Electricity Security Advisory Board – Sept 9, 2025

Ensuring resource adequacy with increasing system variability

Research and Customer experience Findings

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The Landscape

Key trends:

- Solar rocketing and rooftop solar in particular
- Electrification Supercycle: Buildings, Mobility and Industry demand side electrification + AI Data center growth
- Without Digital, neither energy management nor flexibility
- Pressure on the Grid (deployment speed)

Schneider Electric coverage:

From Renewable integration to Load integration, looking at the whole system

- Grid (FTM), Demand side and Distributed generation (BTM)
- Electrification, Efficiency, Digitization
- Flexibility for the End-User, for the DSOs

Distributed generation

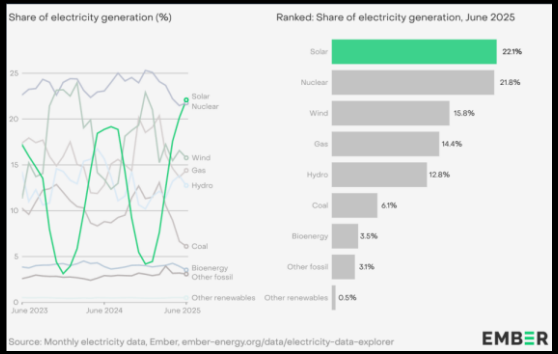
Solar is booming (+64% global growth H1 2025)

- Complementarity Wind and Solar => EU plate
- UK => real need for seasonal storage ?

Rooftop solar is the silent champion, going faster than we think

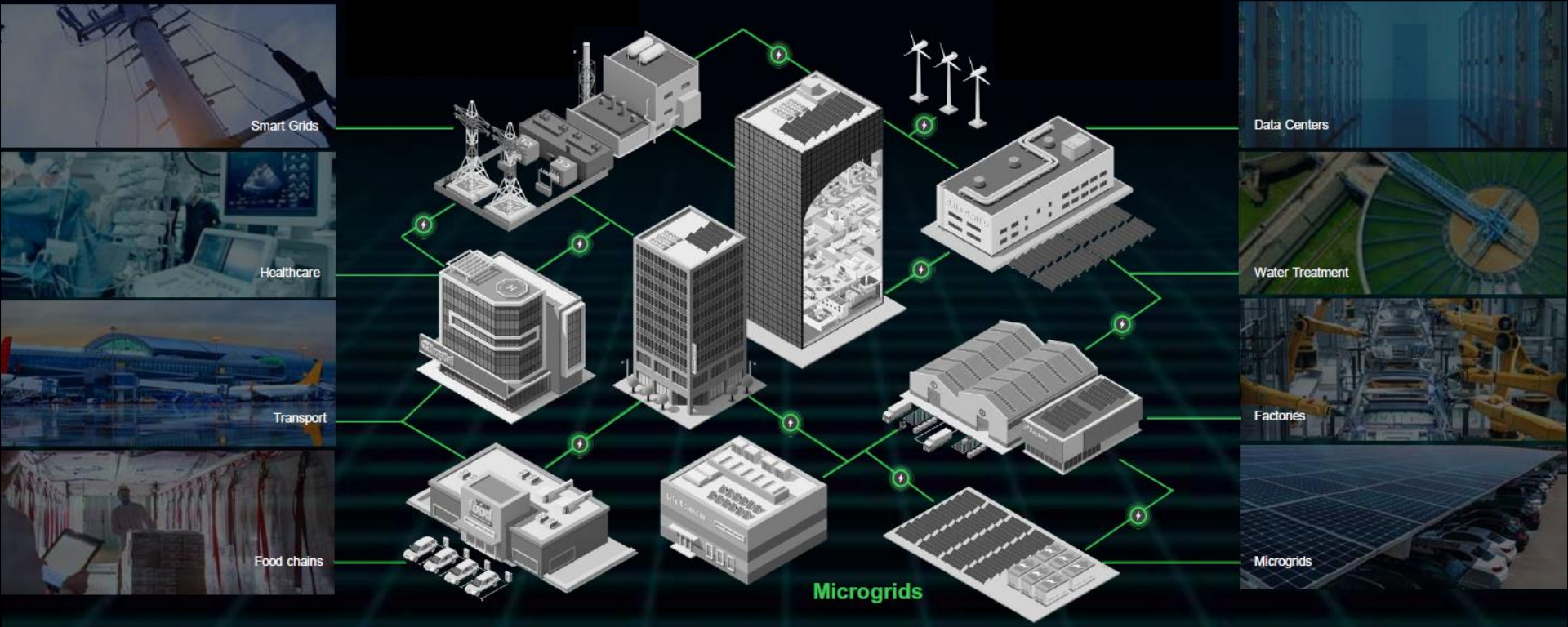
- > 50% of deployed solar in the EU
- Pakistan adding +20GW?!
- 1.5M buyers of balcony solar Germany
- Australia and Germany impressive BESS attachment rate
  => to increase elsewhere with falling costs (LFP, Na-Ion)
- Future key role of EV batteries
  - zero marginal cost asset
  - Low degradation if well managed
  - BESS cannibalization ?

