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Energy Transition Monitor #2 – Lower energy consumption, no supply worries

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- **Primary energy demand to remain structurally lower.** Primary energy demand of the entire German economy declined by 5.4% yoy last year and a further 6.8% yoy in Q1. This decline is driven by cyclical (weak economic activity) and structural (loss in energy-intensive industrial production and energy efficiency gains) factors. As the latter two are likely to be further reinforced (e.g., energy efficiency regulation) we expect primary energy demand to continue to decline, albeit at a lower rate.

- **Shift of energy sources – higher speed of renewables' build-out.** The combination of continued high energy prices and national policy measures to speed-up renewables' build-out seems to be bearing fruit. Germany is on track to reach or even surpass this year's goal of adding 9 GW of solar, with 5 GW already added in the first five months, also boosted by private homeowners. Expansion of onshore wind power is still lagging behind, though.

- **One year after – favourable gas supply outlook for next winter.** In our baseline scenario we assume gas consumption to remain flat yoy for the rest of this year and during winter 2023/24. Gas storage levels are set to exceed the level of 90% by late September and 95% by late October. Storage levels would then be some 35% at the end of the heating season 2023/24.

- **Key risks to our forecast are a protracted cold winter and/or pipeline disruptions.** With close to 50% of all apartments heated by gas, winter temperatures remain the key demand-side risk factor. In case of 20% yoy more household gas demand, gas supply shortage risks resurface. On the supply-side, Germany is on track with respect to opening its new LNG terminals, but the availability of LNG might be hampered by rising Chinese LNG demand. Moreover, pipeline disruptions in Norway and Algeria and/or a cut of Russian gas transit via Ukraine (to other EU countries) might negatively impact EU gas supply. These are tail risks.

- **Continued strong policy momentum to boost domestic energy capacity and improve the economy's overall energy efficiency.** While some measures have a more immediate effect on domestic energy capacity (unlocking new locations for solar & wind energy, removing legislative hurdles, easier labour immigration), others will be effective only over the medium-term (e.g., corporate off-take agreements leading to new offshore wind farms being built, state aid for boosting domestic production of solar and wind technologies).

The energy crisis of 2022 had a massive impact on energy consumption in Germany. **Primary energy demand** declined by 5.4% yoy last year. This was the second largest slump at par since German reunification after 2020 (-7.4% yoy due to COVID-19) and 2009 (-5.4% yoy, global financial crisis) (see Figure 1). In 2022, Germany consumed close to 16% less gas (driven by the stop of gas deliveries from Russia and higher gas prices) and roughly 50% less nuclear energy (three of six nuclear power plants were shut down at the end of 2021). To partly compensate for lower consumption of gas and nuclear power, more lignite (+4.2%), hard coal (+4%), renewables (+3.9%) and mineral oil (+2.9%) were used.

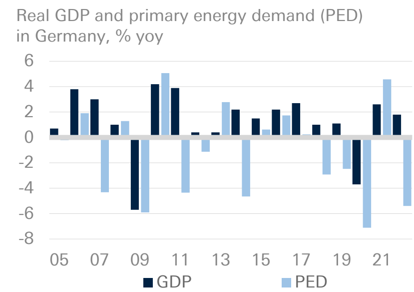
German primary energy demand continued to decrease by 6.8% yoy in the first quarter of this year. It's astonishing that all energy sources registered a drop. Nuclear energy recorded the sharpest decrease (-31.9% yoy due to stretch-out operation of the last three nuclear power plants), followed by gas (-12.8%), hard coal (-7%), lignite (-6.9%) and mineral oil (-2.6%). The use of renewables in primary energy demand stagnated versus pre-year level because of unfavourable weather conditions in the first months of 2023 (still leading to a higher contribution to primary energy demand, see Figure 10). High energy prices, the recession in winter half 2022/23, mild temperatures and structurally lower industrial gas demand contributed to the significant fall of primary energy demand.

