



Sam Hawkins

Data programme director, Ember

Open data for a clean, flexible power system



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Data Programme Director



EMBER



Outline

- Introduction to Ember
- Context of the European energy transition
- Successes and challenges
- Recommendations



Who we are

5 years

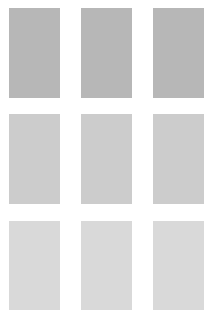
20 Countries

65 people

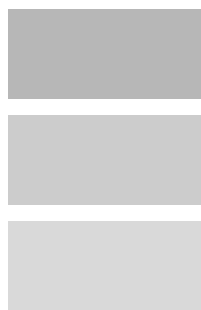
6 Teams: Europe, Asia,
Global, Coal-mine
methane, Data & Comms



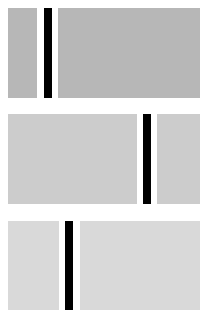
We turn data into action.



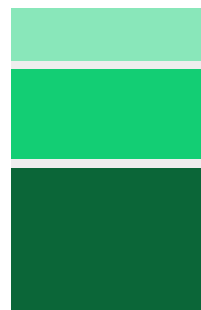
Gather



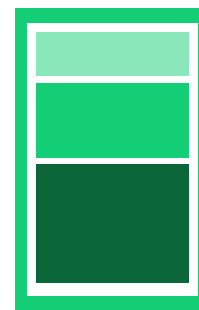
Curate



Analyse



Change
policy



Shift
narratives



Empower
campaigns

Key statistics on Ember's data

97 countries and regions with monthly data

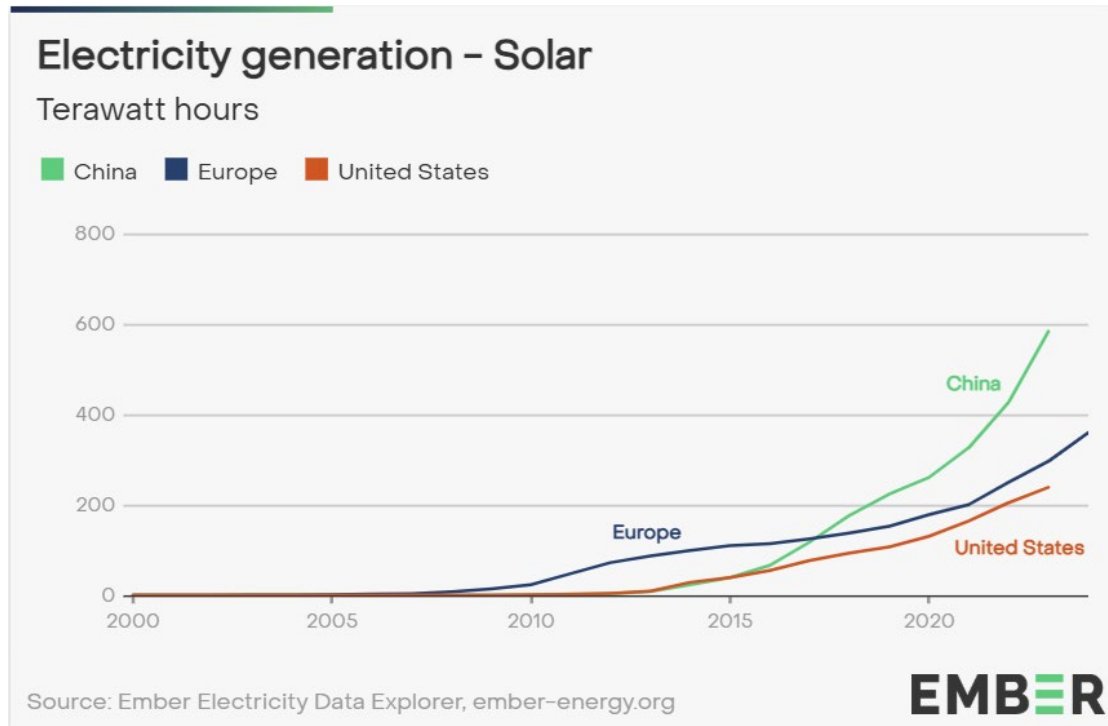
228 countries and regions with annual data

