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ENERGY RESEARCH

The Austrian Power Market: Key Trends and Challenges

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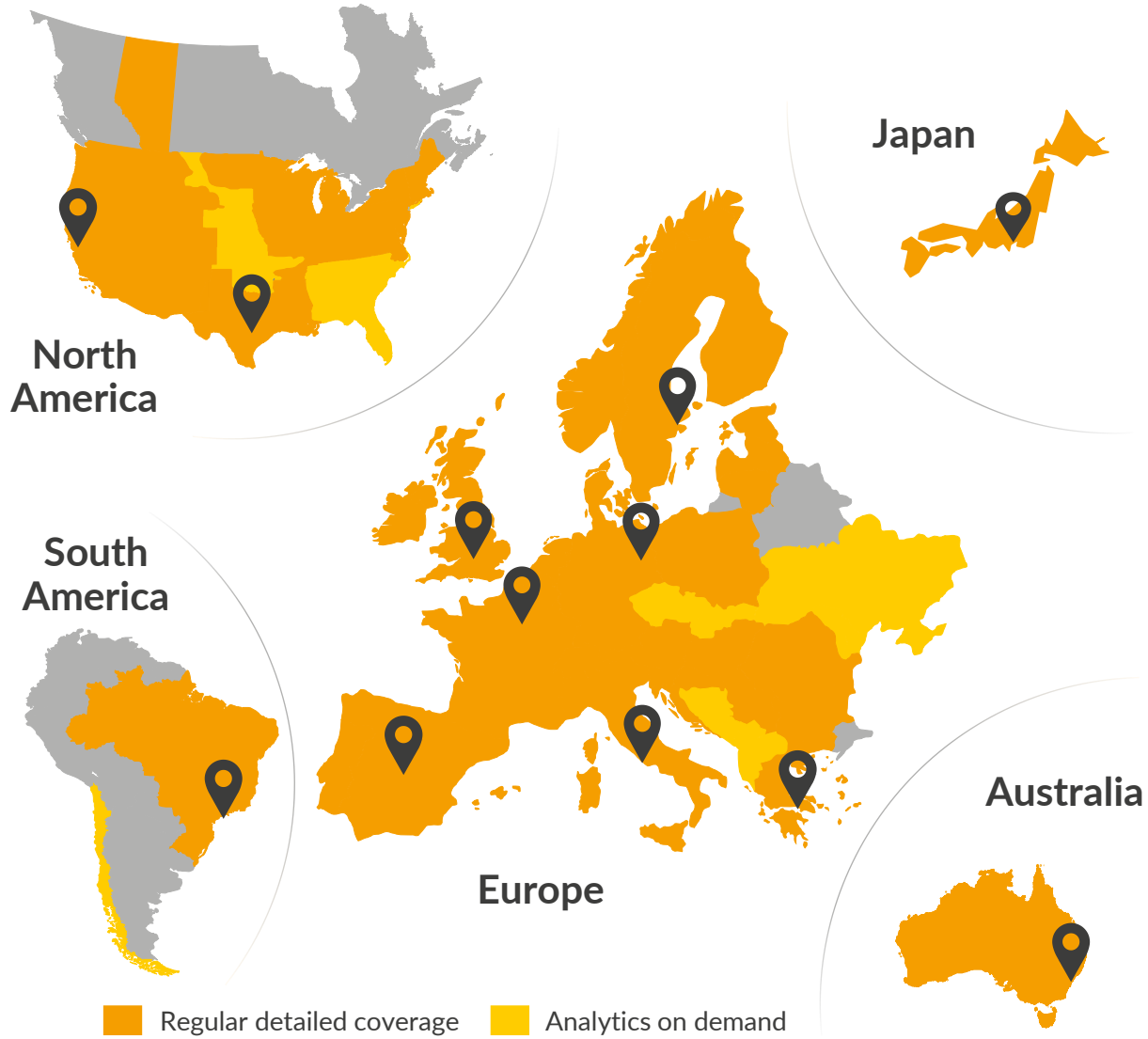

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Source: Aurora Energy Research

Our market leading models underpin a comprehensive range of seamlessly integrated services to best suit your needs

