



Market design for the EU gas sector The implications of increasing renewables (RES) penetration

EURELECTRIC VIEWS

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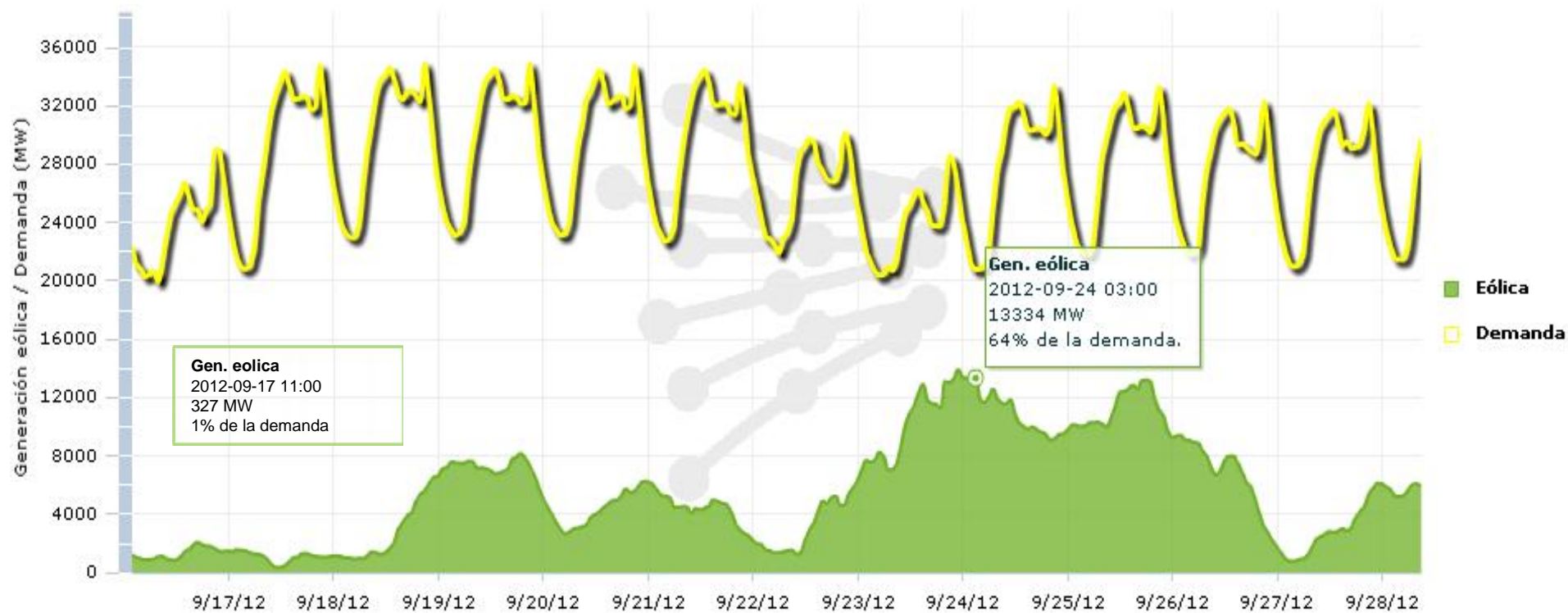
RES penetration requires back-up capacity

- **Environmental targets have driven EU Member States to incentivize more renewable generation through support schemes and preferential balancing/dispatch**
- **Increased RES production is expected to come mainly from solar and wind power:**
 - More uneven distribution geographically
 - Low dispatchability (maximum firmness of 10-20%)
 - Less reliable and predictable generation than from conventional plant
- **Sufficient level of back-up capacity from dispatchable and flexible generation is needed which gas fired plants are well suited to provide**



Wind variability

Gas demand and wind production in Spain (September 2012)