31,440 data downloads

394,976 page views



Data explorer



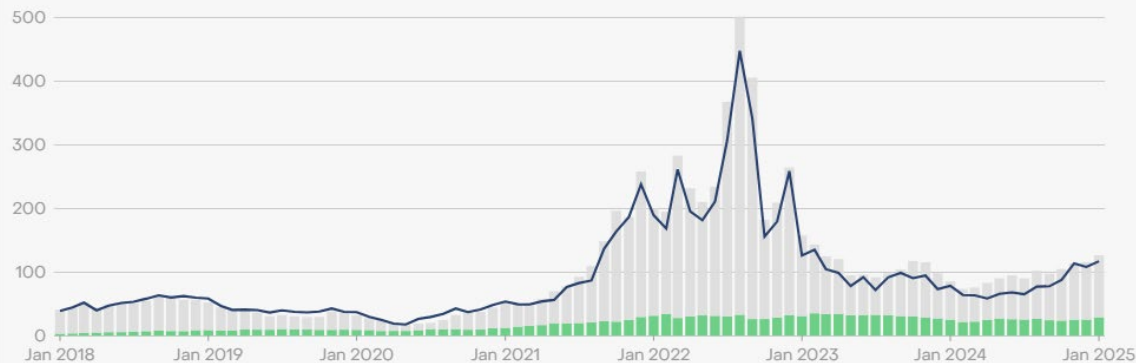
Data tools

The impact of gas costs on electricity prices

Electricity prices, fuel and carbon costs for gas power generation

Netherlands - €/MWh

Electricity price Carbon cost Fuel cost



Source: ENTSOE for EU electricity prices, EMR for UK electricity prices, carbon and fuel price data provided by Montel.
· For full details, see Methodology.
Due to licensing, this data is not available for download

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Who uses our data

Ember's groundbreaking open data not only establishes new benchmarks for quality but also remains a consistent go-to resource for a diverse array of partners, informing and enriching their work.

Data platforms



Government departments



Media agencies



The New York Times



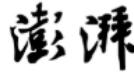
Bloomberg



South China Morning Post

THE WALL STREET JOURNAL

The Washington Post



Other like-minded organisations



Data and political influencers

Michael Liebreich, Adam Tooze, Kyle Chan, Michael Bloss, Jack McCaslin – US Department of State, Ed Milliband MP, Putra Adhiguna and Jan Rosenow (top LinkedIn voices), Nikos Tsafos (Chief Energy Advisor to Greece's Prime Minister), Jutta Paulus, a Green MEP.

Why

- Open data should be the basis for policy-making
 - Making data open democratises it
 - Transparency increases credibility
 - Helps build trust & participation in politics
- Economic opportunities
 - Disruptive business models
 - Incentivise correct investment
- System operation!

