Limited Utility

The European energy companies failing on net zero commitments

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About this report

This report is an initiative of Ember and the Europe Beyond Coal campaign. It is based on the data available in public sources and all power companies included in the analysis were approached in August and December 2021 to verify the data used in this publication.

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For enquiries, please contact:

Authors Sarah Brown, Ember (sarah@ember-climate.org)
Kaarina Kolle, Europe Beyond Coal (kaarina@beyond-coal.eu)

Project Manager Cyrille Cormier, Europe Beyond Coal (cyrille@beyond-coal.eu)

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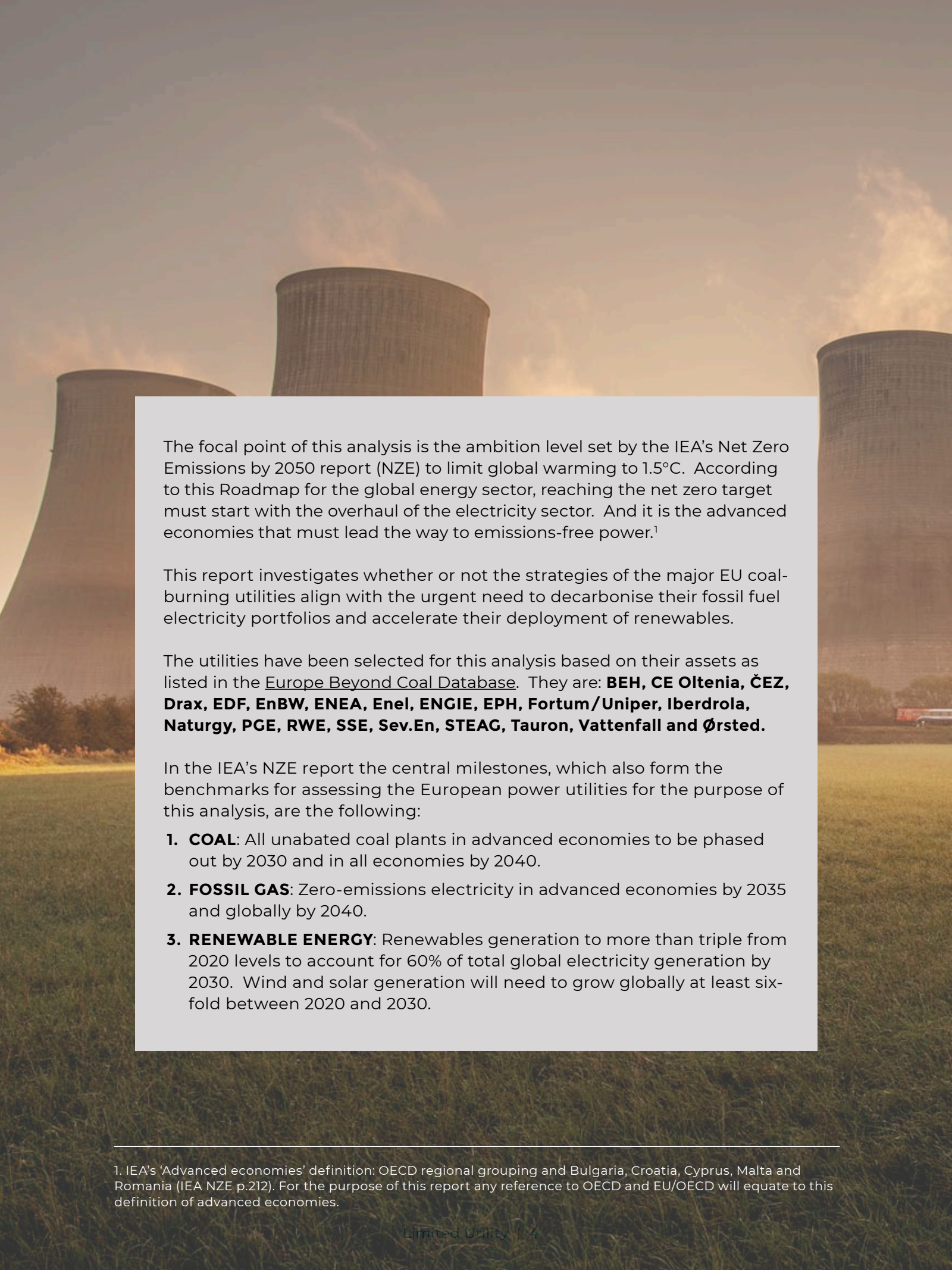
Contents



The focal point of this analysis is the ambition level set by the IEA's Net Zero Emissions by 2050 report (NZE) to limit global warming to 1.5°C. According to this Roadmap for the global energy sector, reaching the net zero target must start with the overhaul of the electricity sector. And it is the advanced economies that must lead the way to emissions-free power.[1]

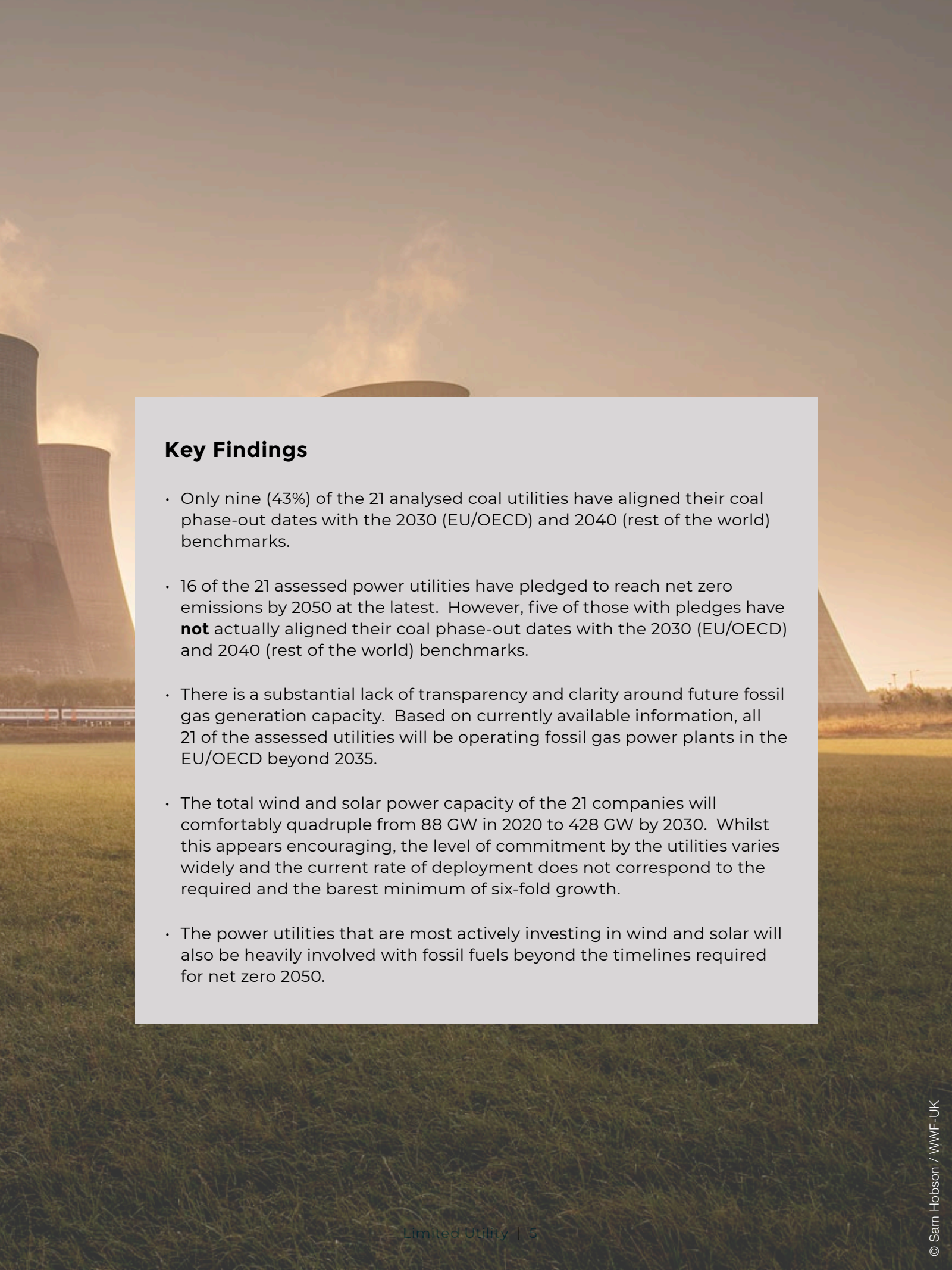
This report investigates whether or not the strategies of the major EU coal-burning utilities align with the urgent need to decarbonise their fossil fuel electricity portfolios and accelerate their deployment of renewables.

The utilities have been selected for this analysis based on their assets as listed in the Europe Beyond Coal Database. They are: **BEH, CE Oltenia, ČEZ, Drax, EDF, EnBW, ENEA, Enel, ENGIE, EPH, Fortum/Uniper, Iberdrola, Naturgy, PGE, RWE, SSE, Sev.En, STEAG, Tauron, Vattenfall and Ørsted.**

In the IEA's NZE report the central milestones, which also form the benchmarks for assessing the European power utilities for the purpose of this analysis, are the following:

1. **COAL**: All unabated coal plants in advanced economies to be phased out by 2030 and in all economies by 2040.
2. **FOSSIL GAS**: Zero-emissions electricity in advanced economies by 2035 and globally by 2040.
3. **RENEWABLE ENERGY**: Renewables generation to more than triple from 2020 levels to account for 60% of total global electricity generation by 2030. Wind and solar generation will need to grow globally at least six-fold between 2020 and 2030.

1. IEA's 'Advanced economies' definition: OECD regional grouping and Bulgaria, Croatia, Cyprus, Malta and Romania (IEA NZE p.212). For the purpose of this report any reference to OECD and EU/OECD will equate to this definition of advanced economies.



Key Findings

- Only nine (43%) of the 21 analysed coal utilities have aligned their coal phase-out dates with the 2030 (EU/OECD) and 2040 (rest of the world) benchmarks.

- 16 of the 21 assessed power utilities have pledged to reach net zero emissions by 2050 at the latest. However, five of those with pledges have **not** actually aligned their coal phase-out dates with the 2030 (EU/OECD) and 2040 (rest of the world) benchmarks.

- There is a substantial lack of transparency and clarity around future fossil gas generation capacity. Based on currently available information, all 21 of the assessed utilities will be operating fossil gas power plants in the EU/OECD beyond 2035.

- The total wind and solar power capacity of the 21 companies will comfortably quadruple from 88 GW in 2020 to 428 GW by 2030. Whilst this appears encouraging, the level of commitment by the utilities varies widely and the current rate of deployment does not correspond to the required and the barest minimum of six-fold growth.

- The power utilities that are most actively investing in wind and solar will also be heavily involved with fossil fuels beyond the timelines required for net zero 2050.

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1. Executive summary

It has been scientifically recognised that limiting global warming to 1.5 °C is imperative and there is an overwhelming consensus that this cannot be achieved without the rapid decarbonisation of the power sector. If that alone is not enough to instigate an acceleration away from fossil fuel electricity, then the current EU energy crisis must surely represent a significant, additional incentive. With soaring energy prices and the political commitment to reach net zero by 2050, the transformation and decarbonisation of the electricity sector has never been so necessary and urgent.

The ongoing energy crisis has exposed the risks of continued dependence on imported fossil fuels and underinvestment in renewable energy solutions. Increasing Europe's self-reliance through renewable energy is a key solution to meet the continent's climate commitments while providing an insurance against fossil fuel price volatility. Furthermore, the best way to protect people, communities and nature is a fair transformation of Europe's energy system. Spending on renewables needs to rapidly rise or Europe will remain vulnerable to the inherent risks that come with fossil fuels.

16 out of 21 (76%) of the coal-burning corporations dominating the European electricity market, and covered in the report, have published net zero targets. For the majority, these net zero targets are for 2050. This report seeks to investigate the shorter-term strategies of these coal-burning utilities to decarbonise the power sector. The report shows that the companies' pledges do not represent the required emission cuts and technology deployment that is aligned with the available scientific benchmarks, namely the key milestones described by the IEA Net Zero by 2050 Roadmap (NZE). Going forward, utilities need to be asked to provide separate sectoral targets for the main fuels and technologies, and increasingly aggressive scope 3 targets. Those financial institutions associated with these companies must become assertive in demanding proper alignment from the European power utilities.

According to the IEA, global electricity generation needs to reach net-zero emissions by 2040 and the global energy sector is based largely on renewables in 2050, with solar and wind the single largest source of supply. Prior to that, there must be a phase-out of coal power in the EU and OECD by 2030. And by 2035 the European power sector must almost entirely decarbonise as coal and gas exit the power grids, leaving them operating mainly with renewable energy. By 2030 renewable energy must triple, reaching 60%, and solar and wind grow six-fold. Consequently, the European power utilities, often with global assets, are the companies whose accelerated transition is paramount.

The report finds that only nine (43%) of the analysed coal utilities have committed to a global coal phase-out by 2030. So a proportion are steadily advancing with their coal phase-outs but there are significant laggards: PGE, ENEA, Tauron, Sev.En, RWE, BEH, ČEZ, Fortum/Uniper, EPH, STEAG and EnBW headquartered in Poland, Czechia, Germany, Bulgaria and Finland. On the future role of fossil gas the reporting is much less transparent but, based on currently available information, all 21 (100%) of the utilities will be operating gas power plants in EU and OECD countries beyond 2035. For some, hydrogen has been promoted as the solution to ultimately decarbonise the gas fleet. There are claims that new fossil gas plants will be 'hydrogen-ready' - in other words they can be converted to burn low carbon hydrogen in the future. However, the current hydrogen production is only a fraction of utilities' existing fossil gas capacity so any current pledges are not significant enough to replace current gas-fired electricity generation. Furthermore, several of the utilities are not exclusively committed to low-carbon hydrogen deployment in the long term, which puts the credibility of the hydrogen economy at risk. And there are no binding timeframes for any of the proposed fossil gas-to-hydrogen plant conversions or any tangible definitions of 'hydrogen-readiness'.

On renewables, the report reveals that some of the assessed power utilities are well-placed to take up the task but are generally not meeting the required wind and solar additions. Many large power generators will become pivotal players in getting wind and solar projects off the ground: the total wind and solar generation of the 21 companies will comfortably quadruple[2] by 2030, growing from 88 GW to 428 GW, as many utilities intend to multiply their existing wind and solar capacity. An NZE-aligned renewable energy portfolio entails a minimum tripling of global installed renewable capacity and for renewables to account for at least 60% of all power generation by 2030. This requires a minimum of six-fold increase in wind and solar. However, this report finds that only four companies (19%) will triple their production with wind and solar additions and only two companies (10%) will grow their wind and solar portfolio more than six-fold. The report shows that the current wind and solar investment strategies are insufficient and the companies must increase their near-term levels of ambition. This is particularly important for those companies that are headquartered in Eastern Europe.

However, the best performing renewable companies are also those very same utilities that plan to run an expansive fossil fuel fleet well beyond 2035, despite public commitments to net zero. This internal contradiction will stand in the way of these companies' credibility to make Paris-compatibility claims, even if their wind and solar investments are substantial.

