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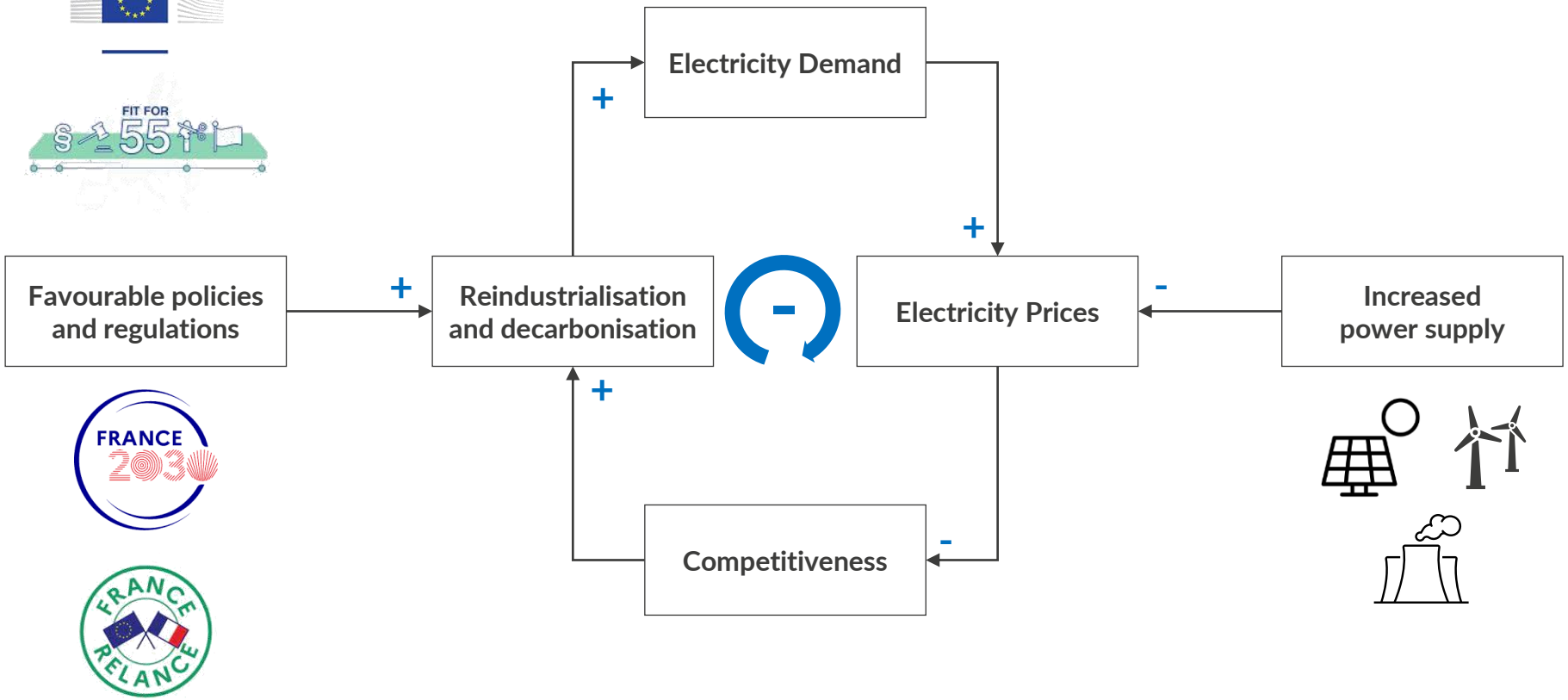
Boosting France renewables growth: CFDs vs PPAs

September 2023

To decarbonise and reindustrialise, power supply needs to increase to counter the negative feedback loop of power demand and prices



1) RTE Comprendre et piloter l'electrification d'ici 2035

Under the current government, strong emphasis has been put on achieving the double objective of reindustrialisation and decarbonisation (mostly through electrification of energy end uses).

This objective is supported by national (France 2030 strategy, Loi Industrie verte) and EU policies (e.g. H2 support schemes, carbon border adjustment mechanism).

