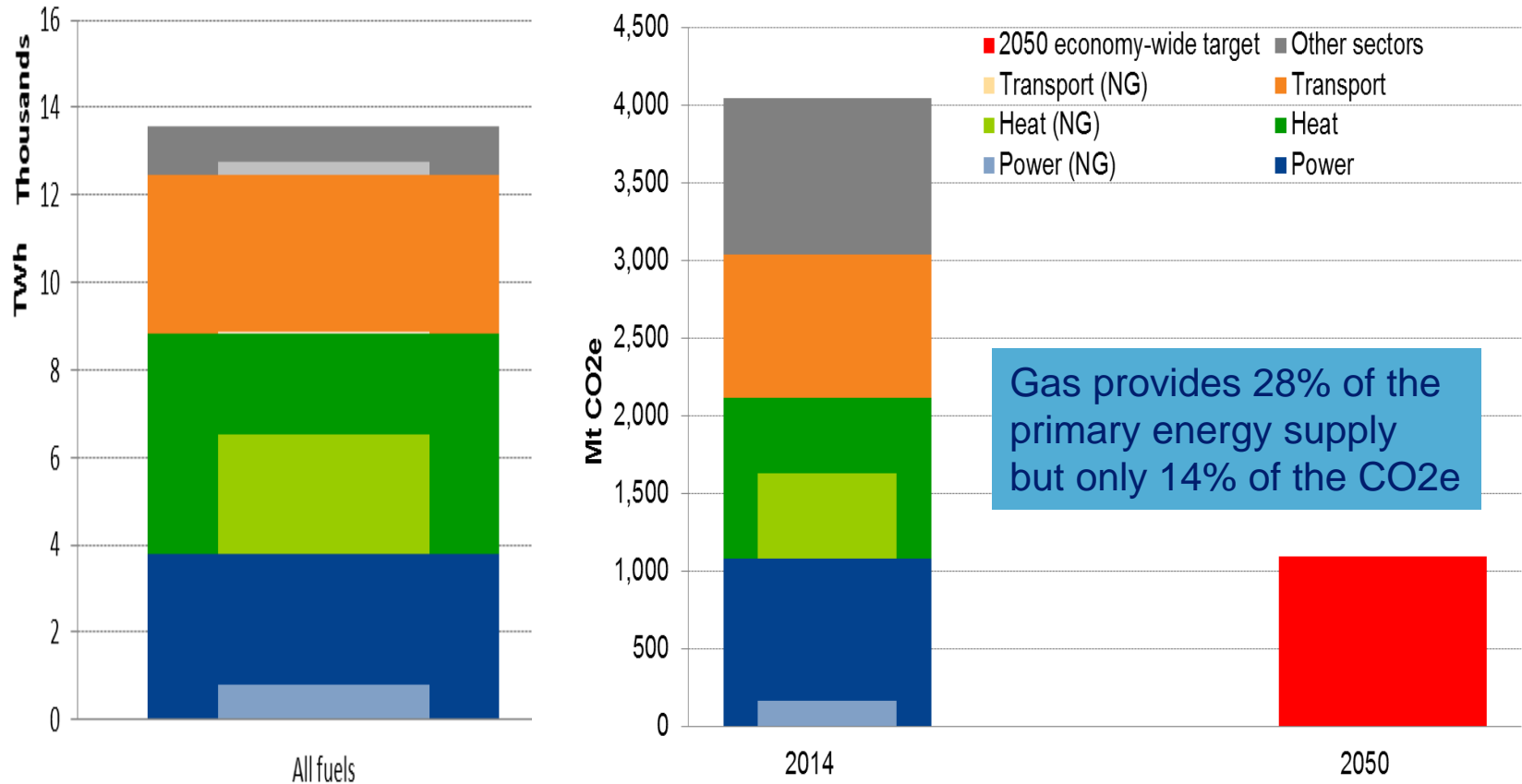