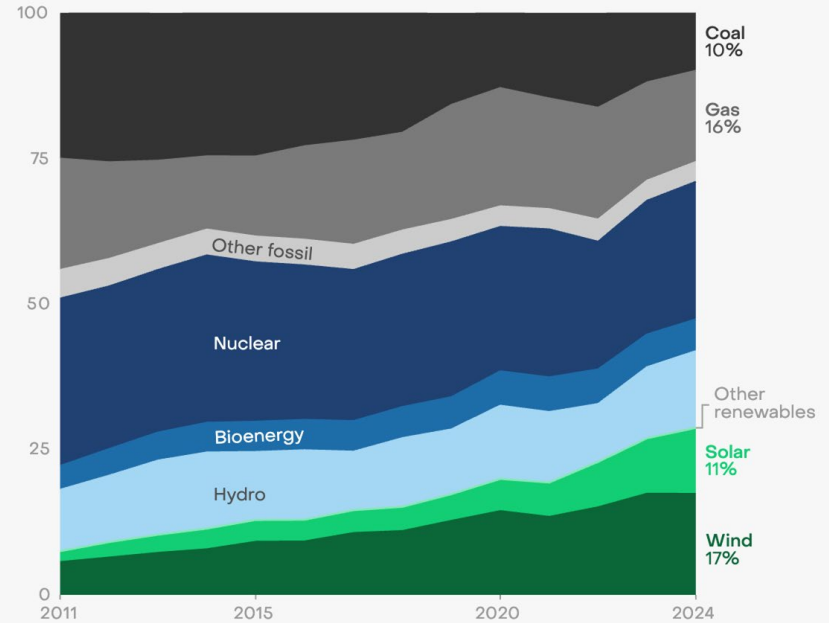


EU Energy Transition

Renewables provided nearly half (47%) of EU power, up from a third in 2019

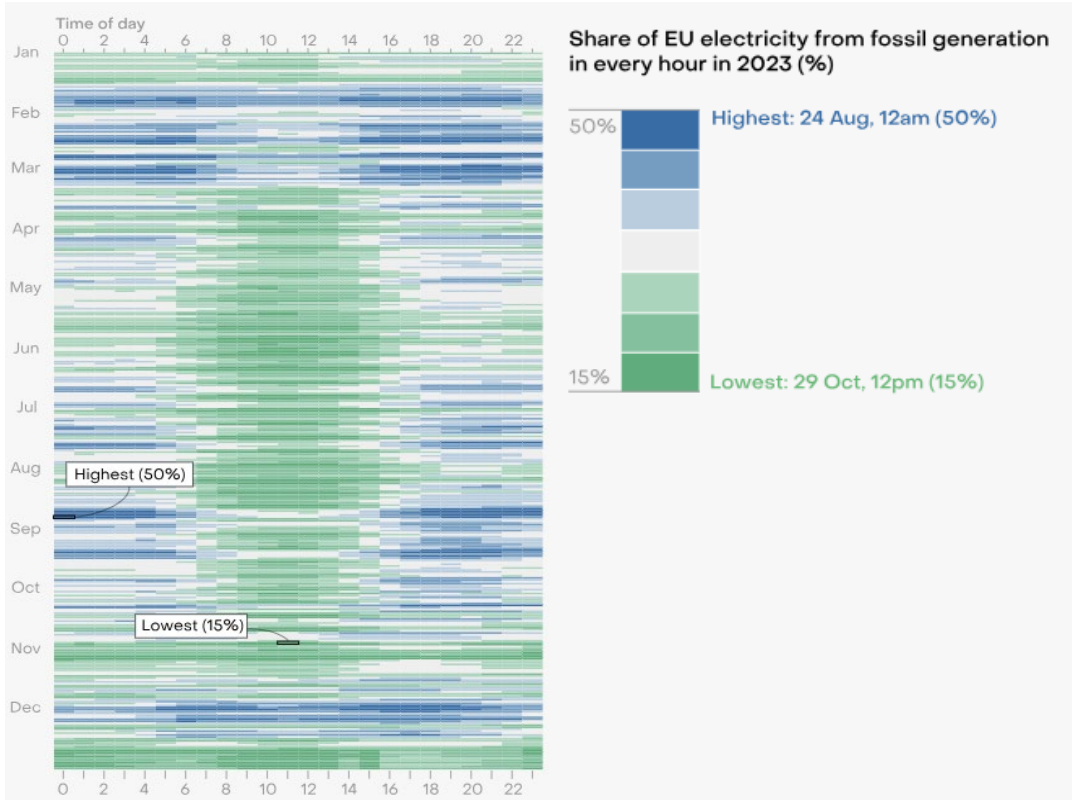
Solar overtakes coal generation in the EU for the first time in 2024

Share of generation (%)