2. The expected growth is approximately 487%. However, some double counting is highly likely thanks to Ørsted's asset rotation strategy (continuous sales of constructed wind power, including to other companies assessed for the report).

An overview of the key indicators with respect to the progress each of the power utilities is making towards achieving Net Zero is summarised in Table 1.

Table 1 : Heatmap of progress towards Net Zero by the analysed European power utilities

Progress to Net Zero by European power utilities

	2030 Coal phase-out (EU/OECD)	2035 Net zero-emissions electricity (EU/OECD)	Wind & solar growth 2020-2030 (minimum sixfold)***	Tripling of installed RES capacity by 2030 with only wind/solar****	Overall RES % by 2030
BEH	2040*	No	Low	Low	Not available
CE Oltenia	2032*	No	Not assessed	Not assessed	7%
ČEZ	2033*	No	Not assessed	High	27%
Drax	2022	2030**	Low	Low	Not available
EDF	2024	No	High	High	Not available
EnBW	2035	2035	Low	Medium	50%
ENEA	2049*	No	Not assessed	Not assessed	30%
Enel	2027	2040	Medium	Medium	80%
ENGIE	2025	No	Medium	Medium	58%
EPH	2038	No	Not assessed	Not assessed	Not available
Fortum/Uniper	2038	No	Not assessed	Low	Not available
Iberdrola	2020	No	Low	Medium	85%
Naturgy	2020	No	Medium	Medium	Not available
PGE	2049*	No	Not assessed	Not assessed	50%
RWE	2038	2040	Low	Medium	56%
SSE	2020	No	Medium	High	79%
Sev.En	No	No	Low	Not assessed	Not available
STEAG	No	No	Low	Not assessed	Not available
Tauron	2049*	No	Not assessed	Not assessed	66%
Vattenfall	2030	2040	Low	Low	65%
Ørsted	2023	2025**	High	High	Not available

EnBW Net Zero-emissions target of 2035 for Scope 1 & 2 emissions only • The data for ENEA, PGE and Tauron does not assume that the proposed transfer of coal assets to a new National Energy Security Agency (NABE) will proceed.
*BEH, CE Oltenia, ČEZ, ENEA, PGE and Tauron coal phase-out dates based on national targets. ** Both Drax and Ørsted will have fossil gas generation beyond 2035. They intend to achieve net zero emissions through negative emissions from sources such as bioenergy carbon capture and storage (BECCS). ***'Not assessed' - those utilities with baseline wind and solar production below 200 MW or <= 6% of total installed capacity. Those without any wind/solar growth plans are categorised as low. ****'Not assessed' - utilities with baseline share of renewables less than 15%

2. Introduction

Europe is in the middle of a rapid energy transition. In the next few decades, the energy system will need to go through a profound overhaul as the European economy electrifies and makes good on the European climate commitments such as the Green Deal and being climate-neutral by 2050. The European power utilities will play a critical role in bringing about the simultaneous phase-out of polluting energy sources and the increased deployment of renewable energy.

Companies, power utilities included, have recently become champions of the net zero targets. Yet, overall, the targets almost universally lack adequate substance and scientific robustness as companies have had the freedom to loosely design the content of their commitments, often favouring to maintain their existing asset base.[3] In May 2021, the International Energy Agency published a much-anticipated 'Roadmap for the global energy system for Net Zero by 2050 (NZE)'.[4]

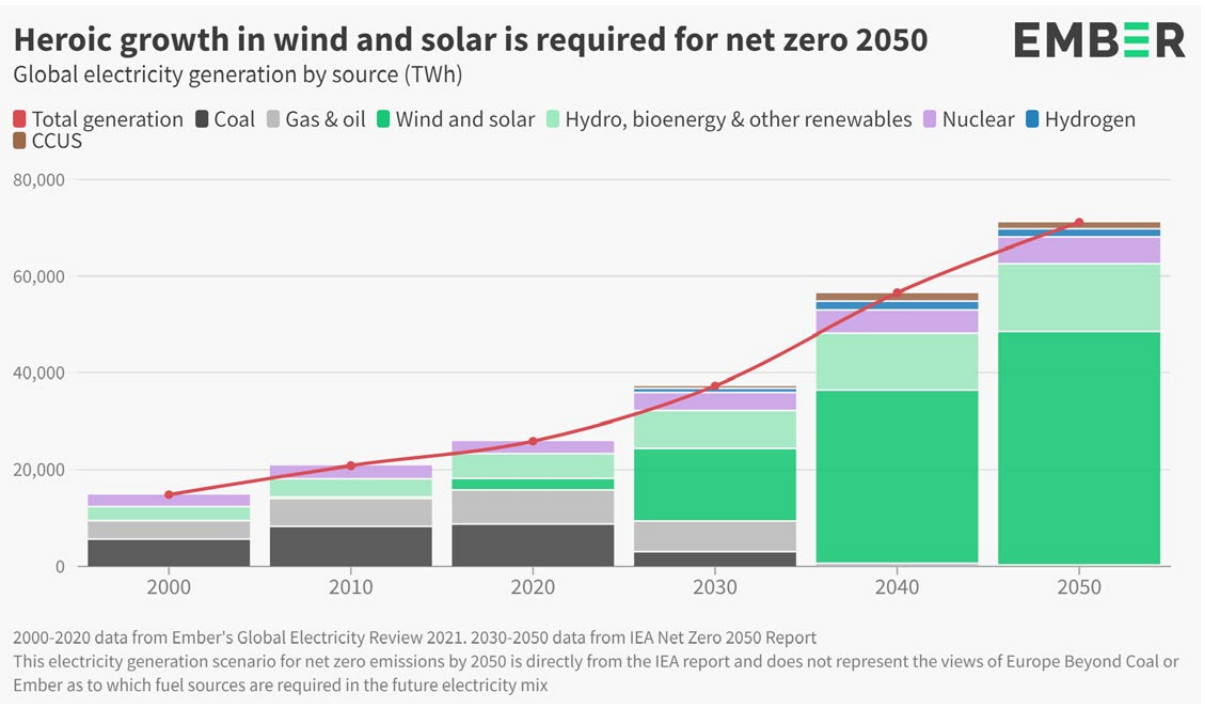

Chart 1: Required growth in electricity generation by fuel type as detailed in the IEA's NZE report.

3. Pledges committed to net-zero by 2050 cover 70% of the global economy - yet a glaring ambition gap remains. https://racetozero.unfccc.int/the-race-to-zero-strengthens-and-clarifies-campaign-criteria/
4. Consistent with the 1.5 °C scenario without a temperature overshoot and with a 50% probability.

It provides clarity on the pathway that many energy companies have committed to in public and establishes milestones for power sector decarbonisation. While some of the details regarding the proposed decarbonisation pathway have also faced criticism, the Roadmap does provide several benchmarks and 'deadlines' for cleaning the electricity system.

According to the IEA's modelling, half of the CO2 cuts this decade are from the power sector, led by the accelerated collapse of coal, so that it is the only zero-emissions sector by 2040. Furthermore, the IEA recommends governments set dates to get to 100% clean power: 2035 for EU/OECD countries and 2040 for the rest of the world. In the short term, renewable energy production needs to triple by 2030. This will eventually result in a power system that is predominantly run by wind and solar.

This report explores the extent to which the European power utilities are able to meet the global ambition levels set by the IEA. The report will touch upon the following fuels and technologies: coal, fossil gas, hydrogen and renewable energy (mainly wind, solar and biomass).

3. Europe's 21 most significant coal-burning power utilities

The utilities have been selected for this report based on their assets in the Europe Beyond Coal Database, which contains information on all major coal power plants in EU-27 + UK, Turkey, and the Western Balkans. The database details the operators of the coal power plants and the report focuses on those with their headquarters in the EU27 and UK. The companies covered are a mix of listed companies, private equity and state-owned enterprises. Some of the companies have started their transition earlier than others, and have effectively completed their coal phase-outs. Some also have extensive operations outside of the EU. Overall, despite differences in ownership structure and the geographical spread, these companies can be considered as peers when assessing their relative performance in coal phase-out.

The power utilities covered in this report are: BEH, CE Oltenia, ČEZ, Drax, EDF, EnBW, ENEA, Enel[5], ENGIE, EPH, Fortum/Uniper, Iberdrola, Naturgy, PGE, RWE, SSE, Sev.En, STEAG, Tauron, Vattenfall and Ørsted.[6] The data analysed is primarily from 2020.

3.1 Emission profiles of European power utilities

The 21 companies, with their subsidiaries, represent a significant portion of Europe's coal footprint. However, amongst those utilities that choose to disclose their emissions in full, it appears that these companies' emissions are not only produced through electricity generation (scope 1 emissions) but also through their indirect emissions (scope 3).

The prevalence of these scope 3 emissions becomes particularly relevant as the net-zero pledges of these companies are scrutinised. As can be seen from Table 2, some utilities leave scope 3 outside of their climate pledges or fail to disclose the full emissions profile of their operations altogether.

5. Enel is a vertically integrated operator. The operations include gas production, power generation and distribution and sale of electricity and natural gas to final customers.
6. See methodology section for information on how data was obtained.

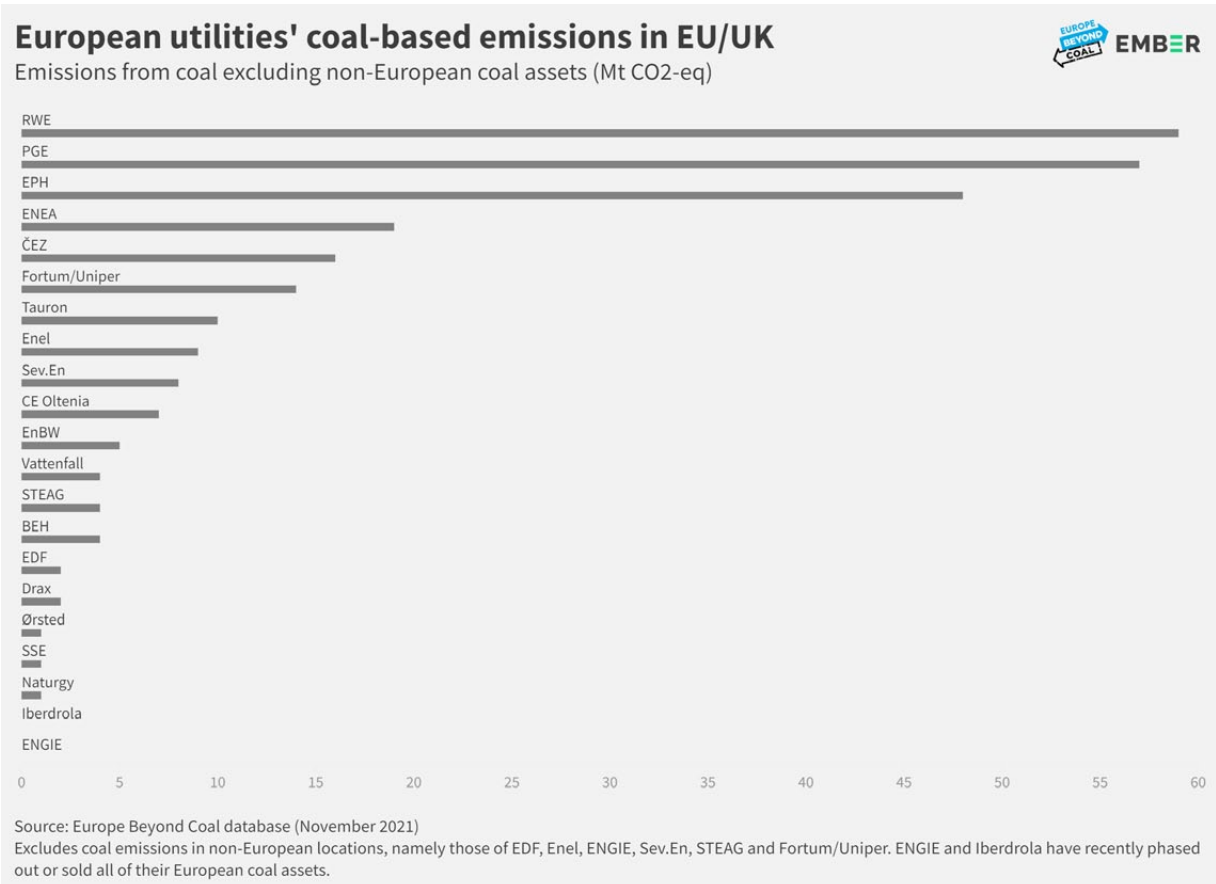

Chart 2: Coal-based emissions of the European power utilities for the year 2020 (source: Europe Beyond Coal Database, retrieved November 2021).
The figures exclude coal emissions in non-European locations, namely those of EDF, Enel, ENGIE, Sev.En, STEAG and Fortum/Uniper.

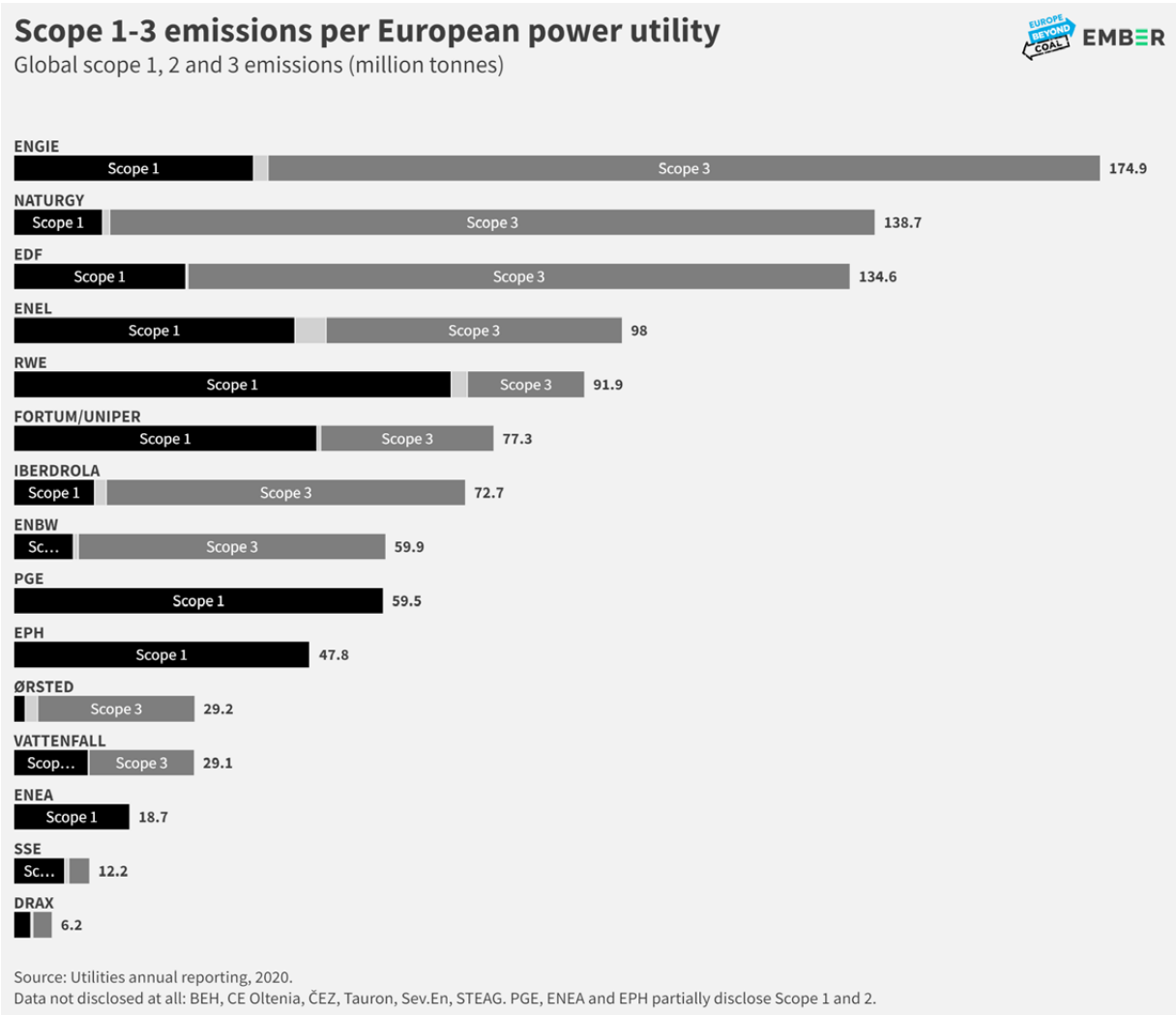

Chart 3: Scope 1-3 emissions of power utilities.