Gas: Structural losses in industrial consumption have materialized

In 2022, industrial gas consumption in Germany fell by 16.4% yoy according to data from the Federal Network Agency. In our February Gas Supply Monitor (Germany Blog, February 17), we assumed that industrial gas demand would stabilize at a low level in 2023 and argued that a further decline below the already depressed level of 2022 was rather unlikely. However, industrial gas demand continued to decline in the first half of 2023 (-11,3% yoy). Admittedly, the war in Ukraine started late in Q1 2022, which is why a base effect is likely to occur from Q2. Most recent weekly data show at least that the gap in industrial gas demand between 2023 and 2022 has started to become smaller. The low industrial gas demand reflects the drop in industrial production in energy-intensive industries. In the first five months of 2023, output in the chemical industry was down 17.2% yoy. Building materials (-11.7%) and paper industry (-14.4%) also registered significant losses. We expect that some production capacities that have been shut down due to higher gas prices and concerns regarding security of supply will not return to the market. Thus, a structural decline in industrial gas consumption has materialized.

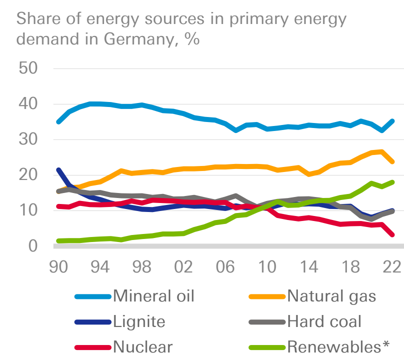
Gas demand of private households and (small) commercial clients decreased by 18.3% yoy in 2022 (higher prices, mild winter). In the first half of 2023, consumption was down by 8.4% yoy (see Figure 4). Since gas prices will remain above the pre-crisis level, private households still have incentives to save gas. Weekly consumption data shows that temperatures are the most relevant driver for private gas consumption: The few weeks with very low temperatures during the winter of 2022/23 showed that private households increased gas consumption despite higher prices. Therefore, temperatures during winter 2023/24 will be again the most important risk factor for private gas demand since close to 50% of all existing residential units in Germany are heated with gas.

Figure 1: Primary energy demand declined in 2022 despite economic growth



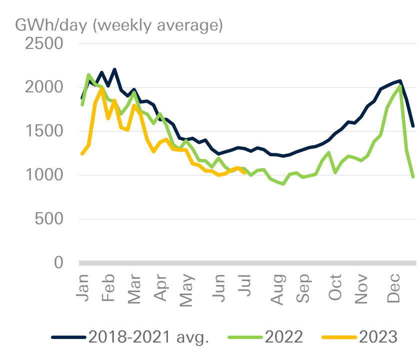
Source : Federal Statistical Office, AG Energiebilanzen

Figure 2: Oil, coal and renewables are gaining in importance



** Including others*
Source: BMWK

Figure 3: German industrial gas demand to remain structurally lower



Source : THE and Federal Network Agency

Gas supply situation expected to remain relaxed

We have updated our **gas demand-supply model** factoring in lower gas imports from the Netherlands with the Groningen gas field supposed to be closed in autumn. Direct gas imports from the Netherlands have already come down during the past few months which has not been compensated by higher pipeline imports from other countries (our new assumption for pipeline gas imports: 2,450 GWh per versus 2,950 GWh per day previously). We also assume a continuous increase in direct LNG imports even though we lowered our average capacity utilization of existing and future LNG terminals to 60% for 2023 and 65% for 2024. In our baseline scenario, gas consumption remains at the pre-year level for the rest of 2023 and during winter 2023/24. We assume a share of gas transiting Germany of 25%, slightly above the actual 2023 average so far.

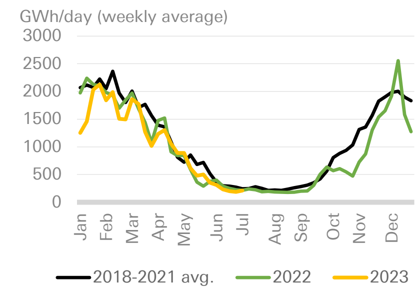
In this scenario, gas storages exceed the level of 90% by late September and 95% by late October (see Figure 5). Storages would be filled by some 35% at the end of the heating season 2023/24. If total gas consumption increased by 10% yoy until the end of winter 2023/24 due to a strong winter (driven by 20% higher gas consumption of private households versus last winter), physical gas shortages could not be ruled out.