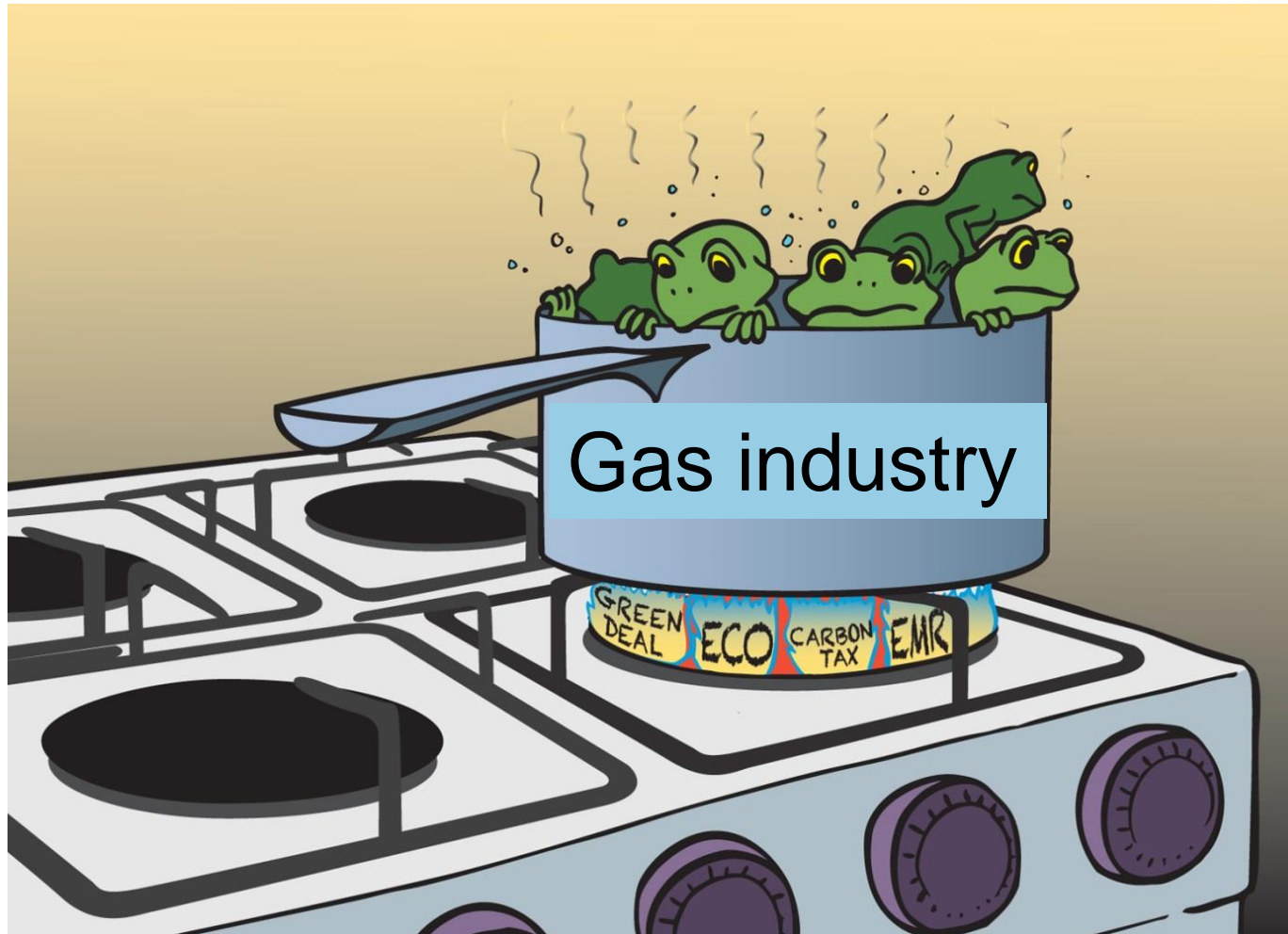


