

Assessment of Renewable Investments in Europe by Leading Companies & Perspectives to 2025



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Center for Energy & Climate
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1. **Introduction to the EU top 20 Renewable Power Index (EU20 RPI) and implications of the new – 55% target for electricity investments**
2. The period 2015-2019: renewables not the priority of the EU20 RPI
3. The medium term perspective to 2025: on track for the new -55% target?
4. Highlights & conclusion
5. Annexes

The EU Green Deal calls for massive electricity sector investments

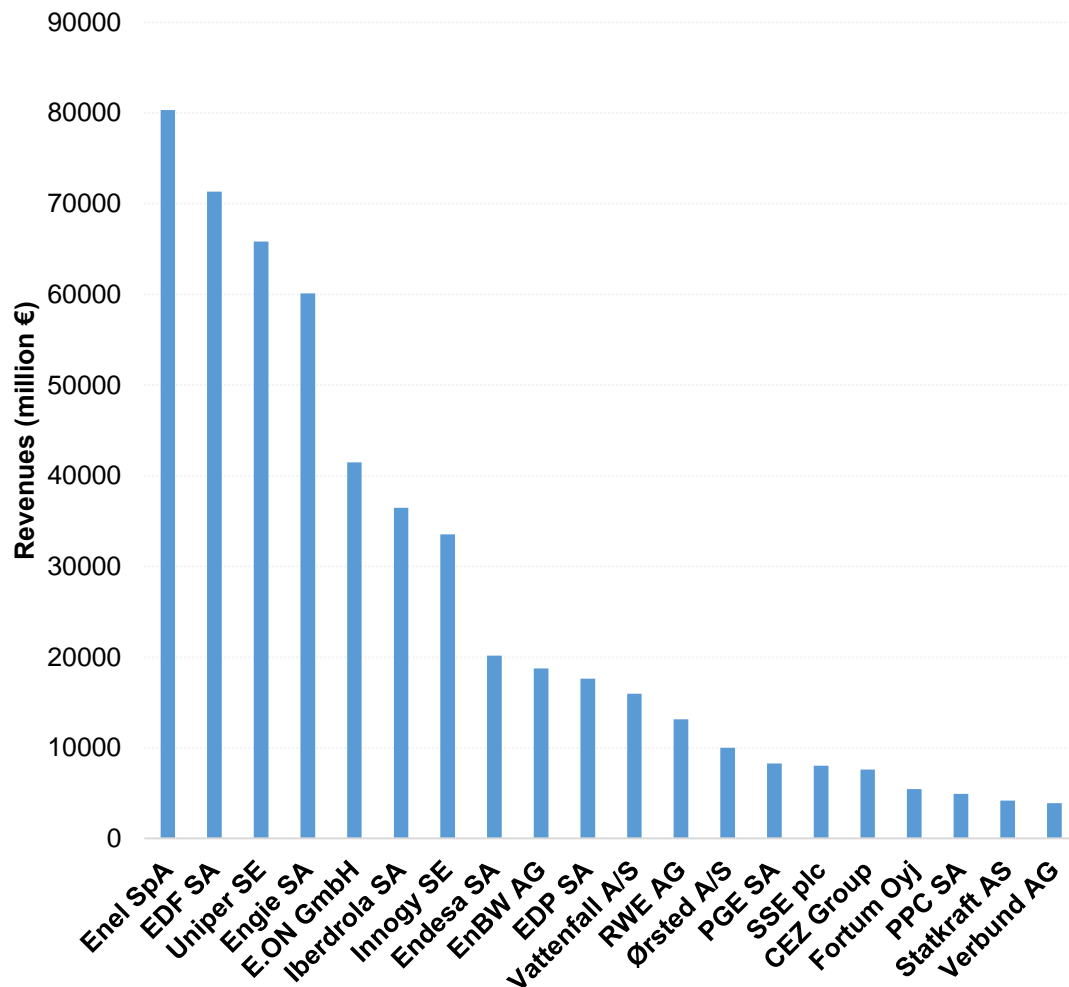
- The -55% target for 2030 means that the pace of average annual emission reductions will have to double in the period 2020-2030 versus 1990-2017. Reaching carbon neutrality by 2050 means tripling the effort in the period 2030-2050 versus 1990-2017.
- The European Commission (EC) points to additional energy investments in supply & demand: the new -55% intermediary objective requires about +350 billion EUR per year until 2030
- The electricity sector will concentrate part of these additional investments:
 - Overall, the investment level of 55 billion EUR/year in 2011-2020 in this sector will have to double in the period 2021-2030, to reach 65% of renewables in final energy demand.
 - Total renewable energy source (RES) capacity should increase from 300 GW in 2019 to up to 800 GW by 2030, equivalent to +50 GW/year of solar and wind capacity additions.
 - Notably, offshore wind investments will have to double from 15 billion EUR/year to 30 billion EUR/year, with 2/3 located in the North Sea.
- These investments into RES will require private companies willing and able to invest, public support (contracts for difference, tenders), enabling regulation, as well as grids and large storage additions.

This analysis looks at Europe's leading energy companies, the trajectory of their investments into RES since 2015 and whether their investments plans into solar and wind are on track by 2025 to deliver on the required scale to reach the -55% emission reduction target by 2030.

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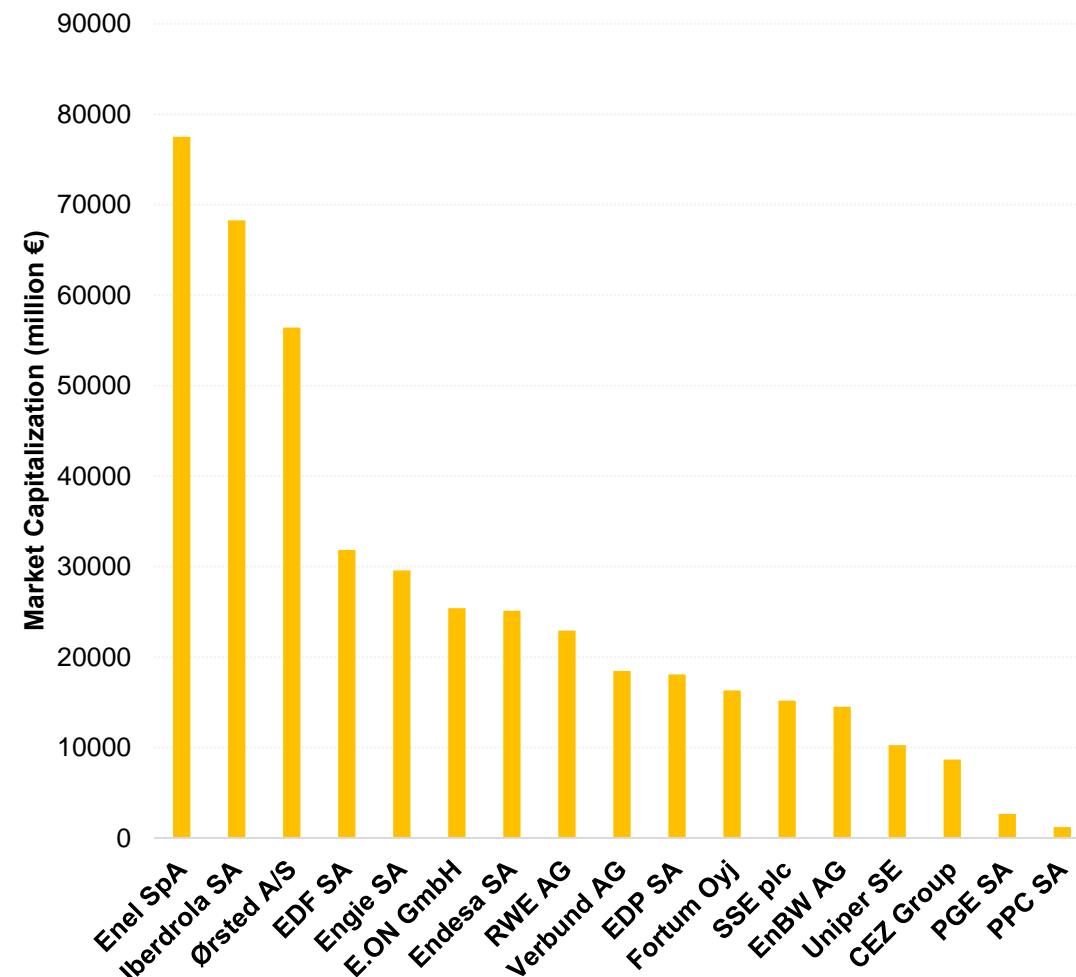
The EU20 Renewable Power Index (EU20 RPI) englobes EU's 20 largest utilities by revenues to track their investments into renewables