Demand and supply-side risks remain – gas prices susceptible to bouts of nervousness

The major risk factor for gas supply on the **demand side** is a cold and prolonged winter 2023/24. Politicians would appeal so save gas/energy if both factors came together: (1) cold temperatures in Europe (2) for several weeks or even months. Another major risk factor on the demand side is LNG demand in Asia, mainly in China. According to the US Energy Information Administration, Chinese LNG imports decreased by 20% in 2022 due to high gas prices and weak economic growth. After the reopening of the economy, we expect Chinese GDP to grow by 6% in real terms in 2023, implying higher energy demand. So far, however, the economic recovery in China is more domestically focused while growth in the energy intensive industrial production has been below market expectations.

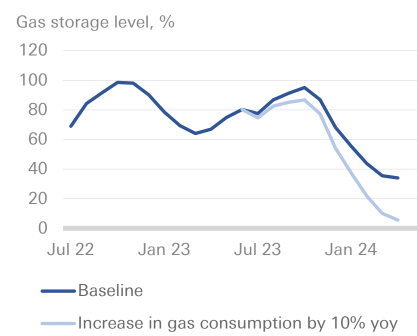
The major **supply side** risk is a stop of Russian gas deliveries via the Ukraine transit or the TurkStream pipeline. During the last few months, up to 10% of total EU gas imports still came from Russia. What is more, the EU receives some 15% of its LNG imports from Russia. Damages to the existing gas infrastructure (accidents, technical disruptions, or sabotage) are another risk factor that never can be ruled out. The proclaimed closure of the Groningen gas field by October 1st will reduce European gas supply. European gas prices (TTF, 1M future) jumped above EUR 40 per MWh after the Dutch authorities announced their decision. Prices have come down again since then but remain elevated (see Figure 6). It shows that markets continue to be nervous. The gas field will remain open for one year (without extraction) to potentially cushion demand during a particularly cold winter. A prolonged drought in Europe during the summer months or technical problems with French nuclear power plants in winter 2023/24 would be a supply risk in the power sector. In such a case, more gas could be used to generate enough electricity in Europe. With rising gas prices, that would also have an impact on power prices (merit order effect).

Figure 4: December cold spell shows that temperatures remain a key driver for household gas demand