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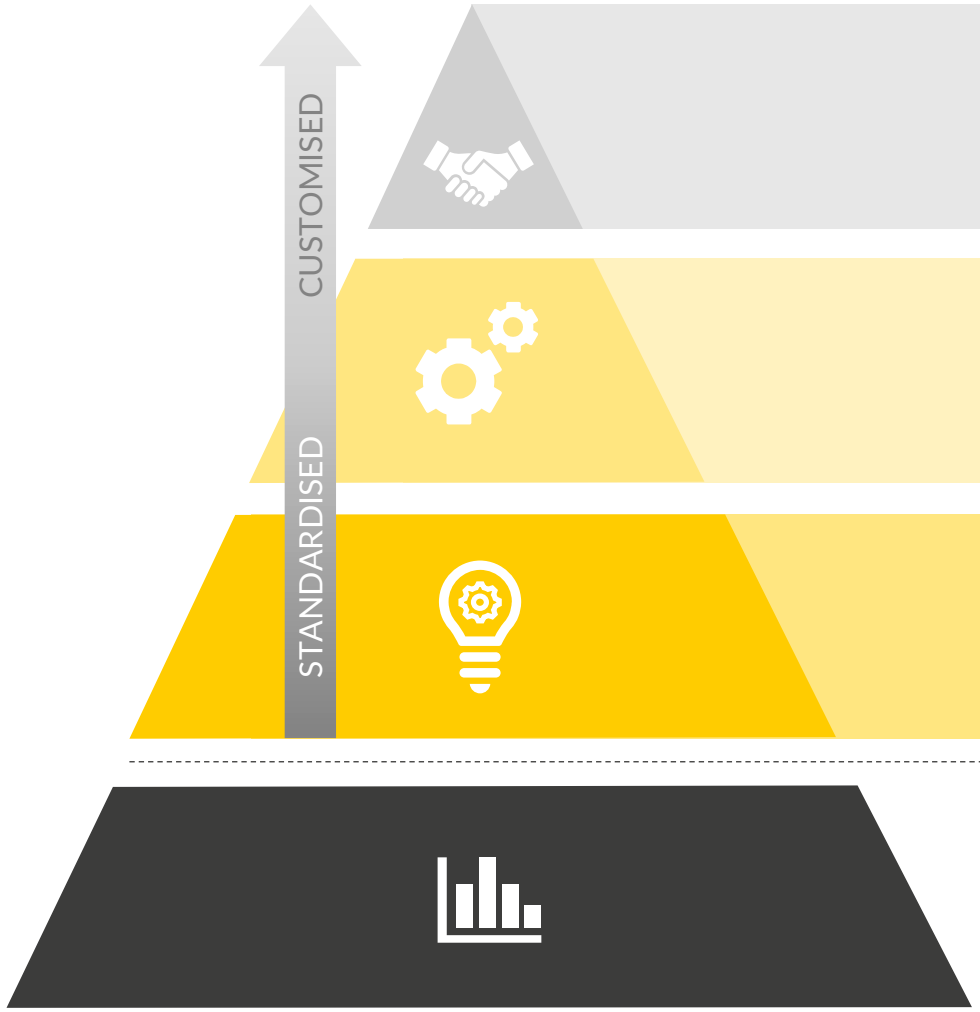

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Developed over 10 years, 40+ dedicated modellers

Source: Aurora Energy Research

Austria's power system is heavily dependent on hydro power, exposing it to seasonal fluctuation in generation and power prices

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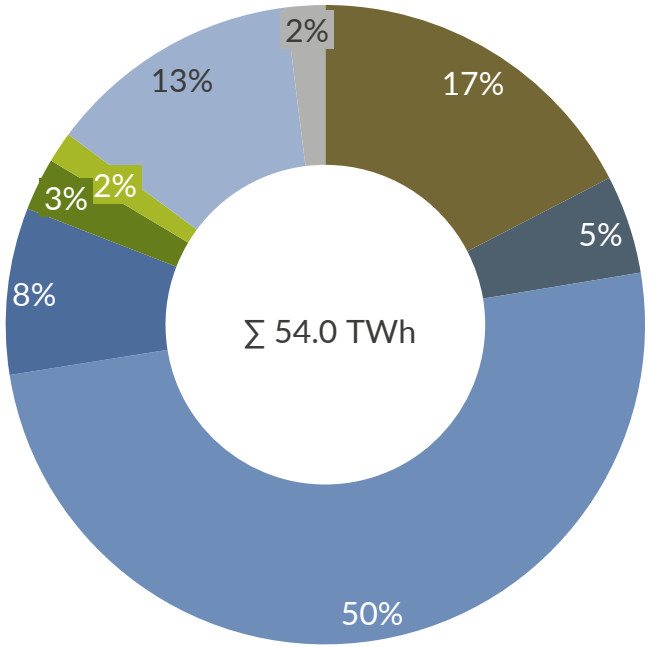
Austrian power generation mix in 2021

