higher in this KEV compared to the KEV 2022.

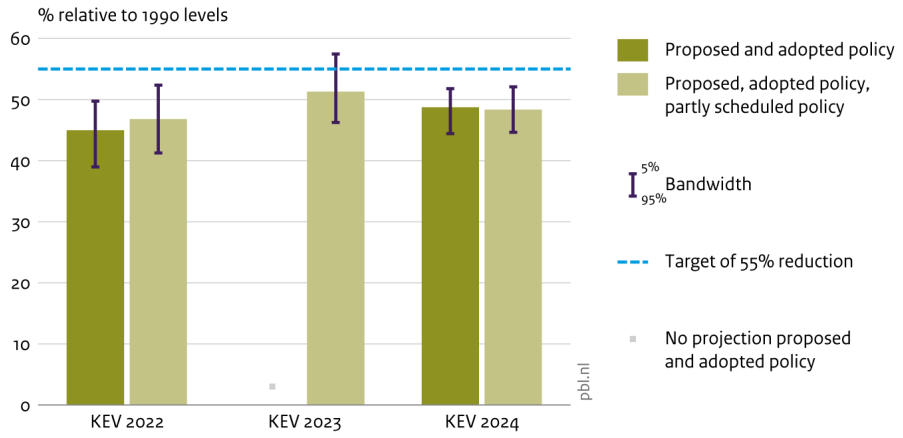
The differences in the projected emissions in agriculture can be explained. On the one hand, the KEV 2024 indicates an increased reduction because of the expiry of derogation in the context of the Nitrates Directive. On the other hand, the projections for energy use in greenhouse horticulture are higher than in the KEV 2022, in particular because it is still beneficial for greenhouse growers to turn on their combined heat and power installation (cogeneration; WKK) for electricity production at moments that less renewable energy is available. Moreover, the expectations for savings in heating have been adjusted downwards and we now expect that greenhouse horticulture in 2030 will likely be larger than was assumed in the KEV 2022.

In the sector land use, the projected emissions in 2030 are higher in the KEV 2024 compared to the KEV 2022. This increase is related to certain methodological changes, among other things. Moreover, it is the expectation that more pastures will be transitioned farmland because the derogation expires. Finally, the policy effects of peat meadow measures in certain provinces have been adjusted downwards, as well as those of additional forest planting.

The bandwidth is smaller in this KEV compared to the KEV 2022 and KEV 2023. This is mostly because the emission bandwidths of the electricity and industry sectors are now smaller (see paragraphs 4.1 and 4.2 in the main report).

Figure 2

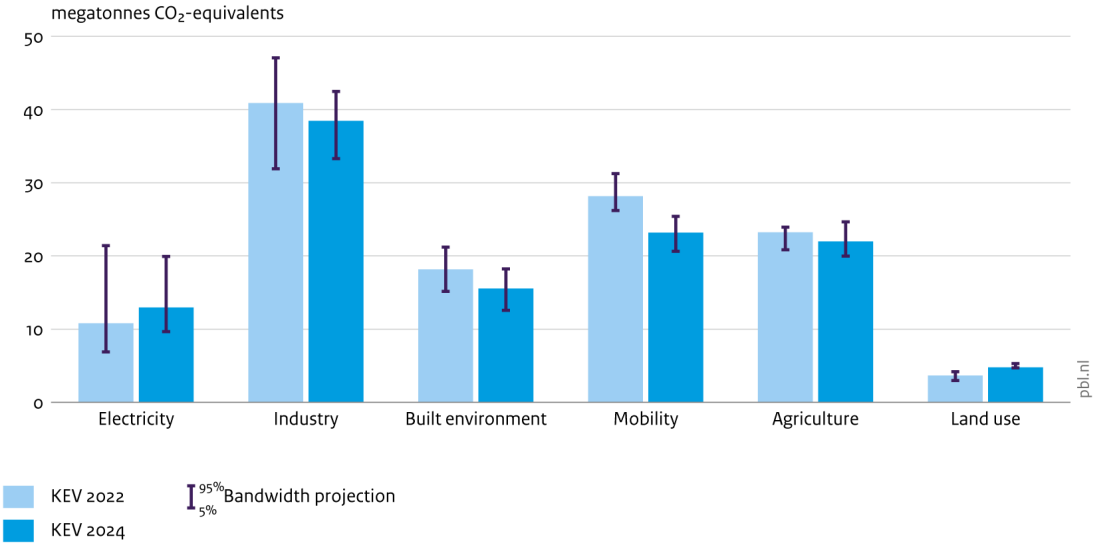
Projection reduction in emission of greenhouse gases in KEV 2022, KEV 2023, and KEV 2024