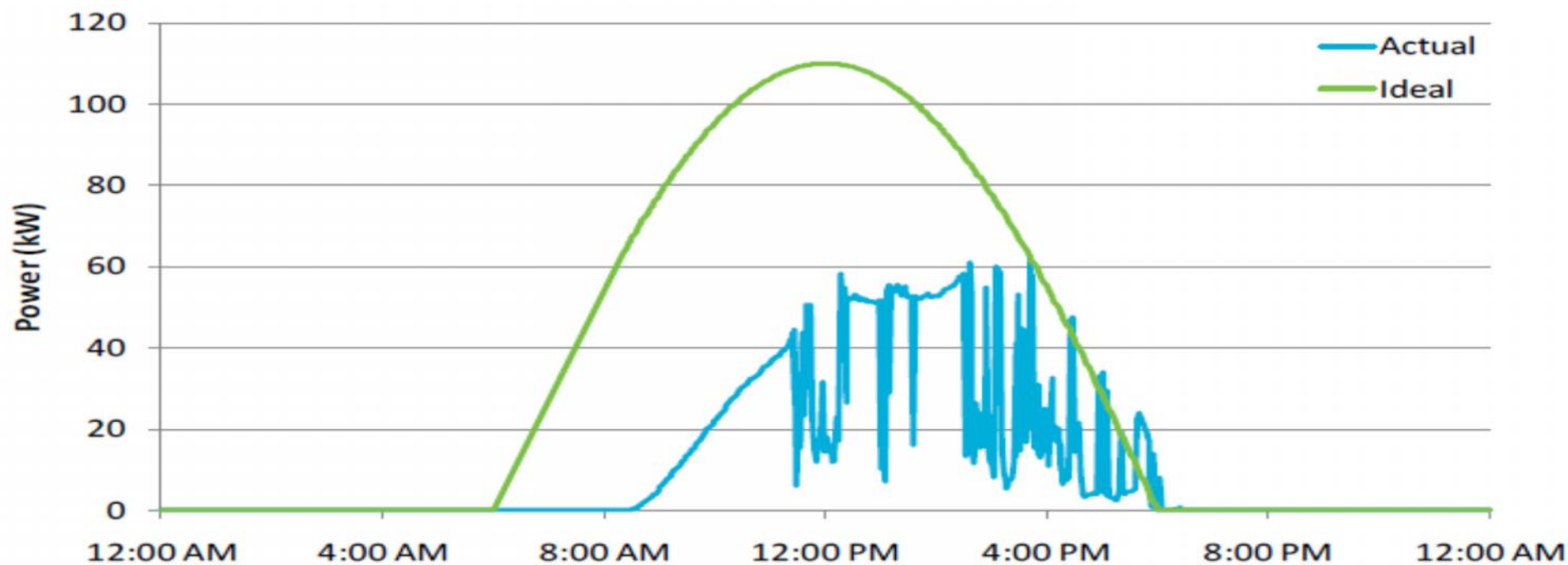
Source: REE

Wind generation covers between 1% and 64% of hourly elec. demand



Solar variability

Optimum and actual power output from a photovoltaic array for a 24-hour period (Spain)