European utilities by global revenues in 2019



Sources: Company Annual Reports






European utilities by market capitalization in 09/2020



Sources: Company Annual Reports

From 2015 to 2019, 132 GW of solar and wind capacity were added in Europe, with just over 10% by Europe's leading utilities (in equity only)

Total Power Generation Capacity by RES in Europe

2015		2019
240 GW		249 GW
136 GW		204 GW
95 GW		150 GW
25 GW		25 GW
496 GW		628 GW





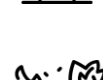
Sources: ENTSO-E, IEA World Energy Outlooks

Added Capacity 2015-2019

RES by Source

+9GW	Hydro	+2GW
+68GW	Wind	+12GW
+55GW	Solar	+1,5GW
+0GW	Biomass	+0,5GW
+132GW	Total	+16GW

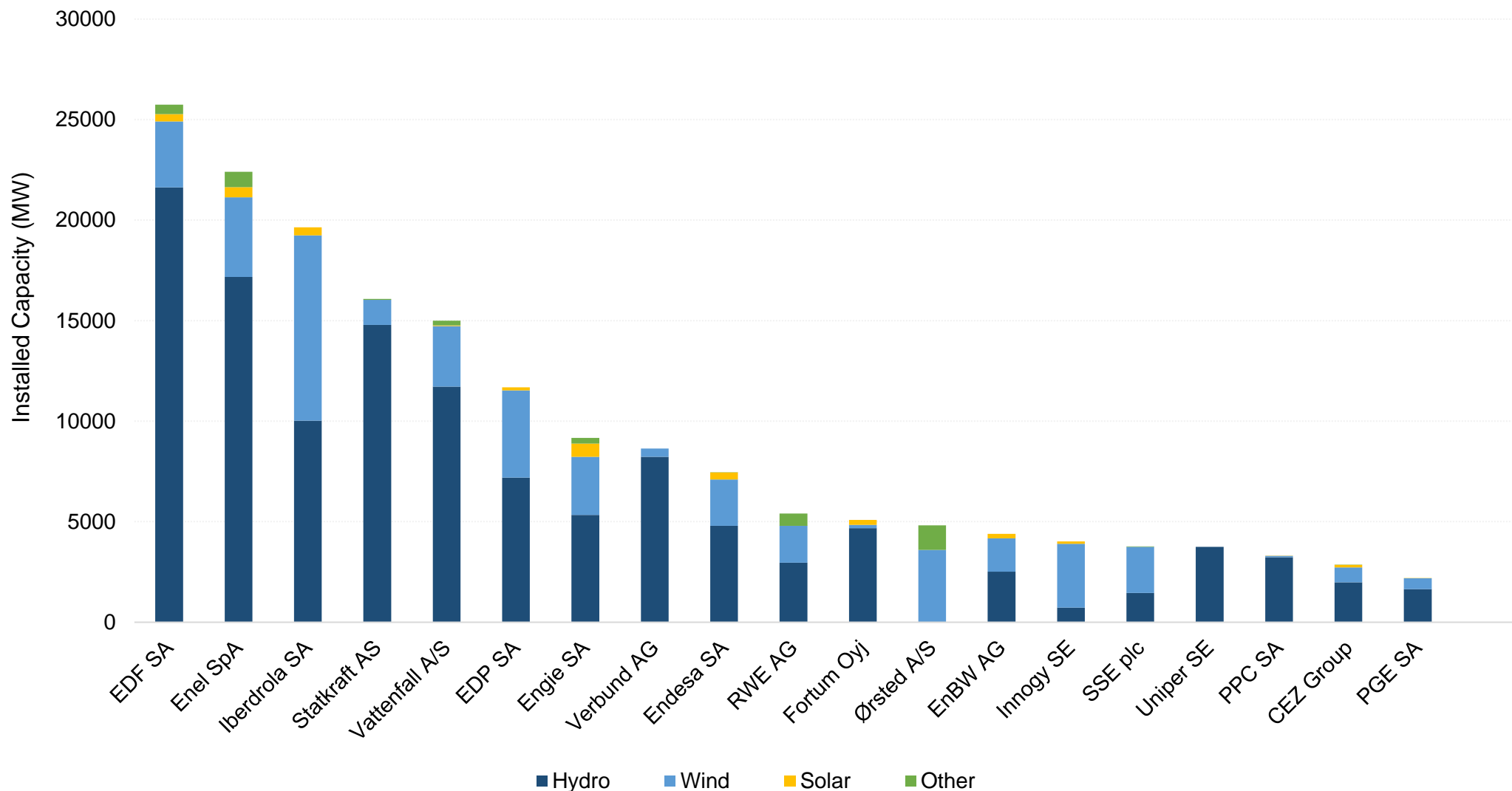
EU20 RPI Power Generation Capacity by RES in Europe

2015		2019
122 GW (51% of Europe)		124 GW (50% of Europe)
33 GW (24% of Europe)		45 GW (22% of Europe)
1,5 GW (1,5% of Europe)		3 GW (2% of Europe)
3 GW (12% of Europe)		3,5 GW (14% of Europe)
160 GW (32% of Europe)		175,5 GW (28% of Europe)

Sources: Company Annual Reports & Presentations/Authors Calculations

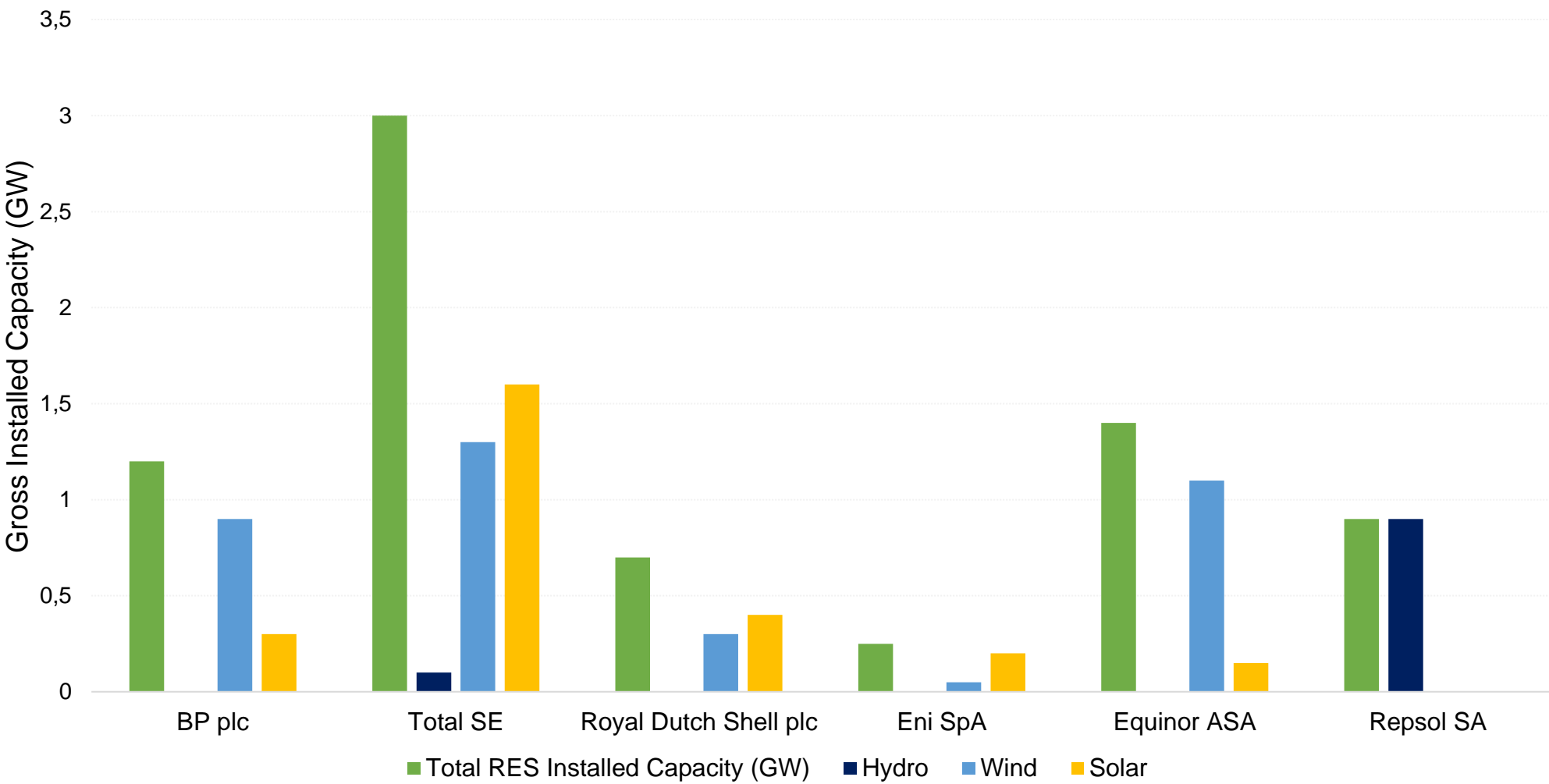
Hydro, followed by wind, dominates leading energy utilities RES portfolios to date, while solar remains marginal