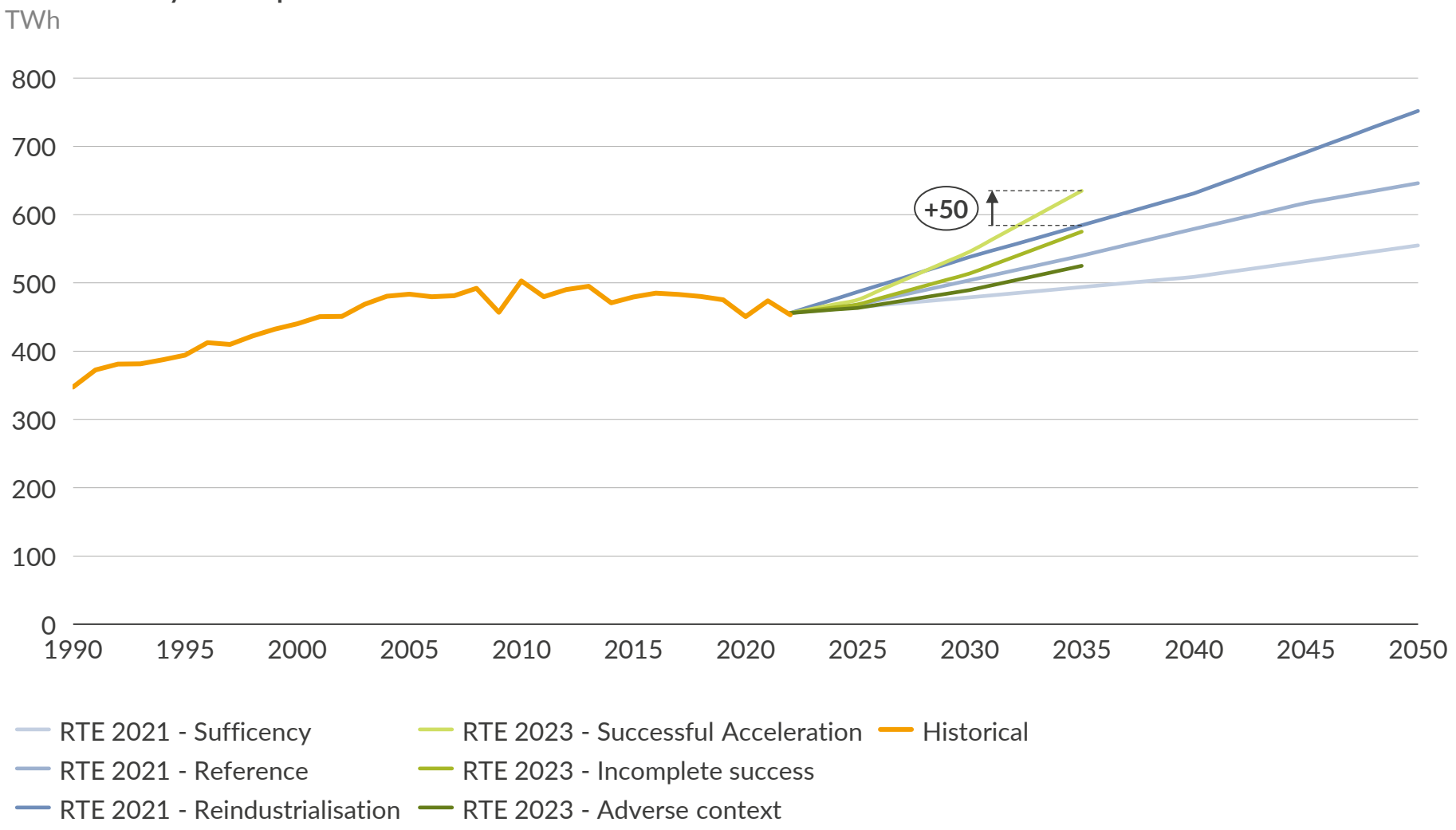
Consequently, numerous industrial projects are being developed (e.g. H2 electrolysers, green steel factories, gigafactories).

Completion of those projects, as well as vehicle fleet electrification, would lead to a significant increase in power demand, as recently modelled by RTE[1].

Increased power consumption results in a negative demand > prices > competitiveness loop which can only be countered by increased power supply.