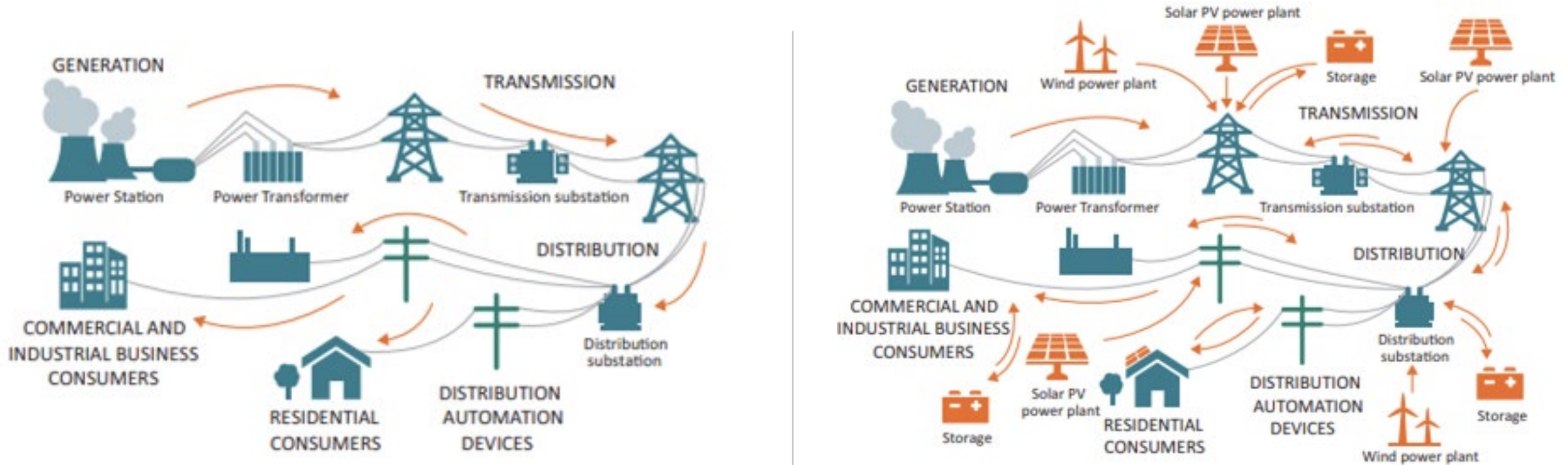
Source: Yearly electricity data, Ember
'Other' includes bioenergy, other fossil and other renewables

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Source: Ember calculations based on ENTSO-E, Eurostat, E-Control GmbH, Cyprus Transmission System Operator, Energy-Charts, Agora Energiewende, Energy Institute, Terna, Statistics Netherlands, NetAnders, Solcast, Open-Meteo, ARE via Instrat, Red Eléctrica, and Elstatistik. Ireland and Malta excluded due to data quality issues.

Energy transition is well underway



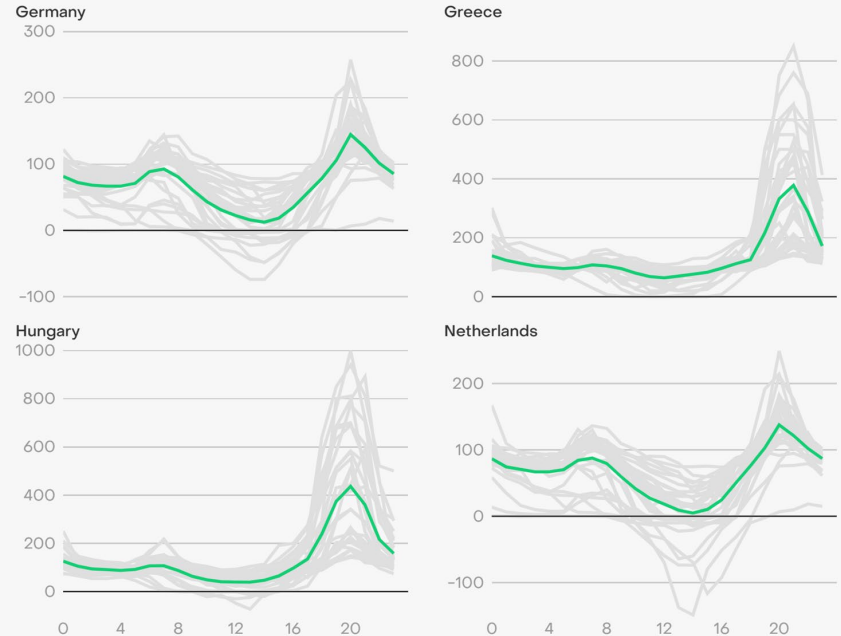
Needs and opportunities

There is both urgent need and also a big opportunity for

- Grids
- Clean flexibility
- Storage
- Data

Solar lowers prices in the middle of the day, increasing intra-day price volatility

Day-ahead wholesale power price by hour in July 2024 (€/MWh)



Source: ENTSO-e wholesale day-ahead electricity prices · The green line shows the average day-ahead price by hour in July 2024.