Source: KEV projection 2022, 2023, and 2024

Figure 3

Projection emission greenhouse gases per sector for proposed and adopted policy, 2030



Source: KEV projection 2022, KEV projection 2024

3) *Over the past year, the climate goal of 2030 has moved further out of sight because contributions by scheduled policy, among other things, have sharply decreased*

When comparing the KEV 2024 with the KEV 2023 on the basis of adopted, proposed, and scheduled policy for which a quantified assessment can be made, it appears that the maximum greenhouse gas emissions reduction in 2030 is lower in the KEV 2024 than in the KEV 2023 (see Figure 2). This projection was 46-57% in the KEV 2023, and the probability of reaching the climate goal of 2030 was thereby circa 15%. In the KEV 2024, the projected emissions reduction is 45-52%. This means that the probability of the Netherlands reaching the climate goal of 2030 is less than 5%.

The projected emissions reduction for 2030 is then, in this KEV, 1-5 percentage points lower than in the KEV 2023. In other words, the projected emissions are 3-12 megatonnes CO_2-equivalents higher than in the KEV 2023. This difference is mainly due to the fact that previously scheduled climate plans are delivering limited results (e.g. in industry), previous plans were halted because of the collapse of Cabinet Rutte-IV (e.g. for mobility), and newly scheduled plans (by the current Cabinet) are leading to rises in emissions (e.g. in agriculture and mobility; see Figure 4).

In industry, for example, the expected growth of green hydrogen production until 2030 has been adjusted downwards, because the cost of electrolysers has significantly increased, the net tariffs for electricity are sharply increasing, and there is uncertainty in the market around the demand for green hydrogen, among other things. Furthermore, the customised agreements with energy-intensive industrial businesses are running less smoothly and, until 2030, there is limited time to realise projects. Finally, the use of natural gas in industry is once more increasing now that energy prices are lower than in the past two years, and, according to the assumptions in this KEV, they will not reach such a peak again in the coming years. It is assumed, however, that production in chemistry will decrease.

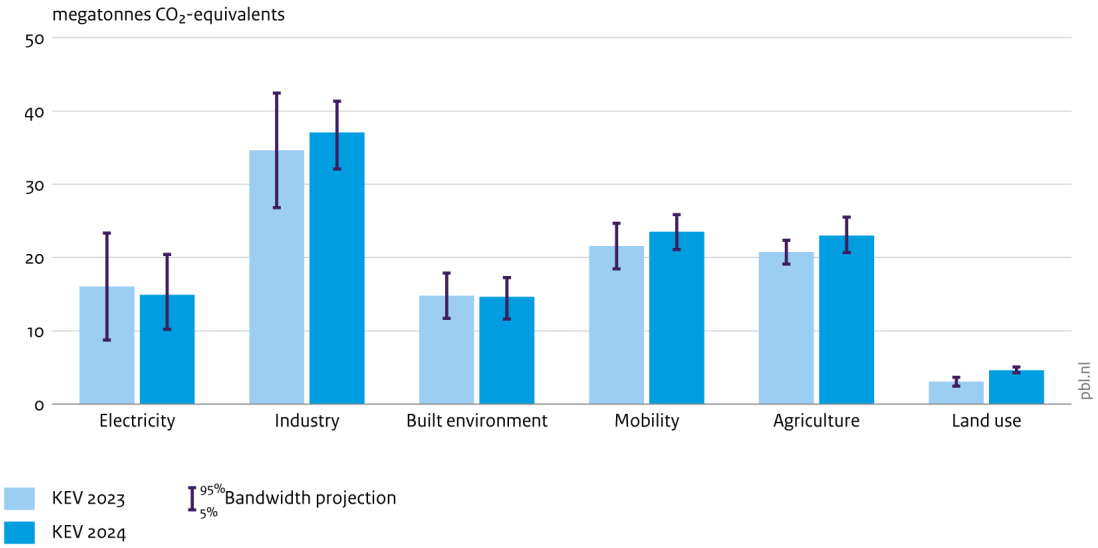
Additionally, the projected emissions reduction in the sector mobility is now smaller than in the KEV 2023. On the one hand, this is related to the current Cabinet scrapping plans for Pay-as-you-Go, and, on the other hand, with the raise, where possible, of the maximum speed to 130 km/h. Furthermore, the lower emissions reduction is a consequence of the proposed implementation of the RED-III measure. In the KEV 2023, only the RED-III goal for the entire transport sector was known as scheduled policy. In this KEV, the national implementation of the RED III has been included as proposed policy in the form of adjusted annual obligations. These annual obligations contain sectoral targets, which lead to fewer uncertainties concerning the amount of renewable energy being applied in domestic mobility (which is relevant for the national emissions target). The bandwidth for the reduction effect of the national implementation of the RED III on the CO_2 emissions of domestic mobility is therefore smaller.