# DECARBONISING THE EUROPEAN ECONOMY – THE SCALE OF THE CHALLENGE



Source: 2016 National Inventory Submissions (Common Reporting Format) for EU, Norway and Switzerland.  
 Notes: Power includes CHP, heat includes auto-generation of power, NG includes other gaseous fuels.

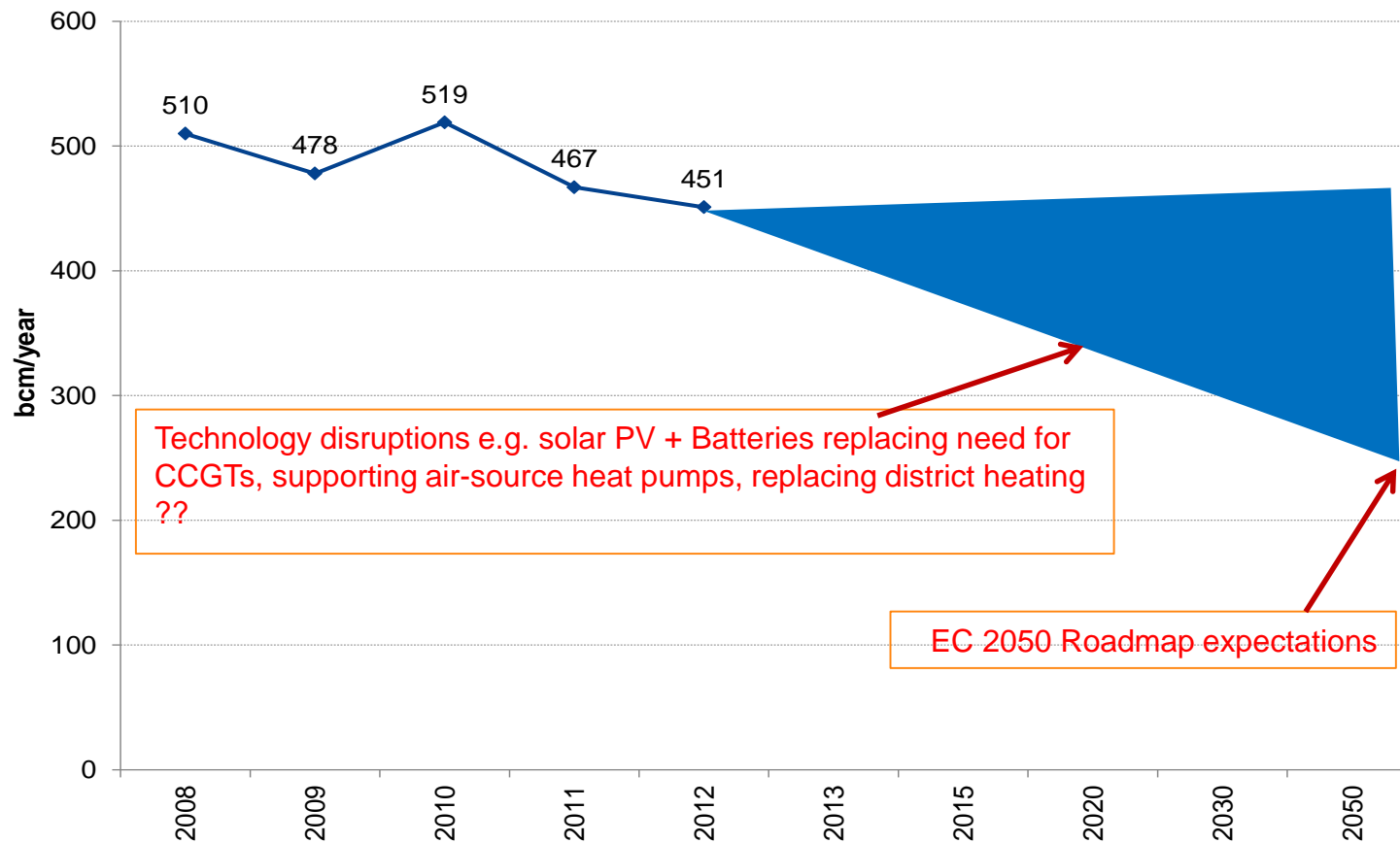
# DECARBONISATION CURRENTLY REQUIRES INVESTMENT IN MORE EXPENSIVE TECHNOLOGIES SO INNOVATION WILL BE KEY