RTE's latest scenarios are significantly higher than those published in 2021, even assuming Fit for 55 targets are not met

Total electricity consumption scenarios in France until 2050



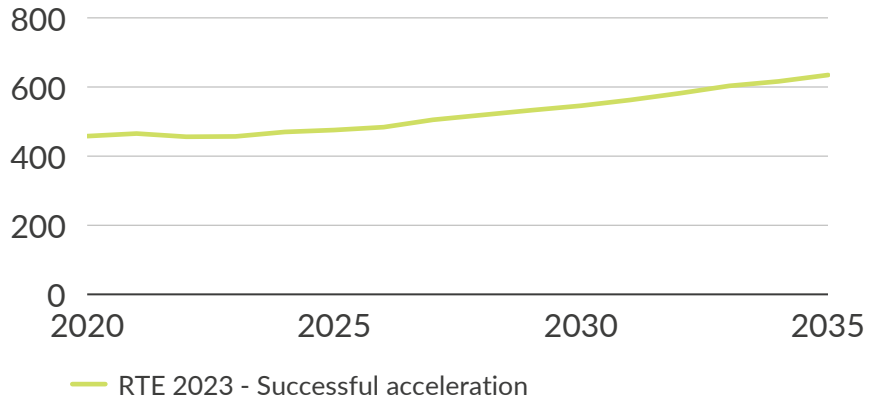
- RTE 2023 low, central and high scenarios are respectively 6% (+29 TWh), 6% (+35 TWh) and 9% (+50 TWh) higher in 2035 compared to its 2021 scenarios
- These differences are driven by:
  - EU Fit for 55 package revised targets, resulting in a quicker pace of electrification
  - The acceleration of France's reindustrialisation program, resulting in increased industrial demand
  - Lower than expected availability of biomass, reinforcing the need for electrification
  - The acceleration of the electrification of the transport sector
  - The acceleration of electric heating deployment

Sources: Aurora Energy Research, RTE, IEA

Against RTE 2021 and 2023 reference scenarios, we modelled the impact on power prices of three renewables deployment scenarios