When we include scheduled policy, the projected emissions reduction in the sector agriculture is smaller in this KEV compared to the KEV 2023. This is the result of the scheduled renewed derogation by the current Cabinet in the context of the Nitrates Directive. If derogation is once more implemented, a potential and substantial shrinking of the national dairy livestock is avoided or reversed. As such, methane emissions will be higher compared to the projections made on the basis of adopted and proposed policy alone. Moreover, the emissions in greenhouse horticulture are not decreasing as rapidly as in the previous KEV because, given the prospects for greenhouse growers, it remains relatively beneficial to turn on their WKK-installations for the production of electricity (combined heat and power installations). In land use, emissions are decreasing at a slower rate because new sources have been incorporated in our projection (methane from bodies of water), as well as new methods (more emissions from grassland and farmland), and because it has become evident that earlier expectations concerning extra planting of forest and the rollout of peat meadow measures have been adjusted.

Furthermore, there have been several adjustments in other factors besides policy. For example, more economical heating behaviour by households (related to, among other things, steep energy prices) in this KEV leads to lower emissions in 2030. On the other hand, changes in methods in land use only leads to more emissions.

Figure 4

Projection emission greenhouse gases per sector for adopted, proposed policy, and partly scheduled policy, 2030



Source: KEV projection 2023, KEV projection 2024

4) *The probability of reaching the indicative sectoral residual emissions in 2030 is, for most sectors, very small*

In Dutch climate policy, indicative residual emissions for 2030 are derived per sector from the Spring Package of 2023 (see Table 1). Added together (excluding a small contribution by cross-sectoral policy instruments), these sectoral residual emissions are directed at an emissions reduction of circa 58% between 1990 and 2030; that is more ambitious than the climate goal for 2030.

On the basis of adopted and proposed policy, there is a probability of circa 35% that the emissions in the electricity sector remain below the indicative residual emissions (Table 2). The probability that the indicative sectoral residual emissions are reached for the sectors built environment and mobility is, in both cases, circa 10%. For the sectors industry, agriculture, and land use, that probability is less than 5%.

In addition to the indicative sectoral residual emissions from 2023, indicative residual emissions specifically for greenhouse horticulture have been added: 4.3 megatonnes CO_2-equivalents in 2030 (LNV 2024). This KEV indicates that the probability of reaching this is 10%.

If scheduled policy for which a quantified assessment can be made is included on top of adopted and proposed policy, then emissions in the sectors electricity and mobility will rise (see Findings 1) and the probability of emissions remaining below indicative residual emissions is lower. These chances are then circa 30% and less than 5%, respectively. For the sector built environment, based on scheduled policy, emissions will decrease. This raises the chance to 20% that the sectoral indicative residual emissions are achieved. For the other three sectors (industry, agriculture, and land use), the chance of achieving the indicative sectoral residual emissions remains below 5%. Similarly, the chance remains circa 10% for greenhouse horticulture.

In the KEV 2023, the indicative sectoral residual emissions for the sectors electricity, industry, built environment, and mobility lay within the bandwidth of the projection, albeit not by an ample measure. The biggest difference with the previous KEV is that the indicative residual emissions for industry in this KEV fall completely outside of the bandwidth. The lower bound of the bandwidth for industrial emissions is now higher than last year because the use of green hydrogen is lower, and the projected effect of the customised agreements with industrial businesses is smaller.

5) *The probability that the Netherlands complies with the European emission goals for 2030, on the basis of adopted and proposed policy, is extremely high for the ESR-goal, and high for the LULUCF-goal*

The Effort Sharing Regulation (ESR) proclaims for the Netherlands a maximum cumulative emissions budget for the period 2021-2030 of 829 megatonnes CO_2-equivalents. This target is based on a 48% emissions reduction in 2030, relative to 2005 levels. This mainly concerns the greenhouse gas emissions from the sectors mobility, built environment, agriculture, small industry, and waste processing, for as far as these are not covered by the emissions trading system ETS1. The cumulative emissions are sensitive to the speed with which policy is implemented. The sooner a policy measure in the period 2021-2030 leads to structural decreases in emissions, the larger the number of years this emissions reduction can contribute to, which leads to a decrease in cumulative emissions of this period overall.