# WHAT ROLE WILL GAS PLAY IN THE FUTURE?

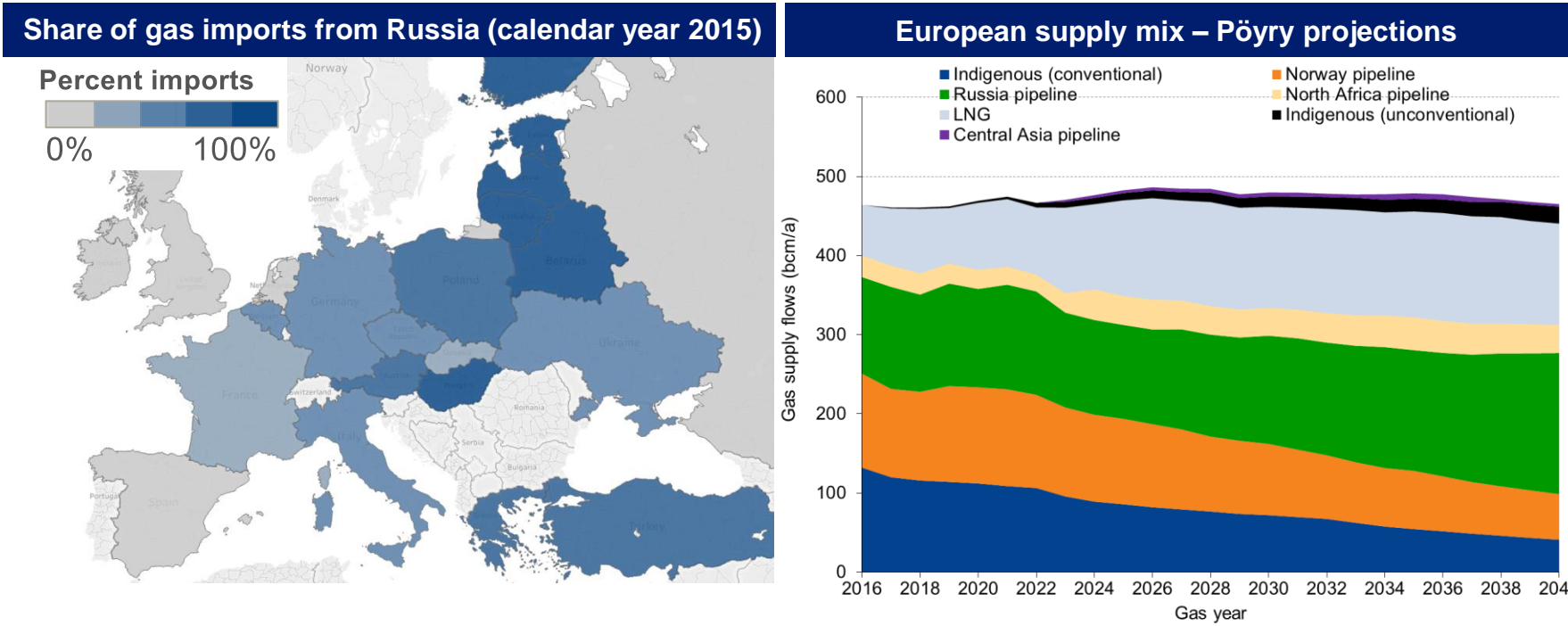
There are widely divergent views on the future path for EU gas demand and its role in the decarbonised future but how do you keep the lights on and homes warm?