3.2 Companies existing climate commitments

The concept of net zero emissions has recently emerged as the 'North Star' for economic and industrial strategy in many of the world's most powerful companies. So much so that the net zero pledges have become mainstream rather than just a curiosity factor. In the meantime, Science Based Targets has been steadily growing its member base and provides a framework to set forward-looking targets for 5-15 years into the future.

However, none of the long-term targets alone are a guarantee of Paris-aligned business models and should not be viewed as a certification system to guarantee sufficient emission reductions. Sectoral targets, especially for the high-carbon fuels, must accompany the high level targets. Unless the set targets translate into near-term coal phase-outs, in particular, the companies should be expected to provide additional evidence of their decarbonisation. From the analysis, it becomes clear that these kinds of near-term targets will also need to be set for fossil gas, especially in light of the company transition triggered by the coal phase out.

Table 2 below shows the European power utilities' net zero and Science Based Targets pledges (note that not all targets are based on the same temperature goal as some still use the inadequate 2 degrees Celsius framework), which are often openly coupled with coal phase-out timelines that are universally considered too slow. **16 power utilities out of 21 have pledged to reach net zero. However five of those with pledges have <u>not</u> actually aligned their coal phase-out dates with the 2030 (EU/OECD) and 2040 (rest of the world) benchmarks** [ČEZ, EnBW, Fortum/ Uniper, PGE and RWE].

Out of the eight companies with validated Science Based Targets one company is yet to align their coal phase-out timeline with 2030/2040: RWE.

Table 2: Climate commitments and coal phase-out dates of European power utilities.

Utility (HQ)	Net Zero Target	Science Based Targets[7]	Coal Phase-Out (EU/OECD)	Coal Phase-Out (Global)
BEH (Bulgaria)	No	No	2040[8]	No global coal assets
CE Oltenia (Romania)	No	No	2032[9]	No global coal assets
ČEZ (Czechia)	2050 (excl. scope 3)	Committed	2033[10]	No global coal assets
Drax (The UK)	2030	Committed	2022[11]	No global coal assets
EDF (France)	2050	Yes (well-below 2°C)	2024	2030
EnBW (Germany)	2035 (excl. scope 3 and traded gas)	Committed	2035	No global coal assets
ENEA (Poland)	2050[12]	No	2049	No global coal assets
Enel[13] (Italy)	2040	Yes (1.5 °C)	2027	2027
ENGIE (France)	2045	Yes (2°C)	2025	2027
EPH[14] (Czechia)	2050	No	2038	No global coal assets
Fortum / Uniper (Finland / Germany)	2050	No[15]	2038[16]	No
Iberdrola (Spain)	2050	Yes (1.5 °C)	2020	2020
Naturgy (Spain)	2050	No	2020	2020
PGE (Poland)	2050	No	2049[17]	No global coal assets
RWE (Germany)	2050	Yes (well-below 2°C)	2038	No global coal assets
SSE (The UK)	2050	Yes (well-below 2°C)	2020	No global coal assets
Sev.En (Czechia)	No	No	No	No
STEAG (Germany)	No	No	No	No
Tauron (Poland)	No	No	2049	No
Vattenfall (Sweden)	2040	Yes	2030	2030
Ørsted (Denmark)	2025 (scope 1 & 2), 2040 (scope 1-3)	Yes (1.5 °C)	2023	No global coal assets

7. Based on the publicly available information on the Science Based Targets website. Information retrieved 1 November 2021.
8. Based on Bulgarian National Recovery and Resilience Plan indicating coal-phase out by 2038 or 2040. BEH has not committed to a coal-phase out date.
9. Romania has announced that coal will be phased out by 2032. CE Oltenia has not committed to a coal phase-out date.
10. Based on the Czech government's announcement on 7 December 2021 that it will phase-out coal by 2033. ČEZ has not yet updated its commitment from 2038 to 2033.
11. Drax announced in July 2021 it had closed its last coal power plant
12. ENEA's updated development strategy published 15.12.2021.
13. Including the Spanish subsidiary Endesa.
14. The report also includes EPH's unconsolidated subsidiaries: LEAG, Slovenské Elektrárne, Ergosud and Saale. 100% of the assets are allocated to EPH, even if its actual equity share is less.
15. Fortum has explicitly stated that it will not adopt a Science Based Target, partly because of its high-carbon Russian assets
16. The companies also have significant coal power production in Russia without clear phase-out commitments.
17. Polish government has indicated coal phase-out by 2049. PGE states it has coal phase-out date of 2030, assuming the separation of the coal portfolio from PGE to NABE. This report does not assume that the transfer of coal assets from Enea, PGE and Tauron to a new National Energy Security Agency (NABE) will proceed.

4. IEA 2050 Roadmap – what are the implications for the electricity sector in economically advanced countries?

The starting point of the report is the ambition level set by the IEA and its NZE Roadmap to limit global warming to 1.5 °C. In its report, the IEA outlines more than 400 milestones that need to be reached to achieve net zero. Many of them focus on the immediate transition of the power system.

Power utilities face several key decisions if they are to follow the pathway to net zero emissions by 2050 envisioned in the NZE, particularly about how to manage existing power fleets running on fossil fuels. Reaching the net zero target, according to IEA modelling, must start with the overhaul of the electricity sector. Half of the CO2 cuts this decade will come from the power sector as its emissions collapse with the introduction of clean technologies, namely wind and solar.

Amongst the agency's most central milestones, which also form the basis of the expectations on the European power utilities, are the following:

1. **COAL**: All unabated coal plants in advanced economies to be phased out by 2030 and in all economies by 2040.
2. **FOSSIL GAS**: Zero-emissions electricity in advanced economies by 2035 and globally by 2040.
3. **RENEWABLE ENERGY**: Renewables generation triples by 2030 reaching 60%. Wind and solar generation will need to grow six-fold between 2020 and 2030. Of the new clean electricity generation from now to 2040, 75% is expected to come from wind and solar alone.

5. Results

5.1 Coal phase-out

According to the NZE, all unabated coal plants should be phased out in advanced economies by 2030 and in all economies by 2040. The IEA also emphasises that the immediate priority is to phase out the most inefficient power plants, globally, by 2030. By that year, total coal generation should only be 2,947 TWh, down from 8,735 TWh in 2020 (-60%), and account for only 7.9% of all generation.

The IEA modelling was preceded by other analytical research that supports its findings on the urgency of phasing out coal in the power sector. The regional analysis set out by Climate Analytics in September 2019 shows that coal-based generation should cease by 2030 for OECD countries, by 2031 for Eastern Europe and the Former Soviet Union, 2032 for Latin America, 2034 for Middle East and Africa and 2037 for non-OECD Asia. Overall, the global phase-out needs to be completed by 2040.[18]

In short: a rapid coal phase-out has long been recognised as the primary, non-negotiable short-term action for credible power utility decarbonisation.

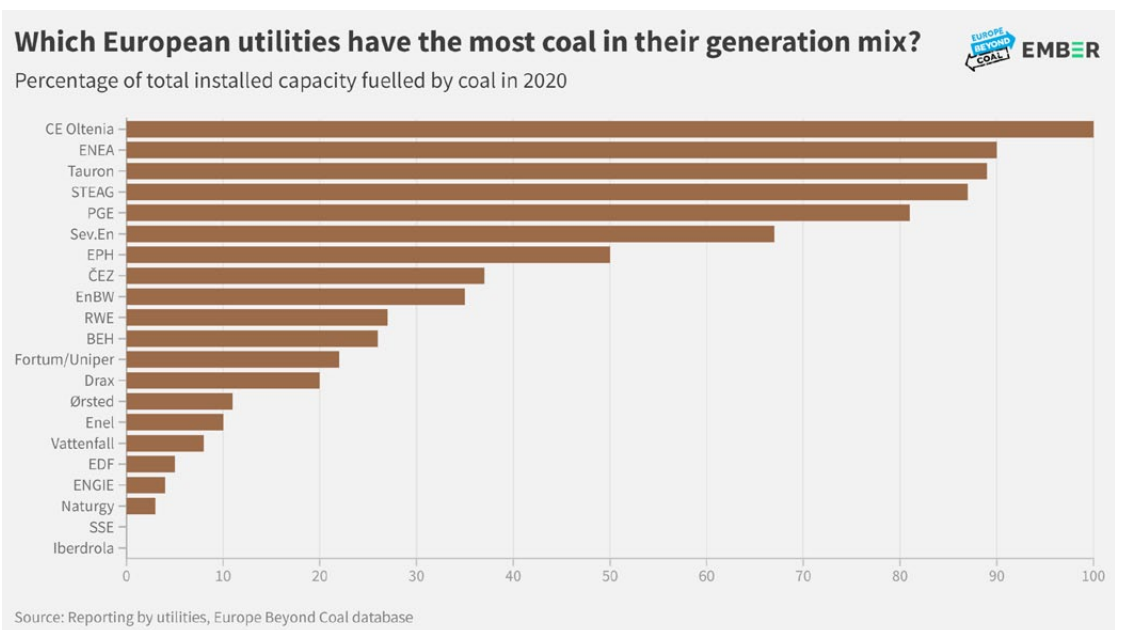

Chart 4: Percentage of electricity generation for each utility fuelled by coal.

18. Climate Analytics - 'Global and regional coal phase-out requirements of the Paris Agreement: Insights from the IPCC Special Report on 1.5C (September 2019) p.4

The total current installed global coal capacity of the assessed utilities is ~108 GW. This will only have decreased by 59 GW (-55%) to 49 GW in 2030. To align with the IEA's 2030 EU/OECD target, 95% (103 GW) of this capacity should have shut down by 2030 with only 6 GW remaining in the system (until 2040 at the latest). So there remains 43 GW of coal capacity that requires urgent action to close by 2030 and a further 6 GW by 2040.

Within Europe, the power utilities with coal assets in Germany, Eastern Europe (including Russia) and, in some cases, Turkey are most noticeably struggling to meet the necessary targets. In terms of the global assets of these European companies, these are located in Australia, Latin America, China and the Philippines.

Out of the 21 assessed companies, only nine have a coal phase-out plan aligned with the IEA's 2030 EU/OECD timeline. Six of the utilities are not even compliant with the 2040 global deadline [Enea, Fortum/Uniper, PGE, Sev.En, STEAG and Tauron].

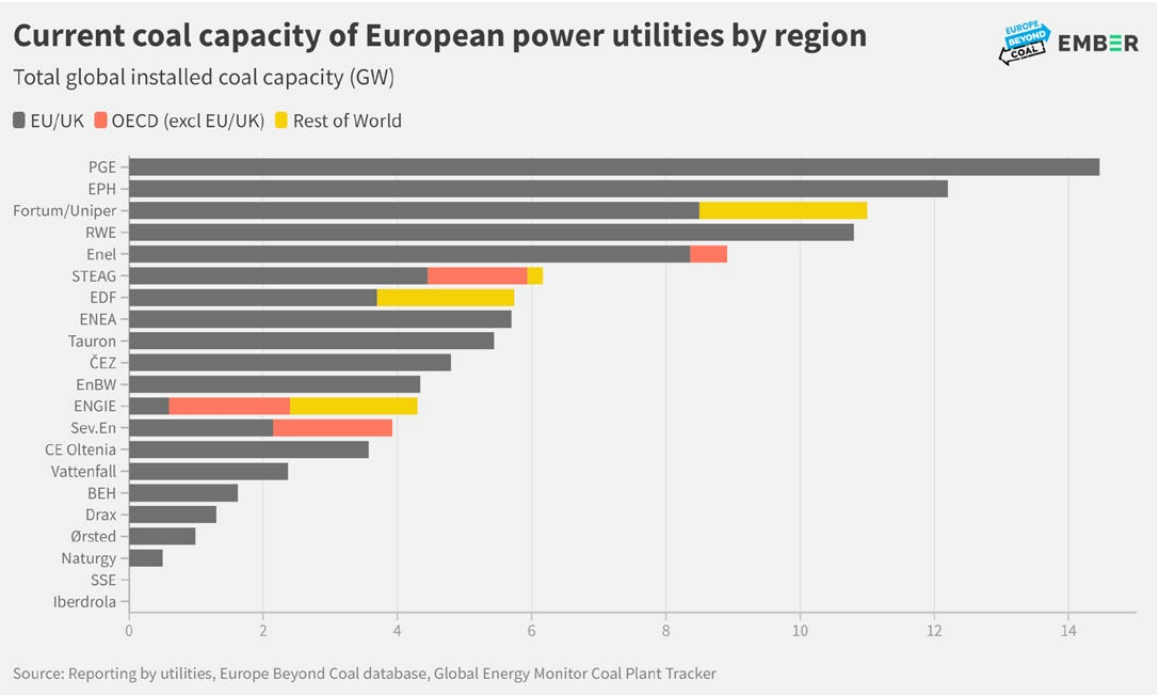

Chart 5: Installed coal-fired capacity (GW) by geographical region.

Polish authorities intend to continue operating coal plants, like the pictured Rybnik, well into the future. Some as late as 2049.

Organisations operating in Poland have made no individual commitments to a total coal phase-out so it is presumed they intend to operate some coal assets until 2049, which is consistent with what has been indicated by the Polish government. This is 19 years beyond the closure date required under the IEA pathway.

There is a proposal to transfer the coal plants of Enea (5.7 GW), PGE (13 GW) and Tauron (4.6 GW) to a state-owned entity called NABE (National Energy Security Agency) later this year. This new entity would then be responsible for all aspects of closing down these assets. An Early Decommissioning Mechanism (EDM) will be tasked with purchasing unprofitable coal assets from NABE for the last two years of their operation and gradually shutting them down. This would still only result in 9 GW of the 23 GW eligible capacity coming offline by 2030. This strategy and the respective assets have not yet been confirmed so the coal plants remain as part of the utilities' installed capacity for this analysis. However, any plant shutdown announcements made by the utilities have been taken into consideration.