With adopted and proposed policy, the probability of reaching the cumulative reduction goal is more than 95%. As such, the chance is extremely high that the Netherlands reaches this target (Table 2). With this policy, the expected cumulative emissions for 2021-2030 are 800 [718-819] megatonnes CO_2-equivalents (Table 1). With adopted, proposed, and scheduled policy for which a quantified assessment could be made, the cumulative emissions in this KEV 2024 are 783-821 megatonnes CO_2-equivalents. That is slightly higher than on the basis of adopted and proposed policy alone. This is because of the contradictory effects of scheduled measures in the built environment, mobility, and agriculture (see Findings 1). Regardless, the probability of reaching this goal remains at more than 95%.

The cumulative emissions in this KEV 2024 are slightly lower than in the KEV 2023, which projected 794-834 megatonnes CO_2-equivalents. These differences are partially explained because, in the KEV 2023, the effects of the high energy prices could not sufficiently be taken into account, and partially because of differences in the determined implementation speed of new policy.

For the sector land use, there is a European emissions target for the Netherlands in 2030 of 4.9 megatonnes CO_2-equivalents. This target is part of the European regulation for Land Use, Land-Use Change, and Forestry (LULUCF). With adopted and proposed policy, the probability of the Netherlands reaching this goal is circa 60%. If we include scheduled policy, the emissions for land use decrease. This is mainly related to the renewed derogation, which means the transition of grassland into farmland is limited, as well as a decrease of CO_2 storage in mineral soil because of the decreased supply of animal manure. This raises the chances of reaching the goal to circa 85%. In other words, there is a very high probability this target will be reached.

6) *The current Dutch Cabinet is scheduling to renew the derogation on the European Nitrates Directive. This brings the methane reduction goal for 2030 even further out of sight*

In the National Methane Strategy (LNV 2023), a target has been established, based on the Global Methane Pledge, of a reduction of 30% of methane emissions by 2030, relative to 2020 levels. With adopted and proposed policy, the reduction of methane emissions between 2020 and 2030 is 18.5% [13.3-22.4%]. This means that the probability of reaching the methane goal is less than 5%. For 2030, an additional reduction challenge remains of 11.5 percentage points [7.6-16.8].

This methane goal corresponds with an emissions level of 13.6 megatonnes CO_2-equivalents in 2030. Expressed in absolute emissions, the projected methane emissions in 2030, with adopted and proposed policy, is 15.8 megatonnes CO_2-equivalents [15.1-16.8]. In relation to the methane goal, then, the remaining challenge for 2030 is another 2.2 [1.5-3.3] megatonnes CO_2-equivalents.

In 2030, agriculture contributes 12.1 megatonnes in methane emissions. This is three-quarters of the total methane emissions, according to our projection. Of that 12.1 megatonnes, 11.2 megatonnes comes from livestock and arable farming and 0.9 megatonnes comes from greenhouse horticulture. The methane emissions of the agricultural sector overall, according to this projection, decrease by 17% in 2030, relative to 2020 levels. Meanwhile, methane emissions from other sectors decrease by 24%. Therefore, the contribution of agriculture, particularly livestock and arable farming, remains substantial and the tempo of reduction remains limited.

On the basis of adopted, proposed, and scheduled policy for which a quantified assessment could be made, the reduction of methane emissions between 2020 and 2030 appears to be lower: 9.1-19.9%. The renewed derogation in the context of the Nitrates Directive, which is incorporated in this KEV as scheduled policy, contributes 0.2-1.3 megatonnes CO_2-equivalents to the overall increase in methane emissions; exactly how much is dependent on the conditions that will be imposed on the new derogation. The chances of reaching the methane goal therefore decrease even further.

The most significant uncertainties for methane emissions are the shrinking of livestock due to business termination regulations and the scrapping of derogation. The extent to which farmers are prepared to participate with these voluntary measures is, for business termination regulations, the largest uncertainty. Particularly the anticipated shrinkage of livestock by the expiry of derogation has a large effect on the projected emissions for 2030. Simultaneously, it is very uncertain how businesses will react to the expiry of derogation and the increase of the manure surplus.

