Large-Scale Electricity Interconnection: Technology and Prospects for Cross-Regional Power Networks

15 November, Marrakesh

Jean-Francois Gagne

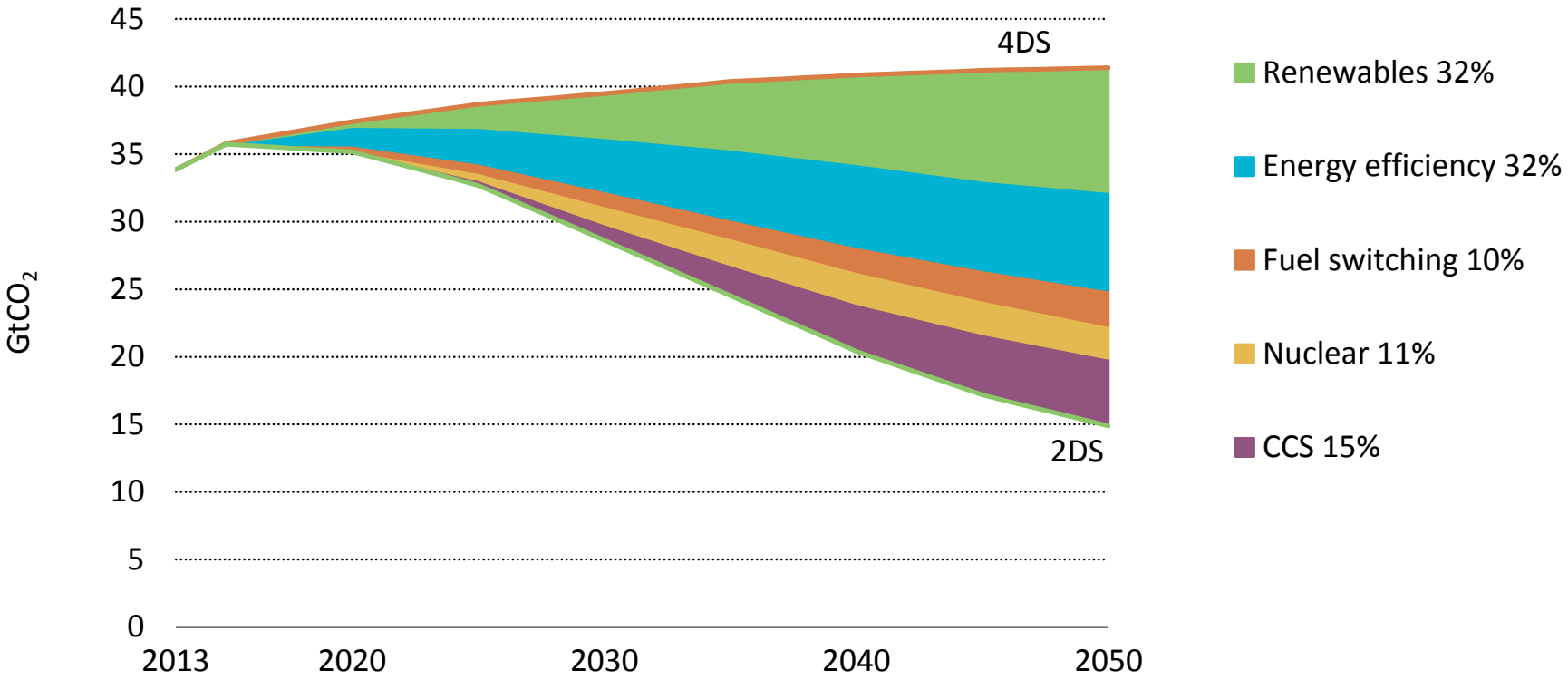
Head of Division, Energy Technology Policy

Context

- **Paris Agreement gives momentum to renewable energy (RE) and energy efficiency (EE)**
  - Record additions of RE in 2015, installed capacity surpassed coal
  - EE investments grew 6% in 2015 reaching $221bln
- **Local air pollution & energy security are also key drivers for power sector decarbonisation**
- **Energy investment flows confirm a shift to clean energy, but there is need for investment in electricity grids to support the transition**