Net total installed RES capacity in 2019 by the EU20 Renewable Power Index in Europe



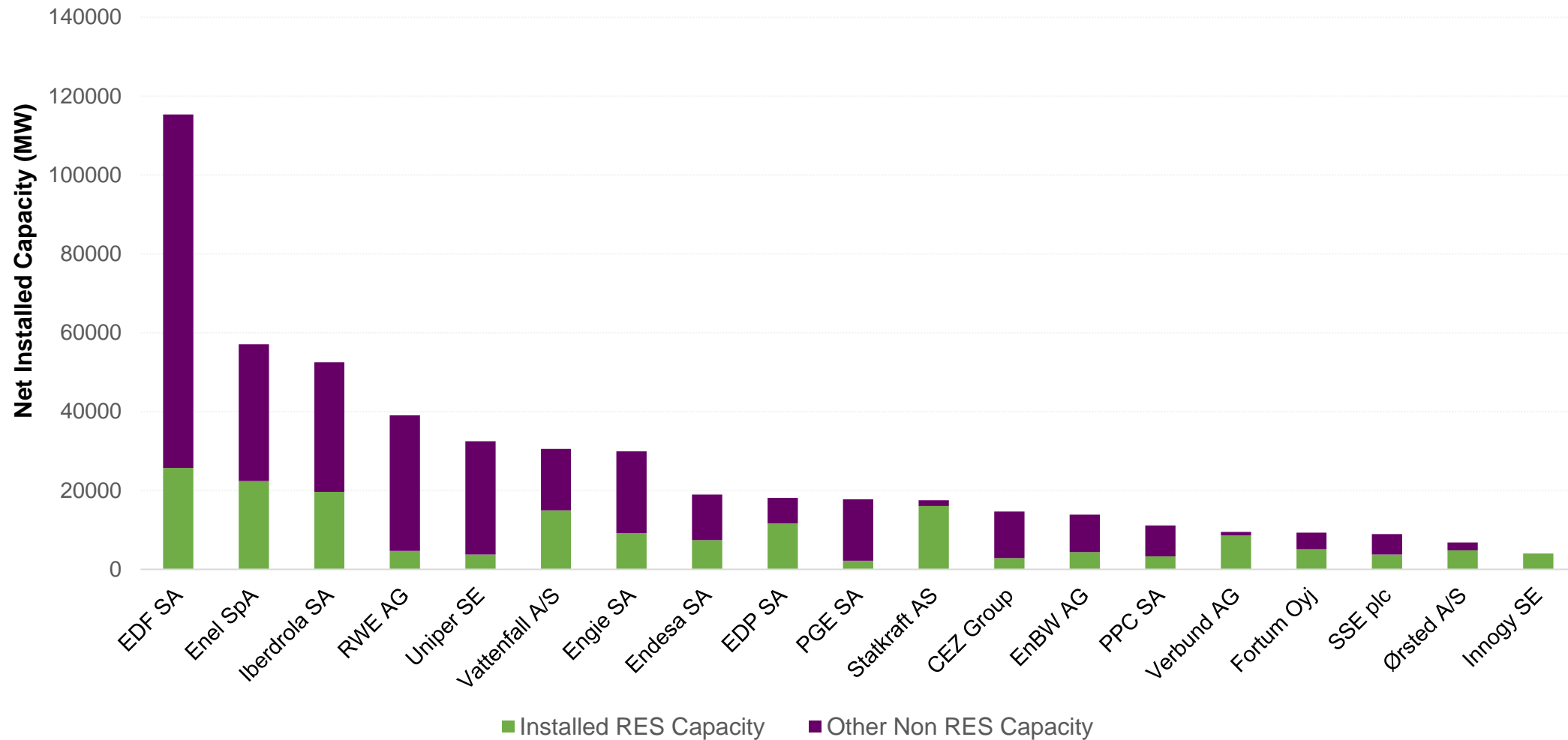
The O&G majors have played a marginal role so far, with the exception of Total and Equinor

Total installed RES capacity in 2019 in Europe by the European O&G majors



EU20RPI: several smaller utilities are specializing in renewables only while the larger ones tend to have diversified generation sources

The EU RPI's installed capacity portfolios in 2019 in Europe



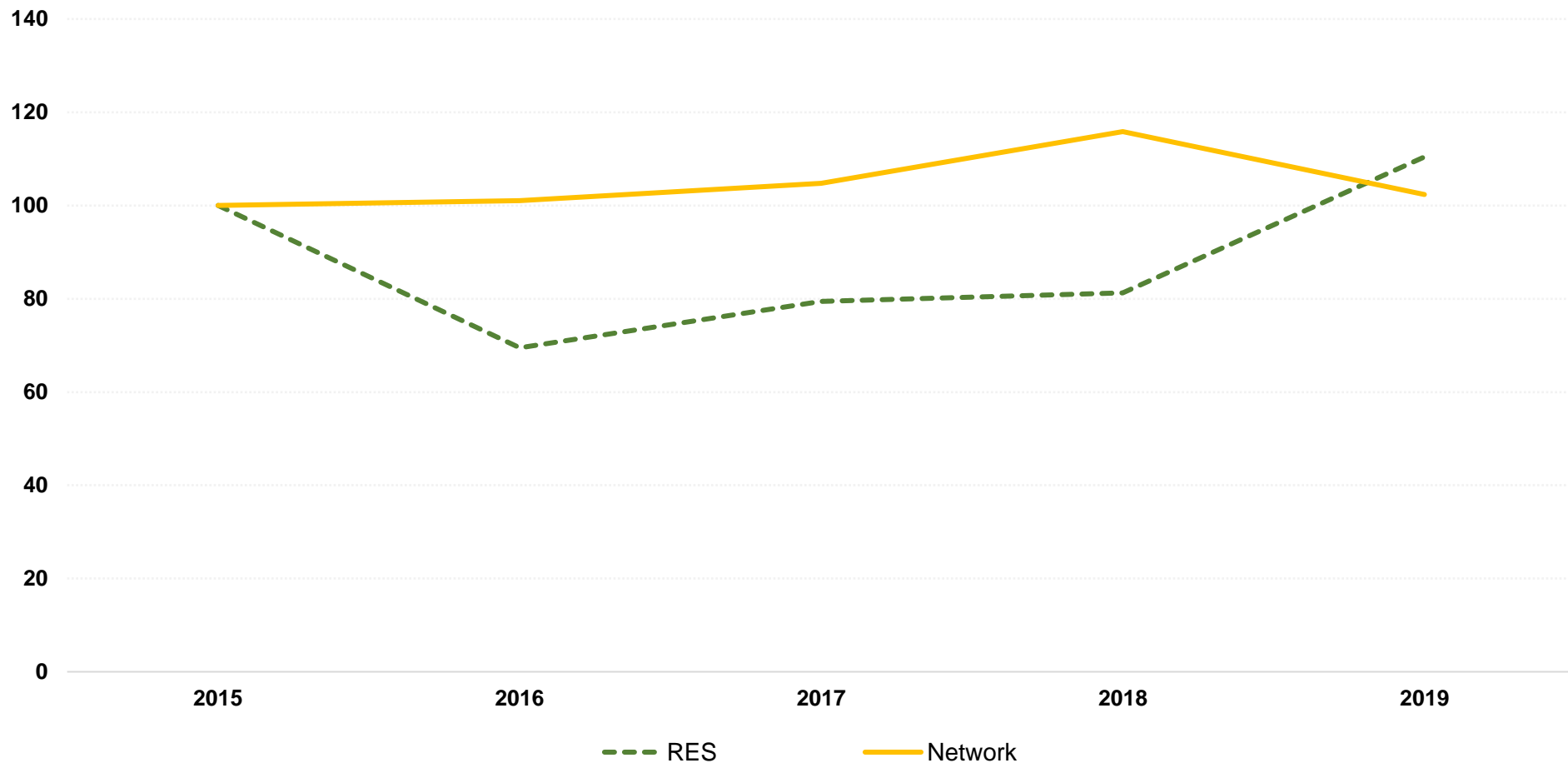
Leading utilities have focused on their network investments, or other generation investments (nuclear, gas, coal)