7) *The probability, on the basis of adopted and proposed policy, of reaching the energy savings goals for primary and final use in 2030, is extremely low for primary use and very low for final use*

The European Energy Efficiency Directive (EED) stipulates goals aimed at reducing final and primary energy use in Europe. Final energy use is defined in the EED as energy use by final users in the sectors industry, built environment, agriculture, and mobility, including international aviation. Primary energy use is defined in the EED as total energy use without the non-energetic use of energy carriers used as raw materials in industrial production processes. The goal aimed at reducing final energy use in the EED is legally binding, and the goal aimed at reducing primary energy use is indicative. Member states contribute to these EU-wide goals via targets for maximum energy use in 2030; for the Netherlands, this is a final energy use of 1,609 petajoules and a primary energy use of

1,935 petajoules in 2030. To guarantee that the EU-wide goal for final energy use is reached, the European Commission can impose regulations and measures to those member states not on track with their national contribution.

Final energy use

Final energy use was 1,723 petajoules in 2023. In the projection based on adopted and proposed policy, final energy use increases to circa 1,833 petajoules in 2025, since it is anticipated that production in industry and greenhouse horticulture will once more increase and households will, on average, start heating more as natural gas prices are lower than in previous years. After 2025, final energy use decreases due to energy savings, reaching 1,744 [1,606-1,844] petajoules in 2030. The probability of thereby reaching the goal of a reduction towards 1,609 petajoules in final energy use is circa 5% (Table 2). The decrease in total final use until 2030 is partly limited because the use of bunker fuels for aviation increases. The uncertainties in the projection of final energy use in 2030 concern variations in production volumes and energy intensity of production processes in industry; area development in greenhouse horticulture; heating and investment behaviour by households; developments in the weather; economic growth; and the energy prices.

With scheduled policy for which a quantified assessment could be made, final use in 2030 is 1,590-1,828 petajoules. The probability of thereby reaching the goal of decreasing final energy use is circa 10% (Table 2). Scheduled policy in industry and the built environment, such as customised agreements, additional subsidy budgets for post-insulation, and standardising the phasing out of bad labels, can lead to a decrease in energy use. Scheduled policy in the sector mobility, such as an increase of the maximum speed to 130 km/h where possible and the reintroduction of red diesel, will, on the other hand, lead to higher energy use.

Projected final energy use for 2030, including scheduled policy, is in this KEV 10-24 petajoules higher than in the KEV 2023. In the latter, final energy use was projected to be 1,566-1,818 petajoules in 2030, on the basis of adopted, proposed, and scheduled policy (PBL et al. 2023). The difference can be explained at the hand of the delay in customised agreements in industry, therefore having limited effects in 2030, and the scrapping of plans for Pay-as-you-Go for personal vehicles and delivery vans since the collapse of Cabinet Rutte-IV, among other things.

Primary energy use

Primary energy use was 2,259 petajoules in 2023. Primary use contains, alongside final energy use, also the use of distribution- and conversion losses in the energy sector, such as electricity production, refineries, and blast furnaces. Primary energy use is anticipated to first increase to circa 2,462 petajoules in 2025 because final energy use increases. After 2025, primary use decreases with circa 200 petajoules towards 2030 because final energy use by end users decreases and because the high electricity production from solar- and wind energy leads to fewer conversion losses. With adopted and proposed policy, primary energy use is 2,246 [2,083-2,346] petajoules in 2030. The probability of the Netherlands reaching the goal of 1,935 petajoules is therefore less than 5% (Table 2). Alongside the uncertainties already named in the projection of final energy use above, the uncertainties in the projection of primary energy use in 2030 also concern the developments on the European electricity market.

With scheduled policy for which a quantified assessment projection could be made, primary use in 2030 is 2,070-2,334 petajoules. The additional savings on final energy use as a result of scheduled policy is partly compensated because extra use of gas power plants for electricity production leads

to more conversion losses. The probability that the Netherlands reaches the EED-goal for a reduction in primary energy use therefore stays at less than 5%.

Projected primary energy use for adopted, proposed, and scheduled policy in 2030 is, in this KEV, 11-119 petajoules higher than in the KEV 2023. In the latter, primary energy use was projected to be 1,951-2,323 petajoules in 2030 (PBL et al. 2023). This increase is, on the one hand, related to differences in final energy use, and on the other hand to the delayed rollout of offshore wind farms. The latter leads to a wider application of gas power plants.

Cumulative savings of final energy use due to national policy

The EED also contains a binding cumulative energy savings goal through national policy for the Netherlands: a goal of 1,300 petajoules for the period 2021-2030. In the projection of this KEV, we expect that, in this period, cumulative saving through national policy will be 920-1,445 petajoules. It is uncertain to what extent national policy in industry will have an additional effect or will overlap with the effects of the European emissions trading system. This is why we have applied a broader bandwidth for industry. At the lower bound of the bandwidth it is expected that a significant part of the savings in industry that are currently being determined by the Energy Investment Allowance, will not be allowed to be included. In that case, it is estimated the goal will not be reached. If, however, the savings in industry hardly overlap with the effects of the European emissions trading system and are allowed to be included in the cumulative energy savings goal, then it is estimated the goal will be reached.