Renewables and efficiency are at the heart of the energy transition

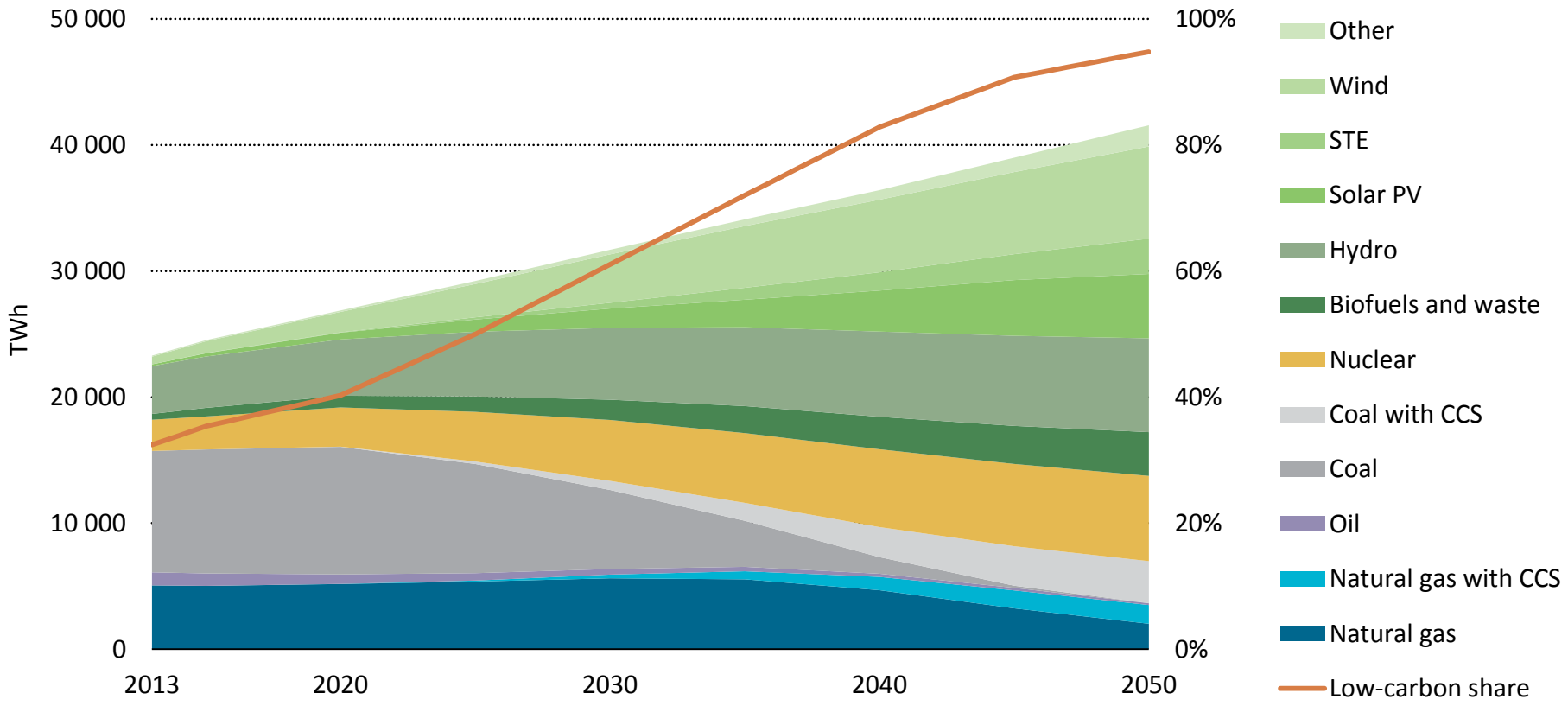
Contribution of mitigation actions to global cumulative CO_2 reductions



The carbon intensity of the global economy can be cut by two-thirds through a diversified energy technology mix

Electricity Generation: a share reversal

www.iea.org



Generation today:

- Fossil fuels: 68%
- Renewables: 22%

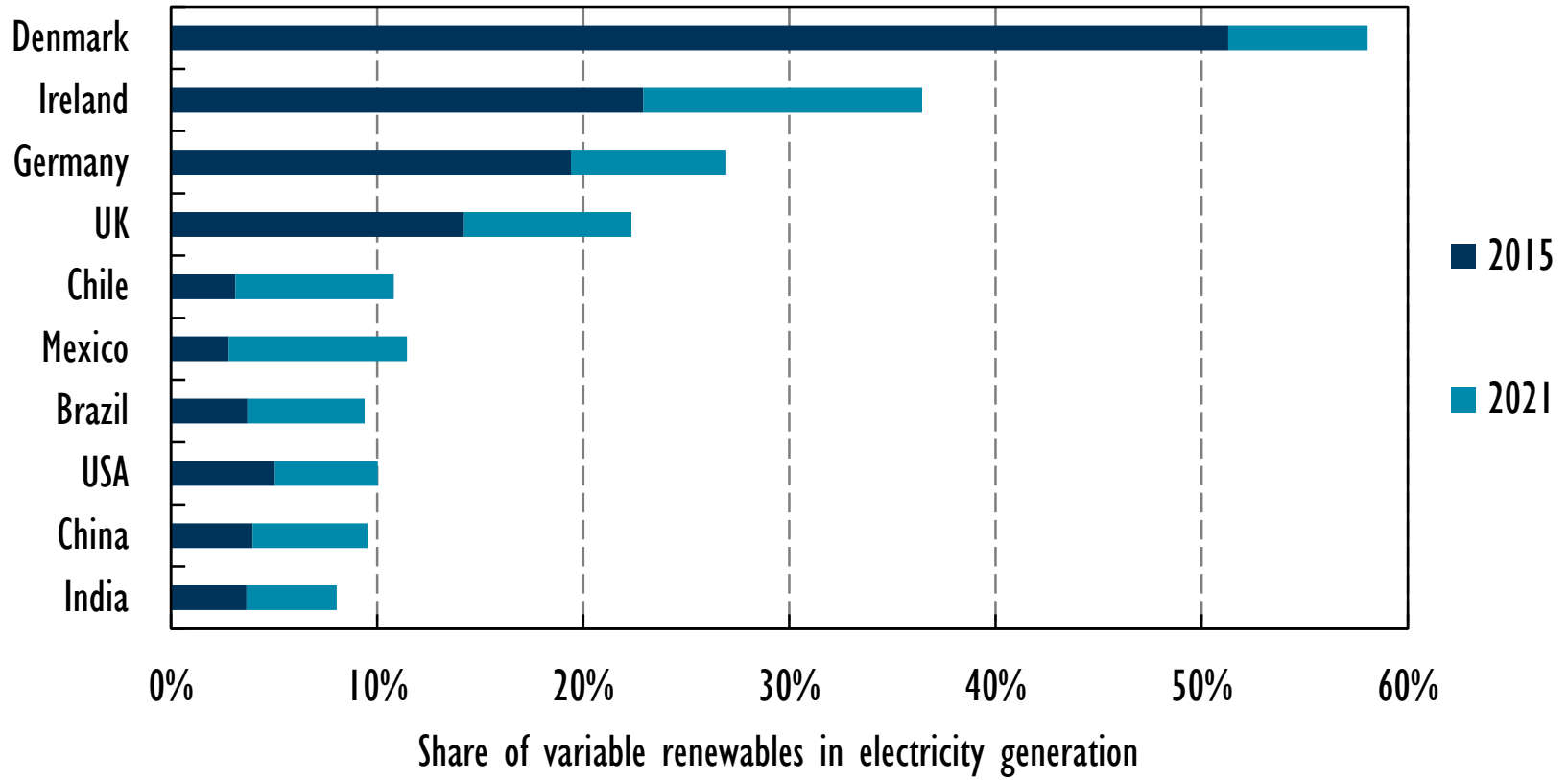
Generation 2DS 2050:

- Renewables: 67%
- Fossil fuels: 17%

Increasing shares of variable renewables calls for more flexibility

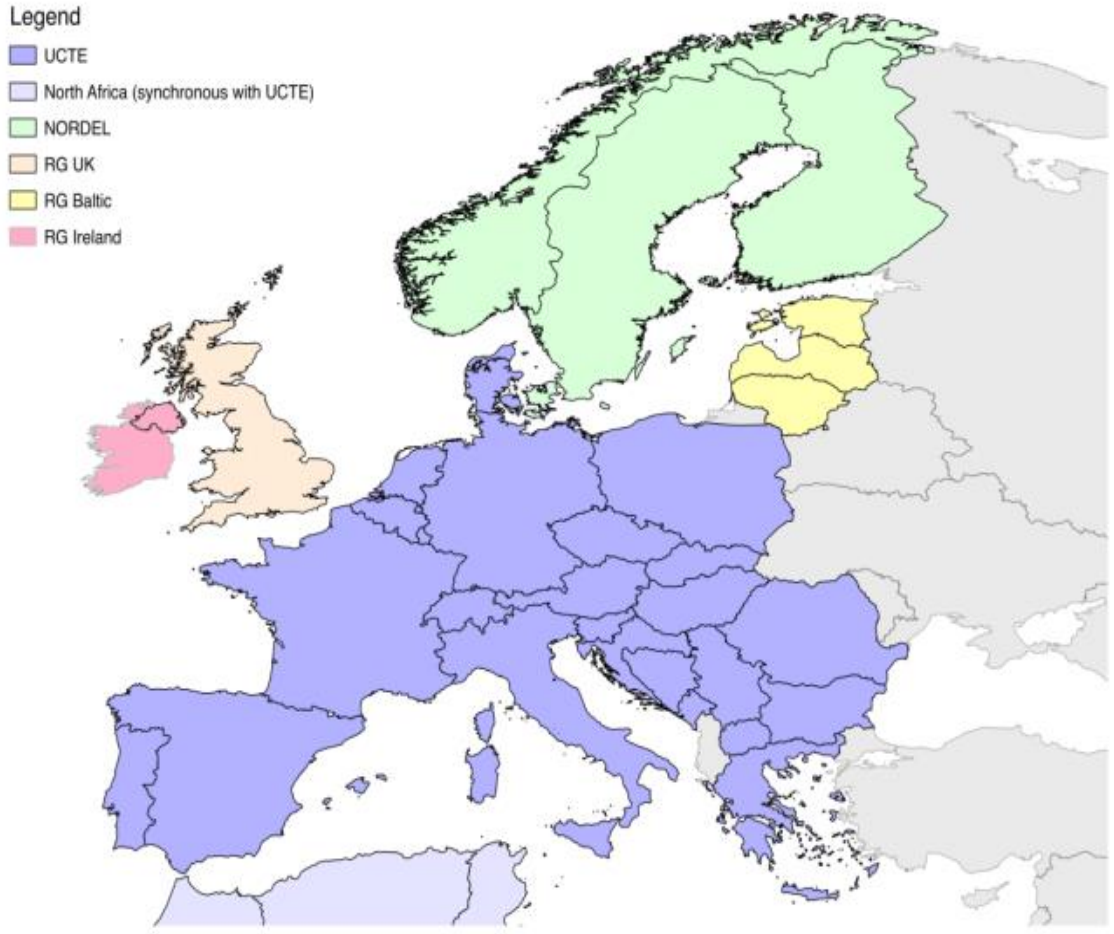
www.iea.org

Share of variable renewables in total electricity generation



Experience has shown that cost-effective system integration of high shares of variable renewables is possible - with the right policies & investments