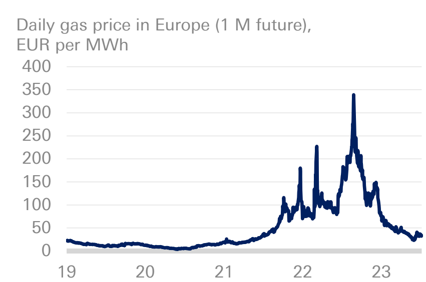
Source : THE and Federal Network Agency

Figure 5: Comfortable starting point for next winter



Source : Deutsche Bank Research

Figure 6: Gas prices in Europe are still above the pre-crisis level



Source : Bloomberg Finance LP

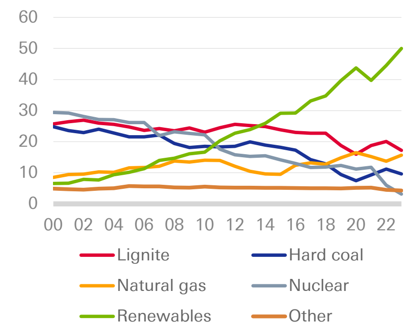
Electricity: Lower demand, more imports

Besides primary energy demand and gas demand, electricity consumption also dropped in 2022 (-3% yoy according to BDEW data). In the first five months of 2023, electricity consumption fell by a surprisingly high 6.5% yoy (electricity accounted for close to 21% of final energy demand in Germany in 2021). What is more, gross power generation in Germany declined by even 10.3% yoy. Nuclear power generation was down by 50% yoy (stretch-out operation and final closures of plants in mid-April; 2021: -49.8%). Power generation based on hard coal (-18.2%) and lignite (-17%) also decreased significantly, after they recorded an increase by 18% and 5.5% respectively in 2022). Electricity generation of gas-fired power plants fell by 4.9% yoy (2022: -11.6%). Due to unfavourable weather conditions in the first months of 2023 (lower wind level and fewer sunshine hours) and despite a significant increase in installed capacity especially in solar PV (+5 GW in the first five months of 2023), renewable power generation was down by 2.7% yoy. For June, a significant increase in renewable electricity generation is likely given the high number of sunshine hours and the increase in installed capacity.

The decline in domestic power generation in the first months of 2023 was compensated by high electricity imports (+25.3%) and lower exports (-15.6%). Still, Germany has been a net exporter of power in the year to date. It is also true, however, that Germany became a net importer of electricity in May, the first full month after the final phase-out of nuclear power. With rising contribution of solar PV during summer months, we expect net electricity exports to rise again. In case of prolonged phases with limited rainfall in central Europe, Germany could again help to compensate for lower thermal power production in neighbouring countries such as France.

Figure 7: Renewables in the lead

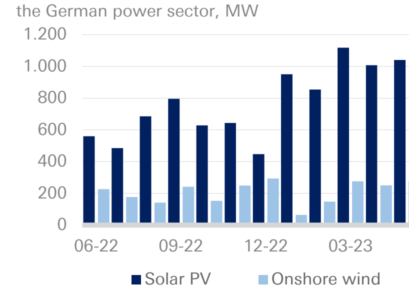
Share of different energy sources in gross electricity production in Germany, %



2023: January-May
Source: AG Energiebilanzen

Figure 8: Accelerated expansion of solar PV

New (gross) installations of renewable energies in the German power sector, MW



Source : Federal Network Agency

National and EU policy measures contribute to boosting domestic energy capacity and encourage energy savings

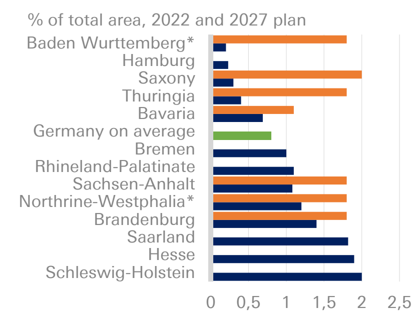
The immediate threat of gas/energy supply shortages has subsided and is not expected to resurface in the second half of this year. Thus, national and EU-level policy action is focused on boosting domestic energy capacity and further improving the overall economy's energy efficiency in order to accelerate the energy transition. While some measures have a more immediate effect on domestic energy capacity (unlocking new locations for solar & wind energy, removing legislative hurdles, easier labour immigration), others will be effective only over the medium-term (e.g., corporate off-take agreements leading to new offshore wind farms being built, state aid for boosting domestic production of solar and wind technologies).

1) Boosting domestic energy capacity – more progress with solar than with onshore wind

- **Expansion of solar PV is already gaining traction – new legislation to further facilitate build-out.** Germany is on track to reach or even surpass this year's goal of adding 9 GW capacity, with 5 GW already added in the first five months, also boosted by private homeowners (see Figure 8). The July tender for rooftop PV installations has been oversubscribed, pointing to further dynamism. The German photovoltaic strategy presented in May aims at simplifying regulation, unlocking new locations and incentivizing investments in the technology.[1] The first set of legislative proposals – called "Solarpaket I" – was published on June 29 and proposes to simplify the expansion of rooftop systems and "balcony PV" installations. A second set of legislative proposals called "Solarpaket II" is set to follow soon.