%

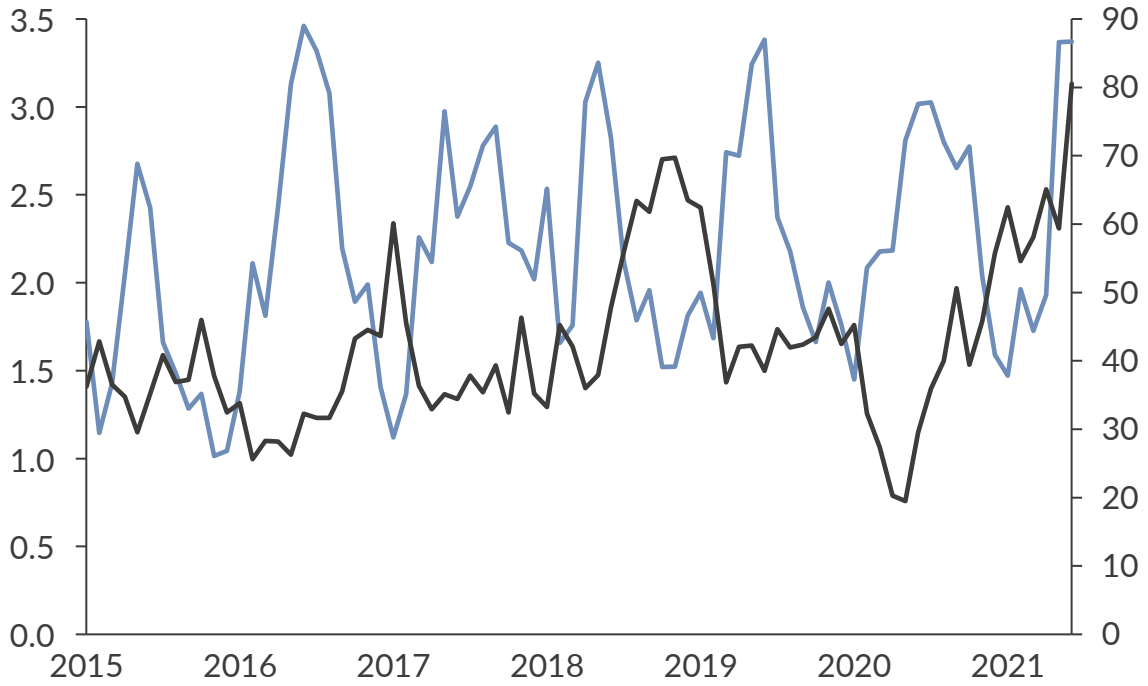


Monthly run-of-river generation

TWh

Monthly average baseload wholesale price

€/MWh (nominal)



- Austria's power system is largely decarbonised already:
  - Over 60% of power in 2021 was generated through hydro.
  - Onshore wind and solar accounted for an additional 15% of the power mix

- Strong hydro reliance exposes Austria's power system to seasonal volatility:
  - Hydro generation in winter is on average 32% lower than in spring.
  - System tightness induces upward pressure on baseload prices which are on average 32% higher in winter compared to spring.

Fossil gas
Hydro pumped storage
Hydro run-of-river and poundage
Hydro water reservoir
Biomass
Solar
Onshore wind
Other[1]

Monthly run-of-river generation
Avg. monthly power prices

1) Other power generating technologies include oil and waste.

Sources: Aurora Energy Research, ENTSO-E

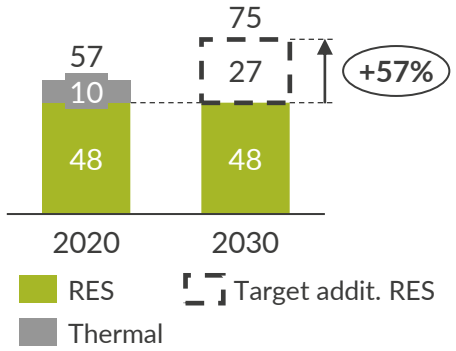
Key challenges for the Austrian power market include decarbonisation, system flexibility, security of supply and sector-coupling

Decarbonisation

How can the 100% renewables target[1] by 2030 be achieved?

