

**17 April 2019**

## Electricity: A shift in power

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- **So far, Dutch decision-makers have little influence on the wholesale electricity price**
- **Variables, like coal and gas, have the highest influence on the Dutch wholesale electricity price...**
- **... but these are mainly driven by the international markets**
- **The European Emission Trading Scheme (EU ETS) price is becoming an important driver**
- **With the phase-out of coal from the generation mix, a shift towards gas and renewables is inevitable and as result a “shift in power”**

### **The main variables driving the Dutch wholesale electricity price**

Over the last three years, the Dutch wholesale electricity price hovered between EUR 24/MWh and EUR 72/MWh, a vast range that can be explained by market trends. Since 2016, the Rotterdam coal price and TTF (Title Transfer Facility) natural gas price have had the highest explanatory power<sup>1</sup> (influence) on the Dutch electricity price, given their share in the electricity generation mix. This was followed by the wind share<sup>2</sup> as a percentage of the electricity generation mix and the fourth variable was the European Emission Trading Scheme (EU ETS) prices (see Figure 1). However, the ranking of these variables is destined to change, resulting in a shift in the variables' explanatory power.

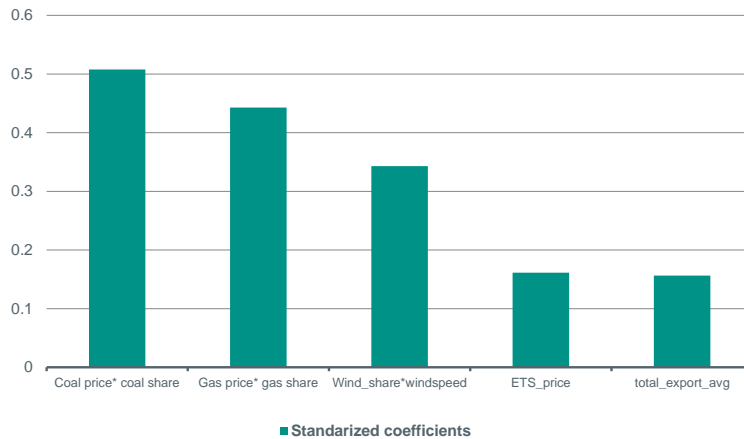
The phase-out of coal from the electricity generation mix signals an inevitable shift towards more usage of gas and renewables. As the renewable energy cost continues to drop and given that the national government feels it has spent enough on subsidies, the EU ETS will start playing a bigger role (to be explained further below). However, the EU ETS price development will continue to depend on policies and fuel prices. In addition, as the share of renewables in neighbouring countries continues to grow, this will start to feed into the Dutch wholesale electricity price. Therefore, interconnectivity (exports/imports) will also have an increasing influence. The key drivers that affect the wholesale electricity price will be discussed in the following order: (1) coal, (2) gas, (3) the EU ETS price and demand for carbon allowances, and (4) the influence of Dutch decision-makers.

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<sup>1</sup> Explanatory power estimates the effect/influence of the independent variable on the wholesale electricity price.

<sup>2</sup>The percentage of wind in the electricity mix is modelled with wind speed as an interaction term.

**1. Variables with the highest influence on the wholesale electricity price**



Source: ABN AMRO Group Economics  
 Please note that the standardized coefficients were calculated to standardize for the variance of the different variables with different units of measurement and can therefore be compared to each other. Standardized coefficients are also referred to as the beta coefficients in regression analysis.

**The impact of coal on the Dutch electricity price is evident**

Over the past decade, the strong influence of the Rotterdam coal price on the wholesale electricity price is evident (see Figure 2). The high coal prices contributed to the rise in electricity prices in 2011. The continuous fall of the coal and ETS price up to April 2016 contributed significantly to the decline in the electricity price. In tandem with the recovery of the coal price in mid-2016, the price of electricity also started to increase. In the last few weeks, the Rotterdam coal price (active monthly contract) has plunged and the electricity price followed due to reasons to be discussed in the following section.