Source: Ember



Flexible demand / Cities :

Connecting facilities, microgrids (PV + batteries), with smart grid, in an energy market to redefine



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Flexible demand / Cities : Connecting facilities, microgrids (PV + batteries), with smart grid, in an integrated market

1. Load controls is the least cost technology but not harvested enough yet:

- Heating load shifting through HEMS/BMS, controlled HPs / water tanks / Building thermal inertia, Smart and bidirectional charging

  => need for the right remuneration schemes for deployed assets

- AI layer on top of the IoT layer for increased value

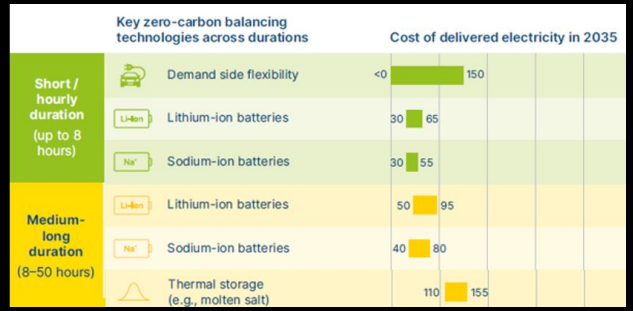
2. BTM storage becoming very cheap

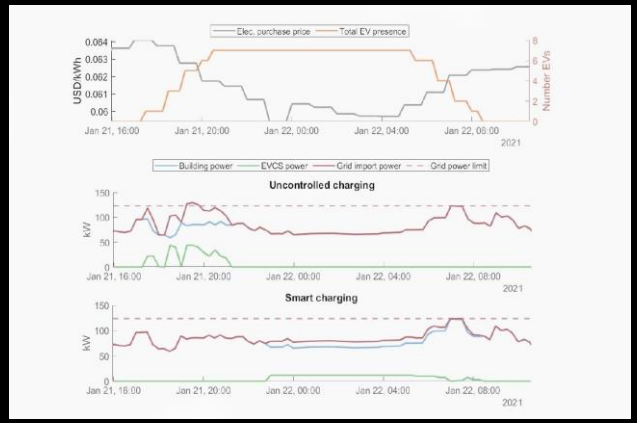
3. Integrated BTM Mobility, Building, Energy management approach creating the highest value for all stakeholders

4. Potential to extend optimization to Energy communities / Districts, benefiting from time-wise diverse energy sharing capacity, allowing to reduce district congestion/peak issues

5. Industrial buildings with light processes (Manufacturing, Food & Beverage, Package Goods) are usually embedded into cities

   => Electrification of Motion and low temperature Heat (Heat pumps)





Source: ETC Power system transformation report (2025), SE SRI (2025)
https://www.se.com/ww/en/insights/sustainability/sustainability-research-institute/towards-net-zero-buildings-investment-case-smart-integration-electric-vehicles//