**EU gas demand projections (bcm/yr)**



# SECURITY OF GAS SUPPLY

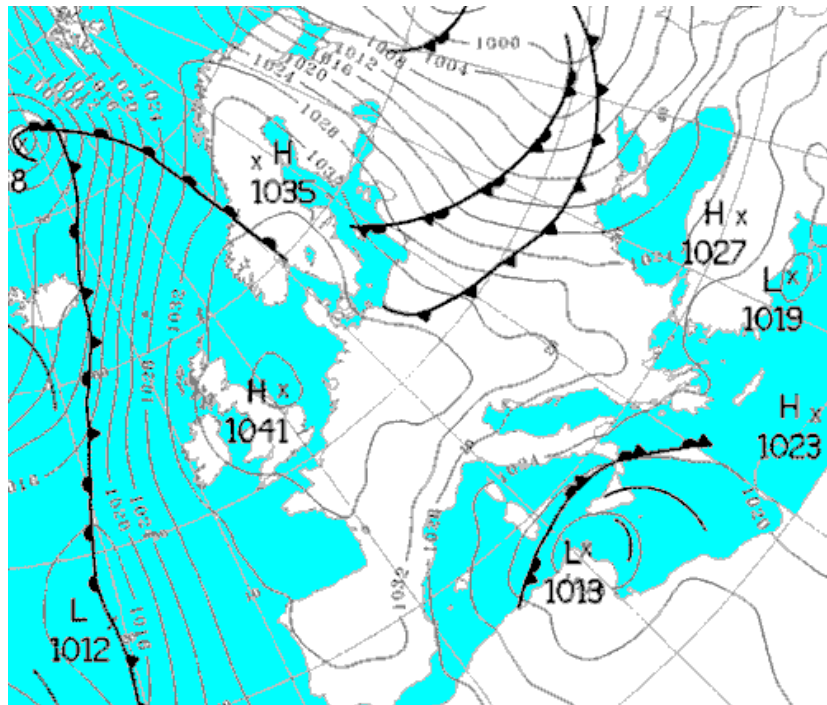
Will new regulation approved on 26 April 2017 improve situation or is this a non-issue that stakeholders should not be concerned about?



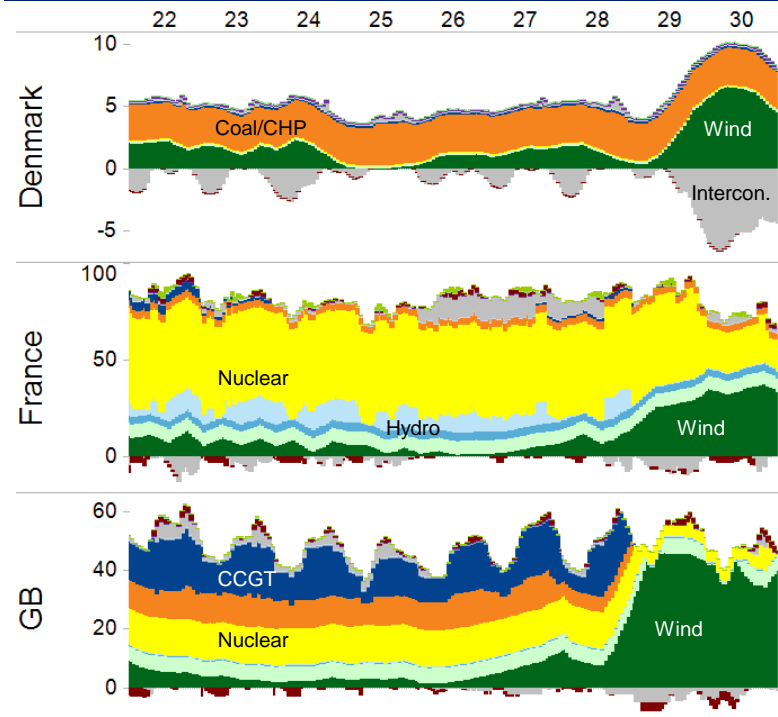
# CAN YOU KEEP THE LIGHTS ON AND HOMES WARM WHEN HEAT IS DECARBONISED BY 2050?

