The critical role of dispatchable power generation for a sustainable and secure energy transition - ETN Global White Paper

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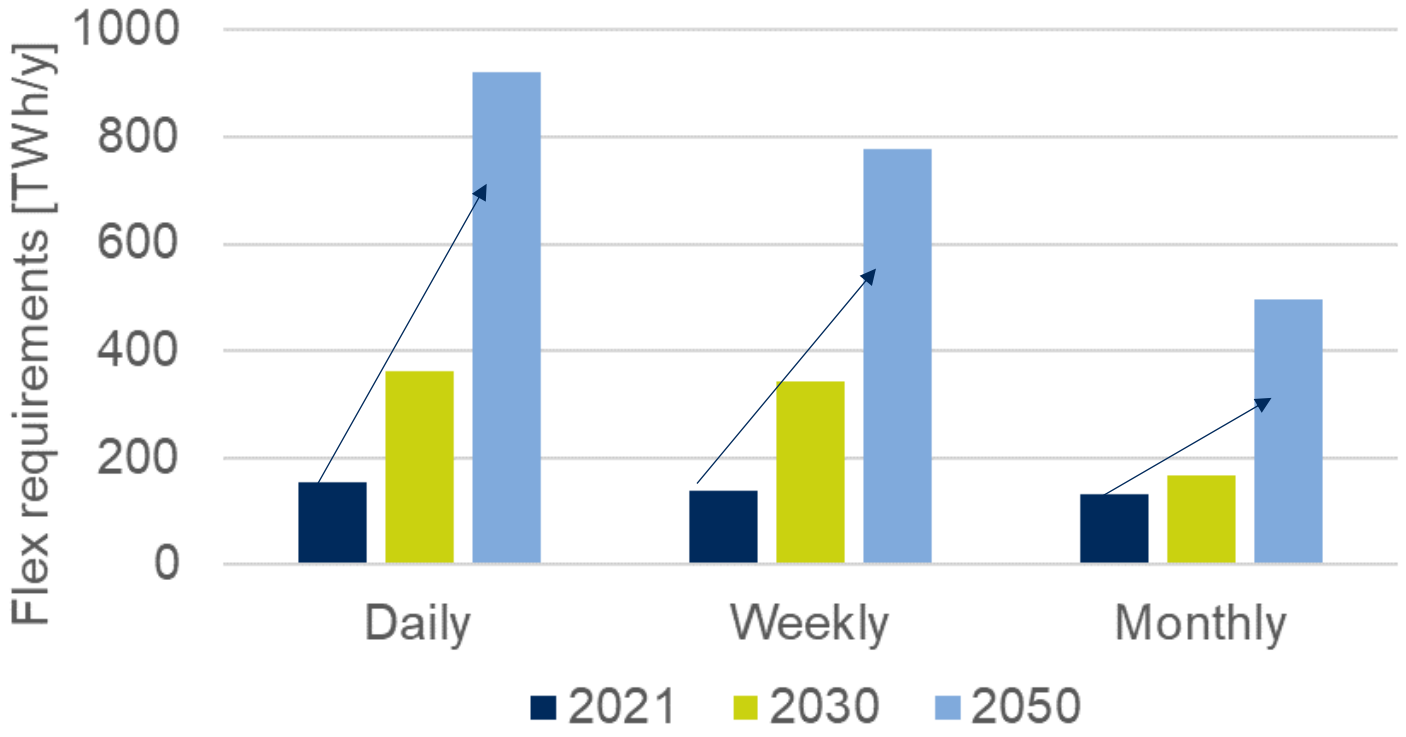
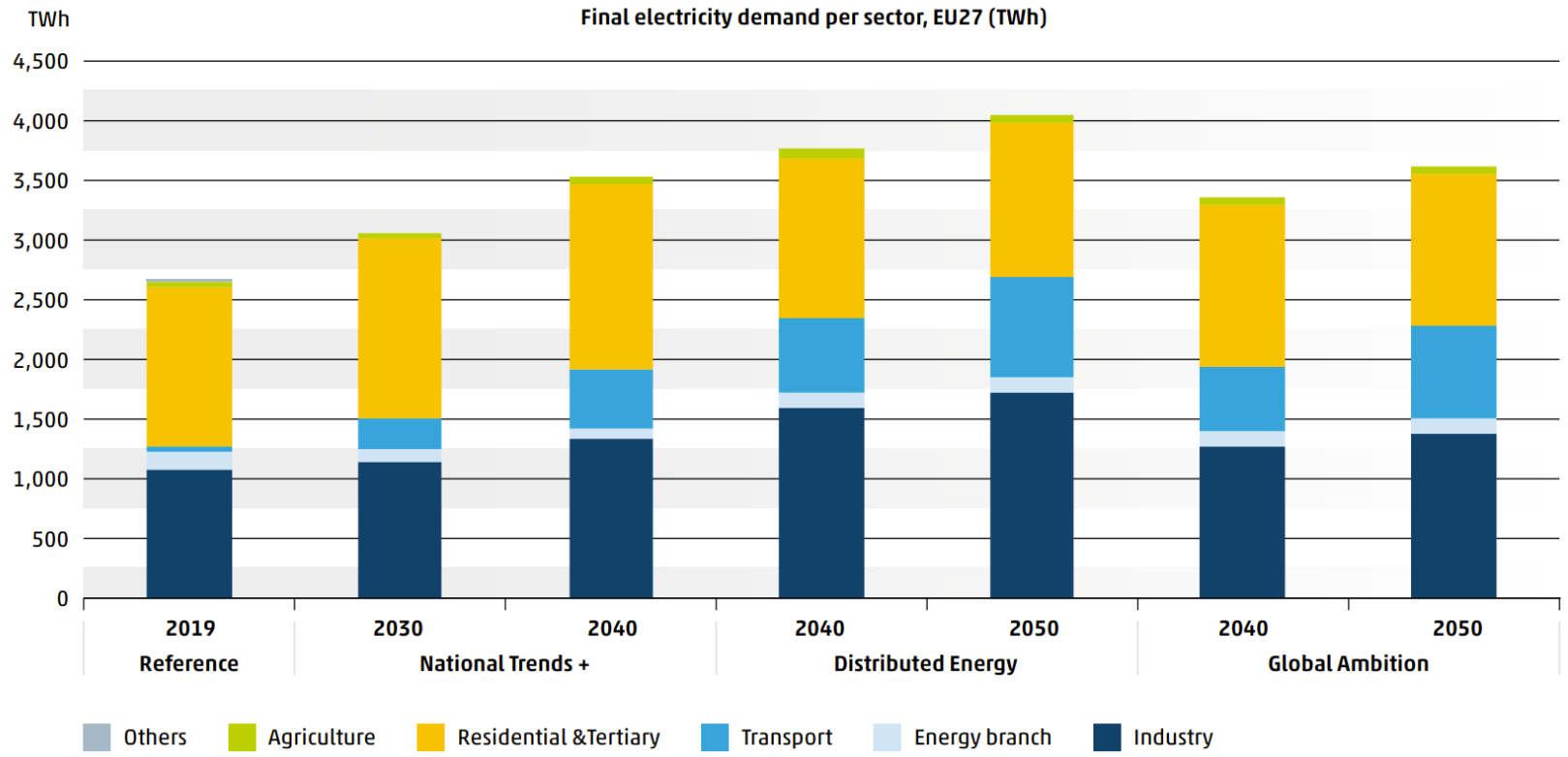
Flexibility requirements set to surge in the coming years

