Extra update

Energy Research Strategy

Thursday 24 October 2024

Include supply and investment security in policy

This Extra update highlights the evolution of the electricity sector described by the KEV. With the publication of the KEV, it has become clear that the Netherlands is not on track to achieve the stated greenhouse gas reduction of 55% by 2030. Zooming in on the electricity sector, the development of renewable energy sources (solar and wind) stands out. The share of solar and wind in the electricity mix is growing rapidly in 2030 (65%) and 2035 (77%). This increases the number of times when supply exceeds demand.

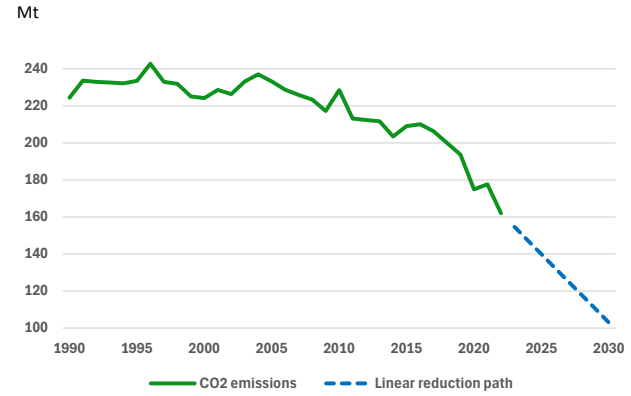
Electricity prices will become increasingly lower in summer, while remaining at higher levels in winter. At times when not enough renewable electricity is produced, dispatchable power will be needed. This will be accompanied by extreme prices. In addition, the financial and political risk for commercial parties to hold dispatchable capacity - for example, in the form of (CO2-free) gas-fired power plants - could be too great, putting security of supply at risk. A capacity mechanism in the electricity market is an option to deal with these risks. New climate policy following the KEV should explicitly include security of supply and affordability to strengthen the policy.

KEV 2024: Achieving CO2 reduction target gets out of sight

Starting with the Climate Act in 2019, the government is required to commission a Climate and Energy Outlook (KEV) every year. This KEV is prepared by the Netherlands Environmental Assessment Agency (PBL) and is the main monitor evaluating the progress of national climate policy. The KEV 2024 shows that with currently adopted and planned policies, a greenhouse gas emission reduction of 44 to 52% will be achieved in 2030 compared to 1990. This makes it unlikely that the national climate target of 55% greenhouse gas reduction will be achieved in 2030.

Earlier, the 2023 KEV showed that the Netherlands was heading for a 46% to 57% emission reduction. That made that edition the first and only one in which the 2030 national climate target was within range to be met. So the expectation for achieving the 55% emission reduction in 2030 has now been revised downwards. The graph below shows that, based on historical emissions, there is still quite a gap to bridge towards 2030.

Emissions NL and reduction needed for 2030 target



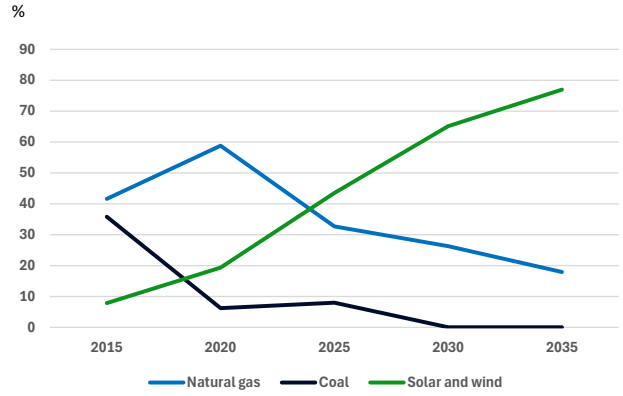
Source: PBL (KEV)

The drop in projected emission reductions is partly due to setbacks in implementation. For instance, the construction of offshore wind farms and the production of green hydrogen are delayed. In addition,

political choices, such as the abolition of the mandatory (hybrid) heat pump and increase in the national CO2 tax, are to blame for the more negative estimate of the KEV.

The rate of progress of emission reductions varies greatly by sector. For instance, GHG emissions in the electricity sector fell sharply (again) in 2023. Total emissions came to 23.5 Mtonnes. That is 23% less than in 2022. This is partly due to the sharply increased share of renewables in the electricity mix. Furthermore, the KEV shows that, based on the adopted and intended policies, the share of electricity production covered by generation from wind and solar grows to 65% in 2030 and 77% in 2035. The additional electricity generation from solar and wind is mainly at the expense of coal and gas, as shown in the chart below. This lowers greenhouse gas emissions in the electricity sector to 10 to 20 Mtonnes in 2030. This decrease continues to a level of 5 to 16 Mtonnes in 2035.