There are historical periods where there is no wind and minimum solar for 4 days

### Historical weather 25 December 2006



### Projected generation in December 2030 using 2006 weather pattern

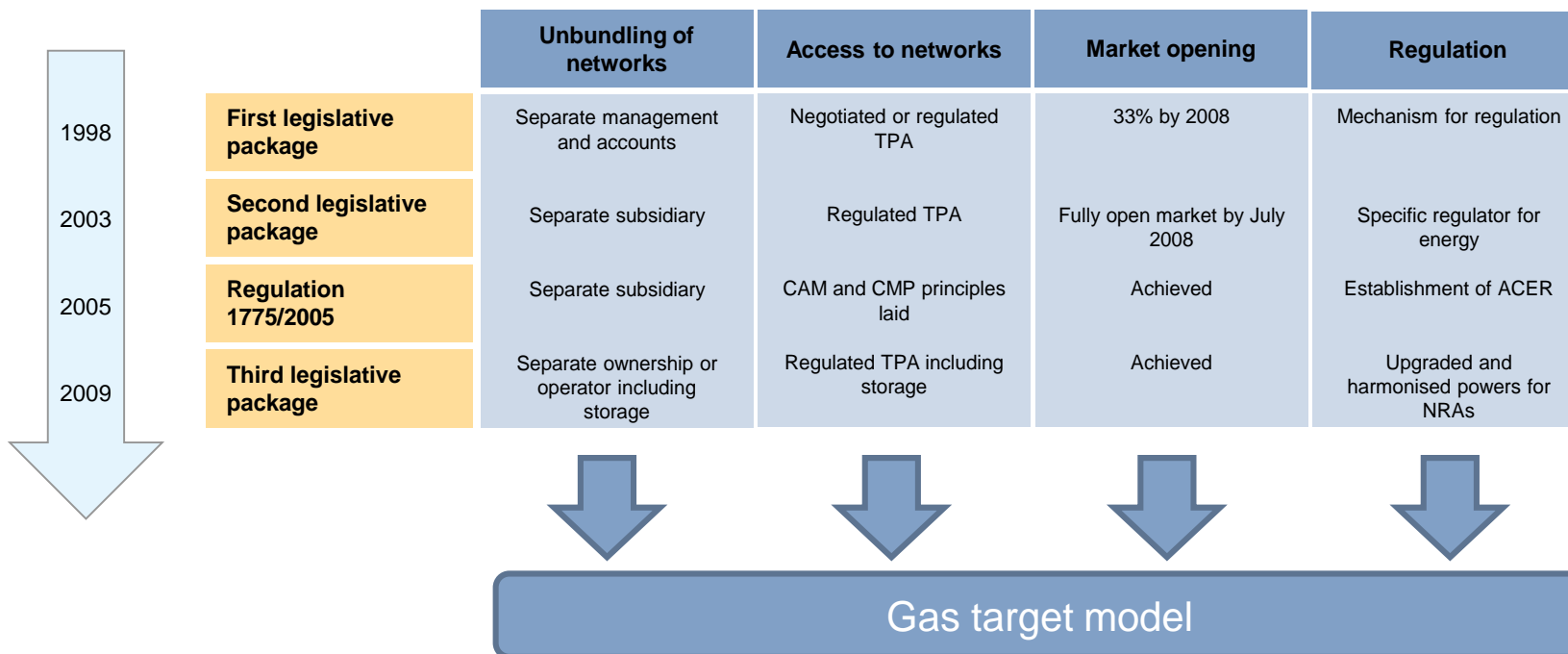


By 2050 EC forecast electricity demand will be 38% higher (assume major energy efficiency offsetting new electric vehicles and renewable heat - making managing such intermittency a significant challenge