**2. Rotterdam coal price vs. wholesale electricity price**



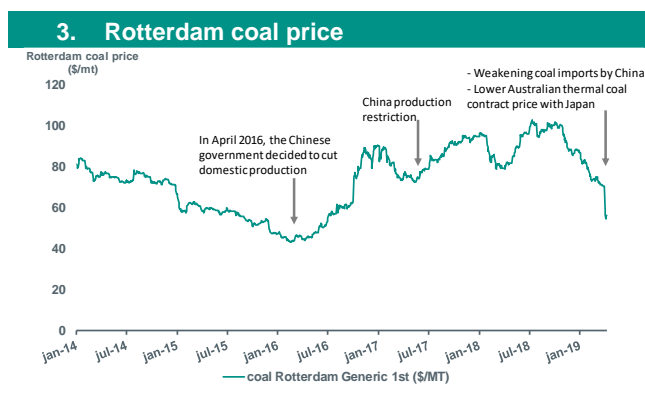
Source: Bloomberg, ABN AMRO Group Economics

**Asia has the capability to swing the global coal market**

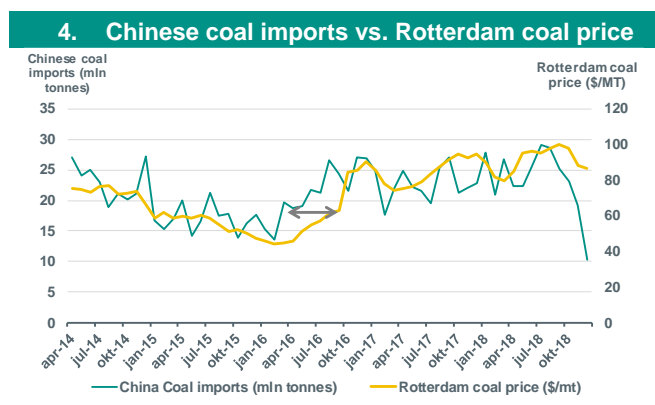
In the last three years, the thermal coal price has been moving between a min of USD 42/mt and a max of USD 116/mt. This volatility in prices can be explained by market fundamentals.

Given the sheer size of Asia’s market share, particularly that of China, any unexpected demand/supply change in China can spill over to the global market. In April 2016, for example, prices increased with a time lag due to an unexpected rise in Chinese imports and the inability of export markets to satisfy this sharp increase (see Figure 4). This surge in imports was not a result of a rise in demand in China but of a decrease in domestic production. The Chinese government had decided to reduce domestic production and restricted the number of operation days of mines. The fall in production was stronger than the fall in domestic consumption, which drove utility companies to turn to export markets. This led to a sharp rise in coal prices as global supply was depressed by low investments in coal globally (mines, port infrastructure and transport infrastructure), due to a previous episode of low coal prices. Similarly, in May 2017 the increase in China’s coal demand and lower production levels resulted in a sharp increase in coal prices in Europe and other unregulated markets (see Figure 3).

Since March 2019, China’s attempts to stabilize domestic coal production resulted in a decrease in imports, especially from Australia. In addition, the low contract price of Australian thermal coal with the Japanese Utilities (Japan is the largest buyer of Australia’s thermal coal) put downward pressure on coal prices. Therefore, depressed Chinese imports and low Japanese contract prices pushed thermal coal prices below USD 80/mt, weakening both the Australian and Rotterdam coal prices (see Figure 3). China will continue to play a key role globally from the demand and supply side of the balance, countered by the commencement of cleaner energy initiatives and policy changes.



Source: Bloomberg, ABN AMRO Group Economics



Source: Bloomberg, ABN AMRO Group Economics

**Gas is the second largest driver**

In the short term, the gas price is mainly driven by temperatures, the price of oil (albeit a weaker correlation nowadays), and the price of coal (either favouring a shift towards or away from gas). The recent drop in the price of TTF gas – regardless of the decrease

in domestic gas production in the Netherlands – is due to the availability of sufficient alternative sources (possible gas imports Norway, the UK and Russia, as well as LNG).