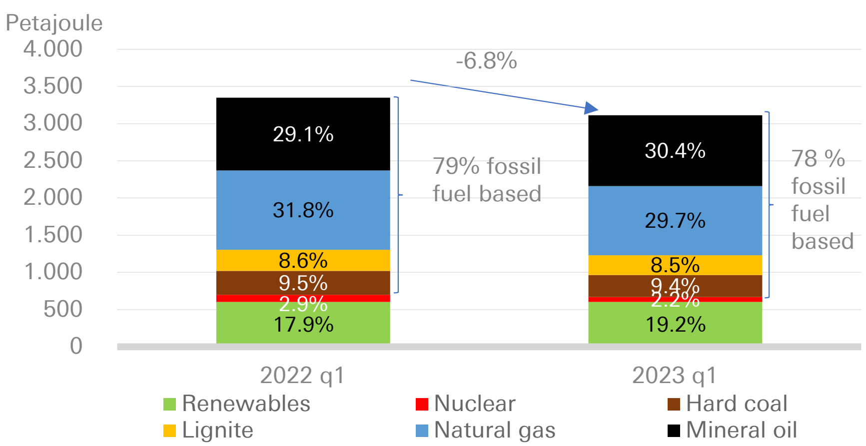
- **Onshore wind tenders continue to be under-subscribed.** The Onshore Wind Strategy, published in May 2023, aims to improve financing (through EEG, PPAs) as well as planning and approval procedures for onshore wind parks. On February 1, the "onshore wind energy law" came into force, which aims to expand onshore wind by a massive 10 GW a year from 2025 – for 2023. It details rules for using a minimum of 2% of the country's surface area for wind turbines. EconMin Habeck regards 4 GW in 2023 as feasible[2]. In the first five months of 2023, however, just 1 GW of onshore wind power capacity was added. Given mandatory targets (and sanctions) for the states, it is likely to accelerate reaching the 2% goal (see Figure 9). But onshore wind investment had a slow start into the first half of the year (3.21 GW on offer in February, under-subscribed with only 1.502 GW bidded, 2.866 GW on offer in May, under-subscribed with only 1.535 GW bidded.)[3] The legislative proposal for the facilitation of repowering existing wind turbines (Immissionsschutzgesetz), is in the final stages of the legislative process (first reading in the Bundestag on July 7).

Figure 9: Some states lagging behind the 2% target for dedicated wind power area



Source: BDEW/ EY Fortschrittsmonitor

Figure 10: Structural shifts in primary energy consumption



Source : AG Energiebilanzen, Deutsche Bank

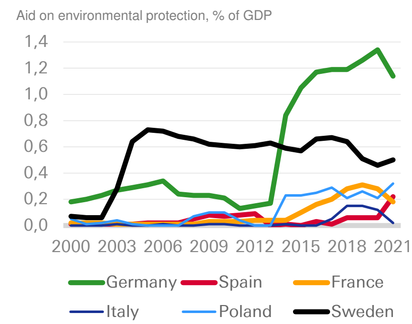
- **Fast-track permit-granting procedures for renewable energy projects – implemented.** On December 22, the EC adopted the Regulation on accelerating the deployment of renewable energies, which are declared to be of overriding public interest. Permit-grating periods will be limited to a maximum of either one, three or six months (e.g., for solar installations, electric heat pumps). The regulation will be valid for 18 months and is likely to (at least slightly) accelerate the rollout of renewables by reducing administrative hurdles. Germany already approved the national law implementing this fast-tracking in on March 3.[4] However, supply-side constraints (skilled labour shortages, bottleneck for certain components)

1 See also: Clean Energy Wire, Germany tables solar power strategy, May 5, 2023
2 Clean Energy Wire, Germany can double onshore wind power capacity buildout in 2023 - economy minister, May 23, 2023
3 Bundesnetzagentur - Pressemitteilungen - Ergebnisse der Ausschreibungen für Windenergieanlagen an Land und der Innovationsausschreibung zum 1. Mai 2023
4 BDEW, EU Notfallverordnung vereinfacht Erneuerbaren-Ausbau, March 2023

are likely to continue to act as a constraint. In Q1, renewables accounted for 19.2% of total primary energy demand in Germany (see Figure 10).