# REGULATION IN THE EUROPEAN GAS MARKETS

The European Commission (EC) has continuously put efforts to liberalise the gas markets in the EU

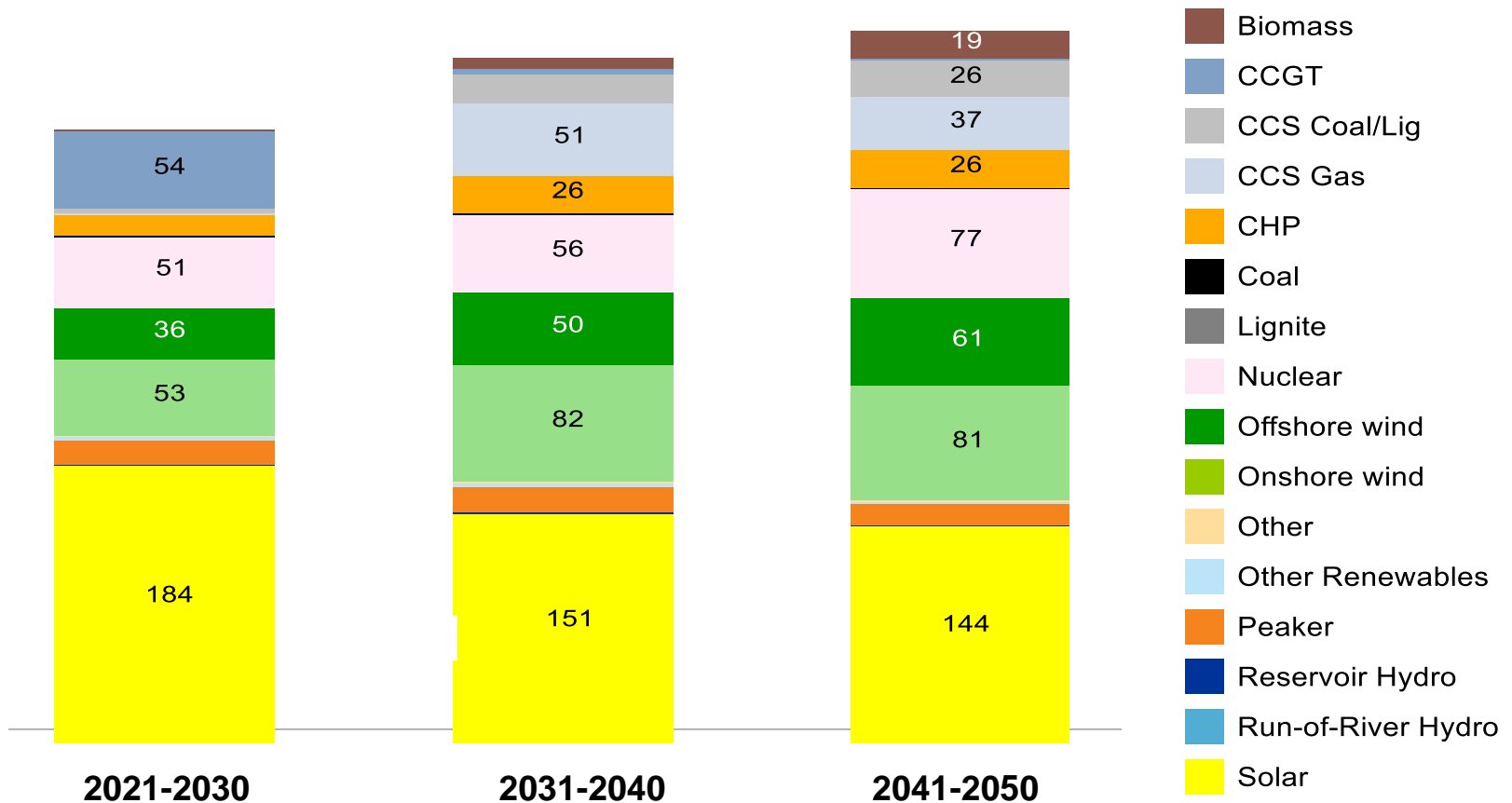
- The EC follows the principle to remove barriers and to create a working internal gas market and the establishment of a competitive gas market that delivers lowest prices for its consumers
- The regulatory process and its results so far is summarised in the diagram
- So far long process to achieve market harmonisation, standard network codes, etc.