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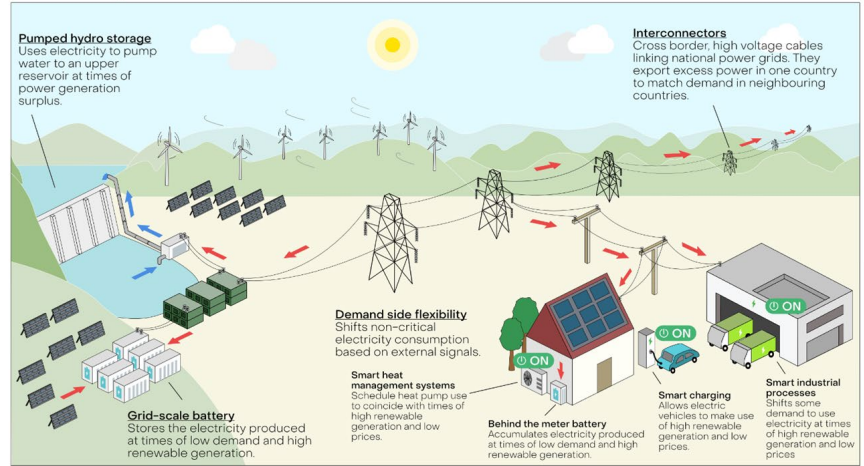
Clean flexibility

What do we mean by clean flexibility?

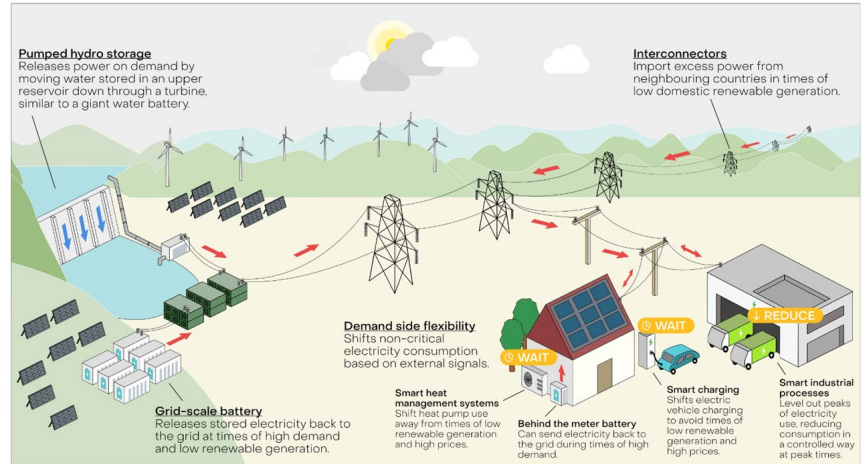
A suite of solutions that balance the grid when weather-dependent generation, such as wind and solar, either exceeds or falls short of electricity demand.

Ember [explainer](#) and [infographic](#) on clean flexibility

If renewable generation is higher than electricity demand...



If renewable generation is lower than electricity demand...





“Smart Electrification” Action Plan



The “Future Grids” Task Force



Joint DG ENER- DG AGRI “Strategy for Agri-PV”



EU as a Global Leader in Open Energy Data and Modelling

The good

EU has many good policies and initiatives on open data

- Open Data Directive
- Transparency platforms
 - ENTSOe
 - Common European Energy Data Space



Data challenges

But there are many data challenges and areas for improvement:

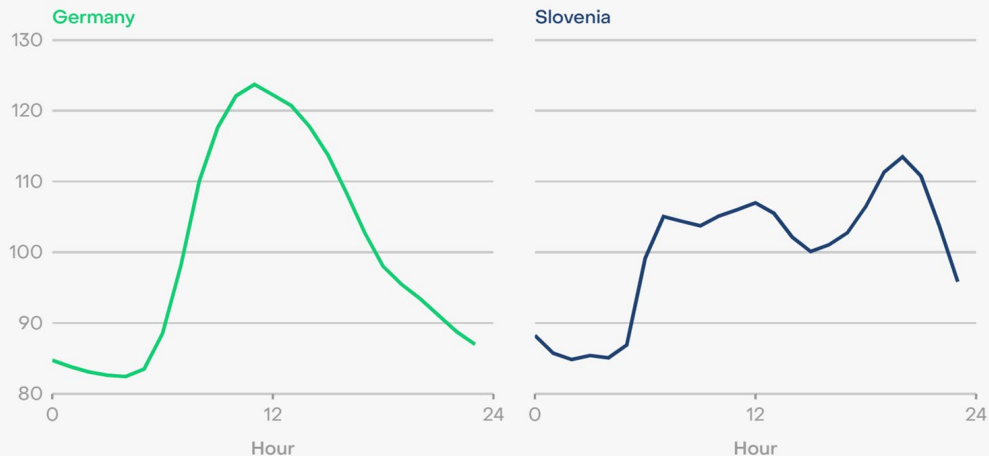
- Quality and consistency
- Availability
- How open



Consistency

Domestic solar generation is not reported consistently

Reported generation by hour (%)



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Availability

Some important data is either not available, or not available consistently

- No systematic asset registration scheme
 - Batteries,
 - EV chargers,
 - Heat pumps



Open

Some data is available but in formats which limit data exchange

- National Energy & Climate Plans
- Grid plans
- Mainly pdfs
- Limited interoperability
- Often proprietary models



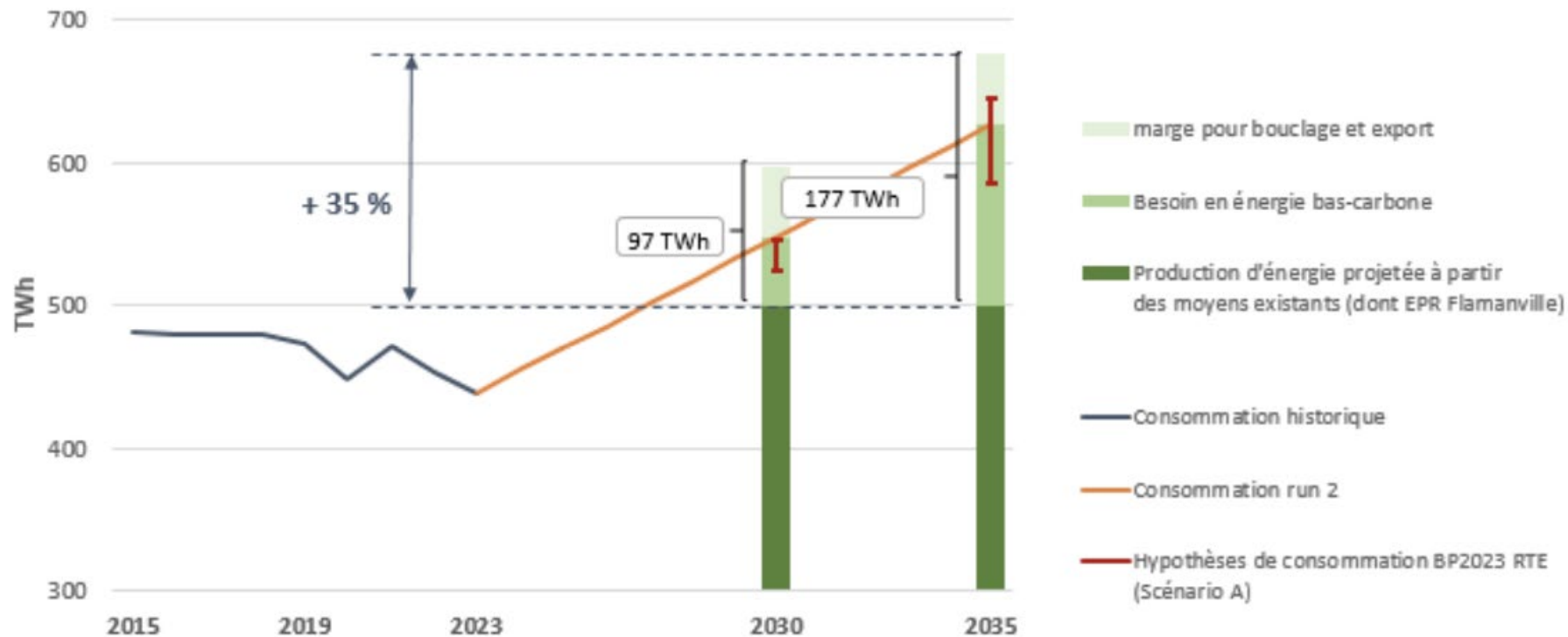


Figure26: Projected electricity consumption at 2030 and 2035 (Source: SGPE/DGEC modelling)