We apply the same monitoring method in our projection that the Netherlands Enterprise Agency applied for the years 2021 and 2022. Because of differences in the calculation methods, it is not possible to compare this projection with those in earlier KEVs.

If, alongside adopted and proposed policy, scheduled policy for which a quantified assessment could be made is also included, then the cumulative savings in the period of 2021-2030 is 1,030-1,550 petajoules. The additional savings occur because of customised agreements with large emitters in the industry, an additional subsidy budget for after-isolation of homes, and the phasing out of bad labels of homes and buildings. In the sector mobility, national policy leads to fewer savings due to the lowering of the discount on the motor vehicle tax for electric cars.

8) Necessary scaling up of the production of renewable energy is not taking place

In 2023, 17% of total Dutch gross final energy use was renewable energy. As such, the Energy Agreement of 2013 was reached, which stipulated a goal of 16% in 2023. In the projection in this KEV, on the basis of adopted and proposed policy, this share of renewable energy will increase at a comparable speed, but the necessary acceleration towards 2030 is not taking place. The projected share of renewable energy is 33.4% [29.9-36.9%]. The probability that the Netherlands thereby reaches its target of 39% is less than 5%. The bandwidth for the projection of the share of renewable energy in 2030 is predominantly determined by the uncertainty around the speed within which offshore wind projects are being realised.

With adopted, proposed, and scheduled policy for which a quantified assessment could be made, the share of renewable energy in 2030 will ultimately be somewhat higher, likely 30.6-37.7%. The probability that the Netherlands reaches the goal for renewable energy in 2030, however, remains lower than 5%. The application of heating pumps will somewhat increase, and energy use itself will

somewhat decrease, due to scheduled policy aimed at homes (e.g. additional ISDE-budget and phasing out of bad labels for private rental housing). A ban on return costs can mean that households will invest more in solar panels. Scheduled policy measures, such as raising the maximum speed to 130 km/h where possible, a decrease in the discount of the motor vehicle tax for electric cars, and the reintroduction of red diesel, will all lead to a higher use of fuel in the mobility sector, as well as a few additional petajoules in biofuels to complete the chain emission reduction regulation from the RED III obligation.

The projected share of renewable energy in 2030 on the basis of adopted and proposed policy, as well as scheduled policy for which a quantified assessment could be made, turns out to be lower in the KEV 2024 as compared to the KEV 2023, which still projected 32-42% (PBL et al. 2023). The use of renewable energy in 2030 is, in the KEV 2024, dozens of petajoules lower than in the KEV 2023. This is mainly due to a delay in offshore wind projects, a slower increase of solar energy due to the phasing out of netting arrangements, a slower increase of the use of heating pumps due to the cancellation of the standardisation of heating installations, and a slower projected growth of green gas. Moreover, final energy use in the KEV 2024 is dozens of petajoules higher than in the KEV 2023, due to fewer energy savings. The discussion within Europe recently has made evident that biofuels for shipping bunkers in the RED III obligation will be counted for the use of renewable energy and the total gross end use. When calculated, this ultimately leads to a higher share of renewable energy, but the effects are smaller than those effects already mentioned above.

9) The emission of greenhouse gases from bunker fuels declines due to new European policy

On the basis of adopted and proposed policy measures, the greenhouse gas emissions coming from the burning of bunker fuels that are sold in the Netherlands to international aviation and shipping, will decrease from 43.7 megatonnes CO_2-equivalents in 2023 to 41.5 megatonnes CO_2-equivalents in 2030. These emissions, of both international aviation and shipping, as well as international inland shipping (with an origin or destination outside of the Netherlands), are not being calculated into the national emission total.

In maritime shipping, it is expected that emissions will decrease from 31.1 megatonnes in 2023 to 28.0 [23.8-33.2] megatonnes CO_2-equivalents in 2030. This decrease is the result of a further trend of decline in the sale of bunker fuels for maritime shipping, in combination with new policy measures aimed at the sustainability of maritime shipping, which were implemented over the past year. With the FuelEU Maritime regulation, the European Union introduces, by 2025, an emission reduction obligation for the entire emission chain of maritime shipping. This reduction obligation will increase in the following years.