Yearly capital expenditure on PPE in RES and networks in Europe by the EU20 RPI



After a few years of lower renewable investments by the EU20 RPI, these are finally picking up

Indexed Evolution of Capital Expenditure in RES and Networks in Europe by the EU20 RPI



Sources: Company Annual Reports & Financial Statement/Authors' Calculations

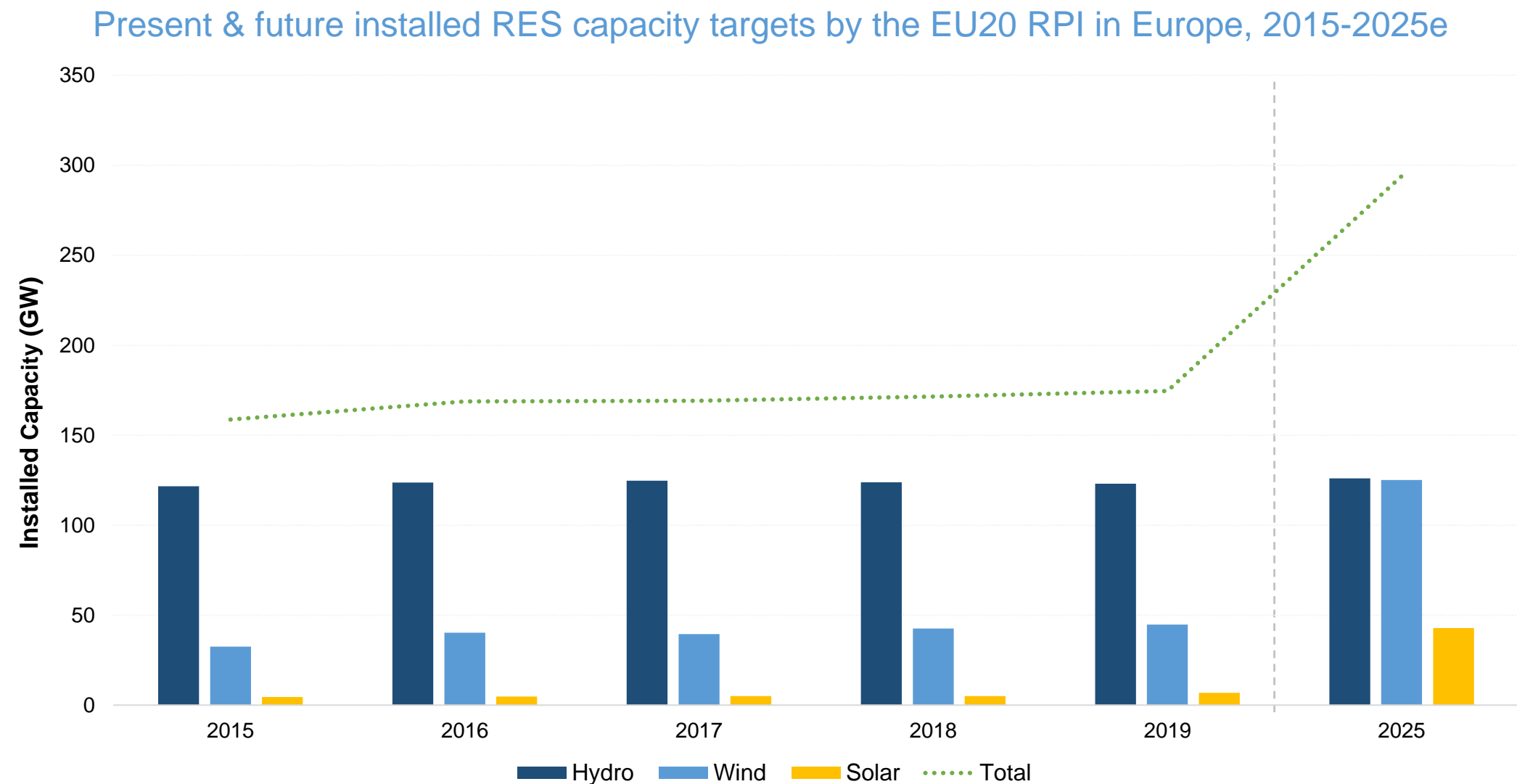
First takeaways, period 2015-2019: despite their size, utilities played a marginal role in the European renewable energy investments

- Overall, RES installed capacity in Europe has increased by 132 GW over this period. Yet only, 20GW of the newly added RES capacity is owned by the EU20 RPI.
- Europe added a total of 68 GW of wind of which 12 GW belongs to the EU20 RPI.
- Over the same period, European solar capacity increased by 55 GW of which the EU20 RPI owns only 1,5 GW.
- Biomass and hydro capacity has remained relatively stable, with a null increase in biomass and a respectable 9GW of additional hydro capacity in Europe of which 2 GW is owned by the EU20 RPI.
- Capital expenditure in networks have remained relatively stable across the 2015-2019. Yet, more RES penetration will trigger more investment needs.

The capex and competences required for wind as opposed to solar may explain the dominance of the utilities in wind technology as opposed to solar. Yet, these utilities have installed solar capacities for other actors including private citizens, farms and businesses.

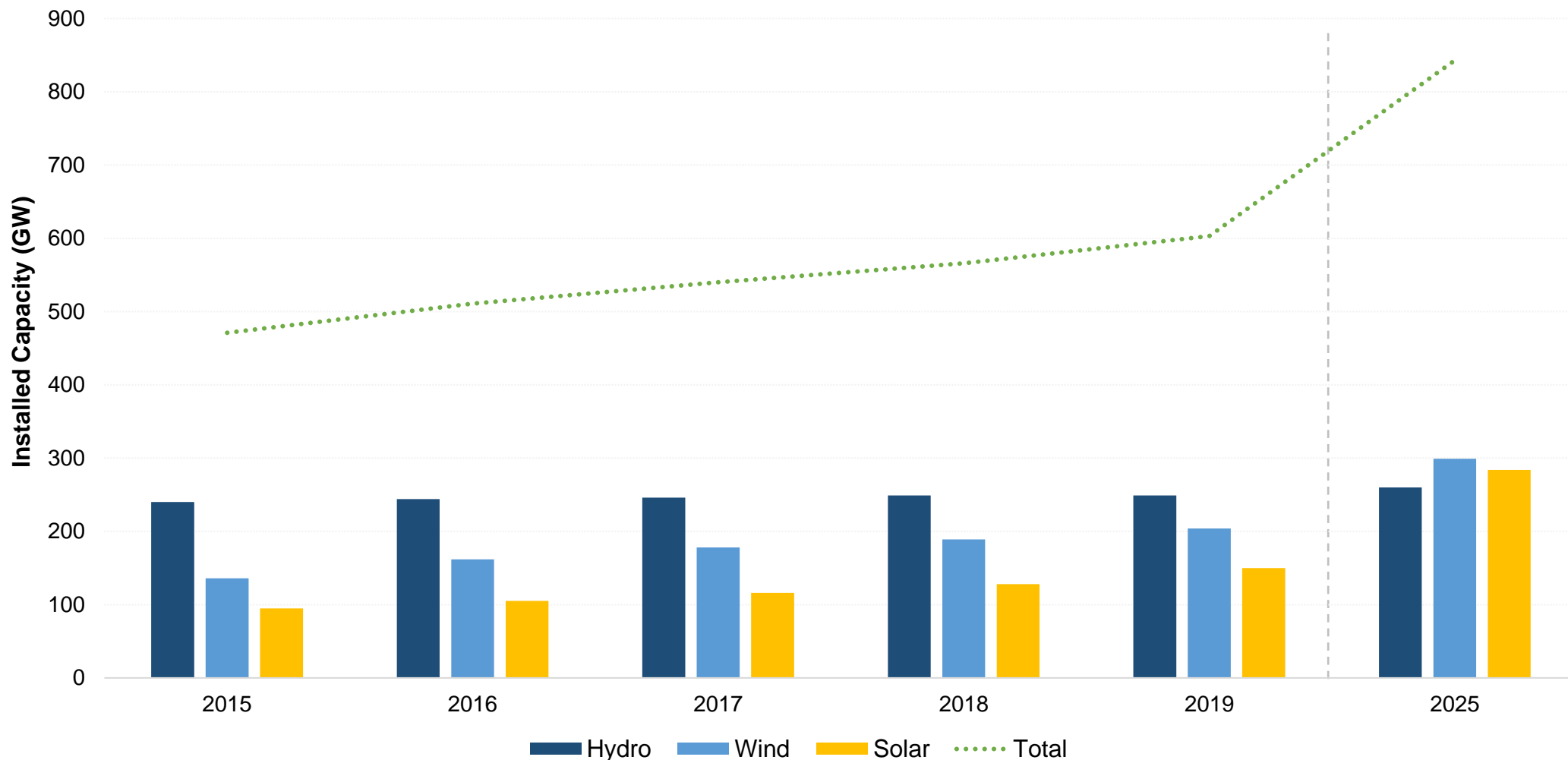
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Renewable energy targets by the EU20 RPI by 2025: sharp acceleration of investments into solar and wind by a factor of up to 5