By 2030, Europe's electricity system will need more than double its current flexibility resources and five times more by 2050



Note: The analysis was performed for interconnected ENTSO-E member countries

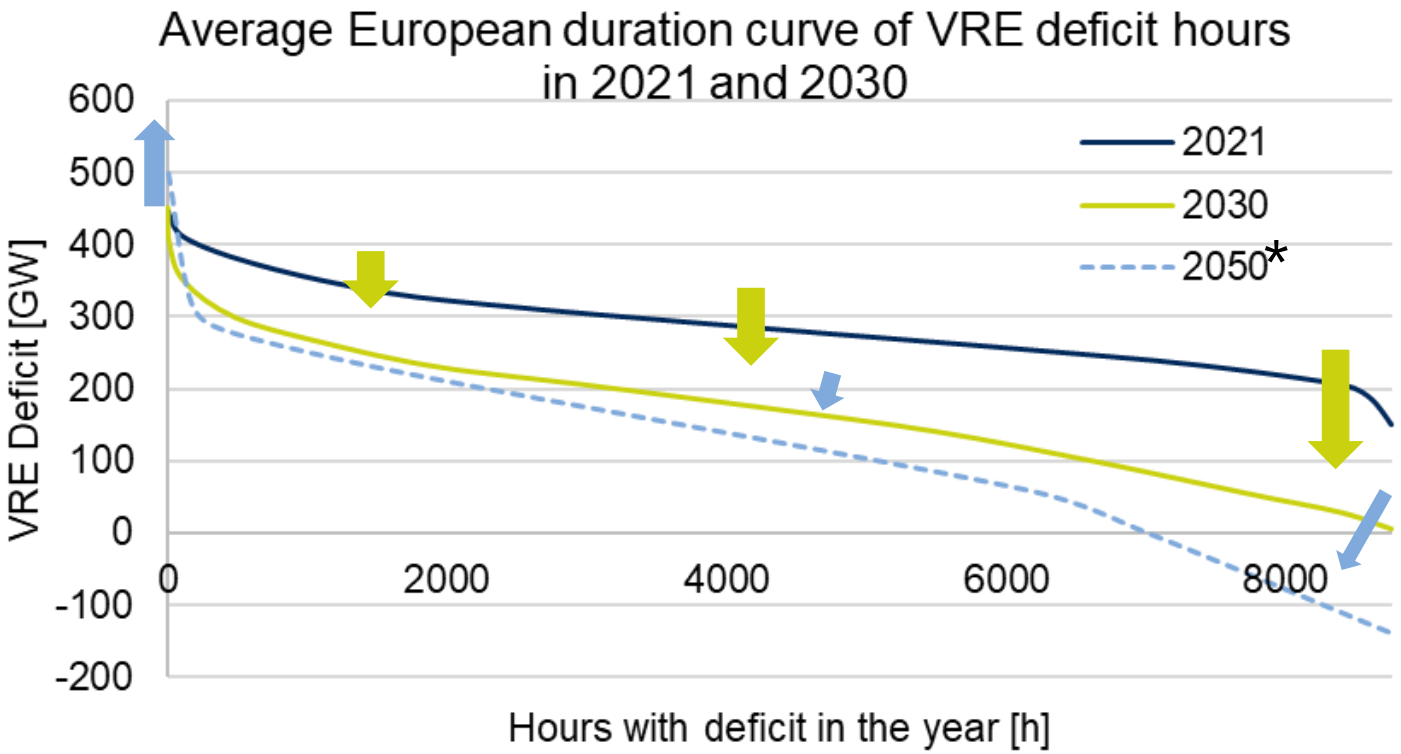
Electricity demand predicted to increase in the route to 2025



Source TYNDP2024

Dispatchable Power Capacity will still be required

Switch from a high-capacity/high-volume to high-capacity/lower-volume



Note: The analysis was performed for interconnected ENTSO-E member countries
Source: ACER, ETN Global adaptation.
* Theoretical scenario (extrapolation)

Requirement for dispatchable power:

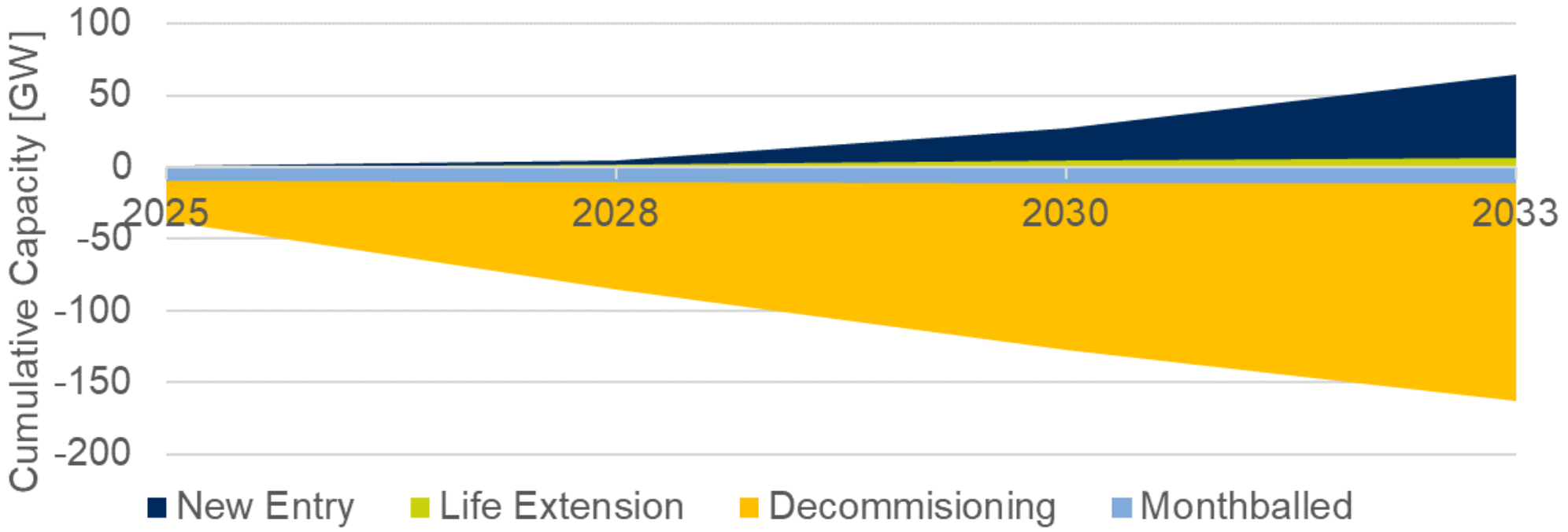
- 2021: High-capacity / high-volume
- 2030: High peak capacity / lower-volume
- 2050: reduced operating hours

Need to preserve dispatchable capacity to be progressively converted into carbon-free

The lack of flexible capacity may produce adequacy risks

By 2030, the EU alone will experience a flexible capacity reduction of 107 GW.

The loss in generating capacity is triggered by economic decommissioning.



Source ENTSO-E

Dispatchable turbomachinery technologies to secure energy supply

Renewable fuels-based turbines: a readily available carbon-neutral solution

- **Balance** Supply-Demand (Load following, peaking and back-up capacity)
- **Provide** grid services (inertia, frequency control)
- **Enable** medium-to-long-term storage solutions for a wide range of power scales (in combination with future low carbon fuels)

FCR: Frequency Control Reserve FFR: Fast Frequency Response (automatic/manual)

Clean thermal Generation options	Primary control reserve (FCR)	Secondary reserve (aFFR)	Tertiary Reserve (mFFR)	Daily flexibility	Seasonal flexibility
Combined cycle + CCS					
Combined Cycle: H2/e-fuel					
Open Cycle: H2/e-fuel					
Battery integration					

Suited to provide the service: Yes (optimal) Yes (conditional): Spinning reserve/seasonal-storage

ETN Global White paper: Structure

The Critical Role of Dispatchable Power Generation for a Sustainable and Secure Energy Transition

- Flexibility requirements set to surge in the coming years
- Dispatchable Power Capacity will still be required
- The lack of flexible capacity may produce adequacy risks
- Dispatchable thermal turbine generation to secure energy supply

Key Demands

The lack of policy and regulative support will produce adequacy risks

- **The role of dispatchable turbines** is unclear in current energy and environmental policies
- **The supply of low-carbon fuels** must be accounted for in fuel supply projections to secure the electric energy supply
- **Viable business cases and predictable conditions** are required to secure investments to low- and zero carbon solutions
- **Development of careers for energy-related engineers** must be supported by promoting and incentivising decarbonisation activities

Summary of Key Demands

Need for policy supporting flexible generation

1. Increase Flexibility Resources
2. Recognise and Incentivise Dispatchable Generation
3. Support Carbon-Neutral Technologies
4. Mitigate Adequacy Risks
5. Strengthen Policy and Regulatory Support
6. Promote Decarbonisation and Market Viability

Way forward

Inform decision makers to support flexible thermal power generation technologies

- Dissemination:
  - Leverage on ETN Global network
  - European Commission
  - Support of and coordination with other organisations (e.g. IEA, ETIP-SNET, EUTurbines, EUGINE, ENZA…)