The emission of international inland shipping is expected to decrease from 2.5 megatonnes CO_2-equivalents in 2023 to 2.1 [0.3-2.7] megatonnes CO_2-equivalents in 2030. This decrease is mainly attributable to the proposed implementation of the RED III, which leads ships bunkering more renewable fuels.

The emissions of international aviation out of the Netherlands is expected to increase from 10.1 megatonnes CO_2-equivalents in 2023 to 11.4 [10.3-12.9] megatonnes CO_2-equivalents in 2030. Despite the fact that the ReFuelEU Aviation ordinance leads to a rising blending percentage of renewable resources, the emissions by aviation will increase. This is due to the increase of the

number of flights at the six internationally significant airports, projected in this KEV to increase from circa 506,000 flights in 2023 to almost 540,000 flights in 2030.

10) Insufficient policy has been developed to realise the intended significant emissions reduction in 2040 on the way to climate neutrality in 2050

On the basis of adopted and proposed policy, the climate goal of 55% for 2030 will, according to this KEV, only come into view around 2035. In line with this, there is insufficient European and national policy that fits with the necessary significant emissions reductions towards 2040.

On the way towards climate neutrality in 2050, the European Commission advised in February 2024 to aim for an emissions reduction of greenhouse gases of net 90% in 2040, relative to 1990 levels (EC 2024). Taking into account, that is, the net future contribution of emissions removal through land use and CO_2 capture (CCS) from the air or from bio-energy.

If this intended emissions removal is actually realised, the necessary emissions reduction for the other sectors will decrease to 83% in 2040. The advice of the previous European Commission strongly builds on the stipulated emissions reductions in the emissions trading system ETS1 and ETS2, the legislation on land use, the CO_2 standardisation for the mobility sector, and demands for energy efficiency of buildings and equipment. It is the task of the new European Commission, together with the European Parliament and the European Council, to determine a definitive goal for 2040 and to embed this in European Climate Law. If this happens, it is expected that this will be followed in 2026 by an associated policy package. This will also clarify how the goal is to be distributed across sectors and countries.

Even though the current Dutch Cabinet has indicated not to determine a national goal for 2040 (unlike for 2030), the Netherlands still has to realise fierce emissions reductions in 2040 on the way towards climate neutrality by 2050. To illustrate this, to realise a 90% reduction in 2040 in the Netherlands, from 2023 onwards an average emissions reduction speed of 7.3 megatonnes CO_2-equivalents annually would be necessary. Whereas the high reduction speed between 2018 and 2023 still reached 9.0 megatonnes CO_2-equivalents per year, the reduction speed in the years towards 2035 will, according to this projection, only be 3.8 megatonnes per year.

The European emissions trading systems ETS1 and ETS2 will likely also be the most important European policy instruments after 2030. If the EU continues its current plans, then, from 2039, no new emission rights will be granted in ETS1; in ETS2, this would be from 2044 onwards. There are, however, many uncertainties concerning how both instruments are implemented. In this KEV projection, the ETS1- and ETS2 emissions in 2040 still land well above zero. This is because the projected CO_2 prices and supporting policy are still insufficient to reach the necessary emissions reductions in 2040. The perspective per sector for the period of 2030 until 2040 is further elaborated on in the main report.

Table 1
Greenhouse gas emissions per sector in megatonnes CO_2-equivalents[1, 2, 3]

	1990	2023*	Projection 2030	Bandwidth projection 2030	Bandwidth projection 2030 including part scheduled policy with indication	Indicative residual emissions 2030	Projection 2035	Bandwidth projection 2035	Bandwidth projection 2035 including part scheduled policy with indication
Reduction national greenhouse gas emissions, relative to 1990 levels (percentage)	0	35.6	48.7	44.4-51.8[7]	44.7-52.1		55.8	51.9-60.9	52.3-61.6
Total[1]	228	147	117	110-127[8]	109-126	96[9]	101	89.1-110	87.6-109
Electricity[4,5]	39.6	23.5	12.9	9.6-19.9	10.2-20.4	13.0	7.9	4.6-16.2	4.9-16.4
Industry	86.8	46.6	38.5	33.3-42.5	32.1-41.3	29.1	36.6	26.4-38.8	24.6-37.2
Built environment	29.7	17.3	15.6	12.6-18.2	11.6-17.3	13.2	13.4	10.9-16.2	9.9-15.2
Mobility[6]	33.4	30.6	23.2	20.6-25.4	21.1-25.9	21.0	18.1	15.2-21.1	15.7-21.5
Agriculture	33.1	25.0	22.0	20.0-24.7	20.7-25.5	17.9[10]	20.2	18.4-22.8	19.1-23.8
Land use	5.4	3.8	4.8	4.7-5.3	4.3-5.1	1.8	4.5	4.0-4.9	3.6-4.7
ETS1 sectors		58.9	43.8	38.4-51.8	37.8-51.2		37.5	27.2-44.6	25.8-43.4
ETS2 sectors			41.1	36.4-44.4	36.0-43.9		34.2	29.6-38.3	29.0-37.6
ESR sectors		84.1	68.3	63.3-73.2	63.6-73.6				
Cumulative ESR sectors 2021-2030			800	781-819	783-821				