- What are the levers for decarbonising the remaining generation from thermal plants?
- What role will subsidies play to increase RES output by 27 TWh until 2030? What are the prospects for merchant buildout?
- How strongly will power prices be affected by renewables buildout?

Power generation
TWh



System flexibility

What measures can be taken to drive the flexibilisation of a power system increasingly relying on intermittent energy sources?

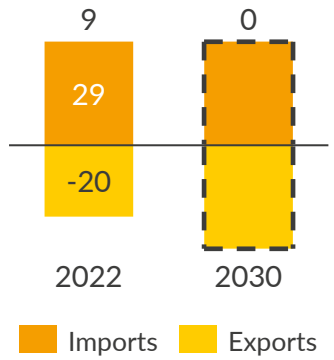
- What challenges and opportunities does hydro-driven power generation pose to system flexibility?
- Can electrolyser buildout and hydrogen-fuelled power plants provide sufficient seasonal flexibility?
- What role will batteries play to ensure short-term flexibility, and will the EUR 15mn support scheme[2] for household batteries be effective in driving buildout?

Security of supply

How can a stable power supply be ensured while decreasing dependence on imports?

- How can Austria reduce its net imports from currently 9 to 0 TWh by 2030?
- Can CHP plants remain a source of system security without jeopardising decarbonisation targets?

Power imports and exports
TWh

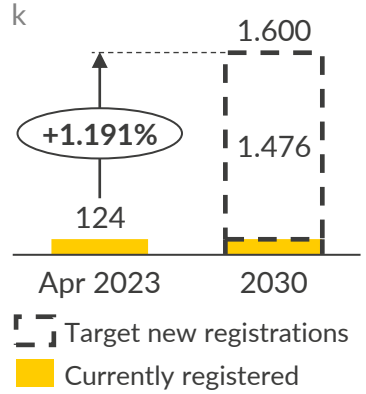


Sector-coupling and power demand

To what degree will other sectors be coupled with the power sector, and how will this affect the power market?

- From 2030 onwards, all newly registered vehicles should be emission-free. How will this impact power demand?
- How can heat pump buildout be facilitated? How much power demand will they add to the system, and can they replace CHP plants?

Number of registered EVs
k

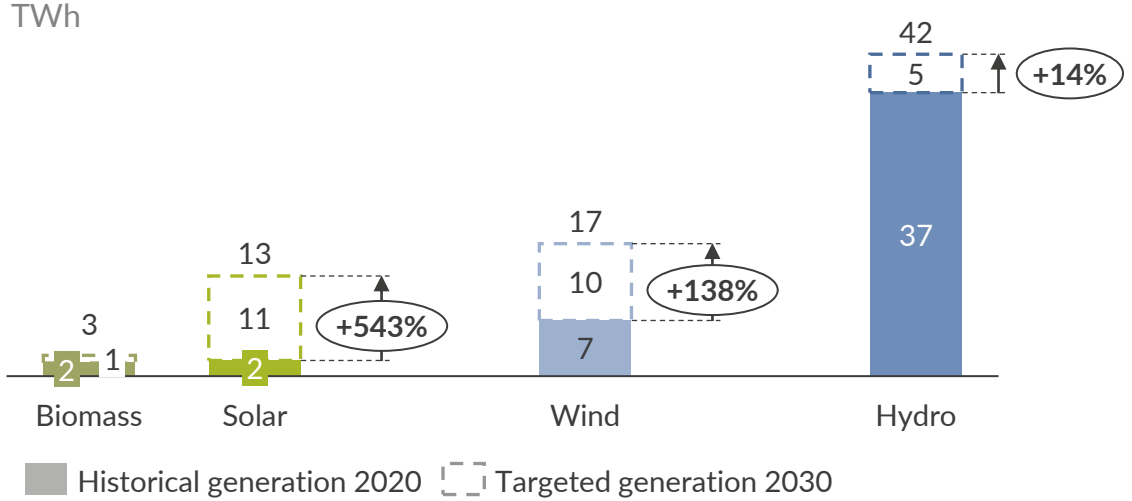


1) According to the Renewable Energy Expansion Act, 100% of consumed power should be supplied by domestic renewables in 2030, with renewables including hydro, solar, onshore wind and biomass. The target does not include balancing power. 2) Program launched by the Climate and Energy Fund in accordance with the Renewable Energy Expansion Act, § 56.
Sources: Aurora Energy Research, BMK, BKA, E-Control, Entso-E, Bundesverband Elektromobilität Österreich