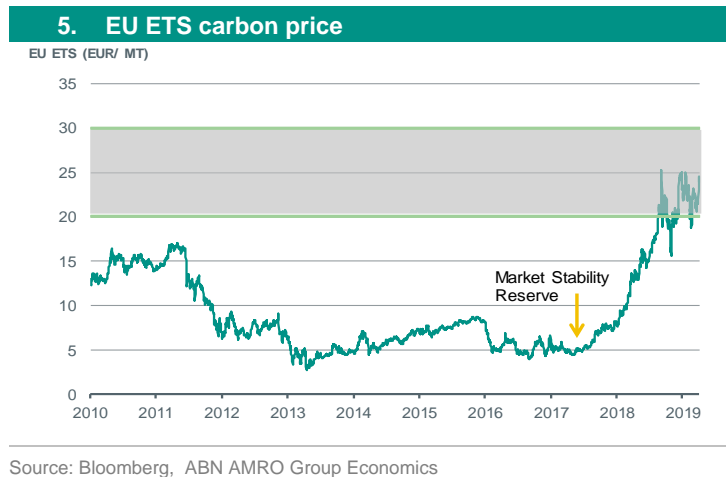
In the long term, the phase-out of coal and nuclear in neighbouring countries will create further demand for gas, especially if the penetration of renewables cannot cope with the pace of phase-out of baseload production (coal and nuclear). As the penetration of renewable energy (especially wind energy) intensifies, it will increasingly impact the wholesale electricity price. As a result, the volatile feed of renewable electricity into the electricity grid and the increasingly complex electricity consumption behaviour will necessitate more expensive units (like gas peaker plants), flexibility sources, and storage capacities in response to the variability in electricity production.

One can therefore conclude that variables (like coal and gas) that have the highest influence (explanatory power) on the Dutch wholesale electricity price are mainly driven by the markets and policies internationally and in neighbouring countries.

### **EU ETS price and its underlying variables**

Until mid-2017, the EU ETS price struggled to exceed EUR 8/tonne due to the surplus of allowances in the market. The steep price increase in the EU ETS in 2018 was a result of multiple factors. First, as the EU approved phase 4 of the EU ETS reforms, this created an atmosphere of tighter markets for permits (the Market Stability Reserve, the linear reduction factor and the cancellation of the excess allowances after 2023). As a result, aggressive hedging soared, which pushed prices higher. Second, the rise of the gas price in 2018 from EUR 20/MWh to close to EUR 30/MWh resulted in more coal demand that increased demand for carbon allowances and put upward pressure on the EU ETS price. Third, the heatwave in 2018 also had an impact on the ETS price. Temperatures in Europe were higher than in previous years, which affected the hydro, wind and nuclear output. This led to more power production from coal and gas and, as a result, to an increase in demand for allowances.

It can therefore be concluded that the EU ETS price, which has predictive power on the Dutch wholesale electricity price, is primarily driven by reforms. The latter two factors (fuel prices and weather) can have a temporary effect on the electricity market's merit order and, as a result, an indirect impact on the ETS price. Meanwhile, a UK exiting from the EU ETS can put short-term downward pressure on the ETS price by releasing allowances into the market. However, to avoid market distortions, the MSR will trigger a recovery in the ETS price by reducing the surplus of allowances. Looking ahead, the ETS reform remains the biggest driver. The EU ETS price is still to be aligned with the Paris agreement and therefore, a further reduction of the cap is expected. This can put further upward pressure on the EU ETS price.



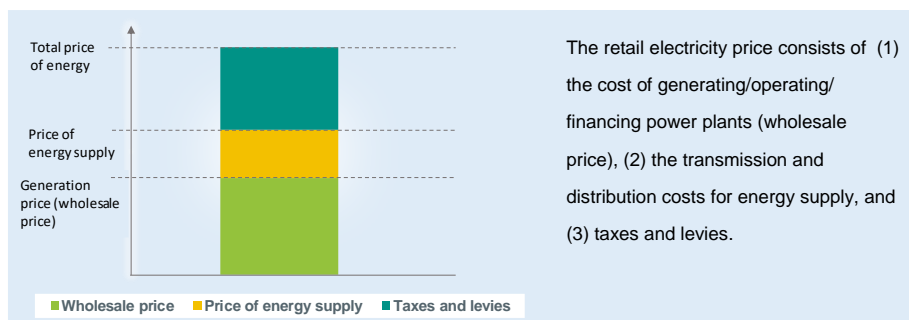
### The demand for EU ETS allowances from the power market perspective