1) The statistics for the years 1990 and 2023 are not corrected for temperature (RIVM 2024, Emission Registration 2024).
2) Because of rounding, small differences can occur between totals and underlying numbers.
3) The projections for 2030 and 2035 are based on adopted and proposed policy.
4) The sector electricity here covers electricity and (residual) heat production.
5) Here, a calculation value for the projection of the electricity sector is provided. In reality, this scenario is not more or less likely than the other results within the bandwidth (see paragraph 4.1 in the main report for more explanation).
6) Includes mobile equipment.
7) The reduction percentage is based on total bandwidths which correspond to uncertainties.
8) The sectoral bandwidths cannot be added up to the national total bandwidth, because of the applied methodology which takes into account interactions between uncertainties in the sectors.
9) This is excluding the intended reduction of 3.2 megatonnes due to cross-sectoral policy instruments by the Cabinet Rutte-IV (EZK 2023b).
10) Within agriculture, a specific indicative residual emission for greenhouse horticulture has been determined of 4.3 megatonnes CO_2-equivalents.

* Provisional data (Emission Registration 2024

Table 2
Probability of reaching national and European climate- and energy goals

Description of goal	Goal	Probability of reaching the goal with adopted and proposed policy	Probability of reaching the goal with adopted, proposed, and scheduled policy
National goal for the reduction of greenhouse gas emissions in 2030, relative to 1990 levels	55%	<5%	<5%
Methane emissions, goal of reduction in 2030, relative to 2020 levels	30%	<5%	<5%
ESR sectors, binding cumulative emission ceiling 2021-2030	829 megatonnes CO_2-equivalents	>95%	>95%
Land use emissions, binding national target for 2030	0.435 megatonnes CO_2-equivalents reduction, relative to the average of 2016-2018. Thus, a provisional residual emissions goal for 2030 can be determined of 4.9 megatonnes CO_2-equivalents	c. 60%	c. 85%
Electricity, indicative residual emissions 2030	13.0 megatonnes CO_2-equivalents	c. 35%	c. 30%
Industry, indicative residual emissions 2030	29.1 megatonnes CO_2-equivalents	<5%	<5%
Built environment, residual emissions 2030	13.2 megatonnes CO_2-equivalents	c. 10%	c. 20%
Mobility, indicative residual emissions 2030	21.0 megatonnes CO_2-equivalents	c. 10%	<5%
Agriculture, indicative residual emissions 2030	17.9 megatonnes CO_2-equivalents	<5%	<5%
Land use, indicative residual emissions 2030	1.8 megatonnes CO_2-equivalents	<5%	<5%
Greenhouse horticulture,	4.3 megatonnes CO_2-equivalents	c. 10%	c. 10%

Description of goal	Goal	Probability of reaching the goal with adopted and proposed policy	Probability of reaching the goal with adopted, proposed, and scheduled policy
indicative residual emissions 2030			
Renewable energy, binding contribution to EU-goal renewable energy in 2030	39%	<5%	<5%
Increase in share of renewable heating and cooling (binding goal)	0.8% between 2021-2025 and 1.1% between 2026-2030	c. 10%	c. 50%
Increase in share of renewable heating and cooling, including electrification and residual heat (facultative binding goal)	0.8% between 2021-2025 and 1,1% between 2026-2030, raised by half of the extra contribution by electrification and residual heat	c. 60% when cold, electrification, and residual heat are included	c. 95% when cold, electrification, and residual heat are included
Additional increase renewable energy heating and cooling (indicative goal)	Indicative top up of 1.1 percentage point per year between 2021-2025 and 0.8 percentage point between 2026-2030	<5%	<5%
Reduction of final energy use (article 4 EED), binding goal	1.609 petajoules in 2030	c. 5%	c. 10%
Reduction of primary energy use (article 4 EED), target	1.935 petajoules in 2030	<5%	<5%

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