The EAG is the centrepiece of Austria's power sector decarbonisation legislation, with particularly ambitious targets for wind and solar

Power generation targets for 2030

TWh



Overview of the Renewable Energy Expansion Act (EAG)

- The EAG aims for Austria's climate neutrality by 2040, and, as an intermediate target, defines a 100% net renewable generation share for the power sector for 2030. To achieve this, it sets out technology-specific buildout targets for 2030, adding to 27TWh above 2020 levels.
- The law, passed in July 2021, lays down the ground rules for support schemes to:
  - Increase renewables buildout
  - Foster green hydrogen production
  - Promote renewable gas production

Renewables support schemes under the EAG

- The EAG foresees two main support schemes for renewables and replaces the former feed-in tariff scheme from the Green Electricity Act 2012 (ÖSG):

Market Premium Scheme

- Value to be applied (*anzulegender Wert*) is determined administratively or through competitive auctions separated by technology, where funding levels are determined by a pay-as-bid mechanism.
- Premium on top of technology-specific capture price is paid if capture price falls below the value to be applied, eliminating price risk during a subsidy period of 20 years.

Investment Grants

- One-time subsidy granted over the course of new construction and expansion of a renewable asset.
- It can be awarded through auctions to PV (with or without electricity storage), hydro, wind, and biomass plants.

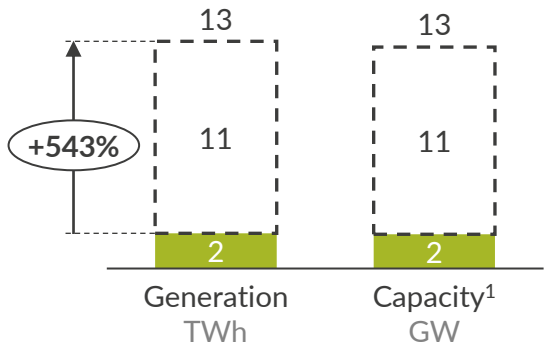
- The two types of support schemes are mutually exclusive and the first rounds for both support schemes took place in late 2022.
- Plants with active support contracts based on the ÖSG may apply for market premiums within 2 years of the EAG entering into force.

Sources: Aurora Energy Research, BMK, EAG

Solar market premium auctions were significantly undersubscribed, indicating that 2030 target will be missed

Government plans and supporting policies

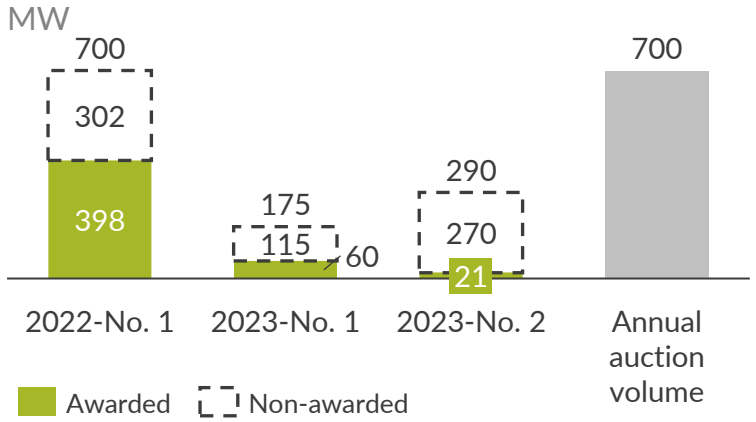
Solar buildout target for 2030



- Solar PV assets above 10kW can participate in market premium auctions. Assets located on agricultural or green land are subject to a 25% premium reduction.
- Construction and expansion of PV plants are eligible for investment grants up to a maximum capacity of 1MW. They can be awarded for PV with or without storage in 4 categories, depending on their installed capacity, and are capped at 30% of the total investment[2].