PGE even opened a new 460 MW hard coal unit, Turow B11, in 2021 and the associated mine is causing substantial controversy and political tensions along with serious social and economic repercussions. No other utility assessed for this report intends to commission new coal plants. On 26 November. Enea announced closure dates for its Kozienice units: B1-4 (2025); B5-8 (2027); B9-10 (2041-2) and B11(2048). This equates to 1.8 GW (-32%) of capacity being removed from its coal portfolio by 2030. It will still operate 3.9 GW of coal beyond the EU/OECD benchmark of 2030. And it also intends to replace the coal units with fossil gas ones.

The Czech Republic is an advanced economy country but ČEZ has only committed to cease generating electricity from coal by 2038 (it is likely that this will be brought forward to 2033 to align with the Czech government's announcement on 7 December that it will phase-out coal by 2033) and Sev.en has made no commitment at all. Sev.en also owns coal plants in Australia with no phase-out plans. EPH, RWE and Fortum/Uniper will be operating coal plants until 2038 based on Germany's current coal exit law, eight years later than required. And Fortum/Uniper has coal assets in Russia with no indication of any shutdown dates.

Several of the utilities are operating in countries with national coal phase-out commitments that are not compatible with their individual strategies. In Germany, for example, the new coalition government announced on 24 November 2021 that it would like to phase-out coal-fired generation 'ideally by 2030'. This affects EnBW, EPH, Fortum/Uniper, RWE and STEAG. **Even more significantly, on 11 December, the German government stated that it would aim for net zero emissions in the electricity sector by 2035, in accordance with the IEA's pathway.**[19] It will be interesting to see how other future revised national targets will impact the actions of the associated utilities.

19. https://www.bmwi.de/Redaktion/DE/Downloads/Energie/220111_eroeffnungsbilanz_klimaschutz.pdf?__blob=publicationFile&v=8 p.15

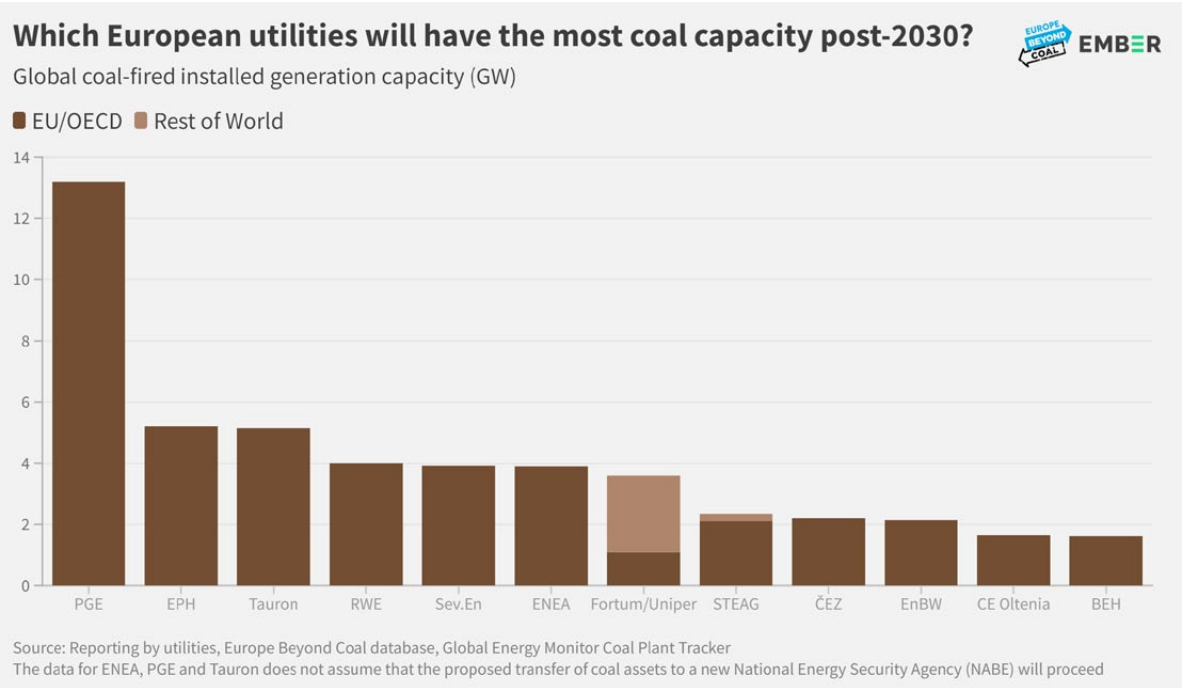

Chart 6: Installed coal-fired capacity (GW) beyond 2030.

Despite the obvious urgency to stop generating electricity from coal, **twelve of the assessed companies have not committed to a 2030 global coal phase-out**. While this is not an official IEA benchmark, European utilities could and should be setting an example to the world in how to successfully accelerate the transition to clean power.

The relative levels of ambition and the speed at which the companies will stop burning coal is extremely varied. BEH, Sev.en, Tauron and PGE have little or no decrease in coal capacity from 2020 to 2030 - whereas Drax, Enel, EDF, ENGIE, Vattenfall and Ørsted have committed to completely remove coal from their electricity mix in that decade. Iberdrola, Naturgy and SSE are ahead of the curve and already shut down all coal assets in 2020.

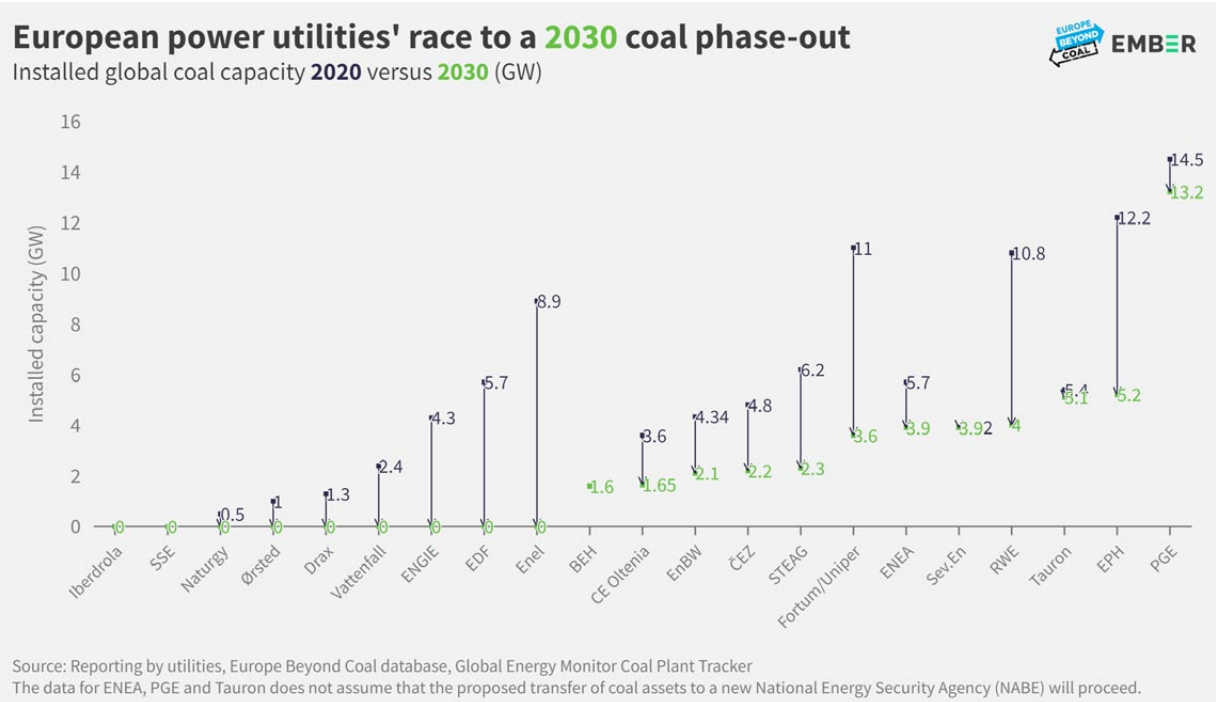

Chart 7: Installed global coal capacity by 2030 compared with 2020 levels.

5.2 Fossil gas phase-out

According to the NZE, the decline of unabated fossil gas alongside coal must be rapid: the total decarbonisation of the electricity sector is achieved by 2035 in advanced economies and by 2040 in emerging markets and developing economies.

The assessed utilities currently have 181 GW of installed fossil gas capacity globally, 118 GW of which is located in the EU/OECD. So, even excluding any plans to convert existing coal plants or build new gas plants, they have a considerable task ahead of them to decarbonise their advanced economy gas portfolios by 2035.

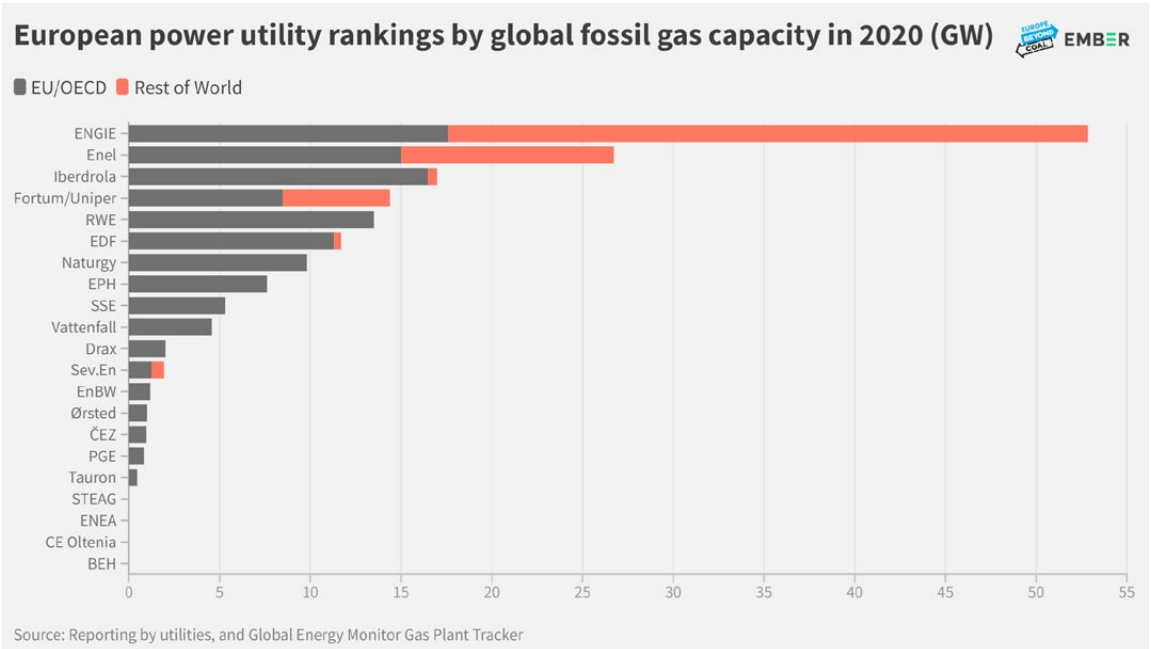

Chart 8: Installed global fossil gas capacity in 2020.

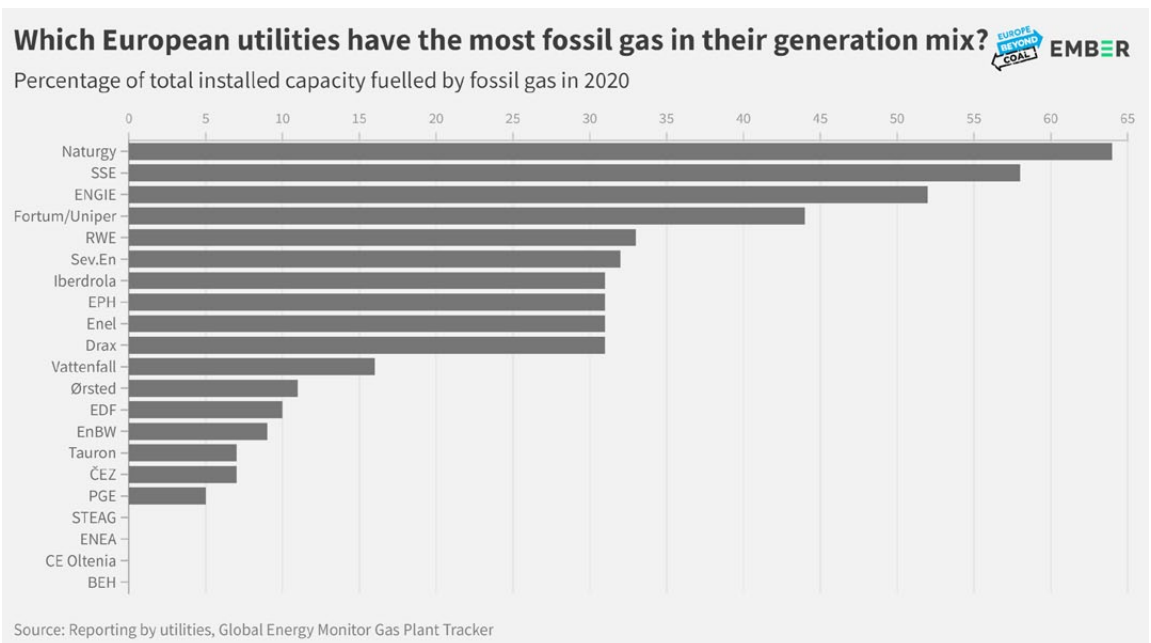

Chart 9: Fossil gas share of total installed electricity generation capacity.

The transparency of the utilities regarding future fossil gas use has been extremely disappointing. Where we received confirmation of planned new gas plants or coal plant conversions, specific capacity figures or timelines were frequently not supplied. The majority said they did not have planned gas generation targets or phase-out dates. Only Drax, EDF, SSE and Ørsted provided actual firm values for installed gas capacity after 2035. RWE also disclosed 2 GW of new fossil gas capacity by 2030.