Source: CSIRO's Energy Centre



Changing operating profiles of gas power plants

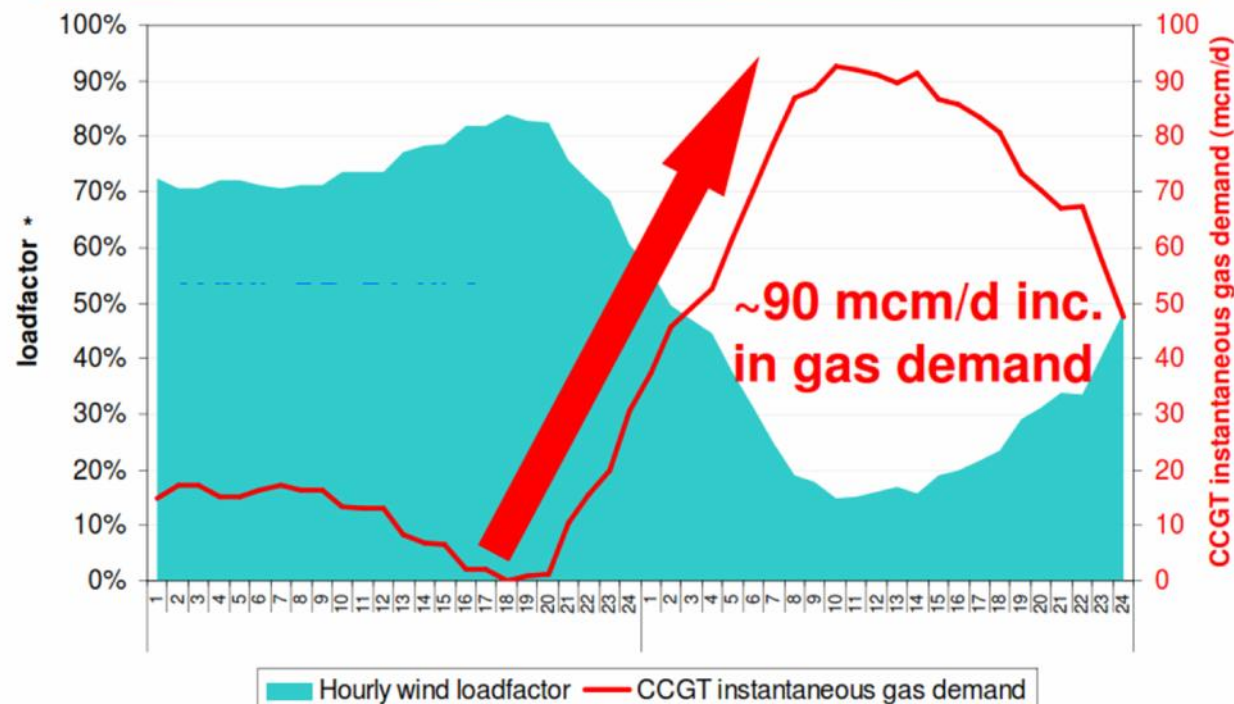
- **Gas plants will have to adapt to:**
 - Unpredictable running patterns – the focus will increasingly be on partial load efficiency (and hence emissions), fast ramping and short start ups
 - Cold starts - leading to higher operation & maintenance costs, increased plant breakdown, shorter economic lifetime and breaches of plant warranties
- **Gas transmission systems - typically designed to cope with predictable peak flows - will have to invest to facilitate sudden/multiple ramping up/down of large number of gas plants to back up RES**
- **The impact of gas intermittency is greatest in countries where CCGTs make up a significant proportion of the installed generation and there are plans for strong growth in installed wind capacity**
- **Who should pay for these hidden costs of RES?**



A potential extreme event in GB in 2020/21 assuming 30 GW wind capacity

A potential extreme event 2020/21: 30GW wind capacity

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* - Load factor is the generation output as a proportion of capacity



How should this affect gas market design?



EU gas markets must become more flexible (1)

- **Efficient and liquid trading hubs needed throughout the EU to enable generators to meet unexpected shortfalls/surpluses and to hedge risk**
 - Full entry/exit systems each with a single Virtual Trading Point (VTP)
 - Remove bureaucracy and barriers to entry associated with licensing, reporting and language
 - Market must deliver and shippers must be able to respond to within day price signals
- **Robust market based balancing regimes must be in place throughout the EU to incentivise all shippers to balance their portfolios**
 - Daily balancing gives greatest flexibility and within day liquidity
 - Where absolutely necessary, system wide within day obligations (WDO) preferred to portfolio or entry-exit WDO as they capture more of the diversification effect
 - Ex-ante linepack services are of little use to gas fired generators if they only know when or how much they'll run within day



EU gas markets must become more flexible (2)

- **Gas fired generators must have non-discriminatory access to storage**
 - Increased price volatility will reward fast cycle storage
 - Minimum restrictions on when/how much gas can be injected/withdrawn from storage
 - Minimum restrictions on how much gas must be kept in store
- **Gas fired generators must have non-discriminatory access to transport capacity**
 - Liquid hubs and VTP lessen the need to buy entry capacity (incl. cross-border) direct
 - Within day capacity nomination and allocation are essential
 - Ability to easily and conveniently trade capacity i.e. both primary and secondary
- **System linepack/imbalance information along with flow data at relevant points must be available near real time to give full transparency on the need for TSO balancing actions**



Gas TSOs will need a new approach to meet the challenge of increased RES penetration

- **New approach to design and operational standards focusing on:**
 - Linepack availability
 - Realistic ramp rates
 - Locational balancing actions
 - System pressures
 - Localised gas storage
- **New approach to allocating and pricing power station exit capacity**
- **ENTSOG should focus on the capability of EU networks to manage increased ramping from Gas plants in future 10YNDPs**
 - Work closely with ENTSOE on gas generation scenarios
 - Investigate opportunities to export flexibility cross-border
 - Identify potential investment needs



THANKS FOR LISTENING