Driven by strong growth in wind and solar, RES are targeted to increase by 230 GW by 2025, two times more than during 2015-2019

Present & future total installed RES capacity in Europe

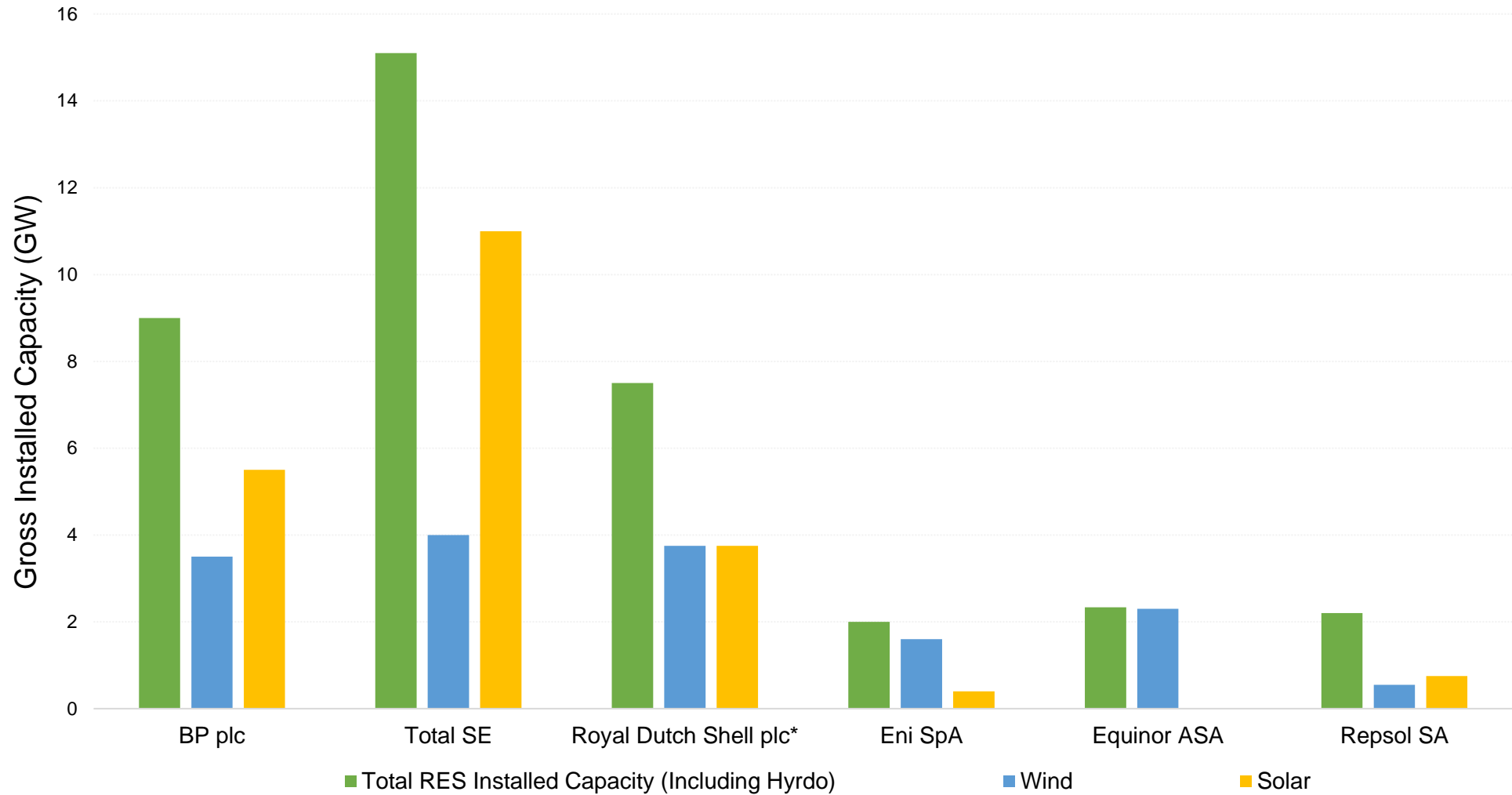


EU20 RPI plan to boost wind investments

- Capital expenditure by the EU20 RPI into renewables has remained below 2015 level until 2019, which marked a strong surge in capital expenditure tied to RES projects.
- A boost in RES investments is expected to happen in the coming years:
 - **By 2025, the EU20 RPI's total wind capacity matches that of hydro (c.125 GW).**
 - An expected ten-fold increase in solar capacity by these groups which will reach 39 GW in 2025.
 - By 2025, total RES capacity by the EU20 RPI will have almost doubled from 175GW in 2019 to 294 GW.
- Provided investments are in line with company announcements, the EU20 RPI will increase its market share in RES by circa 7% reaching 35% of total RES installed capacity in Europe by 2025.
- These companies will also maintain their dominance in hydro and increase their share in wind from 1/3 of installed capacity today to circa ½ in 2025.

Beware the elephant in the room: here come the O&G majors

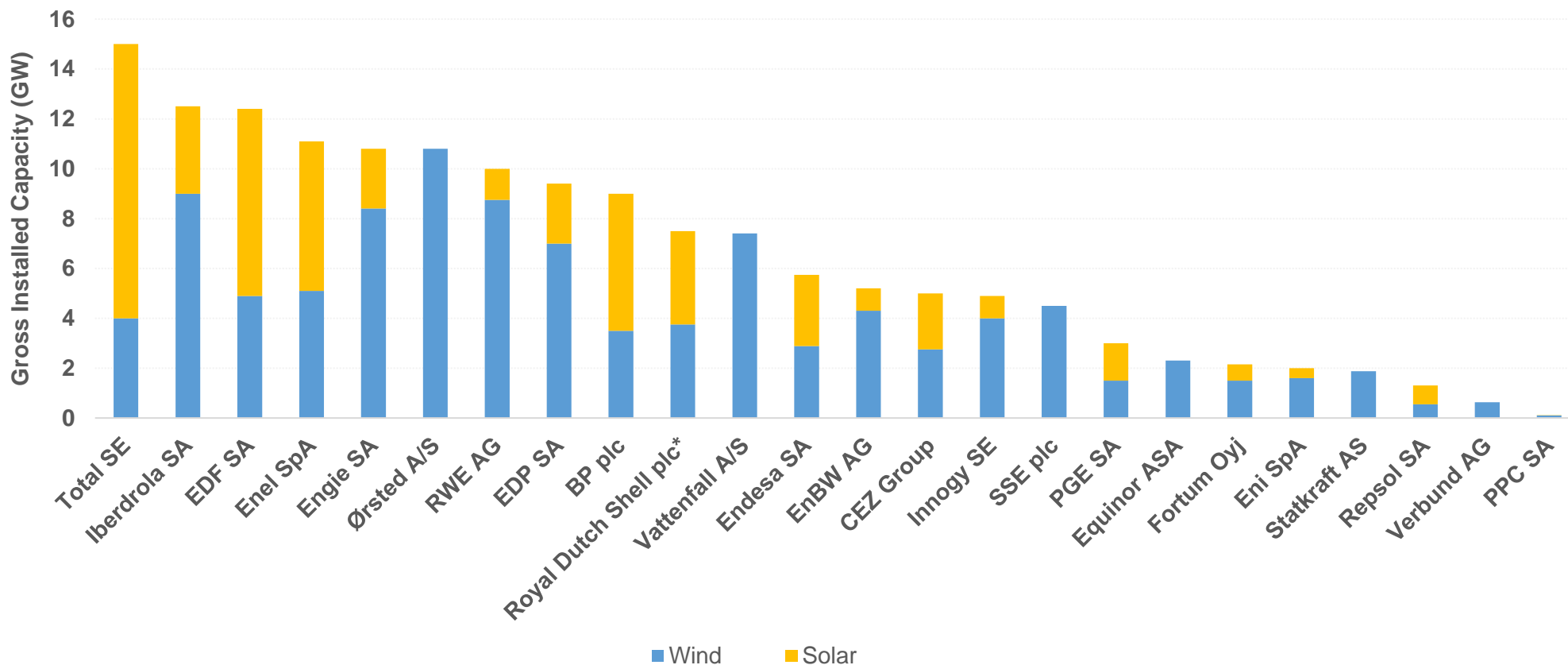
Total Installed Capacity by RES in Europe by 2025 by the European O&G Majors