The information we have been able to collect from publicly available reports and utility data includes ~23 GW of new fossil gas capacity globally - but we anticipate the figure could actually be much higher. (Global Energy Monitor's Global Gas Plant Tracker currently details ~25 GW of planned global capacity from these utilities). **The reported amount from the utilities would bring the anticipated installed post-2035 fossil gas capacity to ~197 GW globally. In the EU and OECD countries, the installed post-2035 fossil gas capacity equates to ~135 GW.**[20]

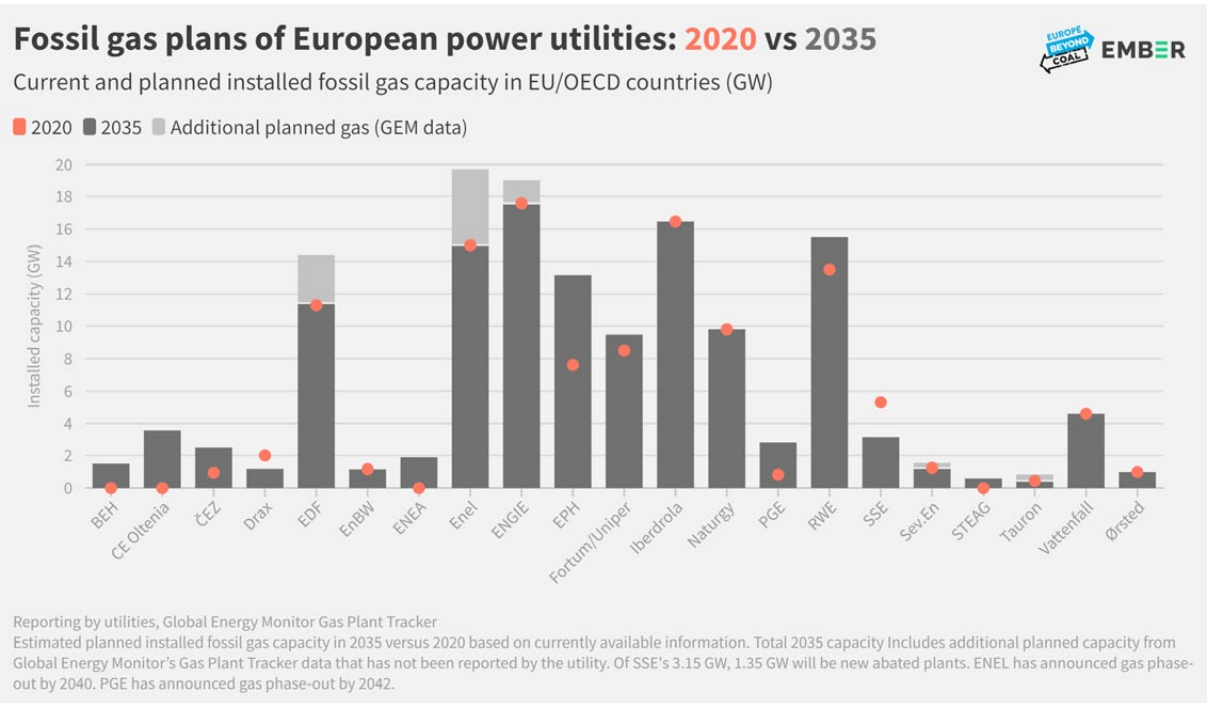

Chart 10: Planned installed fossil gas capacity in the EU/OECD: 2035 versus 2020. Including additional planned capacity from Global Energy Monitor's Gas Plant Tracker data that has not been reported by the utility.

20. Where specific data on post-2035 fossil gas capacity is not available from the power utilities it has been calculated based on 2020 installed gas capacity plus any reported planned new gas capacity.

Chart 10 shows planned change in EU/OECD gas capacity from 2020 to 2035. It also includes additional proposed capacity according to the Global Gas Plant Tracker. Of the companies that did directly provide the requested data on new fossil gas capacity [Drax, EDF, EPH, RWE, SSE and Ørsted], EPH has the highest amount at almost 6 GW. EDF declared that it only intends to increase gas capacity by 0.13 GW. Naturgy, with the highest share of fossil gas in its electricity mix, did not respond to our data survey. ENGIE, with the most installed gas capacity, did not disclose information specifically on its future fossil gas plans. However, on 24 November 2021, **Enel announced its intention to completely phase-out gas by 2040.** Interestingly, PGE is the only other company that has committed to a date for fossil gas phase out - 2042 - even though it does not have a definite coal phase-out date. It is also the only Polish utility that has a net-zero emissions target - 2050.

Due to the lack of clarity and certainty around some of the utilities' pathways to fossil gas phase-out, the analysis of installed gas capacity beyond 2035 (as detailed in Charts 10 and 11) has predominantly been based on existing capacity plus any available data on new gas plans.

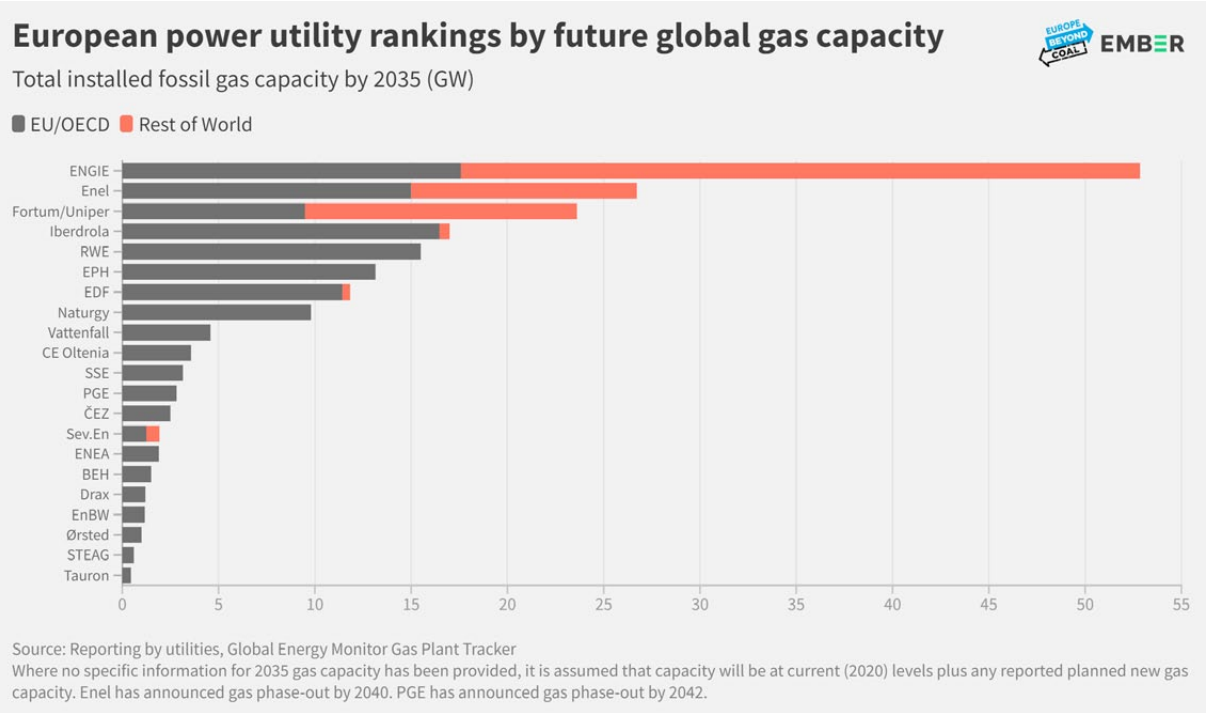

Chart 11: Planned installed global fossil gas generation capacity by 2035.

Only three of the assessed utilities refer to CCUS (carbon capture, utilisation and storage) technology plans for their fossil gas plants [Fortum/Uniper, RWE and SSE]. SSE has stated that all of its planned new fossil gas capacity of 1.35 GW will be abated in some way. Enel has made it clear that carbon capture will play no role in its transition to zero-carbon electricity. Its CEO stated in November that CCUS does not work for power generation and a much more effective climate solution is to actually stop emitting carbon instead. Fifteen of the utilities mentioned hydrogen or provided hydrogen capacity plans but some of these are blue hydrogen (when fossil gas is split into hydrogen and CO2 - creating greenhouse gas emissions) rather than green hydrogen (when hydrogen is produced by splitting water through electrolysis powered by renewable energy sources - with zero emissions). See Table 3 in Annex.

In the NZE, hydrogen-based fuels generate 900 TWh of electricity in 2030 and 1,700 TWh in 2050 (about 2.5% of global generation in both years). Of the fifteen assessed utilities that referred to hydrogen plans, seven provided volumes (see Annex 1). The total comes to ~20 GW, the majority of which could be blue hydrogen. The hydrogen commitments are understandably vague. Turbines that can generate electricity using 100% hydrogen are currently not expected to be available until 2030 so it is impossible to say with any certainty what utilities will be able to achieve with regard to replacing fossil gas with 100% hydrogen by 2035. What must be avoided is uncertain and speculative hydrogen-ready claims being used to justify new or converted fossil gas-fired generation or enable current gas plants to remain operational for longer.

5.3 Fossil phase-out

The IEA's NZE calls for the full decarbonisation of the electricity sector by 2035 in advanced economies and by 2040 in developing economies. In this section we examine the current combined coal and fossil gas capacity of the 21 utilities alongside their planned capacity. As we do not know the future total generating capacity of the entities, it is not possible to estimate the proportion that will be fossil fuels beyond 2035 so we must scrutinise it in absolute capacity terms.

It is apparent that - based on current plans (or lack thereof) for coal phase-out, fossil gas conversions and new build, and an absence of any feasible commitment to alternative renewable fuel sources such as green hydrogen - the majority of the utilities appear unwilling or unable to align their strategies with the zero-emissions electricity by 2035 or 2040 benchmarks.

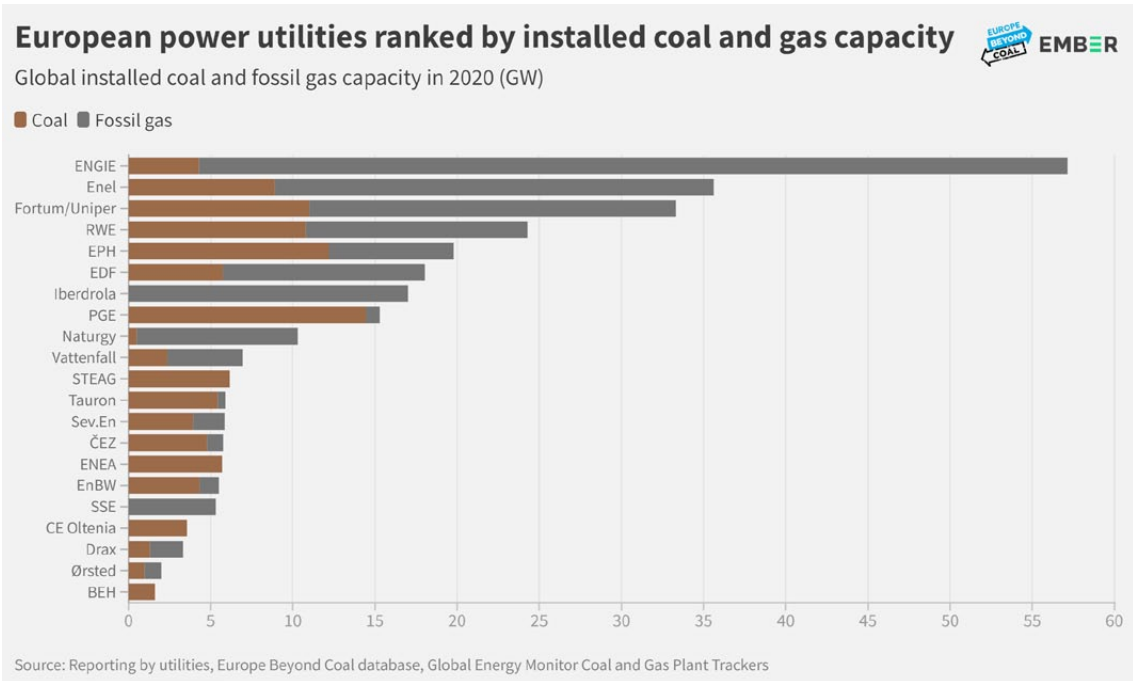

Chart 12: Current total installed capacity for coal and fossil gas (GW in 2020).

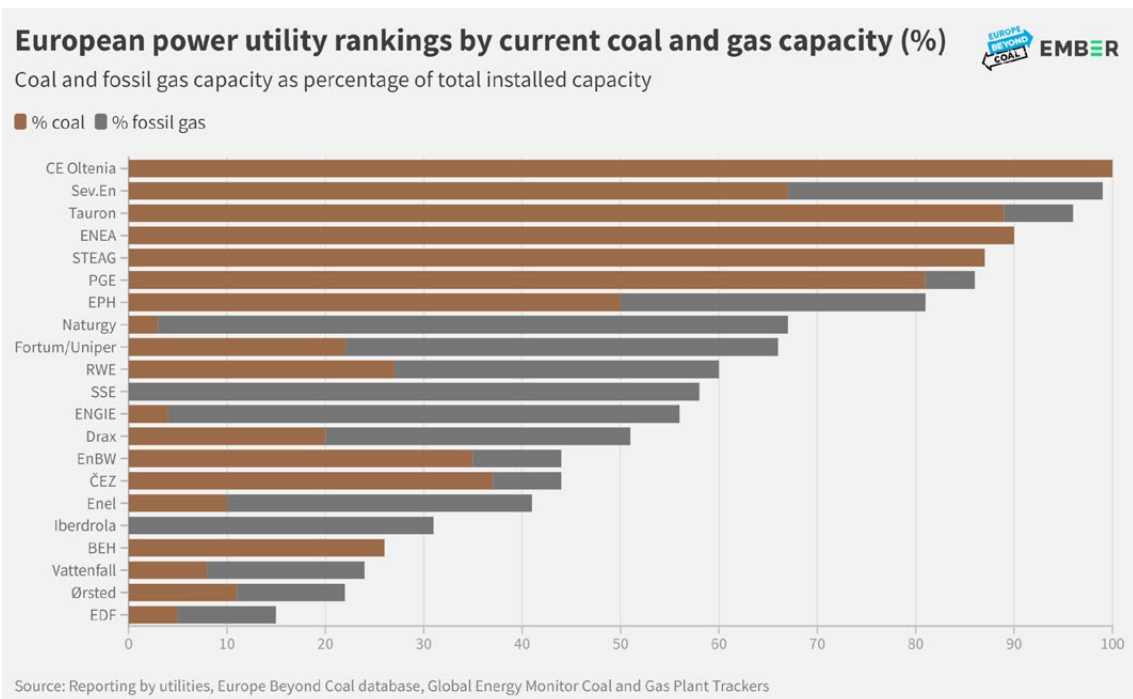

Chart 13: Current total installed capacity for coal and fossil gas as a percentage of total installed capacity (2020).

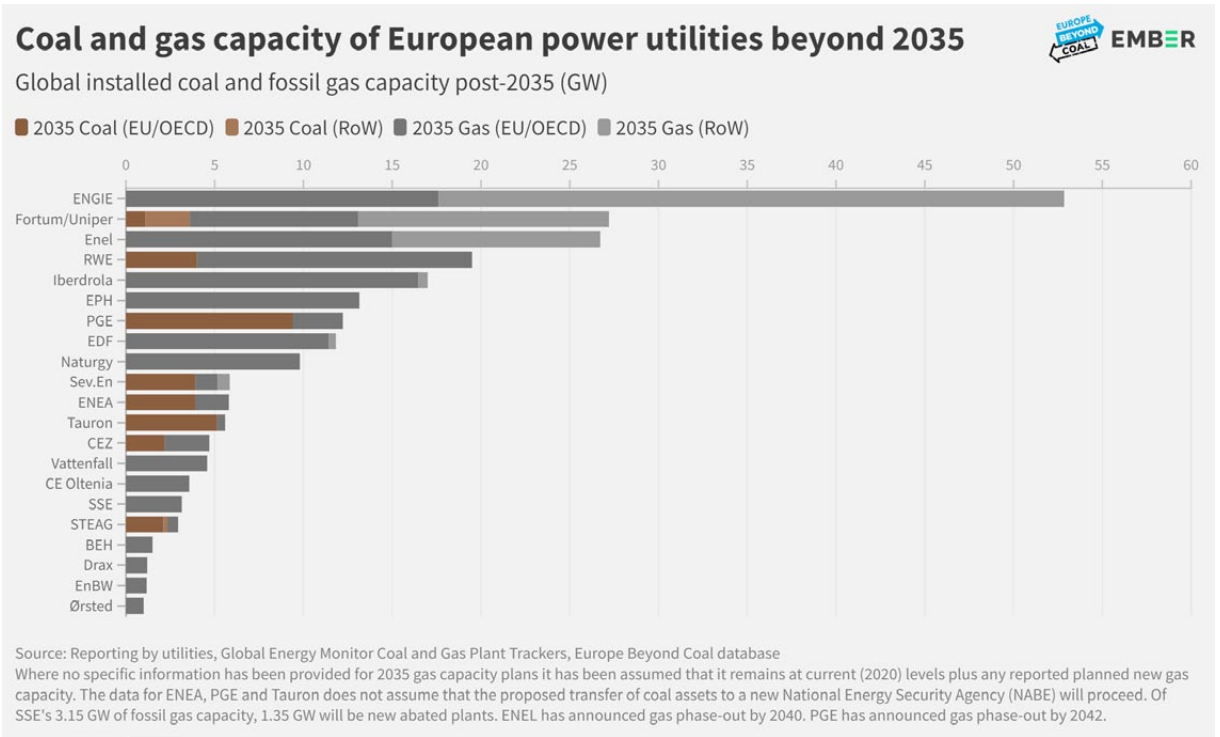

Chart 14: Future installed capacity for coal and fossil gas in GW (post-2035).