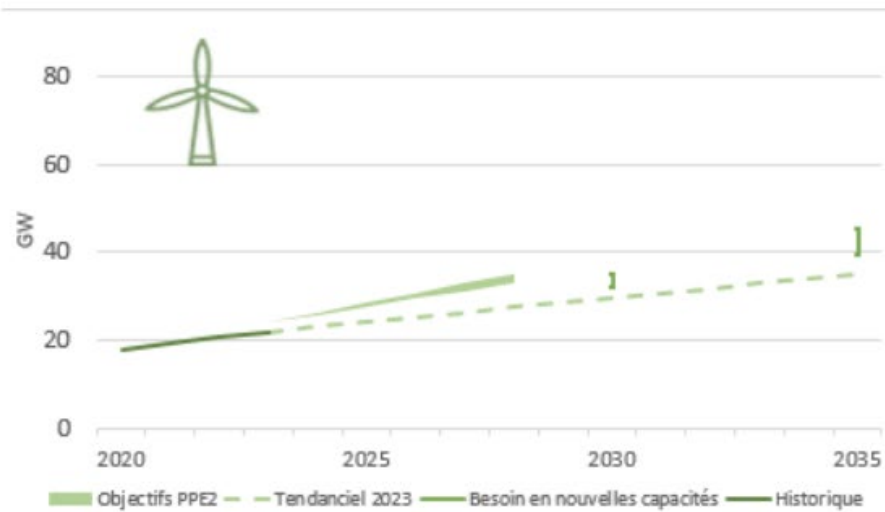
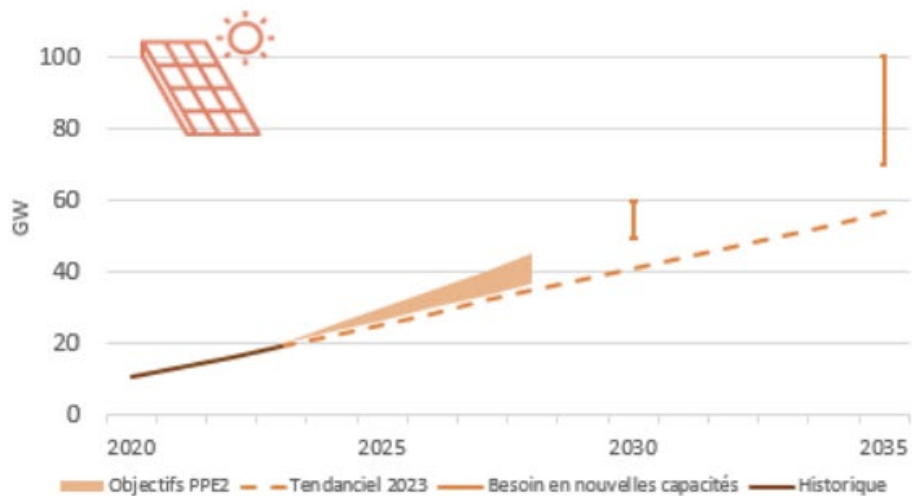


Figure28: Onshore renewable energy development trajectory in GW (Source: DGEC Models)

