Integrated National Energy and Climate Plans submitted – Substantial changes should be expected in final plans

Germany, Sweden and the UK have submitted their NECP drafts in late 2018. Without including important political decisions such as the recommendations from expert commissions on the coal phase-out and the future of mobility, Germany's document is poised to be altered substantially in the final version. Still, compared to the other two drafts, it includes the most detail. The UK stresses its commitment to advance energy market integration with the EU despite Brexit. Sweden provides a comparatively much shorter and vaguer document, stressing the role of market forces as main drivers for the expansion of renewable electricity and interconnectors, even though their outlined targets are arguably the most ambitious, aiming at 100% renewable electricity generation by 2040. Substantial changes, not only for Germany but also for Sweden and the UK, should be expected in the final versions due Dec 31, 2019.

In this insight, some key aspects of the NECPs for Germany, the UK and Sweden are summarized. The plans are comprehensive, and we focus on elements relating to the internal electricity market.

Although substantial revisions are to be expected in the final plans, some interesting insights can be drawn from the drafts as well.

Expert reports could substantially change outlined targets for Germany's NECP[1]

Important policy decisions expected in 2019

Germany's NECP strongly emphasizes its draft status and that multiple updates are expected to extensively change the core assumptions of its projections. The recommendations of the *Coal Commission* and the *Future of Mobility Commission*, a cross-sectoral energy efficiency strategy, the publishing of implementation plans derived from the *Climate Action Plan 2050* (Germany's long-term energy strategy) and grid infrastructure expansion acceleration plans are all going to feature in the final version of the NECP.

By autumn 2019, the German government will take concrete decisions on acceptance measures and funding conditions to clearly define further RES trajectories until 2030.

The Governance Regulation[2] *was proposed as part of the Commission's Clean Energy Package, politically agreed upon by the Council and Parliament in the summer of 2018 and came into force in December the same year.*

NECPs*: In accordance with the regulation, all Member States were to hand in a draft version of so-called National, integrated Energy and Climate Plans by the end of 2018. In the plans, each country was to indicate target, measures and trajectories concerning the five dimensions of the Energy Union – Decarbonization, Energy Efficiency, Energy Security, Internal Energy Market and Research and Innovation.*

RES deployment depends on grid development pace

The long-term climate goals imply a reduction in German GHG emissions of 55 percent by 2030 and 80 – 95 percent by 2050. Nuclear power should be phased out by 2022, and the RES share is expected to increase to 30 percent by 2030 and 60 percent by 2050. Moreover, energy efficiency improvement is expected to reduce primary energy demand by 50 percent by 2050.

Germany is aiming to increase the share of renewable electricity to 65 percent by 2030 (originally planned for 2040) subject to "challenges involved in achieving better synchronization of renewable energies and grid capacities". The draft mentions an

[1] Draft NECP for Germany

[2] Regulation (EU) 2018/1999

indicative trajectory towards a 50 – 52.5 percent share based on current policies, but cites the provisional status of the draft and expected changes based on newly introduced policies in the final version of the NECP. In short, as also stated in the coalition agreement, Germany plans to achieve a 65 percent share of RES-e by 2030, but this is contingent on the development of adequate solutions for better coordination of renewable electricity deployment and grid expansion. The assessment of the expert commissions will find entry into the final decision on what measures will have to be taken to achieve this measure.

Sector coupling important for future energy system development

Sector coupling represents a recurring theme throughout the document, implying that all measures in the power sector are to be implemented in parallel to and in accordance with efforts in heat and transport sectors. For example, a "National Innovation Programme" on hydrogen and fuel cells researches applications for transforming excess renewable electricity in a power-to-hydrogen plant, thus "coupling" the electricity and transport sectors.

Technology-specific targets for renewable electricity

Offshore wind capacity is planned to increase from 5.4 to 15 GW by 2030. Solar PV auctions should lead to annual gross additions of 2.5 GW, whereas biomass capacity also finds entry into planned auctions up until 2022. These technology-specific trajectories might be adjusted upwards considering the outlined 65 percent target.

In addition to these auctions, another 4 GW of onshore wind and PV respectively should be tendered through special calls. These, as well as also announced open tenders for both technologies, will not count towards the 52 GW ceiling for subsidized PV systems stipulated by the government in 2012. All measures should be implemented in close accordance with the transmission grid expansion to ensure system adequacy.