It is also interesting to note that when the utilities announce their coal phase-out and/or decarbonisation plans, more often than not, they do not disclose in detail if they intend to shutdown or sell the respective fossil fuel plants. If assets are divested rather than closed then, while it may allow the company to claim a reduction of fossil fuels in its electricity mix, this does not have any emission-reducing benefits. Consequently, this type of strategy does not positively contribute to the objective of limiting global warming to 1.5°C.

5.4 Renewables: wind and solar

The IEA's vision for clean electricity entails the development of the renewable energy ramp-up. This expansion should chiefly be led by wind and solar: these technologies are predominantly responsible for the needed tripling of renewable generation by 2030 and a more than eightfold increase by 2050.[21] Of the new clean electricity generation from now to 2040, 75% is expected to come from wind and solar alone.

21. P. 114 of the Roadmap.

For wind and solar, specifically, the build-up rate needs to quadruple by 2030,[22] adding one terawatt a year globally. **In 2030, 40% of all generation should come from wind and solar**, which requires **six times higher wind and solar share of the electricity mix** in absolute terms.[23]

The share of renewables in total electricity generation globally increases from 29% in 2020 to **over 60% in 2030** and to nearly 90% in 2050. Given the long-term dominance of these technologies in the clean energy mix, particular emphasis should be placed on them.

The above mentioned wind and solar growth pathways should be interpreted as conservative estimates. The NZE indicates that if the expansion of land use for bioenergy by 2050 turns out to be too unsustainable, the share of wind and solar will need to be higher.[24] A growing majority of scientific evidence shows that burning biomass, in particular wood, for power is often not carbon neutral - and in some circumstances can be a worse polluter than coal. The IPCC also outlines how large-scale bioenergy is associated with a number of other consequential risks, including in food production, biodiversity, social cohesion and human rights, by driving up demand for land, and leading to the over-use of water and nutrient resources. Similarly, NZE has quantitatively assessed what the failure to develop CCUS means for the electricity sector. Given that carbon capture technologies remain at an early stage of commercialisation there is no guarantee that the technology is going to deliver any carbon reductions in significant timescales or competitive prices. In such a case of failed progress, wind and solar projections must also be revised upwards to make up for the gap.[25]

Consequently, all wind and solar benchmarks in the IEA's Roadmap need to be considered as the absolute minimum.

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22. The IEA NZE has set an overall 2030 goal of 390 GW and 630 GW, for wind and solar respectively. While the IEA forecast for 2020 was 114 GW and 134 GW, for wind and solar respectively. Therefore, we can extrapolate quadrupling of capacity by 2030 for each technology.
https://www.iea.org/reports/renewable-energy-market-update-2021/renewable-electricity
23. In 2020, 9% of total generation was solar/wind (2412 TWh out of the total of 26800 TWh). That solar/wind generation will go up to 40% and since IEA assumes growth in electricity (to reach 37 300 TWh in 2030) the absolute amount of solar should be 14920 TWh, which means the growth is six-fold. Source: NZE, p. 117. See Chart 1 on page 9.
24. "The additional electricity that would be needed could be produced using renewables, which would require an additional 1 700 GW of wind and solar PV capacity and almost 350 GW of additional battery capacity in 2050. Annual capacity additions during the 2030s would need to be 160 GW higher than in the NZE". P.94 of the NZE
25. If CCUS technologies fail an additional 7 000 GW of wind and solar PV capacity in 2050 is required. This is around 30% more than in the NZE, and would mean that annual capacity additions of solar PV and wind during the 2030s would need to reach 1 300 GW (300 GW more). (NZE, page 98)

It should be emphasised that neither the IEA or this report attempt to provide an immediate solution in regards to the possible adverse effects of each technology on nature or material resourcing. It is well established that even wind and solar projects could challenge local biodiversity concerns, on land and in the sea, unless the permitting is done by dovetailing the legitimate concerns to halt climate change as well as nature loss. Intelligent design will need to be an inherent element in any renewable expansion and land-use - while ensuring that the length of permitting does not become a bottleneck for projects.

This report assesses the companies renewable energy performance by looking at the following three aspects:

1. **The relative importance of wind and solar today** vis-a-vis the companies' overall generation portfolio in 2020.
2. The planned **growth from wind and solar between 2020 and 2030,** both in absolute terms as well as relative to the existing renewable energy generation portfolio.
3. The **planned share of renewables** of the total generation in 2030.

Emphasis should be placed on renewable energies, primarily wind and solar, as total the power sector requires over 60% of generation to come from renewables by 2030.

As wind and solar are singled out as the clear leading technologies, the European power utilities' generation mix and future planned capacity need to first be assessed against their current relative importance.[26] This reveals the overall readiness of the power utilities to embark on the expansion of wind and solar.

As it stands, the combined solar and wind assets of the assessed coal utilities are at **88 GW of installed capacity, 53% of which are located in the EU27 and UK.** This is approximately **14% of utilities' total power generation capacity**. Meanwhile, **renewable energy accounted for 34% of the total installed capacity amongst the assessed utilities.** The IEA estimates that the share of renewables in total global electricity output was 29% in 2020 and, of that, the share of solar PV and wind was 9%.[27] The European power utilities are therefore starting from a higher baseline than their global peers.

Chart 15 a and b below shows the starting point for companies' wind and solar journey as it was at the end of 2020. Some power utilities have made a head start, already demonstrating that wind and solar are part of their core business.

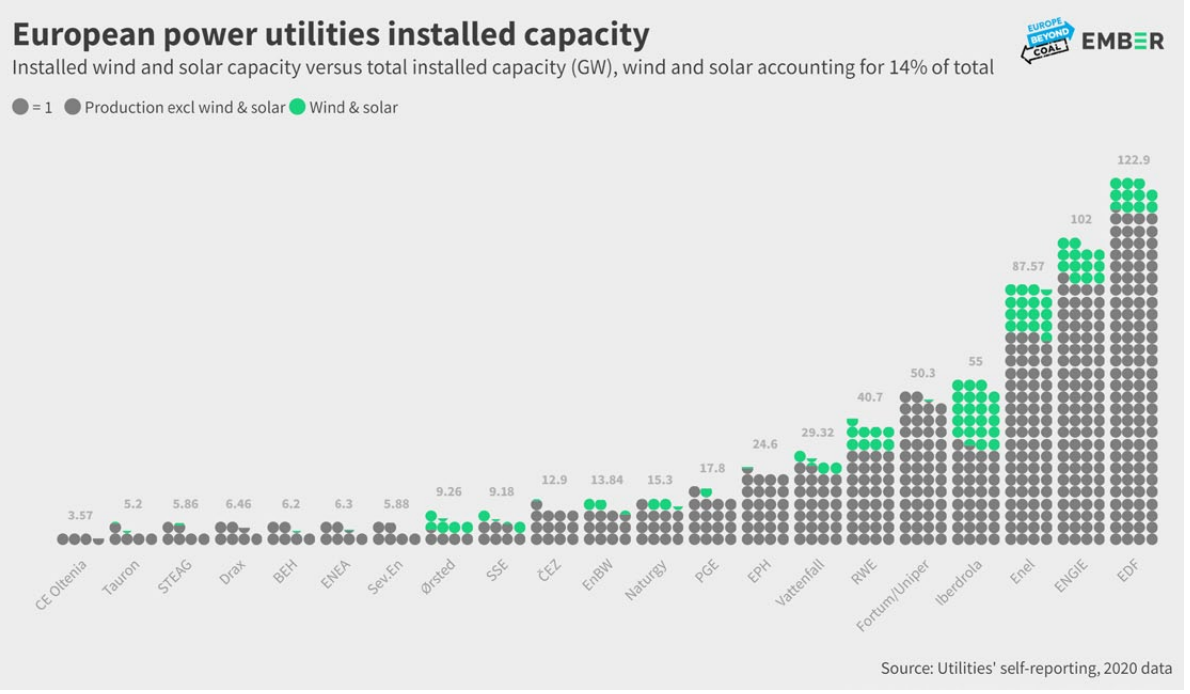

Chart 15a: Existing global wind and solar installed capacity for European power utilities relative to the global installed capacity. The data is from 2020.

26. In some cases the existing wind and solar capacity was obtained through an approximation. See the Excel sheet published together with the report and the Methodology section for details.
27. p. 117 of the Roadmap.

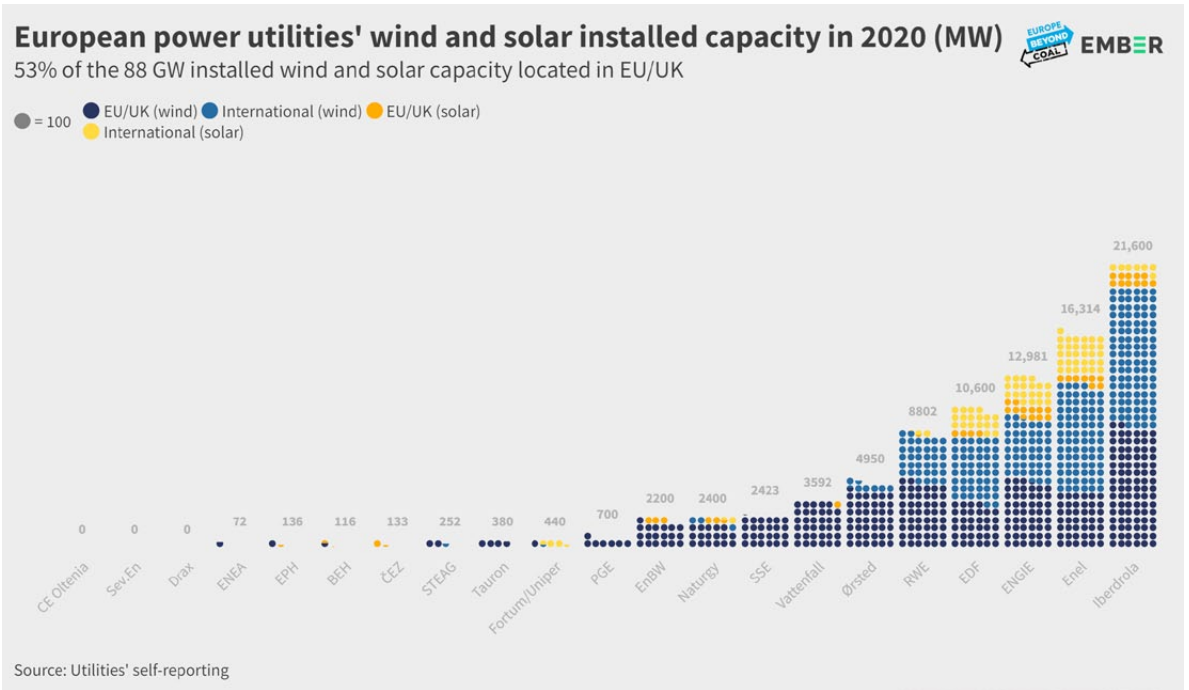

Chart 15b: Existing global wind and solar installed capacity for European power utilities in 2020. European and International installed capacity marked separately.

In absolute terms, Iberdrola, Enel and ENGIE are well ahead of their competitors. Meanwhile, **CE Oltenia, Drax and Sev.En had not yet started building any wind or solar in 2020**.

If we hold the IEA's expectation of tripling renewable energy by 2030, to apply at the portfolio level we need to assess the power utilities' announced renewable energy pledges and targets. The additions should mostly come from investing almost exclusively in wind and solar. Chart 16 below shows the utilities' current level of solar and wind capacity, as well as the plans to increase the technology's share in the upcoming decade (2020 - 2030). The current aggregate wind and solar capacity of these 21 companies amounts up to **88 GW** and will see an additional 340 GW, equating to **428 GW in 2030.** This means that the wind and solar capacity will **more than comfortably quadruple**.[28] See the Excel sheet that accompanies the report for an assessment for the magnitude of the growth relative to the existing capacity per company.

28. The expected growth is approximately 487%. However, some double counting is highly likely thanks to Ørsted's asset rotation strategy (continuous sales of constructed wind power, including to other companies assessed for the report).

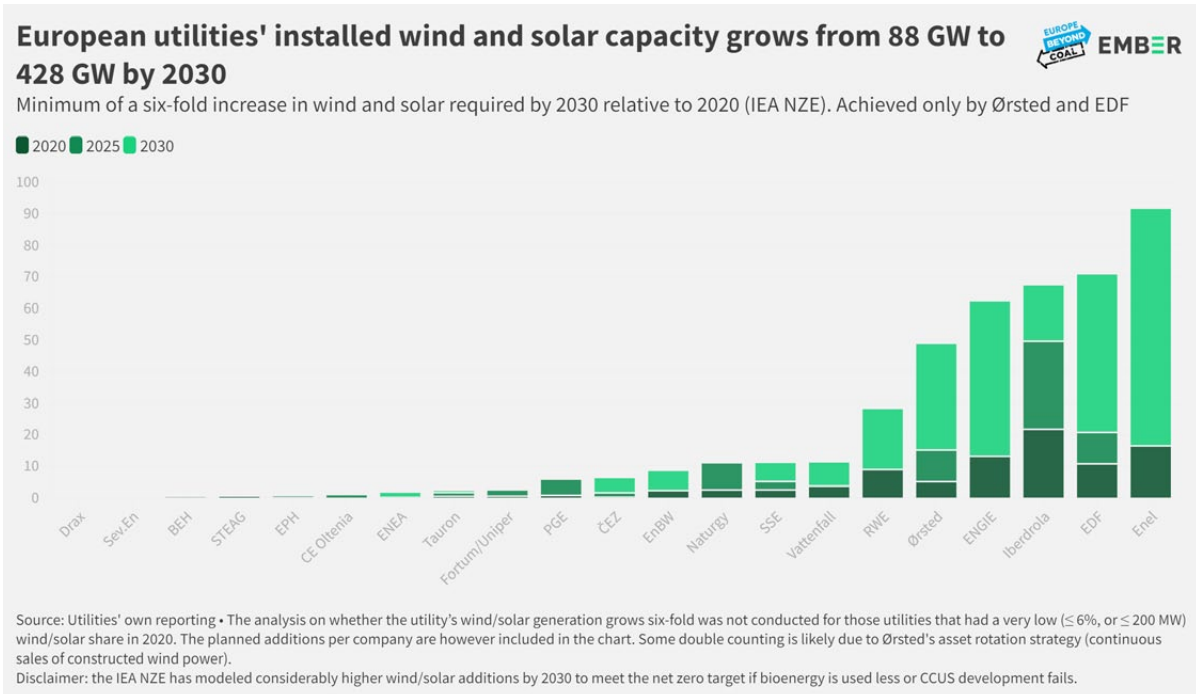

Chart 16: Aggregated wind and solar announcements by European power companies (global figures, MW). Drax, Sev.En and CE Oltenia do not have any solar or wind capacity in 2020.