*Figures for Shell are estimates as the company has no specific RES target
Sources: Company Annual Reports & Presentations, Authors' Calculations

Oil and gas major will represent 1/3 of total RES investments by the EU20 RPI by 2025

Utilities vs. O&G majors: planned installed wind & solar capacity additions, 2020-2025



Sources: Company Annual Reports & Presentations/IFRI Estimates

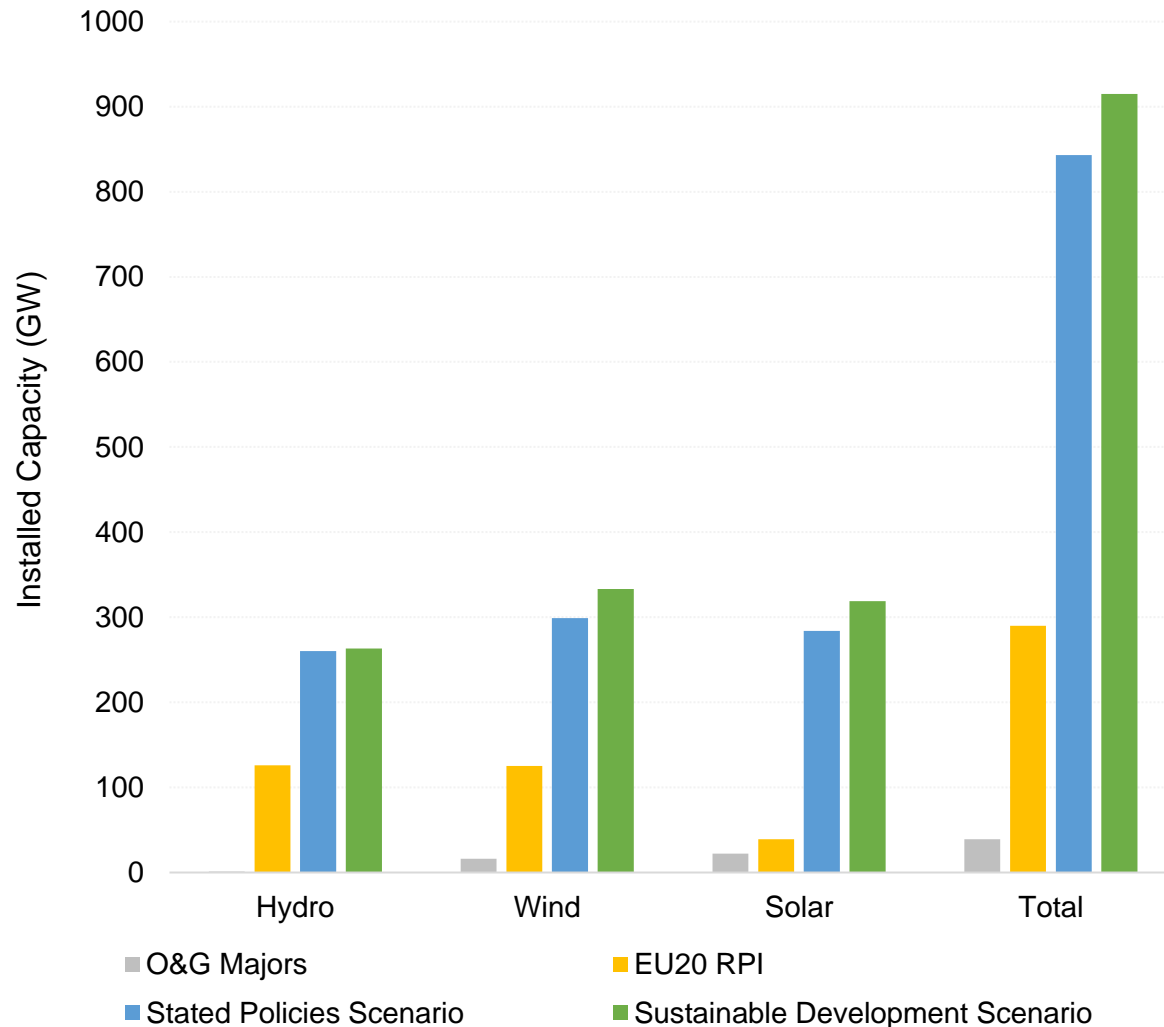
Figures listed above consider the projected added (gross) installed capacity in solar and wind for both the EU20 RPI and the European O&G majors by 2025 in Europe.

*Shell's RES targets have been extrapolated due to the absence of any such target compared to the other European O&G majors.

EU20 RPI are planning to add 120 GW RES from 2020 to 2025, almost equivalent to the total added capacity in 2015-2019 in Europe

O&G majors make an important contribution, utilities too, yet the bulk of investments will have to come from other players

Total Installed RES Capacity by 2025 in Europe



Facts & Figures for a Carbon Neutral Europe in the IEA view

- SDS represents a trajectory in RES capacity for Europe to reach carbon neutrality in power generation.
- Gap of 70 GW in power generation between the SPS and the SDS by 2025.
- As per the SDS, to reach carbon neutrality in Europe:

- Hydro Capacity of 273 GW in 2040
- Wind Capacity of 655 GW in 2040
- Solar Capacity of 637 GW in 2040
- = Total Capacity of 1565 GW in 2040

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A dramatic shift in RES investment is underway, with 20 GW/y planned by the EU20 RPI and 5GW/y planned by the O&G majors

- **The EU20 RPI is planning to add an approximate 20 GW of additional RES capacity every year in Europe between 2020 and 2025.** Note that they deployed a total of only 20 GW in RES between 2015-2019. This represents a dramatic shift and would mean increasing total RES installed capacity by a cumulative 120 GW in the space of six years.
- The EU20 RPI companies are aiming to increase their market share across all RES: notably tripling their installed wind capacity from 45 GW to 125 GW by 2025 (thus representing circa 1/2 of wind capacity in Europe up from c. 1/4 in 2019). Solar will grow too, from 3 GW in 2019 to 39 GW in 2025 thus representing approximately 28% of total solar capacity in Europe by 2025 compared to a marginal 3% in 2019.
- **By 2025, the six O&G companies will account for circa 38 GW of RES installed capacity (5x increase compared to 2019)** from current 7.5 GW. Note that compared to the groups of the EU20 RPI, solar is central to the O&G companies' RES strategies, but also offshore wind.
- Some of the O&G majors are pursuing even more ambitious strategies at a global level. E.g. Total plans to have 35GW of installed RES capacity by 2025 and BP is betting on 50GW by 2030.
- Total, BP and Shell will rival the top European utilities in added installed capacity for RES by 2025.