Share of electricity generation by source



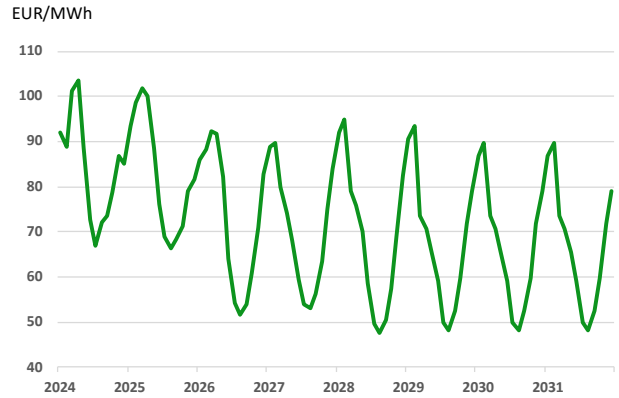
Source: PBL (KEV)

The paradox of more solar and wind in the energy system

The KEV shows that the share of solar and wind in the electricity market is growing so fast that the number of moments of surplus will increase sharply. This means that on a national level, there will be more supply of electricity than demand (combined with what can be stored and exported at maximum). We use a forward curve analysis to show how this development affects the Dutch electricity market. A forward curve reflects current prices for supply in the future. The current forward curve (from 24 October 2024) shows that electricity prices are on a downward trend until 2027/2028. The expected growth in solar and wind - together with a less tight global LNG market - is expected to put pressure on electricity prices in the coming years.

What is remarkable in this forward curve is that from 2027 onwards, the electricity price remains structurally lower in summer, while the price spike in winter rises again after an initial decline. In summer, when there is relatively high solar energy production, electricity is more often abundant. The large supply of solar power will keep structural pressure on the price during the summer months. In winter, a significant proportion of renewable energy production falls away, necessitating more expensive electricity production to meet demand. Producers with dispatchable capacity, e.g. in the form of (CO2-free) gas-fired power plants, will have to step in at those times. This while a higher percentage of renewables in the electricity mix actually reduces the share of dispatchable power. The paradox is that this dispatchable capacity is at the same time crucial in an energy system with a lot of sun and wind.

Forward curve Dutch electricity (baseload)



Source: LSEG Eikon

As a result, generators with dispatchable power need to recover their (fixed) costs in an increasingly shorter time frame. In the current market model, this causes price spikes at times when not enough electricity is produced from renewable sources. However, while price spikes are undesirable, this is the situation in the favourable case. This is because the condition is that enough gas plants keep the doors open to produce only on the rare occasions when it is needed. For gas plants - owned by commercial parties - this is a major risk. On the one hand, financially, where it is highly uncertain whether enough hours can be axed to be profitable. Moreover, the possible arrival of (subsidised) nuclear power plants from 2035 onwards could definitely undermine the earning model of gas power plants. On the other hand, there is the political risk, in which changing climate policies make the use of gas plants for power generation more risky. We saw such political volatility with the policy around coal-fired power plants. Finally, declining public support for fossil power generation is a significant factor. There is therefore a risk that market players will close their gas plants of their own accord, jeopardising security of supply.

Capacity market may provide solution

The government wants to meet climate targets, but also stresses the importance of affordable climate policy and a favourable investment climate. Without adequate policies, the affordability of climate policy and the investment climate will come under increasing pressure due to rising price differences in the electricity market. Moreover, it is questionable whether security of supply will not get a dent when the business case for producers of dispatchable power becomes increasingly risky. Therefore, in addition to new climate measures, new policies are needed that provide financial security and keep electricity prices manageable. Although there are no concrete plans for this yet, a capacity market could be the answer.

A capacity market is a market model in which electricity producers, such as gas power plants, are paid not only for the electricity actually delivered, but also for keeping generation capacity available. This allows these electricity producers to cover their fixed costs, making their business case more manageable. This market model will ensure that electricity prices do not rise too steeply when gas power plants have to step in at times of insufficient renewable energy production.

Because capacity providers in a capacity market have to be remunerated, the cost of electricity for the customer will increase. In that case, at times with sufficient renewable energy, the price will be somewhat higher than in an energy-only market. On the other hand, price peaks will be avoided at times with insufficient renewable energy. In this way, financial risk is hedged. Countries around us such as the UK, Belgium and France already have some form of a capacity mechanism. In addition, Germany is currently preparing to develop one. If the Netherlands takes a different path, it could negatively affect the investment climate.

The KEV has shown that the sustainability of the electricity sector is proceeding apace. At the same time, the overall message is that new policy is needed to meet climate targets. However, climate policy without regard to affordability and security of supply will not bring meeting the targets any closer. Therefore, new climate policy should emphatically also focus on affordability and security of supply. This will also support the investment climate. In the electricity sector, a capacity mechanism could provide a solution here.

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