Ørsted and **EDF** emerge as the only utilities bringing wind and solar power to the market at an IEA NZE compliant scale. Ørsted will see a ten-fold increase and EDF almost seven-fold. However, the Ørsted's business model is based on asset rotation strategy, which entails selling the newly built assets and then using the profits to reinvest in further wind energy development. Since some of Ørsted's current and future clients are amongst the assessed companies some of the wind and solar assets in 2030 and featured in this report are likely to be double counted.[29]

Manyfold growth is also achieved by some companies that have a very low starting point for their wind and solar production. However, for companies that have not previously engaged in wind and solar, any growth - however small - is going to appear exponential and convey a misleading message about their ambition.

29. Due to the asset rotation, the company's end-2020 wind/solar installed capacity was "lower" than if none of the assets had been sold (and thereby affecting the steepness of the growth trajectory by 2030). When the historic installed capacities are considered (7.6 GW offshore wind and 1.7 GW onshore wind and solar by end-2020) the company's growth is a little more than five-fold by 2030.

Therefore, the analysis tracking capacity multiplication excludes those companies whose baseline (2020) production has been either less than 200 MW[32] or less than 6%[30] of total installed capacity.[31] See Table 4 under Annex for details.

Three companies currently demonstrate no willingness to participate in the growth of the wind and solar sector by 2030: Drax, Sev.En and BEH. This is concerning since some of these utilities operate in Eastern European countries where coal phase-outs are coming fast and where leapfrogging an increase in fossil gas generation is of pronounced importance.

Chart 17 shows to what extent the European power utilities are able to triple their renewable production by 2030, as is expected by the IEA, using only wind and solar. The IEA allows for other technologies to complement the growth but the lion's share must come from wind and solar, and even more so if a more conservative approach on bioenergy and CCUS is taken.

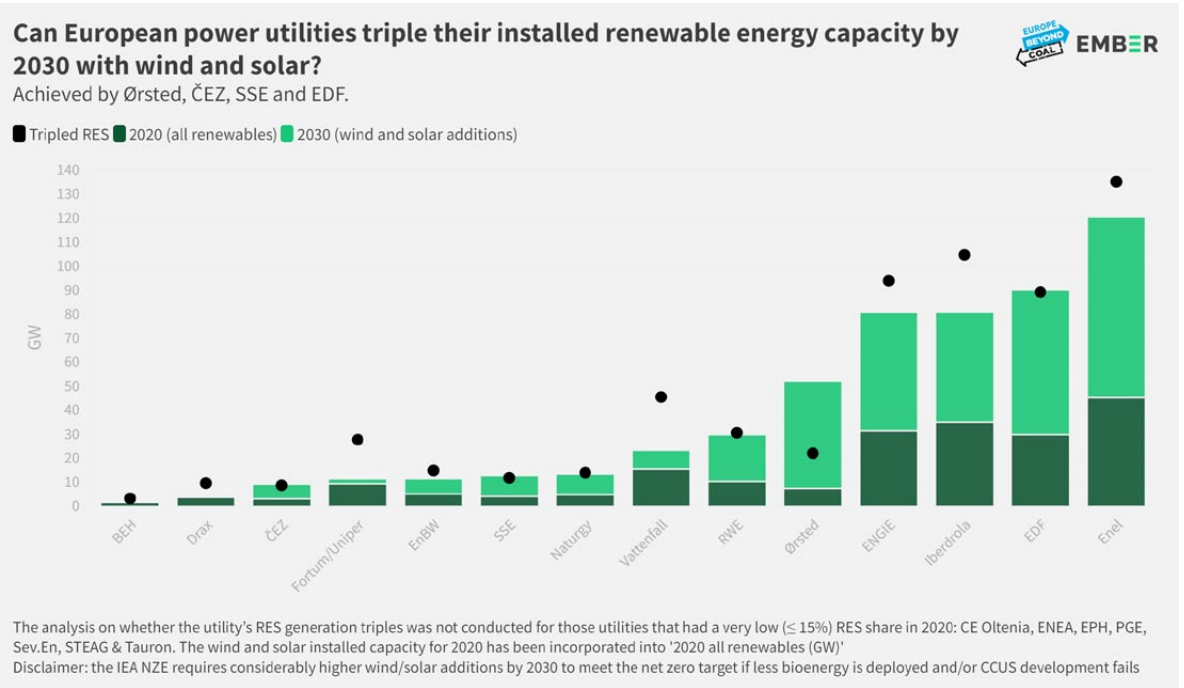

Chart 17: Will the European power utilities triple their renewables by deploying only wind and solar?

30. Corresponding to the size of a typical 30 or so turbine offshore wind farm of one of the assessed companies.
31. This falls well below the global average of 9%.
32. Excluded utilities for having less than 200 MW wind/solar in 2020: BEH, CE Oltenia, ČEZ, Drax, ENEA, Sev. En, STEAG. Utilities excluded for having 6% or less wind/solar in 2020: Tauron (6%), PGE (4%), Fortum/Uniper (less than 1%).

The analysis shows that several utilities are able to triple their installed renewable capacity with wind and solar alone. However, as was noted earlier, when the existing renewable capacity is very low any multiplying of capacity is also much easier to achieve. For this reason, the report's analysis excludes utilities withless than 15% of renewable installed capacity.

Those companies that already had an existing renewable asset base[33] **and are still showing growth include: EDF, ČEZ, SSE and Ørsted.** The rest of the assessed utilities will not achieve the necessary three-fold growth with just wind and solar but with additional investment decisions could bridge that gap.

The companies overall renewable energy growth will be slightly more pronounced when the rest of the renewables are considered, such as geothermal, hydro and biomass. However, the disclosed renewable growth by 2030 from other technologies other than wind and solar is very limited.

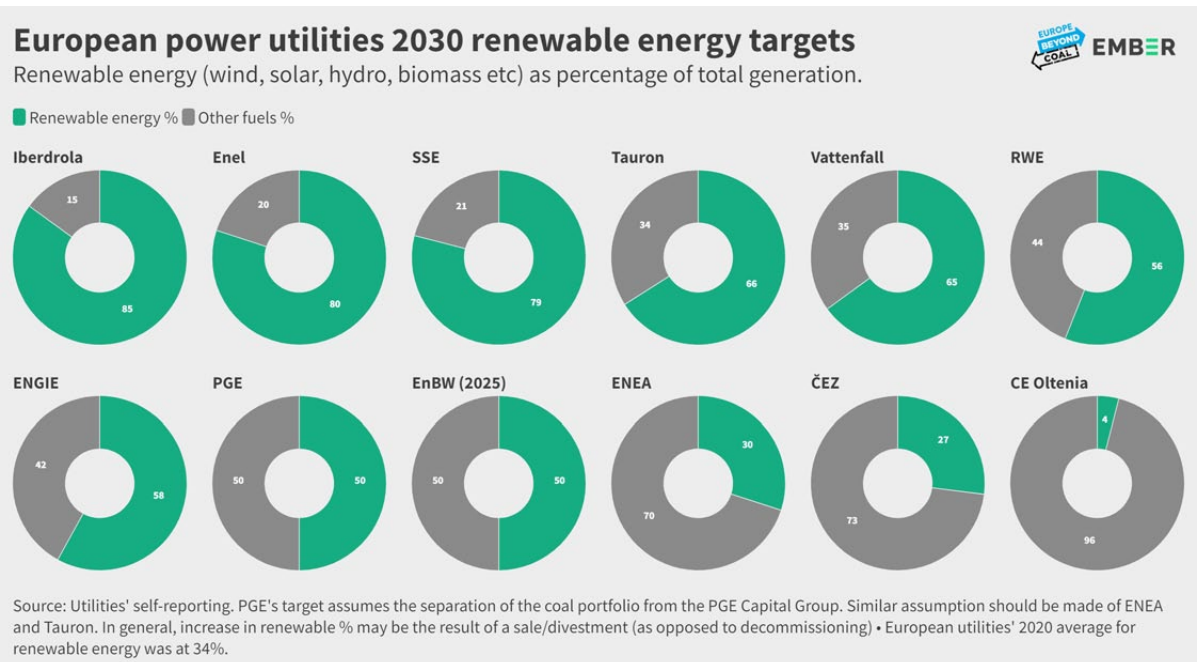

Chart 18: 2030 renewable energy targets (%) by 2030 per power utility (excluding companies without targets). Exact breakdown of renewable energy technologies in 2030 could not be verified for all companies.

33. Note that the global average of installed renewable energy capacity is 29% and amongst the assessed utilities the average is 34%. The chosen cut-off percentage excludes: CE Oltenia (0%), ENEA (7%), STEAG (8.7%), Tauron (14.7%), EPH (9.7%), PGE (6.2%) and Sev.En (% not known). The numbers can also be found in the accompanying Excel sheet.

Some power utilities have made explicit pledges to increase their renewable energy share by 2030 but this applies to only dozen European power utilities (Chart 18). Some of them meet the IEA's expectation of 60% share of renewables by 2030, namely **Iberdrola, Enel, SSE, Tauron and Vattenfall.** It is important to highlight that this particular metric does not penalise for an excessive biomass share of electricity (see next section) nor does it show when the high renewable % was obtained by selling high carbon assets rather than decommissioning them. Similarly, it omits information when renewable assets were acquired from other companies (as opposed to being responsible for developing new and additional capacity) and when the company has sold their own renewable projects.[34] Lastly, even if the relative share of renewables is high it does not mean that the utility will not build new fossil fuel capacity as well.

Some power utilities have a particularly heavy emphasis on alternative renewable technologies with inherent sustainability concerns, such as hydro and biomass. Drax is particularly vulnerable for having invested so heavily in the risky alternative energy technology of biomass, both as a generator and as a wood pellet supplier, as well as staking the company's future on negative emissions from untested bioenergy with carbon capture and storage (BECCS).[35] See the next section for more details on biomass.

If the pledges made by the European power utilities come to fruition, there will be a healthy injection of solar and wind capacity into the global grids in the coming decade. The figures prove that several European utilities will render themselves into a key vessel to rapidly increase the renewable energy production - and that trend must be strengthened. However, those power utilities that are going to be doing much of the heavy lifting on wind and solar - most notably Enel, ENGIE, EDF, Iberdrola and RWE - will also be heavily involved with fossil fuels beyond the timelines required for net zero 2050.

The assessed companies will therefore need aggressive CAPEX plans to ensure that the wind and solar technologies replace the outgoing fossil energy. Going forward, power utilities should be expected to include wind and solar as the leading growth technology in their operations.

34. E.ON's and RWE's asset swap in 2020 demonstrated this well. As a result the wind, solar and hydropower businesses, as well as the biomass, biogas and gas storage activities were transferred to RWE.
35. Drax's website: 'BECCS and negative emissions'. Access at: https://www.drax.com/about-us/our-projects/bioenergy-carbon-capture-use-and-storage-beccs/

5.5 Biomass

The unsustainable use of biomass in the energy sector is a rising concern for climate and nature loss goals alike. There is a well-founded reason for caution: the European Academies Sciences Advisory Council (EASAC) states that using woody biomass for power 'is not effective in mitigating climate change and may even increase the risk of dangerous climate change.'[36]

Agriculture, forestry and other land use (AFOLU) is today responsible for around 5-6 billion tonnes of CO2 emissions, and is therefore the second largest source of emissions after the energy sector. Moving emissions from the energy sector into the land-use sector by increasing biomass use, and the consequent depletion of carbon reservoirs and sinks, should be viewed as a disservice to climate action when these emissions are not accounted for. Any use of solid bioenergy in the energy sector is therefore dependent on sustained efforts in the land-use sector, as well as science-based carbon accounting.

Recognising the high inherent risks of relying excessively on biomass, the IEA's global net zero pathway for bioenergy demand represents the low end of the scenarios

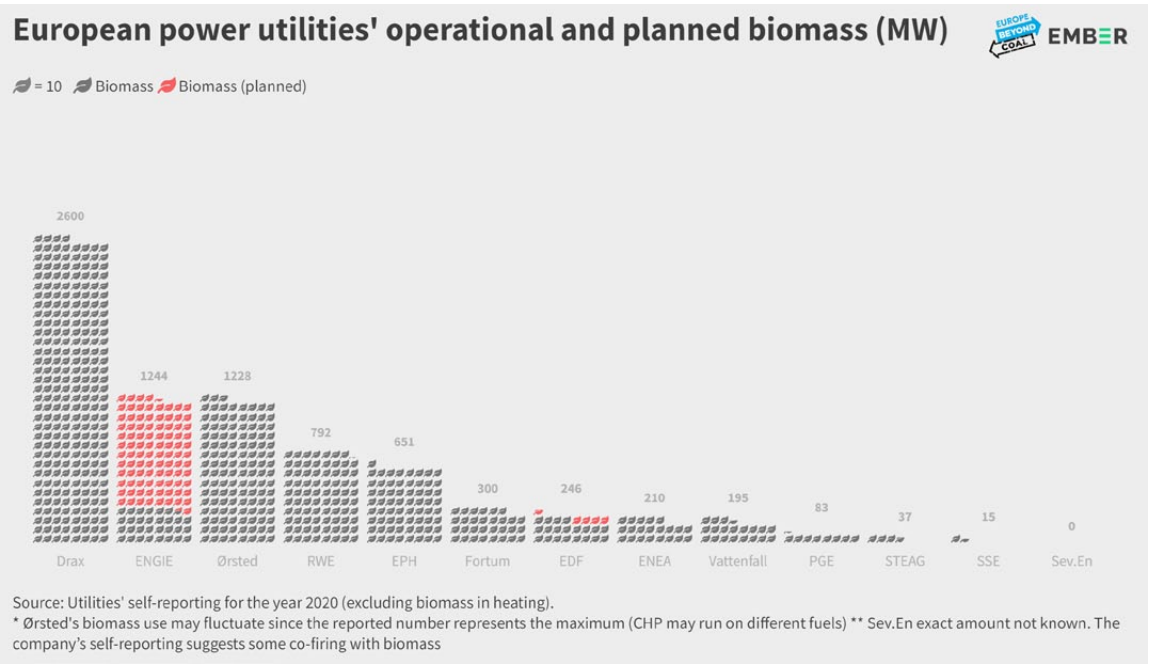

Chart 19: Existing (2020) and planned biomass installed capacity per European power utility. The data reflects power. Data on heat has been excluded where possible.

36. Climate impact of woody biomass' (2021)

by the Intergovernmental Panel on Climate Change (IPCC) aligned with 1.5 °C.[37] Demand is concentrated in sectors that are either hard to electrify, or require a low-cost dispatchable source of renewable energy.

As there are multiple better alternatives to produce electricity than burning biomass, bioenergy provides only 5% of total electricity generation in 2050 and the agency notes the possibility of even a lower share if wind and solar overperform.[38] Therefore, while the IEA acknowledges bioenergy's role, and even growth, the amounts allocated for the electricity sector remain low. Any use of biomass by power utilities should be considered marginal and it should not form the backbone of the electricity production.