Reducing resistance against onshore wind power

To address potential conflicts arising from continuous growth in onshore wind capacity, a working group has been set up to develop actions to increase the acceptance of onshore wind by increasing considerations for processual and distributional justice. This happens after local resistance proved to be detrimental to the expansion of wind power in certain communities. Improving acceptance is particularly important considering the plan to tender 4 GW over the period from 2019 to 2021, on top of the planned, annual gross increase of 2.9 GW onshore wind until 2030.

Geographical distribution of renewable electricity capacity

Steering the geographical distribution of RES-e is another key aspect. To ease grid constraints and minimize curtailment, regional control should lead to a better geographic allocation of offshore and onshore wind deployment. Percentage caps are discussed as a potential tool to achieve a more efficient distribution of RES generation. Germany attributes this to the "… lower level of installed wind capacity in the north, [which] would lead to reduced curtailments because of a reduced requirement to transport energy to the south", also citing the grid bottleneck between Northern and Southern Germany.

Interconnectors and cross-border trade

Germany stresses its importance in the European energy market due to its central geographical position and its participation in multiple regional initiatives[3]. The country sees regional cooperation as a way to incite a more efficient market integration of renewable energy, i.e. through the adjustment and coordination of interconnector expansion projects.

The 2030 target for interconnection capacity is set at 30 percent of national peak load and the country plans to meet the EU's target of interconnection at 15 percent of installed generation capacity by 2030. Annual stress tests shall identify the need for interconnector expansion. The NECP emphasizes the relevance of the single German price zone and sees no need for the introduction of nodal pricing to achieve a more integrated, European energy market.

System flexibility a vital condition

Increased system flexibility is perceived as vital condition for the future electricity system and the following measures are planned:

- Expanding and modernising grids in accordance with demand
- Further integrating European electricity markets and increasing their flexibility
- Grid-financing that is fair and serves the system's needs
- Implement the 'using instead of curtailing' measure (not disconnecting intermittent renewables in times of excess supply and storing/using electricity e.g. through P2G plants)
- Flexible CHP facilities
- Optimisation measures on the topic of redispatch (efficient utilization of the existing grid, gradual shift of feed-in management systems to a predictable process, e.g., through balancing, financially and energy-wise, and the increase cross-border re-dispatching procedures)
- Flexibility check (obstacles to providing flexibility has to be eliminated to give all technologies equal access to the market)

[3] Such as The French-German cross-border collaboration, the Trans-European Energy Network regional group, the Pentalateral Energy Forum (Benelux, Germany, France and Austria) and the membership in North Sea Energy Cooperation and Baltic Seas group.

Opening support schemes for projects in other Member States

In contrast to Sweden and the UK, Germany specifically refers to the opening of tenders for renewable energy for projects located in other Member States. Taking into account the Renewable Energy Sources Act and the law on state aid, "… from 2017 onwards the Federal Government must open up tenders for electricity from renewable energies, comprising 5 percent of the output to be newly installed annually, for installations located in other EU Member States."

CCU key area for R&D efforts

The mentioned CCU R&D programs are primarily targeted towards expanding the feedstock base for petrochemical use of CO_2 but also contain specific prompts to support the development of new and more efficient processes using renewable electricity to transform CO_2.

Sweden's NECP underlines market-based RES-e and grid expansion[4]

New energy policy introduced after draft NECP handed in

Unlike many other nations, Sweden already submitted their NECP document in June 2018. A vital energy policy adjustment made by the end of the year was not included. Thus, substantial changes could be expected in the final version.

Also, where the German and British NECP drafts are comprehensive and rigidly follow the structure outlined in the Governance regulation, Sweden's plan is more loosely structured and only half as long as its counterparts from Germany and the UK.

Ambitious targets for emission reduction, energy efficiency and RES

Sweden outlines ambitious targets, aiming for a 50 percent energy intensity[5] reduction by 2030 compared to 2005 levels, a 63 percent decrease of emissions from sectors outside the EU ETS (base year 1990), a 70 percent reduction in emissions from domestic transport (base year 2010), and a 65 percent share of renewable energies in final consumption by 2030.

The electricity sector is to be 100 percent renewable by 2040. It is however stated that the latter does not constitute a political moratorium for nuclear power.

New renewable electricity should be market driven

Developments in the power sector are explicitly supposed to be market-driven. The Swedish-Norwegian Elcertificate scheme is defined as the only tool to support renewables build-out, apart from already existing measures and support policies. No further RES programmes are currently envisaged. The capacity trajectory pr. production technology indicated in the NECP should only be taken as a prediction.

In the reference scenario, the share of renewable electricity rises from 63 percent in 2014 to 85 percent by 2030 and to 100 percent by 2040. This increase comes mainly from wind power until 2030, when the share of solar power also starts to surge.