Current status and key challenges

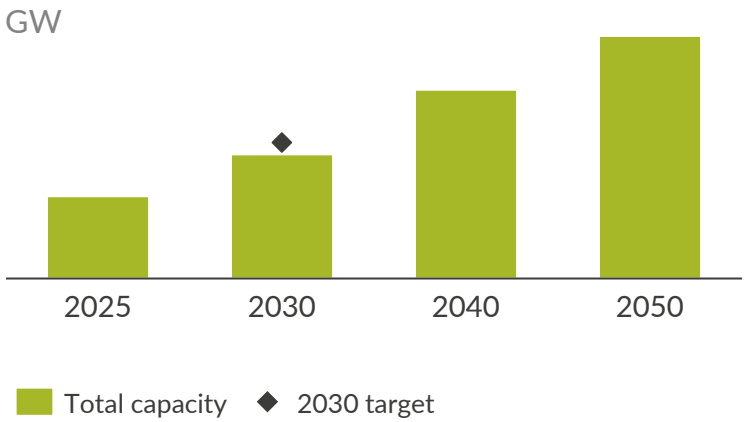
Solar market premium auctions



- While a capacity of 1.4GW has received investment grants in 2022, auctions have been significantly undersubscribed by 67% on average.
- Grid access is currently the main challenge for PV expansion and is expected to remain a major hurdle until 2030.
- Complicated bureaucracy and shortage of skilled workers are additional challenges while issues related to supply bottlenecks and funding are expected to decline until 2030.

Aurora view (current policy scenario)

Subsidised solar capacity



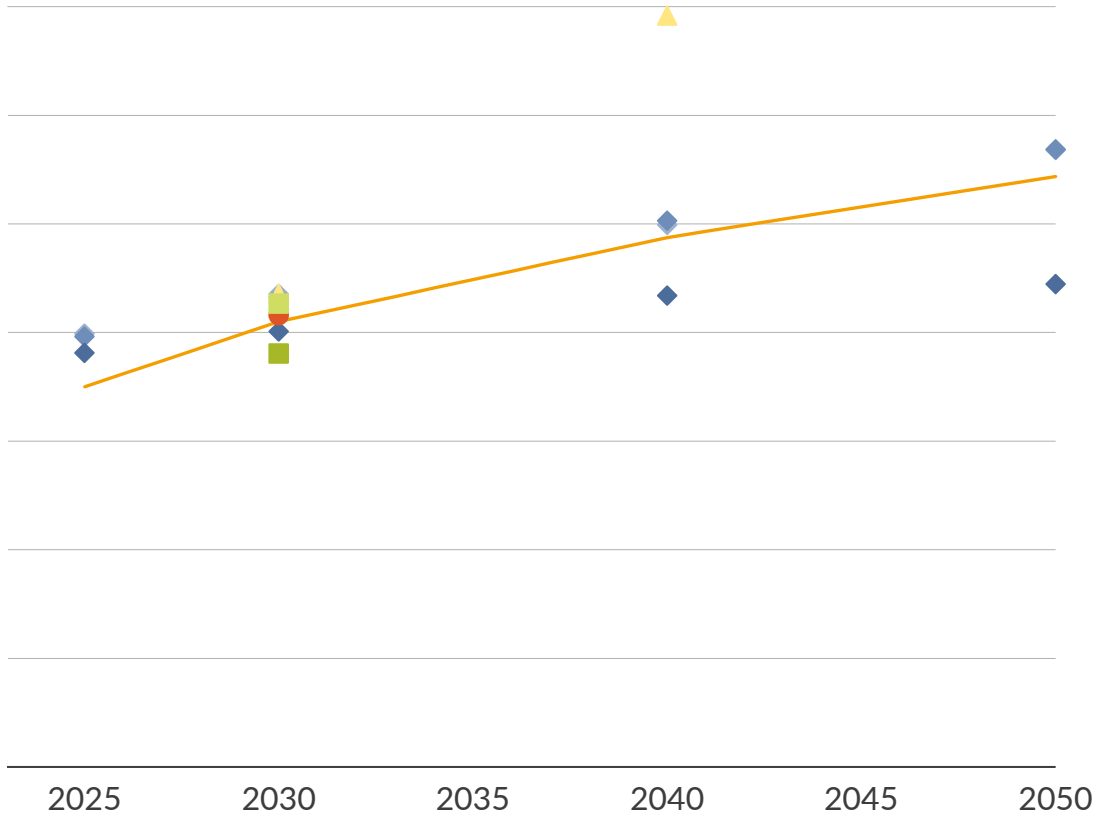
- In light of significant auction undersubscription, we assume the 2030 solar buildout target to be missed.
- In the long term, capacity increases further, assuming limited subsidy support will continue after 2030 as rising power demand will require continuously increasing renewables generation.
- Additional support programmes at EU, national and regional level could lift up buildout further.