Amongst the assessed power companies, several have generation that uses biomass as fuel. In absolute terms, the largest operational biomass-fired fleets are owned by **Drax** and **Ørsted**, closely followed by **RWE** and **EPH**. It is important to note that many of the assessed companies also use biomass for heat production.[39] The largest planned biomass capacity additions are expected from **ENGIE**. Most utilities have not revealed their future plans and the use of biomass could be much higher.

Out of the 21 assessed utilities, biomass constitutes the largest relative share for Drax (40%) and Ørsted (13%) of their entire power generation portfolio. For the others, biomass is currently a relatively small part of their electricity generation.

37. https://www.iea.org/articles/what-does-net-zero-emissions-by-2050-mean-for-bioenergy-and-land-use
38. ibid
39. This includes at least Vattenfall, Fortum/Uniper, ČEZ, STEAG and Ørsted

6. Conclusions

The report finds that the assessed **European electricity utilities' net zero commitments do not correspond to the ambition level required by the IEA Net Zero Roadmap**. The overall transition plans of the utilities, with or without net zero targets, are **widely out of touch with the necessary fossil fuel phase-out timelines and wind and solar escalation in the electricity sector**. After scrutinising the forward-looking plans for each key fuel, it can be concluded that all the power utilities need to urgently prioritise the detailed disclosure of how they intend to align their actions with their pledges.

The quickest litmus test for any net zero plan is a rapid coal phase-out by 2030 in the EU/OECD and by 2040 in the rest of the world. But the report shows that the power utilities with coal assets in Germany, Eastern Europe and, in some cases, Turkey are most noticeably struggling to meet the target. **Out of the 21 assessed companies, only nine have a coal phase-out plan aligned with the IEA's 2030 EU/OECD timeline**. Six of the utilities are not even compliant with the 2040 global deadline. Overall, **49 GW of coal must still be announced for decommissioning as a priority action. This equals the combined net generation capacity of Czechia and the Netherlands**.[40]

While the global use of unabated fossil fuels in electricity generation is sharply reduced in the NZE system, disappearing by 2035 in the OECD, the European power companies are extremely hesitant to disclose their fossil gas-related plans. The report suggests that the combined amounts of the new gas projects, as well as the existing capacity, would bring **the anticipated installed post-2035 fossil gas capacity to ~197 GW**. This amount is equal to **the entire net generation capacity for electricity in Italy, Bulgaria, Poland and Romania**.[41] **In advanced economies, this post-2035 gas capacity will be 135 GW**. Furthermore, the current hydrogen capacity plans of the utilities are light years away from meeting even a fraction of the enormous gas capacity currently in the system. Any company announcement on hydrogen is therefore not yet contributing to decarbonisation at the necessary scale. **Overall, while gas generation has a slightly longer grace period before full decarbonisation, credible plans to decommission the entire fossil fuel fleet are noticeably absent**.

The IEA's net zero modelling entails the rapid and substantial renewable energy transition led by wind and solar. The European power utilities' existing plans will provide a genuine and sizable injection of new wind and solar capacity, which demonstrates that these companies are key players in making the IEA's vision a reality. The total **wind and solar generation** of all 21 companies will **comfortably**

40. ENTSO-E Statistical Factsheet 2018
41. Ibid

quadruple by 2030, reaching 428 GW, as many utilities will multiply their existing wind and solar capacity. However, given the enormity of the task, even these numbers will not suffice as we will need to see growth to the tune of expanding the wind and solar capacity at least six-fold in size. Similarly, the entire renewables portfolios must triple to account for the majority of the companies' business models while keeping biomass is a minority role. Only very few companies meet these requirements and none meet them all at once. **Therefore, European utilities need to urgently ramp up their existing plans to build wind and solar - especially those in Eastern Europe**.

Recommendations to power utilities shareholders, lenders, underwriters and insurers:

1. CORPORATE ACCOUNTABILITY

- Hold power utilities with 2050 (or earlier) net zero plans accountable: timely fossil fuel plant closures and CAPEX plans must be consistent with companies high-level announcements.
- The target must cover all scopes 1-3 in full, in all geographies.[42]
- Utilities without net zero plans must release specific sectoral targets to accompany any announcements.

2. SECTORAL TARGETS: coal

- Do not consider any long-term climate pledge, net zero or otherwise, credible if it lacks an unambiguous coal phase-out plan by 2030/2040.

3. SECTORAL TARGETS: gas & hydrogen

- Treat fossil gas with similar assertiveness as coal: the design of the fossil-free electricity system by 2035/40 needs to be at the front and centre of all business strategies.
- Do not accept a nascent and speculative hydrogen plan as a substitute for a detailed plan to exit fossil gas. Hydrogen could have its place in the transition but it must not be used to obscure or justify utilities' continued fossil fuel operations.

42. Scope 1 = direct emissions, scope 2 = purchased electricity, Scope 3 = emissions from the supply chain and use of sold products.

4. SECTORAL TARGETS: renewable energy

- Assess the existing and planned renewable energy portfolio by using several metrics:
  a) Is wind and solar installed capacity significant, both in relative and absolute terms?
  b) Is the company going to be able to multiply its overall renewable energy generation, mostly using wind and solar at the relevant scale, to form the backbone of its generation portfolio by 2030?
  c) Is bioenergy occupying a larger role in electricity generation than it should?
  d) While building more renewables, is the utility also investing in fossil fuels or fossil-based hydrogen without a credible plan on how to decarbonise it?

References: Refer to the excel sheet with individual data points published together with the report.

7. Methodology

The report sets out to collect and analyse the power utilities' backward-looking data for the year 2020[43] and forward-looking data from the most recent available source. The findings of the report are the result of extensive desk-based research by the authors. The exact figures per power utility were primarily obtained through the most recent company annual reports, investor presentations, company websites and other public announcements. No proprietary data was accessed. Therefore, any gaps in the dataset are a result of the companies' incomplete reporting.

The data was also shared with the companies in August 2021 and a month was given for each to provide corrections or clarifications. In some cases, a short extension was permitted and some additional clarifications have been sought since. The final data sets were shared with the companies in December 2021 for final modifications. The following companies did not respond to the data requests: BEH, CE Oltenia, EnBW, ENEA, Naturgy, Sev.En, STEAG and Tauron.

All data points used, with their associated sources and references, can be found in an Excel spreadsheet that is published alongside the report. Each data point has either been disclosed by the company, is publicly available or has been calculated using several publicly available sources. These sources have been disclosed.

The report covers those technology/fuel benchmarks of the IEA NZE that are the most pressing for the power sector decarbonisation. The assessment excludes detailed analysis on (amongst others): batteries & storage, nuclear power, oil, and some types of renewables. CCUS and the effects of sales/purchases have also been left mostly out. The IEA NZE includes separate pathways for the remaining technologies and fuels.

The report focuses on the power sector data and the units are expressed mostly in installed capacity (GW or MW). While the report assesses gas, hydrogen and biomass in power, LNG and biomass in heating are excluded.

In certain cases the numbers have been obtained by approximations. These numbers are all tagged in the Excel spreadsheet for transparency. This is partly due to the differences in reporting in GW, TWh or % of production.

The report makes the assumption that the economy-wide targets can be applied directly to companies, even when the power utilities in question may have their respective strategies to focus on a particular subset of the fuels available for the transition. The report considers an 'all-hands-on-deck' approach to expanding the wind and solar industry in Europe and beyond, which is why each company is expected to steer their resources to achieve this mission.

43. In some cases only 2019 data was available.

8. Annex

Table 3: Utilities' hydrogen plans. The table excludes those utilities without public hydrogen announcements: BEH, CE Oltenia, Drax (verified), EDF (verified), Tauron, Sev.En. N/A = Not Applicable.

Company	Planned hydrogen (GW)	Existing hydrogen (GW)	Colour of hydrogen	Use of H2 per sector	Verified by the company (Yes/No)	Source
ČEZ	The options for hydrogen (production and use) are being explored.	Not Known	Not known	Power/ heat plant (the Mělník site)	Yes	The greeting of the largest heat source in the Czech Republic has begun. ČEZ is closing the MĚLNÍK III power plant, with the coal in the heating plants to be replaced by gas, biomass and modern technologies (17. 8. 2021)
EnBW	At least the Altbach/ Deizisau power plant is considered for hydrogen.	Not Known	Not Known	Power/ heat	No	Press release (October 13, 2021)
ENEA	Not Known	Not Known	Not Known	Not Known	No	
Enel	2 GW by 2030	N/A	Green	Not Known	Yes	
ENGIE	4 GW by 2030	N/A	Green	Not Known	Yes	
EPH	N/A	N/A	Not Known	Not Known	Yes	EPH reports that there are currently no plans to engage in a large-scale hydrogen production. However, hydrogen is considered relevant for its gas transit, storage and distribution assets (mainly located in Slovakia) which are bundled under EP Infrastructure subholding. EPH has embarked on several projects to ensure that its mid-stream and down-stream infrastructure is ready for large-scale transit, distribution and storage of hydrogen. More in the EPIF 2020 Sustainability Report.

Fortum / Uniper	In late 2020, Fortum and Uniper announced plans to cooperate in green hydrogen production with Perstorp. The latest announcement, from early 2021, states that Uniper plans to start large-scale production of green hydrogen at the Maasvlakte power plant in Rotterdam, Netherlands.	Uniper has two hydrogen production plants, one in Hamburg and the other in Falkenhagen.	Blue and Green	Partnership with Shell to provide H for Energy and Chemicals Park at Wesseling and Godorf.	No	Fortum Sustainability report 2020 Uniper strategy highlights 2020
Iberdrola	0.8 by 2027		Green	Projects being developed for chemicals (fertilizers) and transportation, but planned for industrial, thermal and mobility projects.	Yes	
Naturgy	Not Known	Green hydrogen plants in Spain, 16.5 t/yr.	Not Known	Plan to blend hydrogen and gas in power plants. Mobility & industry.	No	Naturgy's 2021-2025 Strategic Plan
PGE	The use of green hydrogen highlighted as a possible solution in heating and power generation in the PGE Strategy 2030. No specific quantities mentioned.	No	Not Known	Not Known	Yes	PGE Strategy 2030, page 16,27.

RWE	10GW	N/A	Green, and other "low carbon" hydrogen (blue)	The projects target sector coupling in electricity and heat, transport and industry.	Yes	p. 7, 14 & 19 of RWE ESG Presentation p.13 & 23 of Capital markets day presentation Nov. 2021
SSE	0.9GW Keadby Hydrogen power station (CCHT) – 50% joint venture with Equinor. Also developing 320GWh Aldborough hydrogen storage project at salt cavern within the UK's East Coast Cluster).	N/A	Blue and Green	Plan to blend hydrogen and gas in remaining unabated gas power stations. The company is looking at hydrogen blending at 0.84GW Keadby 2, CCGT (hydrogen supply from network in UK's East Coast Cluster).	Yes	
STEAG	0.5 GW by 2025	Not Known	Not Known	Steel	No	STEAG, "Grünes Wasserstoff-Projekt in Duisburg-Walsum strebt IPCEI-Förderung an" (in German). Feb. 2021
Vattenfall	Yes	Not Known	Blue and Green	Steel, large-scale biofuel production, transport, aviatiopn, gas plants.	Yes	Vattenfall's view on European Hydrogen rules Policy Paper - Create an enabling policy framework for Hydrogen uptake (24 March 2021) Vattenfall's views on hydrogen (2018) Vattenfall: Industry decarbonisation
Ørsted	2MW Decided (FID) renewable capacity (not installed) Current pipe-line of + 3GW renewable hydrogen projects.	N/A	Green	Not Known	Yes	Capital markets day presentation, p. 54

Table 4: Utilities' pledged wind/solar installed capacity additions and growth by 2030. The assessment was not conducted for those utilities that had either an extremely low starting point (less than 200 MW or ≤ 6% the total production). Those utilities without any wind/solar capacity growth plans are automatically considered to fail the NZE wind/solar target.

Company	Wind & Solar in 2020 (MW)	New wind/solar additions (MW) after 2020 (until 2030)	Growth of wind/solar by 2030 relative to 2020 (x-fold)	% share of wind/solar in 2020	Less than 200 MW in 2020?
Iberdrola	21600	45500	X 3.1	39%	No
Enel	16314	75000	X 5.6	19%	No
ENGIE	12981	49000	X 4.8	13%	No
EDF	10600	60000	X 6.7	9%	No
RWE	8802	19200	X 3.2	22%	No
Ørsted	4950	44370	X 10	51%	No
Vattenfall	3600	7400	X 3.1	12%	No
SSE	2423	8407	X 4.5	26%	No
Naturgy	2400	8296	X 4.5	16.00%	No
EnBW	2200	6100	X 3.8	16%	No
ČEZ	133	5867	Not assessed	1%	Yes
PGE	700	4800	Not assessed	4%	No
Tauron	380	1700	Not assessed	6%	No
STEAG	252	0	X 0 (no growth)	4.00%	No
Fortum/ Uniper	440	1750	Not assessed	0.9%	No
BEH	116	0	X 0 (no growth)	2.00%	Yes
EPH	123	300	Not assessed	0.50%	Yes
ENEA	72	1438	Not assessed	1.00%	Yes
Drax	0	0	X 0 (no growth)	0%	Yes
CE Oltenia	0	725	Not assessed	0%	Yes
Sev.En	0	0	X 0 (no growth)	0%	Yes

Table 5: Utilities' installed renewable capacity in 2020 and growth from win/solar by 2030. The table shows whether the assessed companies will meet the IEA NZE benchmark of tripling renewable energy by 2030. Only wind/solar growth was included and the other renewable energy technologies excluded. The assessment was not conducted for those utilities that had either a particularly low starting point (≤ 15% renewables of the total production). Those utilities without any wind/solar capacity growth plans are automatically considered to fail the target even when they have a low starting point (Sev.En, STEAG).

Company	2020 (all renewables, GW)	2030 (wind & solar additions, GW)	Included in analysis? (15% or less RES in 2020)	2020 renewable capacity + wind/solar additions by 2030 (GW)	2020 RES installed capacity x 3 (the minimum the company has to achieve by 2030)
BEH	1.01	0		1.01	3.03
CE Oltenia	0	0.725	Excluded	0.725	Not assessed
ČEZ	2.858	5.867		8.725	8.574
Drax	3.161	0		3.161	9.483
EDF	29.7	60		89.7	89.1
EnBW	4.9	6.1		11	14.7
ENEA	0.443	1.438	Excluded	1.881	Not assessed
Enel	45.016	75		120.016	135.048
ENGIE	31.268	49		80.268	93.8
EPH	2.38	0.3	Excluded	2.68	Not assessed
Fortum/ Uniper	9.2	1.75		10.95	27.6
Iberdrola	34.82	45.5		80.32	104.46
Naturgy	4.6	8.296		12.896	13.8
PGE	1.1	4.8	Excluded	5.9	3.3
RWE	10.15	19.2		29.35	30.45
SSE	3.882	8.407		12.289	11.65
Sev.En	0	0		0	No growth
STEAG	0.623	0		0.623	No growth
Tauron	0.895	1.7	Excluded	2.595	Not assessed
Vattenfall	15.31	7.4		22.71	45.31
Ørsted	7.27	44.37		51.64	21.81

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http://beyond-coal.eu/

EMBER
https://ember-climate.org/