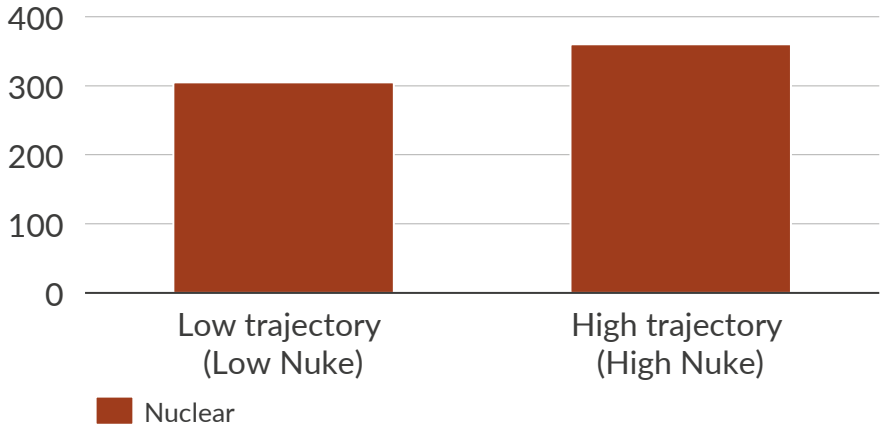
RTE demand scenario

TWh



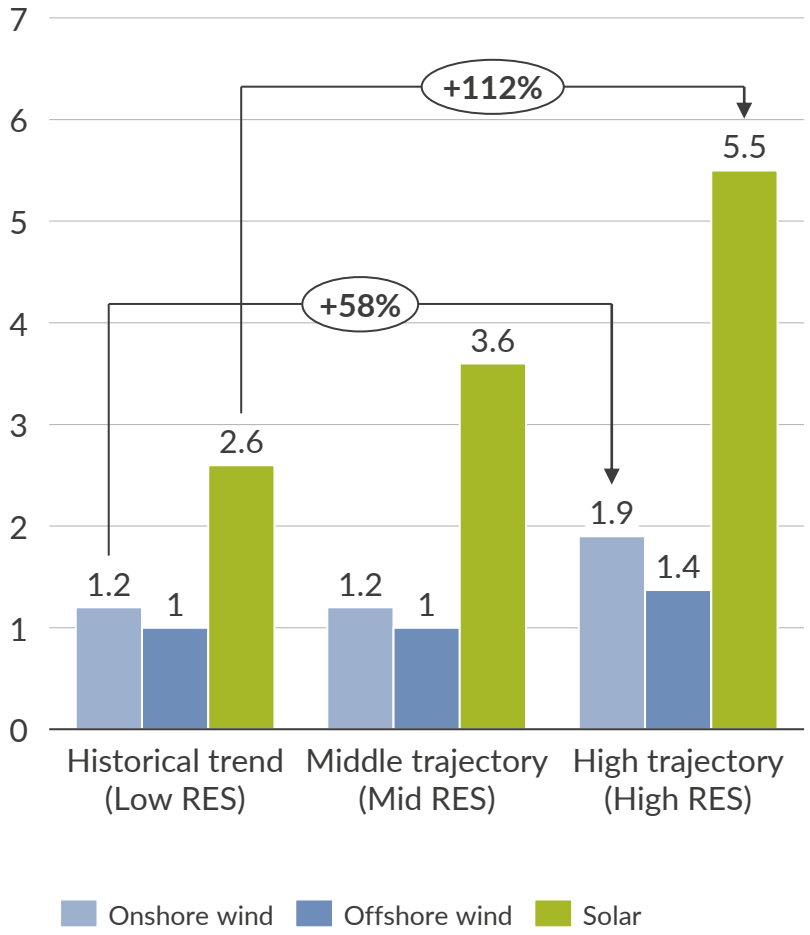
Different nuclear scenarios

Nuclear production in 2035 (TWh)



Different RES growth trends[1]

Total installed capacity (GW/year)



1) For offshore wind, due to long development delays, the trajectory until 2035 is already fixed, with an installed capacity reaching 12 GW in 2035.

Sources; Aurora Energy Research, RTE

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We test the scenario reflecting a significant reindustrialisation:

- **RTE 2023 Successful acceleration scenario**

Three scenarios are tested to identify the effects of the RES build out pace on the baseload price:

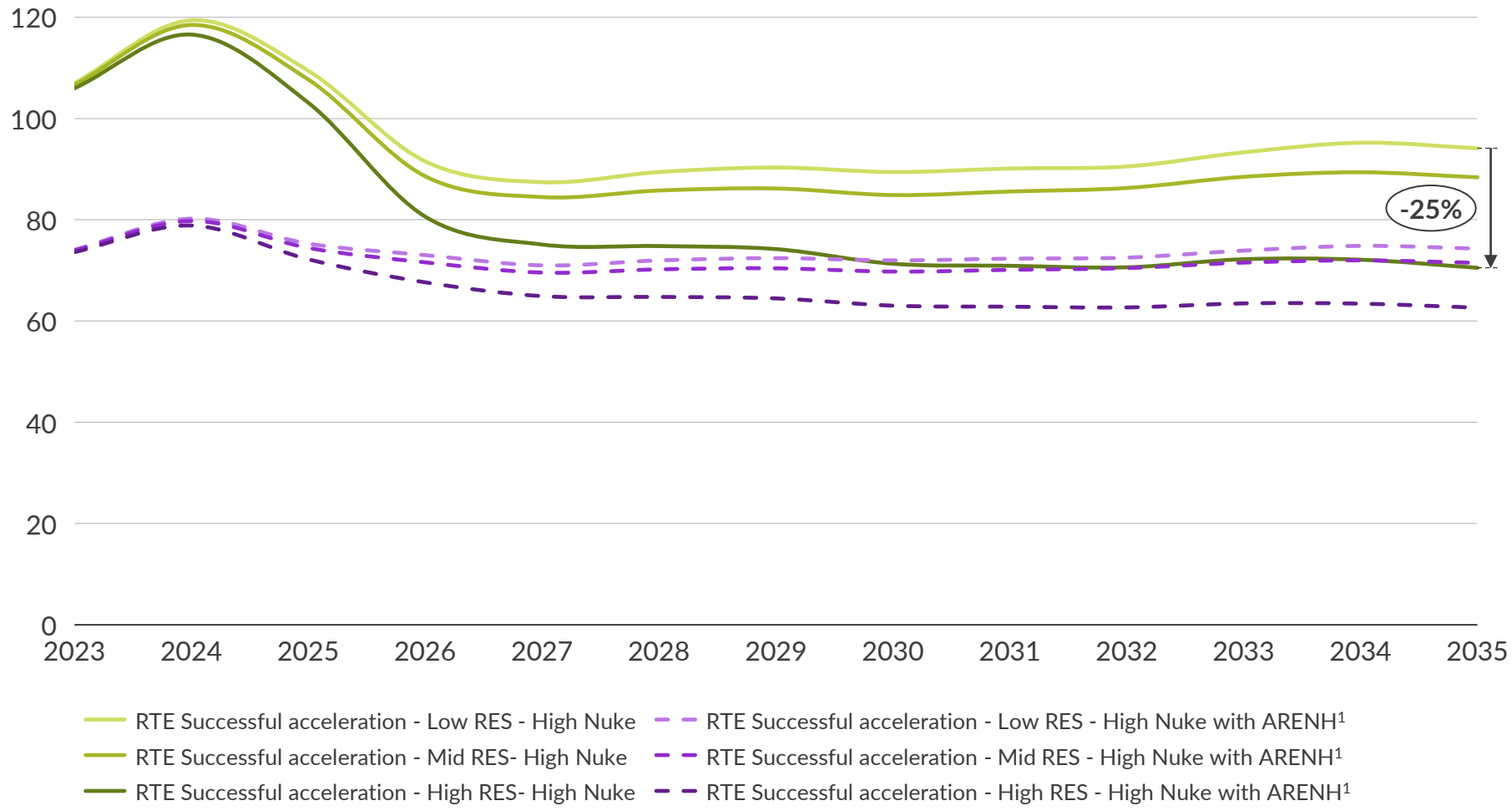
- **Low RES** corresponds to a continuation of the current pace of development on the same pace as 2022
- **Mid RES** corresponds to the lower bound of the Secretariat for planification energy target
- **High RES** corresponds to the upper bound of the Secretariat for planification energy target