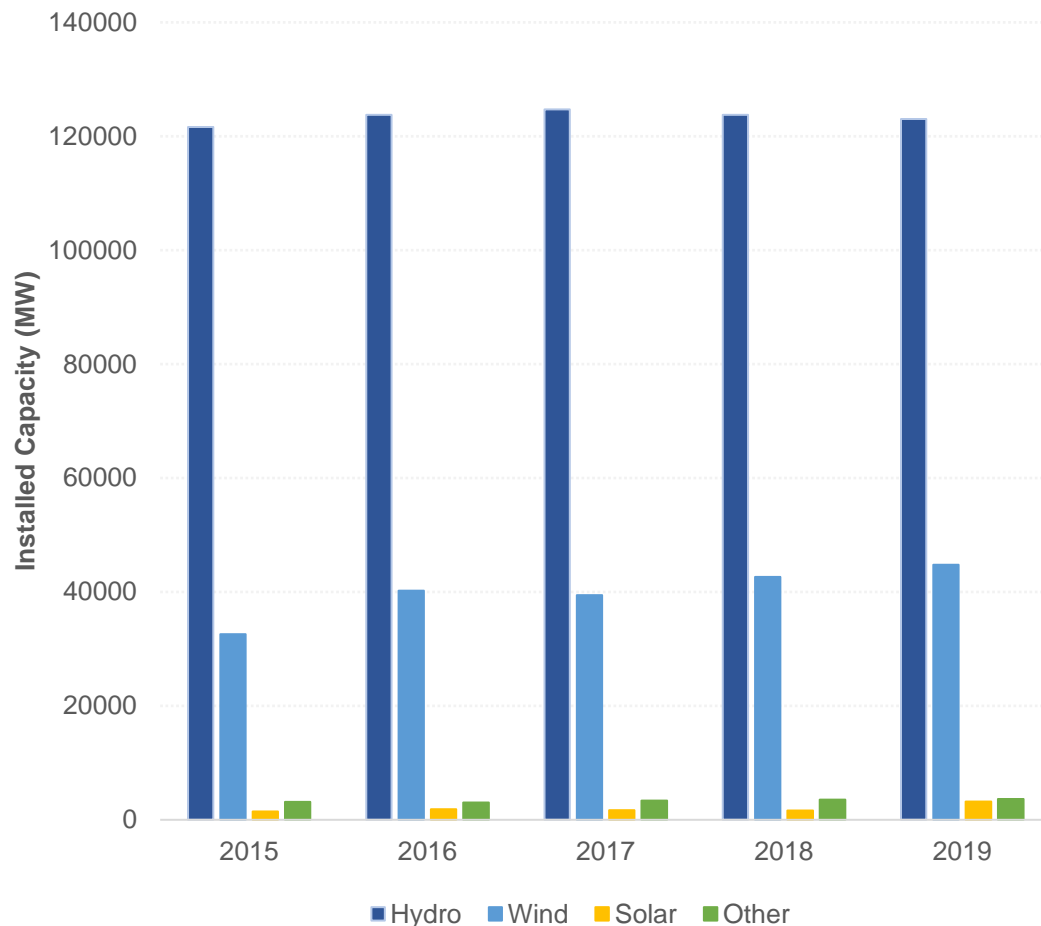
Oil & gas major make a much-needed boost, but more is needed to be on track for the new -55% objective by 2030

- The European O&G majors are still relatively minor players in RES. However, this situation will likely change as by 2025, **the total capacity installed in RES in Europe by these players could reach 38 GW** (+30GW in six years), which will also foster competition.
- **When compared with the IEA SDS scenario, capacity additions that are planned by EU20 RPI and O&G majors are compatible with the levels required for Europe to reach -55% by 2030. Yet, the following conditions have to be met:**
 - Governments provide public support & enabling regulation, there is consensus and certainty over the new 2030 target
 - Despite the covid19 pandemic, the EU20 RPI and O&G majors are still able and willing to pursue these objectives
 - EU20 RPI and O&G majors meet deployment needs with net capacity additions, not M&A.
 - The EU20 RPI and O&G majors represent just over half of the total capacity additions needed. Hence why it is adamant that the other players ramp up their investments too.
- Investments in network technologies will have to pick up the pace in order to deal with the increasing influx of RES in a bid to guarantee grid resilience and stability. Indeed grid investments have not increased over said period despite greater RES deployment.

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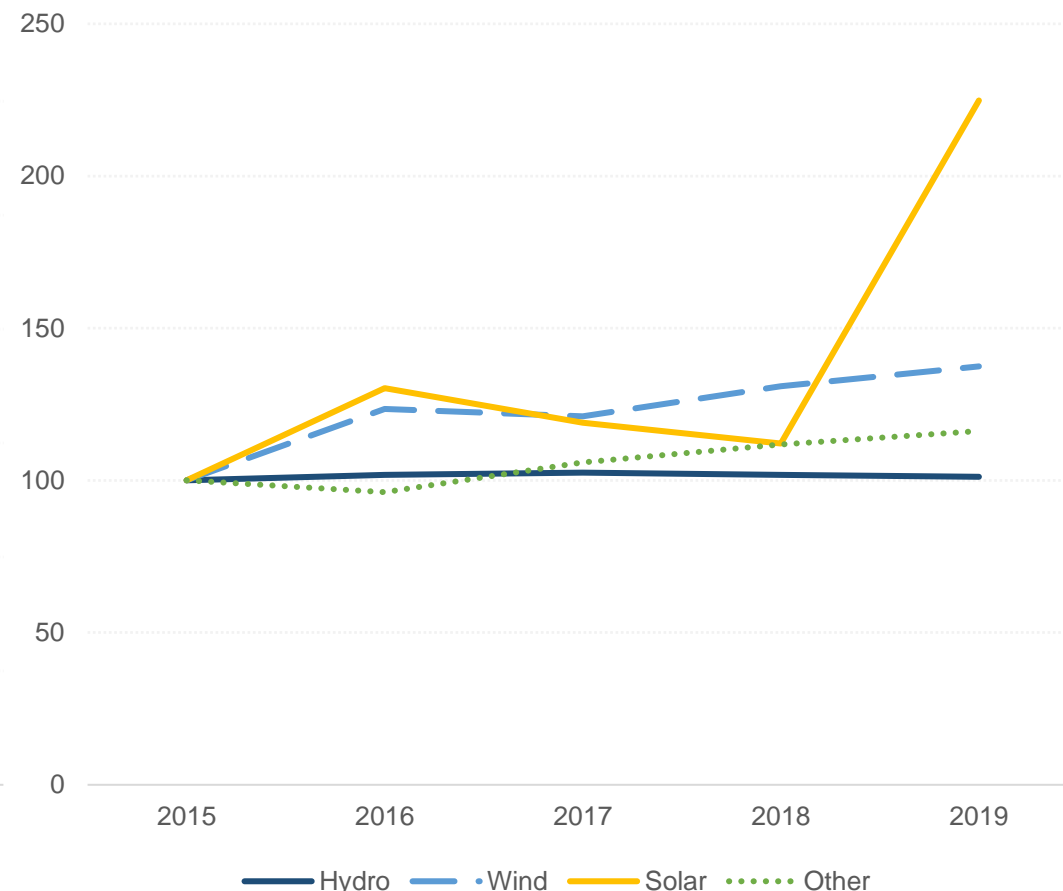
Annex 1. Monitoring the evolution of the EU20 RPI portfolio of RES since the Paris Agreement (2015-2019): slow change at first

EU20 RPI: Installed capacity by RES in Europe



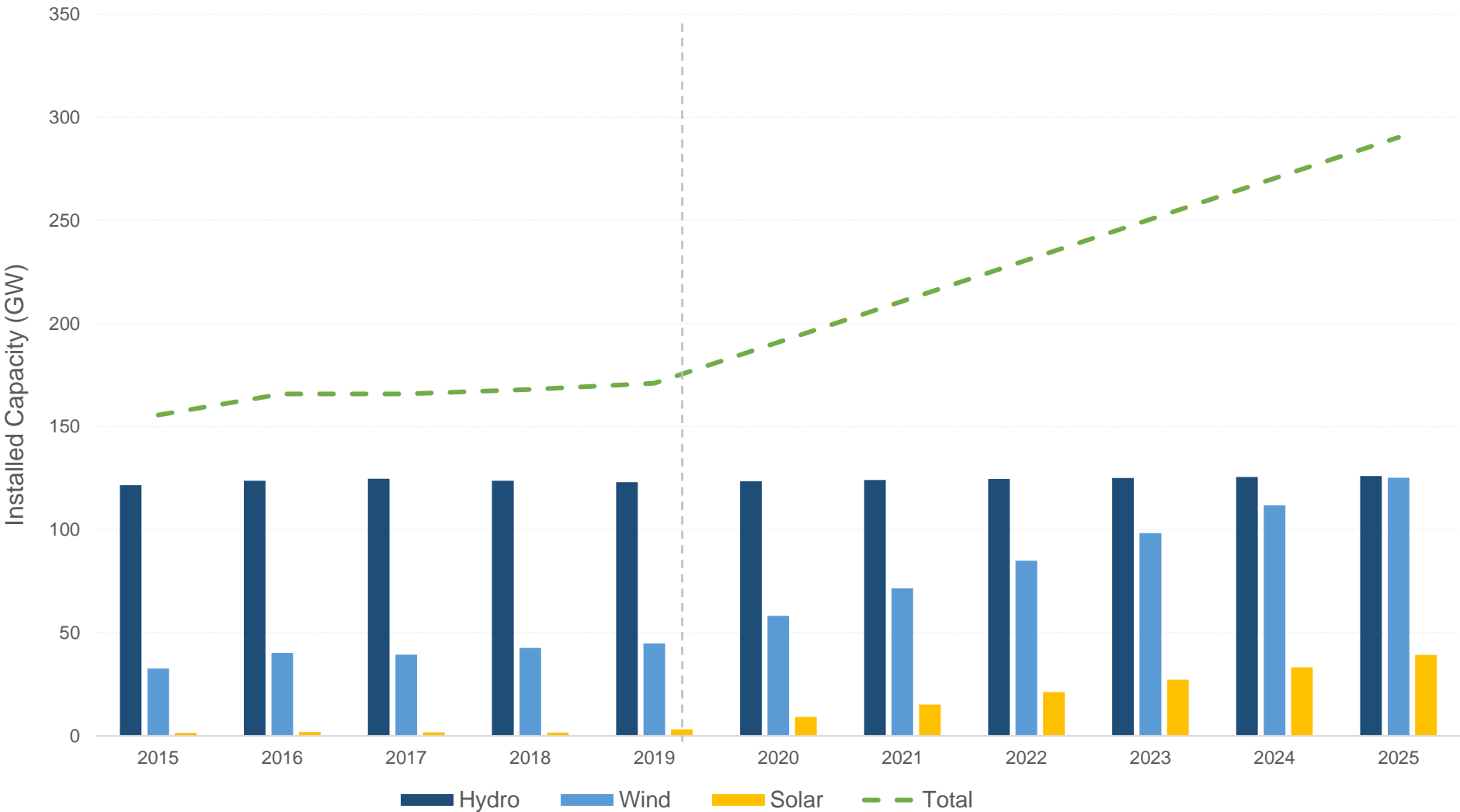
Sources: Company Annual Reports & Presentations/Authors Calculations