1) Assuming 11.7% load factor. 2) Excluding the costs of land.

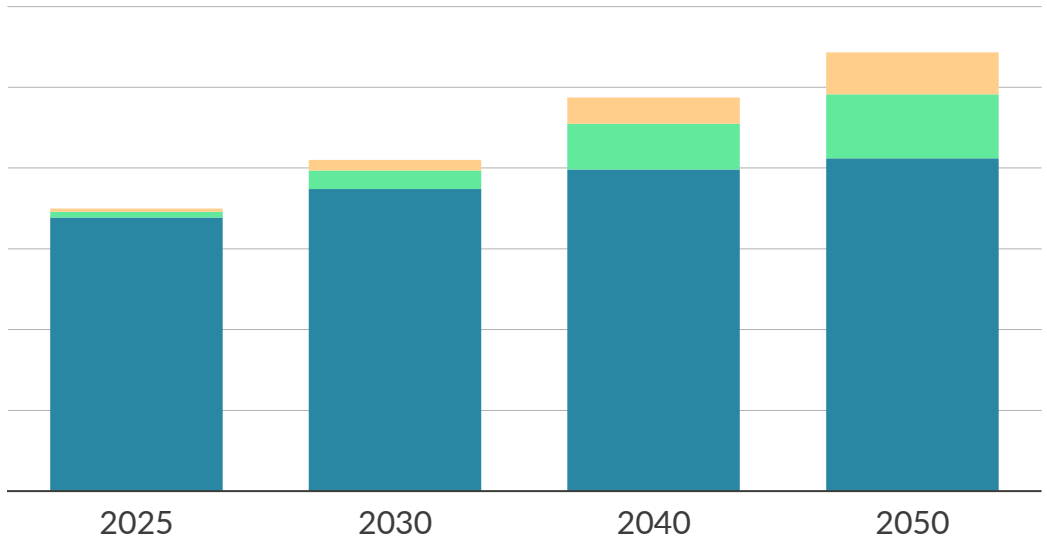
Sources: Aurora Energy Research, IG Windkraft, EAG-Abwicklungsstelle, BMK, E-Control

Similarly to other studies, we expect Austrian power demand to increase by 2050, mostly driven by EVs and H_2 generation

Net annual power demand[1]
TWh



Net annual power demand by type[1]
TWh



- We expect power demand growth to be heavily driven by EVs and electrolyser uptake. In a current policy scenario, demand will increase by XX% by 2050 compared to 2025.
- Base demand growth is comparatively more moderate, of which the key driver is heat pump deployment. Other factors such as economic growth and industry electrification are expected to be counterbalanced by efficiency gains stimulated by the recently-updated Energy Efficiency Act (EEffG).

Deep-dives: 4 EVs 5 Electrolysers

1) Total electricity demand includes transmission losses, excludes power plant self-consumption, and demand from efficiency losses of storage. 2) WEM: With Existing Measures. 3) WAM: With Additional Measures.

Sources: Aurora Energy Research, Umweltbundesamt (UBA), Austrian Energy Agency (AEA), Österreichsenergie (OE), IG Windkraft

Aurora's unique, proprietary, in-house modelling capabilities allow to assess challenges for the Austrian power market in a holistic manner