Flexible demand: industrial clusters

- Potential for electrification is higher than we think but TRL is still low in some sectors
- Uncertainty with respect to future price of electricity (wholesale) slows down investment decision (new market design needed)
- Key KPI is the Levelized cost of production (LCOP) for competitiveness. Need for protection against volatility of future electricity prices
    - Agile processes (digitization) and Heat or Battery storage as key to new electrified processes
    - Eg Steel, Ammonia (SE SRI reports)
- Data center as a new Industrial sector: key to manage flexibility. “Transform Data Centers into Grid Stabilizers”

Source: SE SRI (2025) Green Steel, Green Ammonia, AI DCs in the US

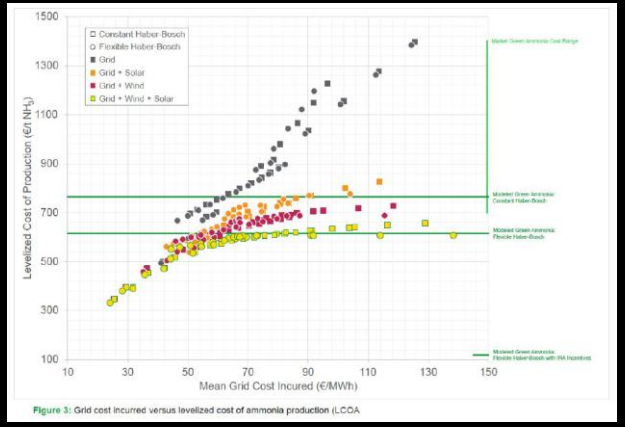


Figure 3: Grid cost incurred versus levelized cost of ammonia production (LCOA

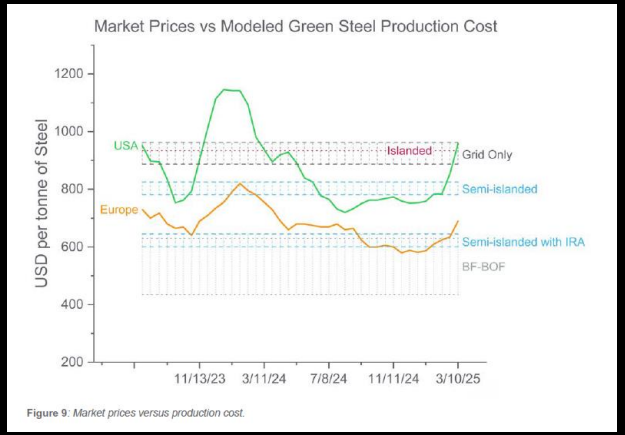
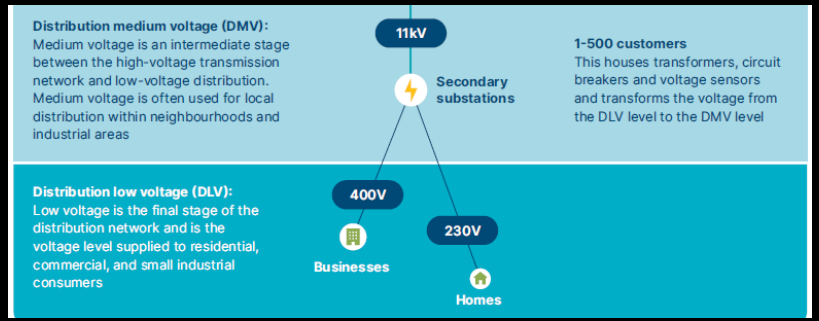


Figure 9: *Market prices versus production cost.*

Grid digitization

- Complementarity of wired and NWA (Non-Wired Alternatives) from the demand side = acceleration of the Energy Transition
- Grid storage booming: Capex deferral investment with speed of deployment capability
- Digital for grid observability is key, esp. in secondary distribution, for digital asset management eg predictive remote maintenance (leading to lifetime extension), system cost optimization from DMS, DERMS usage.
- Data analytics and AI capabilities for planning and operations



Source of infographics: ETC

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