We also study the impact of nuclear capacity, with two scenarios:

- **Low Nuke:** 305 TWh in 2035
- **High Nuke:** 360 TWh in 2035

The combination of an accelerated renewables built out and a high nuclear availability would guarantee stable and reasonable prices

Electricity price (energy part) for a baseload industrial consumer in France
€/MWh (real 2022)



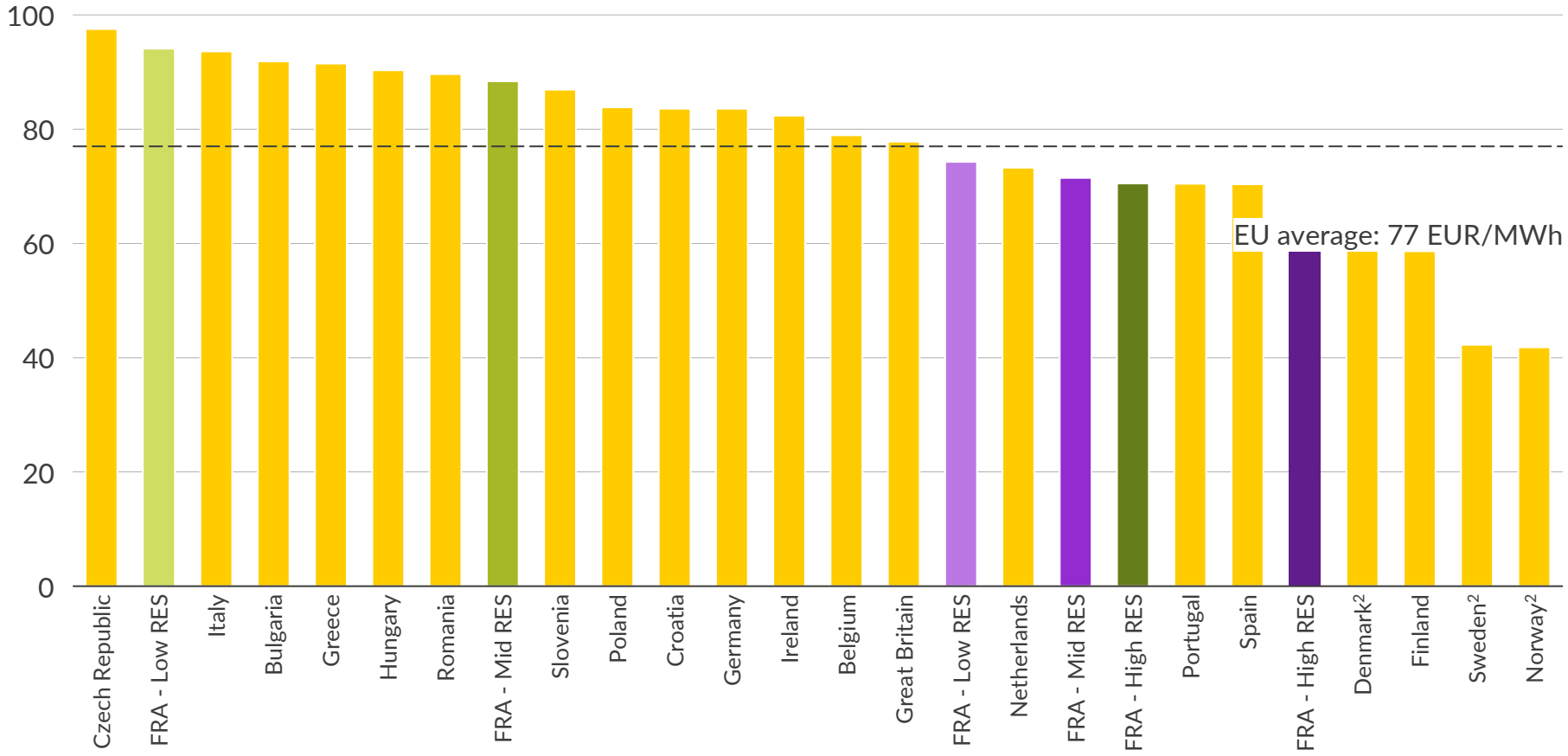
- A nuclear capacity remaining at its present level stabilises prices under 100 €/MWh.
- A fast pace for renewable build out results in a price below 80 €/MWh in 2035, 25 % lower than the low RES trajectory
- The high RES trajectory would guarantee prices similar to the ones obtained with an ARENH-like mechanism

