



Can current Electricity Markets Cope with High Shares of Renewables? A Comparison of Approaches in Germany, the UK and the State of New York

Karim L. Anaya, Michal G. Pollitt

Energy Policy Research Group (EPRG), University of Cambridge

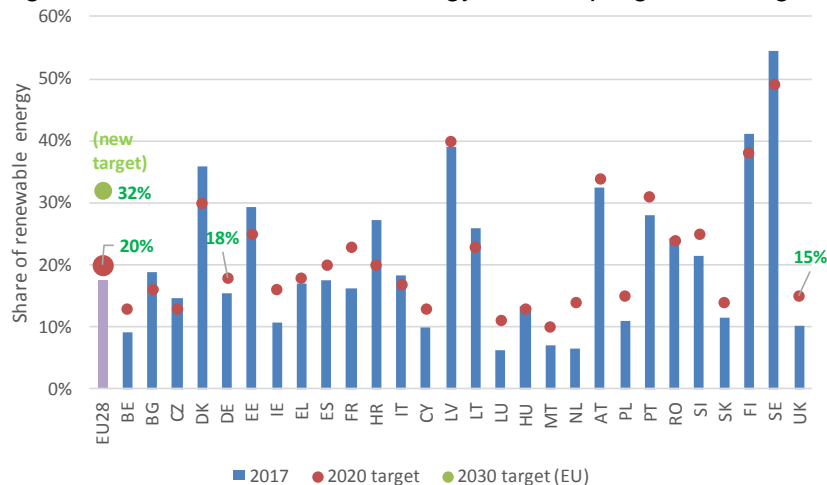
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Coping with high shares of renewables

“Renewables and traditional markets”:

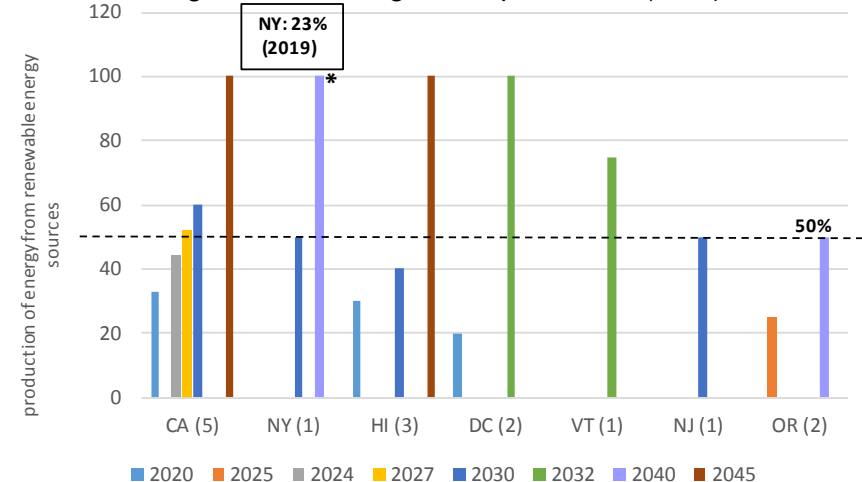
- Increase in share of renewable energy is a fact (EU28: 8.5% in 2004, 17.5% in 2017).
- In contrast with fossil fuel generators, renewables exist outside organised electricity product markets.
- Renewables are not exposed (usually) to market forces (i.e. fixed rate/subsidies).
- Desire to remove barriers to entry to renewable investment (in line with r. targets).
- Special conditions (i.e. subsidies) can work for small shares of renewables...

Figure 1: Share of renewable energy – EU28 progress & targets



Source: Eurostat

Figure 2: RPS targets – top 7 states (USA)



Source: DSIRE, DEC NY. (*) In 2016, the RPS was superseded by the NY state's Clean Energy Standard (CES).

Coping with high shares of renewables

“High share” of renewables:

- The problem of non-availability (wind, solar).
- The problem of surplus (high level of curtailment and high costs to society).
- Then a combination of other options is required (i.e. fossil fuel, storage, interconnection, etc.).

“Coping with” high shares of renewables:

- Some affordability issues associate with renewable subsidies.
- Cost of renewable subsidies charged to electricity consumers.
- However the distribution of charges and costs also matter.
- Some security of supply issues (i.e. too much generation).