# DECARBONISING POWER

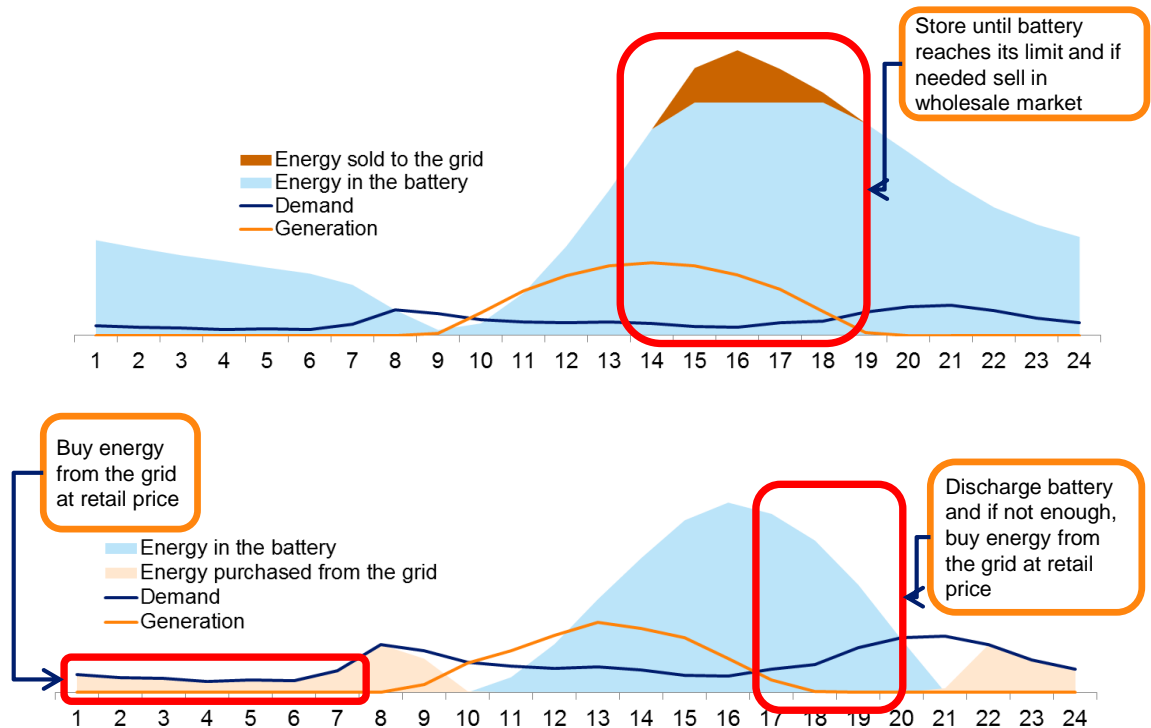
Achieving decarbonisation will require significant investment in technologies that are either unproven (e.g. CCS) or at very large scale (e.g. nuclear/offshore wind)

## New Capacity (GW) EU 2050 Pathway, Balanced Commodities + RES



# DECARBONISING POWER – DISRUPTIVE TECHNOLOGIES

Batteries may transform solar PV and maybe support some air-conditioning load in the summer in the Mediterranean, Southern USA, etc.



But EU gas storage of 1075TWh with 2 cycles/year is equivalent to 98 million electric vehicles fully discharging/recharging every day



# WHICH PATHWAY IS BEST FOR CONSUMERS?

**Are the risks around delivery of an electrification pathway ignored?**

**Can gas offer a pathway to decarbonisation and become the low-carbon super grid?**