EU20 RPI: Indexed evolution of installed capacity by RES in Europe



Sources: Company Annual Reports & Presentations/Authors Calculations

Annex 2. Timeline of EU20 RPI RES Installed Capacity

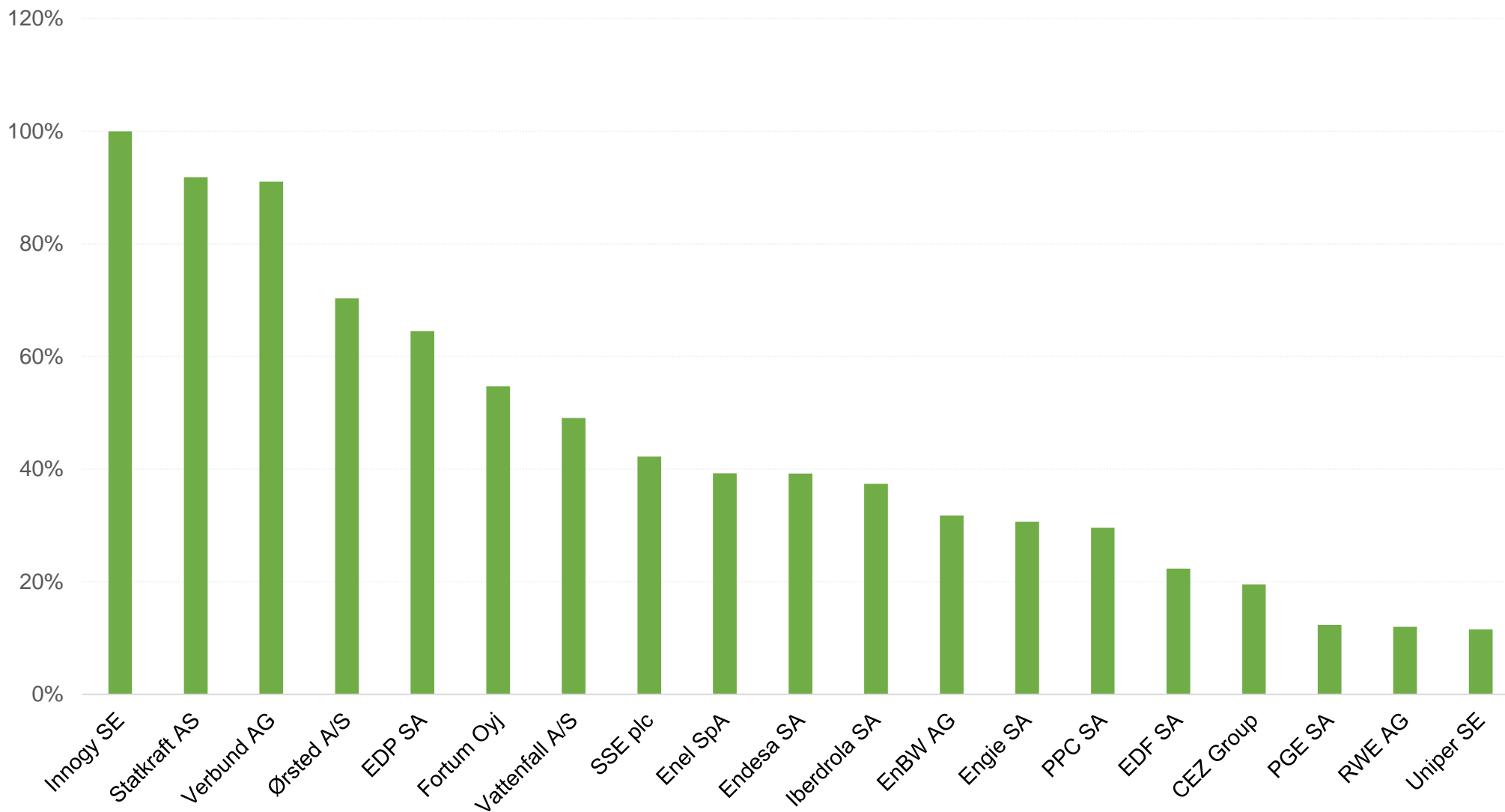


Sources: Company Annual Reports & Presentations, Authors' Calculations

N.B. This graph only considers power generation capacity and not heat generation.
 N.B. Figures of 2015-2019 deal with net installed capacity but 2019-2025 deals in gross installed capacity

Annex 3: EU20RPI share of RES in total capacity

% of RES in total net capacity in 2019 by the EU20 RPI in Europe



Annex 4: Added Installed Capacity 2015-2019 vs. 2019-2025

Installed Capacity Additions in Europe

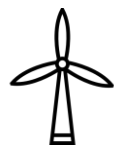
2015-2019 versus 2019-2025

+9 GW



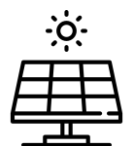
+11 GW

+68 GW



+95 GW

+55 GW



+134GW

+132 GW



+240GW

Hydro

Wind

Solar

Total

Installed Capacity Additions in Europe by the EU20 RPI

2015-2019 versus 2019-2025

+2 GW



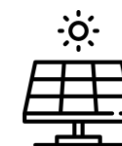
+3 GW

+12 GW



+80 GW

+1,5 GW



+36GW

+15,5 GW



+119GW

Annex 5. Methodology

EU20 RPI Installed RES Capacity Figures

- Installed RES Capacity accounts for power generation capacity and does not include heat generation.
- Installed RES Capacity for each company was based on the net consolidation of their asset capacity according to their ownership share.
- Installed RES Capacity for each company takes into account assets located in Europe, as such countries like the Balkan states, Norway and the United Kingdom. Moreover, due to the geographical segmentation of certain group's renewable energy asset breakdown (e.g. EnBW and Statkraft), a small number of RES assets located in Turkey may be included (these remain marginal however).

EU20 RPI Installed RES Capacity: Future Targets & Objectives

- Installed RES Capacity Targets & Objectives are based on the figures announced by the respective company's in their strategic investment planes or annual reports between 2018 and 2020.
- Given the difference in timelines between each company's respective strategy, targets are brought down to an annual basis in according to make the figures comparable.
- Due to the absence or lack of clarity in the investment strategies of certain companies in terms of future RES objectives, these have been extrapolated by calculating the average annual installed RES capacity by all members of the EU20 RPI and applying a specific coefficient representing how much said company accounts in terms of installed RES capacity in 2019.

EU20 RPI Investment & Capex Figures

- EU20 RPI figures on capital expenditures have been extrapolated from each company's annual report and cash flow statement.
- For certain companies, the capital expenditure breakdown in terms of business unit is done only at a global level. As such, capex on RES at a European level is obtained by multiplying the total RES capex by the percentage of total RES capacity located in Europe.
- For network level capex these consider only grid level investment. As in the case of RES capex, the breakdown for network capex may only be available at a global level as such, to obtain network capex at a European level, total capex is multiplied by the percentage of revenues originating in Europe.

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