Coping with high shares of renewables

UK (EMR)

Focused on decarbonisation
rather than renewables per se
Use of different instruments
Support to low carbon
generation

Germany (Energiewende)

“Just do it” approach
Renewables come first
High tariffs (subsidies)
Nuclear-free

New York (REV)

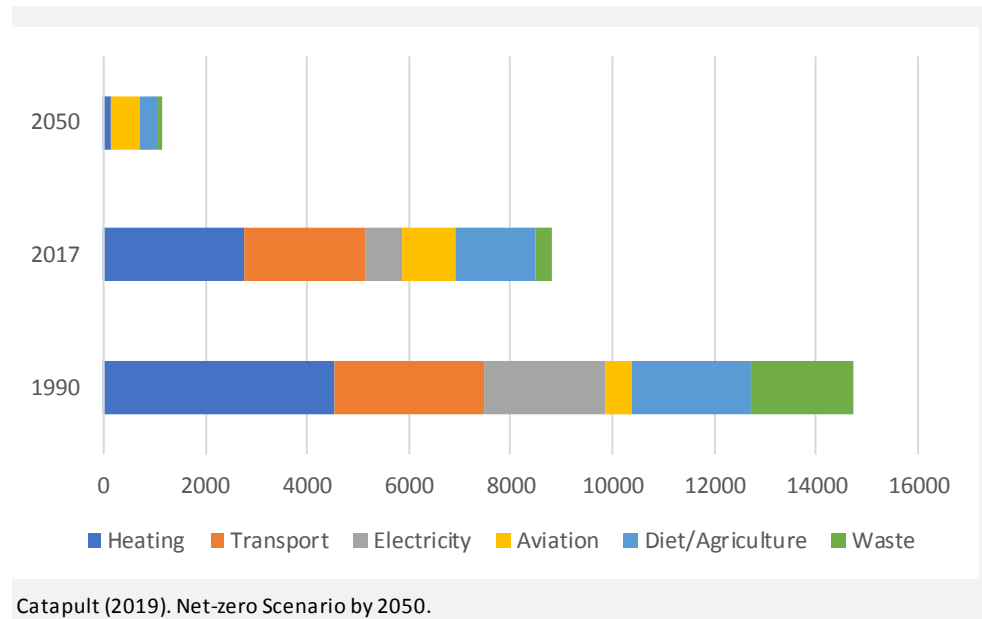
Unlock the value of DER
Utilities become “DSPs”
Extension of market functions (to
distribution)

Some key figures & new developments– UK

Committee on Climate Change (2019):

- “Net zero” greenhouse gasses by 2050 (tougher goal).
- But with current policies it is not possible (even for existing targets!), then clear, stable and well-designed policies are required.
- People also need to do things differently (societal change).
- Some sectors with more impact than others (e.g. heating, transport).

Figure 3: UK average household emissions (KgCO₂e)



Some key figures & new developments - UK

Coping with the increase of renewables and decarbonisation:

Energy Sector:

- Smart systems and flexibility plan -2017 (rise in renewables - decentralised options)
- New interactions with TSOs/DSOs – 2018 (5 DSOs Worlds)
- Improved charging methodology (SCR)– 2019 (WP1, WP2)

Heating Sector:

- 1/3 UK carbon network emissions, half energy usage.
- Heat networks: 14k, 0.5m customers, 10TWh (heat demand:2%),2.4% households
- Launch of the Heat Networks Investment Project – HNIP (Oct. 2018), up to £320m (in addition to other current schemes: RHI).
- Creation of self-sustaining heat networks with robust consumer protection.

Transport Sector:

- Conventional petrol/diesel cars to be phased out from 2040 (Scotland: 2032).
- Right incentives to network companies to facilitate flexible EV charging.
- Efficient investment (“range anxiety”) and access to EV charging.
- Distributional costs (EV owners vs non-EV owners).
- Interoperability (“Automated and Electric Vehicle Bill”).

Concluding Remarks

- Different kinds of electricity market reforms may converge in the long term.
- New developments (i.e. new rules, roles, business models, markets) are required for the integration of high shares of renewables.
- A societal change is needed (*“consumer as the centre of energy transition”*).
- Better management of renewable energy: DR, energy storage, interconnectors can help with this.
- Sector coupling can be also an option (PG)...
- Renewable generating units with better/improved capabilities are required (i.e. new connection codes).

Q&A

Thank you!