Interconnector build-out should be market-driven

Sweden does not indicate an interconnection target for 2030. Rather, market developments should drive increases in cross-border capacity. However, TSO projections show a rise in interconnection from 26 percent today (10 250 MW) to 28 percent assumed by 2030, implying an import capacity of 12 350 MW.

Sweden's strong embeddedness in regional cooperation through the Nordic Council of Ministers and North Sea Energy Cooperation is emphasized on several accounts.

In its NECP, the United Kingdom commits to energy market collaboration despite Brexit[6]

Work on a long-term climate policy is ongoing

The UK Clean Growth Strategy is the basis for the NECP draft, but a *Committee on Climate Change* has been appointed to propose an increase in the ambitions for the 2050 climate target. The report is expected to be published in the spring of 2019, outlining a pathway to achieve emission reductions.

Like Sweden and Germany, the British NECP focuses on the cross-border cooperation the UK undertakes to increase regional market integration, namely through NSEC[7] and collaboration in the EU's Strategic Energy Technology plan.

50 percent renewable electricity in 2030

The UK targets around 63 GW of renewable electricity by 2030, amounting to roughly a 50 percent share of total electricity generation. However, more unique to the plan is the individual consideration of UK's regions. Scotland and Wales have put in place targets for local energy consumption by 2030 (2 GW and 1 GW respectively) that are not necessarily ambitious considering existing levels of 666 MW of community and locally owned RES capacity in Scotland in June 2017 and 750 MW in Wales at the end of 2017 (529 MW renewable electricity and 221 MW renewable heat).

[4] Draft NECP for Sweden
[5] Measured as primary energy consumption relative to GDP.
[6] Draft NECP for the UK
[7] North Seas Energy Cooperation, https://ec.europa.eu/energy/en/topics/infrastructure/high-level-groups/north-seas-energy-cooperation

Support for renewable energy

CfD (Contracts for Difference) auctions for offshore wind and other non-established renewable technologies are planned every odd year for a capacity of 2 GW annually, and £557 million per year have been allocated for further CfD RES support in order to assure developers of Britain's continued support for RES build-out. This is projected to lead to 63 GW in RES capacity by 2030 in a scenario that already assumes policies with higher ambitions than the current UK laws and regulations beyond 2020.

In line with Germany, the UK also affirms the plan to increase the flexibility of the power system and explicitly underscores the development of a smart energy system relying on smart metering, smart energy services and digitalization.

Strong cooperation and more interconnectors wanted post-Brexit

The willingness to and need for collaboration in the energy market after Brexit is stressed. Hence, increased interconnection between the island and the Continent as well as Ireland is indicated as a key target of the UK's energy market efforts until 2030.

According to plans, the existing 3 GW transmission capacity will be increased by 4.4 GW that are currently under construction. Another 4 GW is seeking regulatory approval and a potential 9.5 GW of additional interconnector capacity may be further pursued in the early- to mid-2020s.

Substantial changes can be expected in the final NECPs

All three countries stress that their final version will likely feature substantial changes compared to the draft NECP based on important political developments until the end of 2019. In the drafts, future projections are based on the latest available national analyses, which in the case of Sweden date back to 2016 and are from 2017 for Germany and the UK. New policies, regulations and forecasting exercises developed in 2019 are expected to affect the final version of the NECPs.

Expert committees to guide climate policy

For the assessment of climate policies and measurement of progress, all three countries indicate their intention to rely on independent expert committees. The Committee on Climate Change in the UK, Germany's commissions on "Coal" and "Future of mobility" and Sweden's Climate Policy Council shall ensure compliance with EU objectives and the effectiveness of adopted measures.

Interconnectors and cross-border cooperation emphasised

All three countries emphasise the role of cross-border cooperation to pursue the goal of an ever more integrated European energy market. One part of integration measures comprises inter-connection efforts.

Germany stresses that the country's central location in the EU and the need to integrate growing volumes of renewable electricity necessitates an increase in interconnection capacity. The UK specifies the build-out of cross-channel infrastructure to increase connections to the continental market and continue the mutually beneficial cooperation despite Brexit. Sweden focuses on market forces as drivers for additional build-out of transmission capacity and refrains from mentioning political targets.

Low CO_2 price assumptions and conservative RES predictions

Considering last year's strong increase in CO_2 prices, all three NECP drafts assume relatively low CO_2 prices, below current prices in all countries until after 2025. Thus, we assume the portrayed trajectories to be rather conservative when described as market-driven increases in renewable energy deployment, especially in the case of Sweden.