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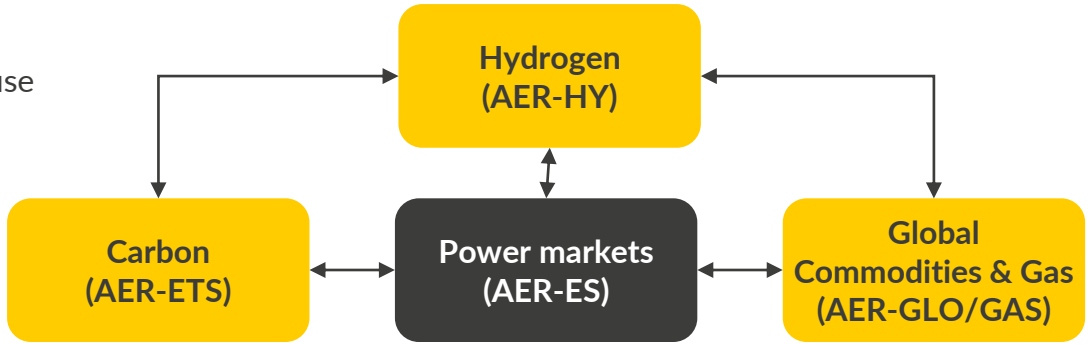
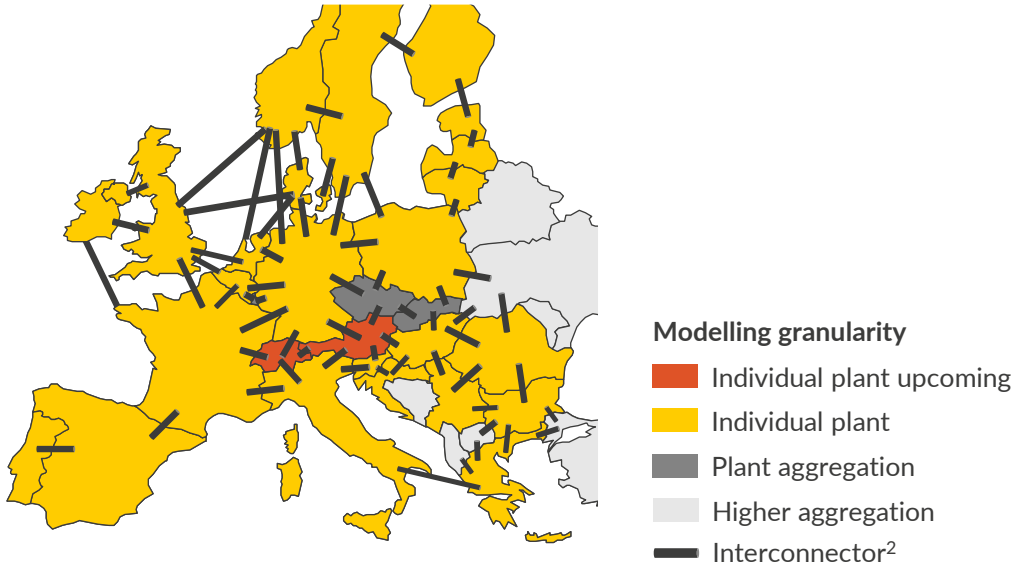
Integration of Aurora's four inhouse models

Endogenous interconnector flows based on price differentials

Interdependence of prices and capacities In different regions

High granularity right down to individual plant level





Advantages of Aurora approach

- Aurora have invested heavily in developing our dispatch models since 2013 and believe they are the most sophisticated available
- Our models have been rigorously tested and refined in a wide range of client contexts
- Flexible and nimble because we own the code
- Zero dependence on black-box third-party software (e.g. PLEXOS)
- Ability to model complex policy changes quickly
- Taking into consideration Europe wide developments through cross-border market modelling

1) Gas, coal, oil and carbon prices fundamentally modelled in-house with fully Integrated commodities and gas market model, 2) Sizes and lengths of interconnectors are for visual representation only, Illustrative and are not to scale

Source: Aurora Energy Research

Austrian Power & Renewables Forecasts:

Dive into key market analysis and forecasts for the Austrian power and renewables markets

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Power & Renewables Forecasts

Forecast Reports & Data

Biannual forecast reports with biannual data updates

- Forecast of **wholesale prices** to 2060
- Data under **three scenarios**: **Central, Low and High**
- **Policy outlook** detailing policy developments and their impacts
- **Capacity development**, generation mix and exports
- **Capture prices** of key technologies (onshore wind, solar)
- Power price distributions
- **EU-ETS carbon price** forecasts
- All forecast data easily downloadable in Excel format and available as **interactive dashboards** on our EOS platform

Strategic Insights

Analyst Support

- **Bi-annual workshops** to discuss specific issues on the Austrian market
- **Ongoing support** from our bank of analysts, including native speakers and on-the-ground experts

Interested in our offering for the Austrian market? Contact **Lucari Jordan, Commercial Associate,** to learn more on how it can help your business.

✉ **lucari.jordan@auroraer.com**


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