1) Considering that the ARENH covers 75% of the consumption of an industrial consumer, with a capping rate of 30%. We assume a price for ARENH of 42 €/MWh until 2025, then 55 €/MWh, following the last estimation of nuclear production costs by CRE

Sources: Aurora Energy Research, CRE

Even in case of a high nuclear availability, a fast renewable build out is necessary to preserve low prices

Electricity price (energy part) for a baseload industrial consumer in Europe
€/MWh (real 2022)



- As the extension of ARENH is unsure, the main way to mitigate high prices for industrial consumers is to accelerate renewable build out
- If extended, the ARENH mechanism would give bring more competitiveness to industrial consumers

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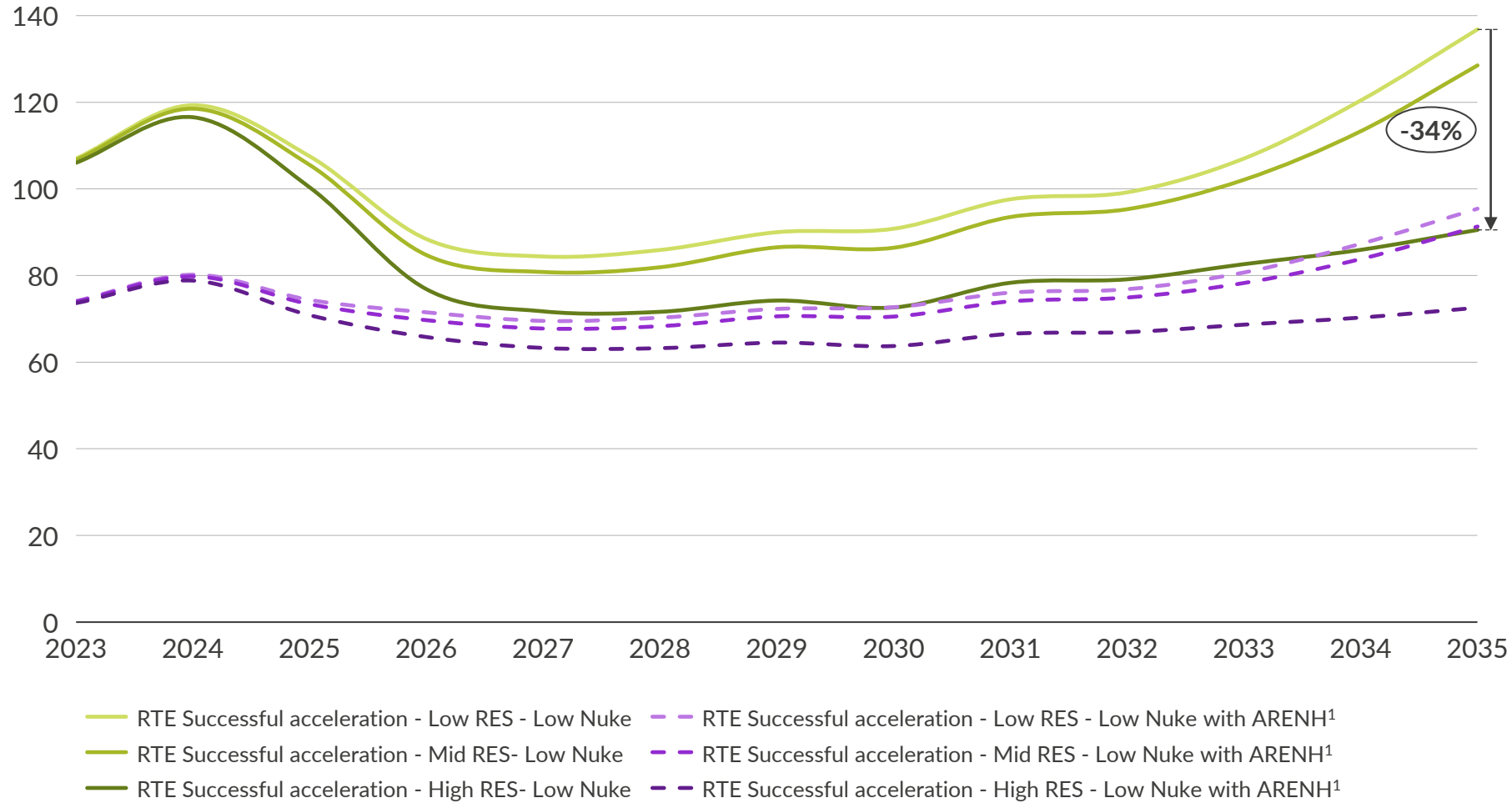
Source: Aurora Energy Research

Under the RTE “Successful acceleration” scenario with low nuclear availability, prices rise even with accelerated renewables buildout

Electricity price (energy part) for a baseload industrial consumer in France
€/MWh (real 2022)