Thus far, the main driver for carbon allowances is the power market. The tightening of the availability of EU ETS allowances is likely to prompt a shift from coal to gas and eventually to renewables in the power mix. However, if coal is being phased out from the electricity mix due to national policies, a shift from coal to gas will happen regardless of the EU ETS. This will result in a drop in the demand for EU ETS allowances. In other words, the demand for carbon allowances from a power market perspective is affected by national policies alongside the ETS price. A good national policy would take this effect into account as well and correct for it by, for instance, issuing fewer emission rights.

The second biggest driver for carbon allowances is fuel prices. Before coal is fully phased out, market prices dictate what is running or not – in other words, the merit order. In a scenario where coal prices are high, there will be a shift from coal to gas in power generation irrespective of the ETS price. In other words, as fossil fuel prices remain uncertain, they can either strengthen or mitigate the effect of the EU ETS.

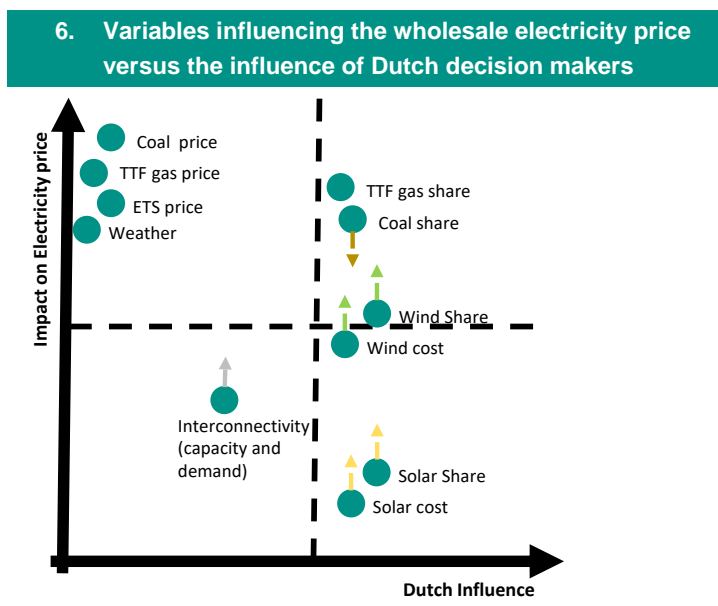
### Dutch decision-makers have little influence on the wholesale electricity price...

We have recently seen in the media that politicians are trying to influence the electricity bill within the climate agreement debate. While Dutch decision-makers can impact the electricity retail price via taxes and levies (see figure below), they have very little influence on the wholesale electricity price. As stated above, the Rotterdam coal price and the TTF gas price have the highest explanatory power (influence) on the Dutch wholesale electricity price (see Figure 6). However, and as discussed earlier, Dutch decision-makers have little influence and these variables are mainly driven by the global market. Similarly, the EU ETS price is mainly driven by (European) reforms, speculation, hedging strategies, and fossil fuel prices. Hence, Dutch decision-makers have also little control over the ETS price.



**... but they can influence the composition of the electricity mix long term**

However, there are things that policy makers can influence, namely the longer-term structure of the electricity mix. After all, the phase-out of coal for power generation continues to be driven nationally. As a result, the influence of coal on the electricity price will gradually fade. Similarly, the share of wind and solar in the electricity mix is directly influenced by subsidies, auctions and national policies, which will continue to gain influence as the penetration of renewables increases (see Figure 6). Interconnectivity will have a bigger influence as renewable energy increases in neighbouring markets and will increasingly feed into the Dutch wholesale market. In conclusion, some variables will lose influence while others will gain influence – a shift in “power” is inevitable and policy makers may have a say in its development.



Source: ABN AMRO Economic Bureau

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