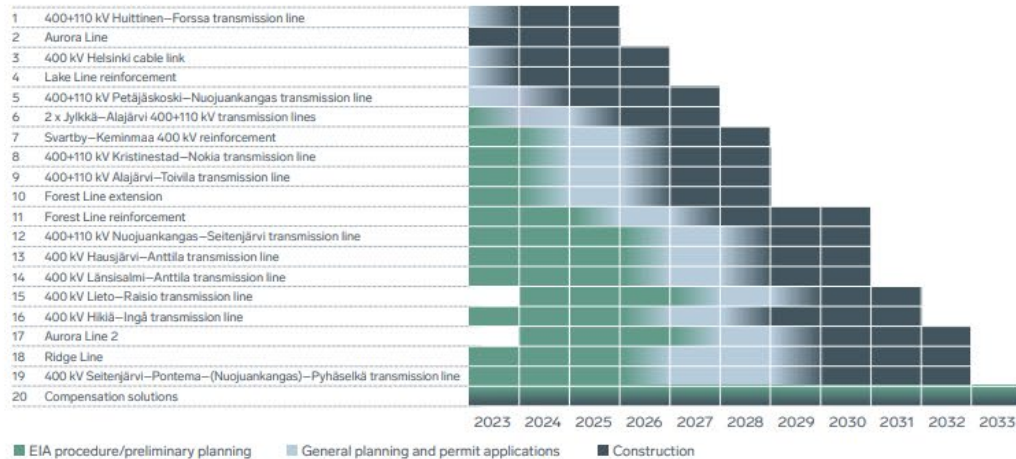
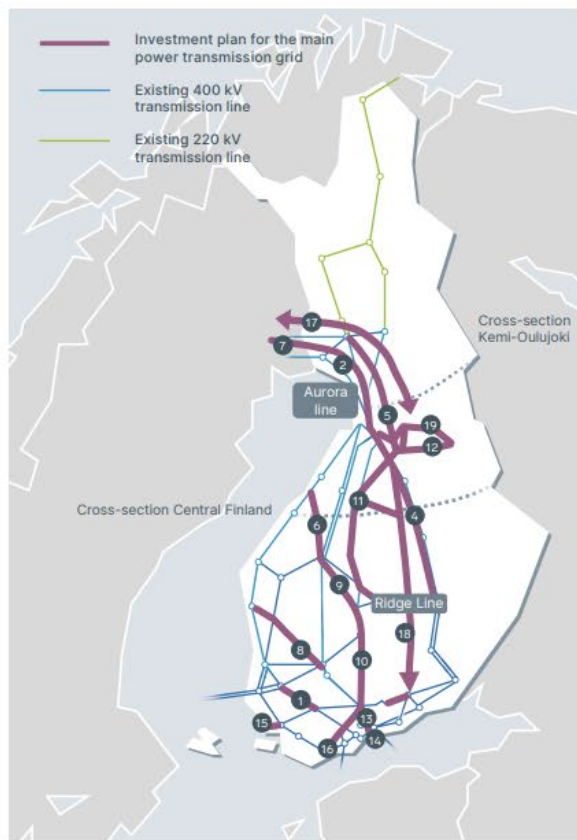


Figure 2. Main grid development plan with respect to the main transmission grid. The new 400 kV connections are shown in red.



“Smart Electrification” Action Plan



The “Future Grids” Task Force



Joint DG ENER- DG AGRI “Strategy for Agri-PV”



EU as a Global Leader in Open Energy Data and Modelling

Improve data transparency

Open data facilitates business innovation, increases confidence in the solutions, allows better grid and system planning

- Coordinated approach across the EU to **asset registration** for granular and timely visibility of renewable, storage and flexibility assets
- Prompt availability of open, granular **data on the status of the grid** (interoperability is key)

EU as a Global Leader in Open Energy Data & Modelling

Transparent data is crucial →

Initiate transition to open energy data and modelling

- EU data platforms disclose additional data in a more timely manner, and implement open data standards
- Coordinated approach across the EU to asset registration for visibility of renewable and flexibility assets
- Commission makes NECP and IA data available in a consistent and regular manner
- Roadmap from proprietary energy system models to open source models



Electrification Action Plan needs to be “smart”

Clean flexibility & electrification must go hand in hand: “SMART from the start & SMART as standard”

- **Opportunities:** more homegrown energy sources, lower energy costs, investment de-risking, optimised grid enhancement
- **Urgency:** action on flexibility is needed now – Electrification Action Plan a crucial moment



Thoughts / opportunities

- AI could help
 - e.g. automated asset registration
- Meteorology & climate is a good example:
 - Data sharing between public and private orgs
 - Commitment to standards
 - National and international cooperation
 - Clear governing bodies



Summary

- EU clean energy transition is well underway
- Clean, flexible power system requires open data
- EU is an advocate on open data
- Many challenges and opportunities
- [Ember's recommendations](#)





EU

OPEN

DATA

DAYS

19 – 20
MARCH
2025

Thank you

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