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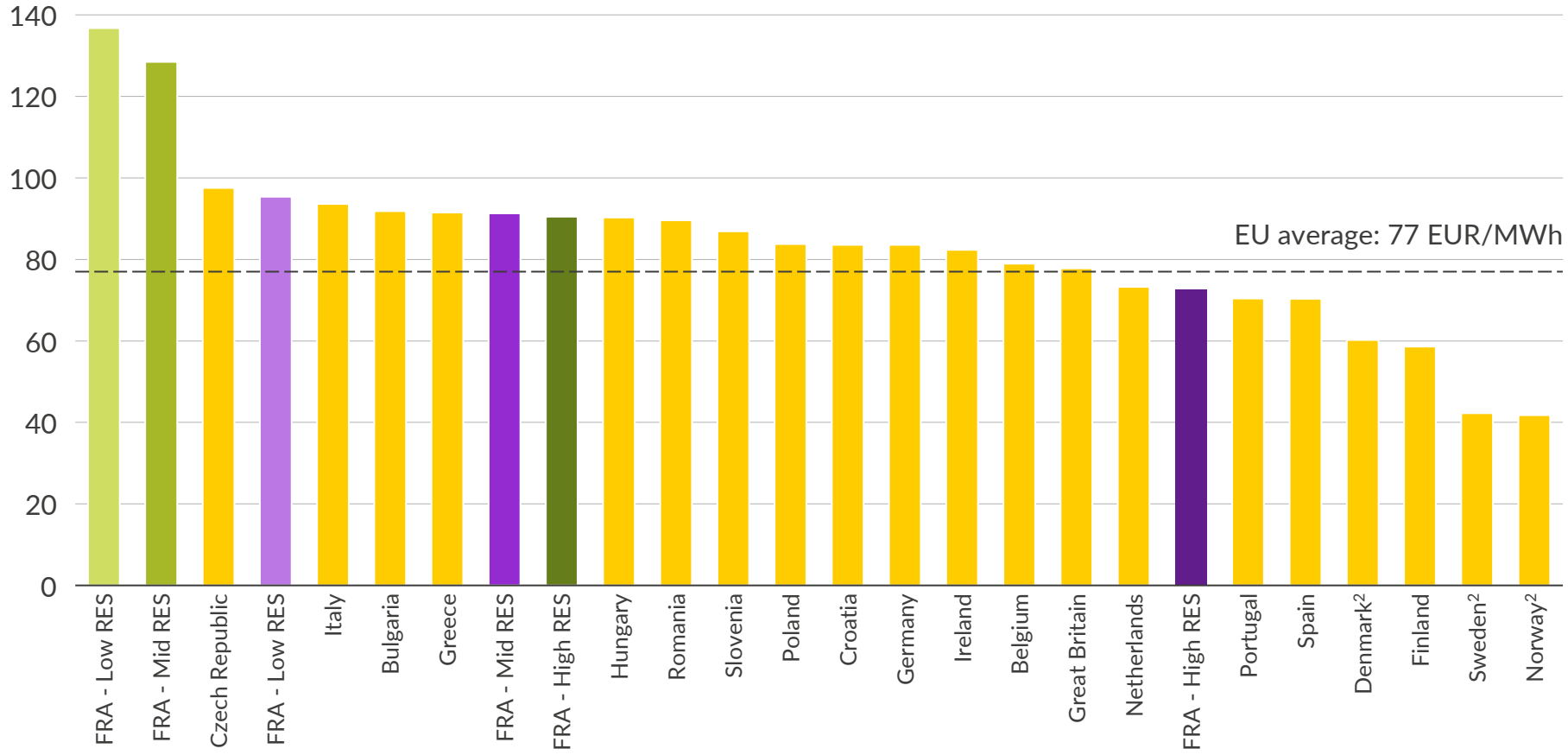
Sources: Aurora Energy Research, CRE

- In all scenarios, price peaks in 2024 then decreases, following commodities price decrease due to reduced dependence on Russian gas
- After a decrease in 2025-2028, prices rise again due to the uncertainty on supply, especially in case of low or medium RES trajectories
- In 2035, the price for high RES trajectory is 34% lower (42 €/MWh) than the low trend scenario.
- In all scenarios, the prices increase would create revenues opportunities for battery (16 GW of battery could be potentially installed in 2035)
- The ARENH mechanism mitigates price volatility

If demand rises quickly with limited nuclear availability, France needs to rapidly increase renewables to stay competitive

Electricity price (energy part) for a baseload industrial consumer in Europe
€/MWh (real 2022)



- Under a successful acceleration scenario with fast reindustrialisation and low nuclear capacity, power prices in France would be higher than every other European country
- Only an ARENH-equivalent mechanism would protect consumers with prices under 95 €/MWh
- An even faster rate of renewables deployment than the high range envisaged by the Secretariat for Planification would be needed to mitigate increase in prices resulting from rapidly increasing demand
- The results already account for the embedded price of CO2 through EU ETS prices

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Source: Aurora Energy Research

Key takeaways

Successful reshoring and reindustrialisation in France will come at the expense of industry power supply competitiveness unless:

- Renewables build out is greatly accelerated by reducing the administrative constraints on project development
- New mechanisms to share the benefits of nuclear generation are put in place to replace ARENH, in favour of large consumers

Complementary measures can be put in place or trialled to further reduce power prices to industrial consumers

- Residential and small commercial consumers could be further incentivised to adopt time-varying tariffs, which would reduce peak prices which greatly contribute to rising electricity prices in a reindustrialisation scenario

Energy consumers should actively manage the risk of increased power prices. They can do so through:

- Local or cross-border Renewable Power Purchase Agreements, directly with developers or through aggregators
- Direct investment in renewable power production and storage assets

Successful reshoring scenarios would directly benefit developers and investors

- Creating higher demand and willingness to pay for corporate PPAs
- Creating demand for additional flexibility in the system to mitigate impact of low capacity margins


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