- **New immigration law and more use of AI applications set to alleviate supply-side constraints.** A recent study by KOFA estimates that for the ramp-up of solar and wind energy around 216.000 skilled workers (IT specialists, skilled electricians) are needed. After approving a new labour strategy in October the government amended its immigration law in June, easing immigration procedures for skilled workers. In addition, the solar industry association has signed an agreement to integrate Indian skilled workers at the end of February. Moreover, the increased use of AI is expected to help speed up planning and approval procedures for renewable installations.
- **Germany intends to make use of relaxed EU state-aid rules to boost production of solar and wind technologies.** Manufacturers of solar modules can declare their interest in receiving state subsidies until August 15.[5] Thereby Germany seems to make use of the temporary and targeted relaxation of the EU's state aid rules, announced by the EU Commission back in March. The relaxed rules allow member states to subsidize part of the investment cost in production capacities for sustainable technologies (batteries, solar panels, heat pumps, wind turbines, electrolysers, and carbon capture technologies, recycling capacities for critical raw materials). The maximum amount of aid is set at EUR 150 m for a single company in more prosperous regions and up to EUR 350 m per supported company in poorer regions (see matrix). A second clause, the so-called matching aid clause, allows member states to **New "matching aid" provision** allowing to match aid received by competitors outside the EU, which poses the risk for governments of being gamed by multinationals. (see Figure 11).
- **Gas-fired power plants strategy to create capacity markets.** A "Gas-fired plants strategy" to mitigate intermittence of renewable energies is set to be presented by the Economy Ministry in the course of the summer (see also our Energy Transition Monitor #1).

Figure 11: Germany stands out in terms of green state aid



Source: Eurostat, Deutsche Bank

2) Further measures to ensure security of gas supply

- **EU launched historic joint gas purchase tender (13.4 bcm) in May – further tenders to follow.** The first joint gas purchase tender is seen as a success as the EU attracted bids from 25 supplying companies equivalent to 13.4 bcm of gas. By leveraging the collective buying power of the EU, joint buying helps to prevent individual member states outbidding each other when filling gas storages and thus contributes to lowering gas prices. As part of the December legislative package, EU countries agreed to pool gas demand (equivalent to 15% of 90% of gas storage capacity, thus roughly 15 bcm). Further tenders will follow every two months until the end of the year.
- **German gas storage requirements to be extended until April 2027.** According to current legislation, gas storages must be filled 75% by September 1, 85% by October 1, 95% by November 1, and 40% by 1 February. With the September target already reached by now (82% storage level), these rules are set to be prolonged until April 2027 according to a recent report by the Economy Ministry. (see Figure 6).

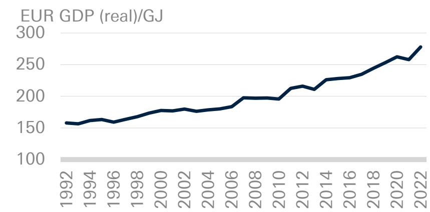
5 https://www.iwr.de/news/habeck-plant-aufbau-einer-deutschen-solarindustrie-interessensbekundung-fuer-foerderung-laeuft-news38349

3) Increasing energy efficiency via mandatory energy savings

Preliminary data for energy efficiency of the German economy have shown that aggregate energy productivity increased by 7.7% yoy in 2022, which was far higher than the historical average of 2.3% for the period of 1990-2022 (see Figure 12). Based on Q1 data for primary energy demand (-7% yoy), aggregate energy efficiency is likely to increase above-average also this year.

- The draft Energy Efficiency Law includes energy saving targets for the German economy (reduce primary energy consumption by 39.3%, final energy consumption by 26.5% by 2030 compared to 2008 levels until 2030) and more specific targets for the public sector. Moreover, it contains obligations for industry to invest in certain energy efficiency measures and for large data centres (bigger than 300 kW, accounting for an estimated 1% of total Germany data centres) to connect to district heating networks (if economically feasible) and use up to 20% of waste heat. It has not been approved by the Bundestag before the summer recess, which started this week.

Figure 12: 2022: Uptick in aggregate energy efficiency



Source: AG Energiebilanzen, Deutsche Bank

Appendix 1

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