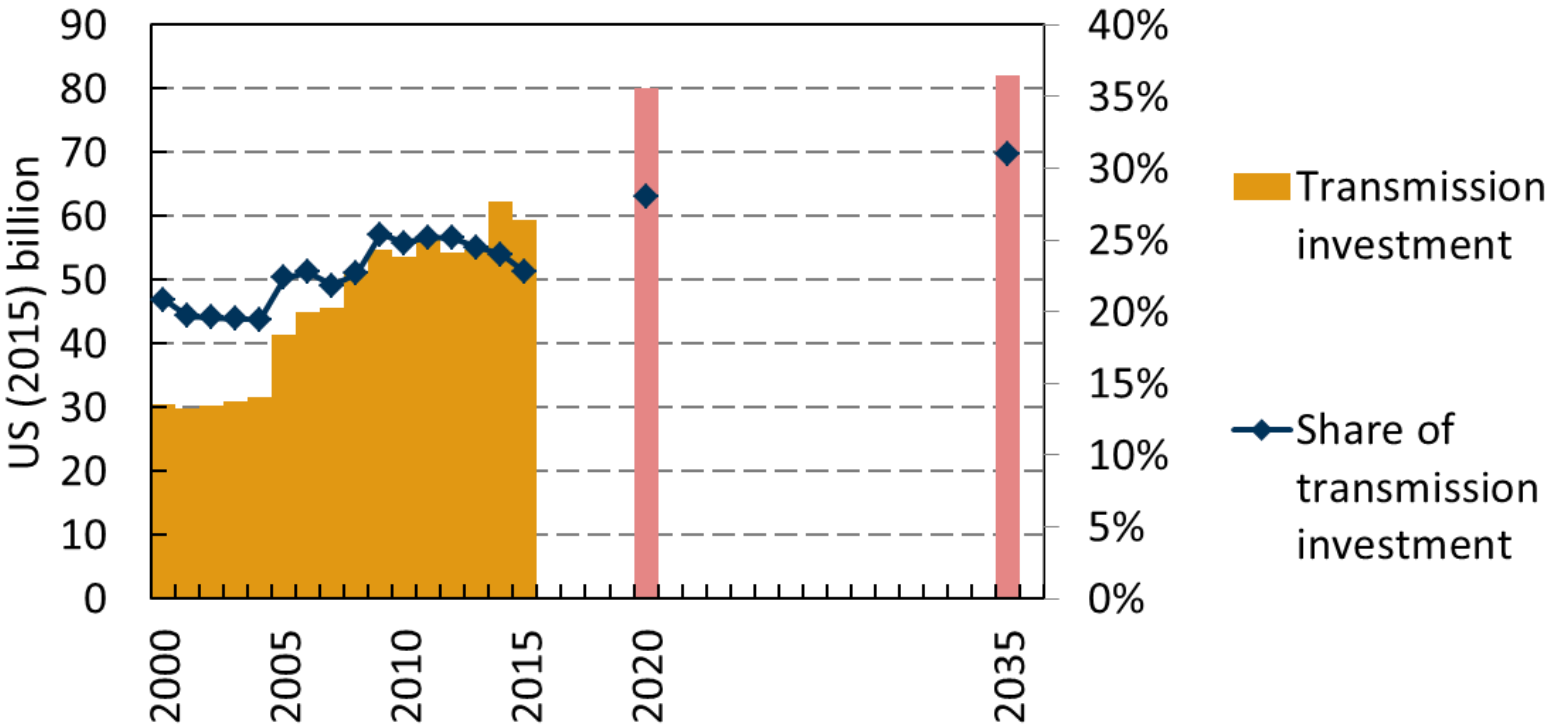
Integration of networks and markets key enabler of flexibility and 21st century electricity systems



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

Over 50 million kilometers of transmission lines – and yet less than 1% of this capacity for interconnection

Investment in transmission grids needs to accelerate to reach COP goals

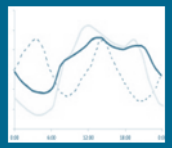


Transmission will account for 40% of all electricity grid investment needs; half of all transmission lines will have to be replaced between now and 2040

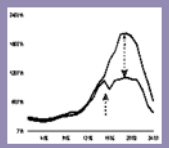
Interconnection can provide a range of benefits to achieve sustainable, secure electricity systems

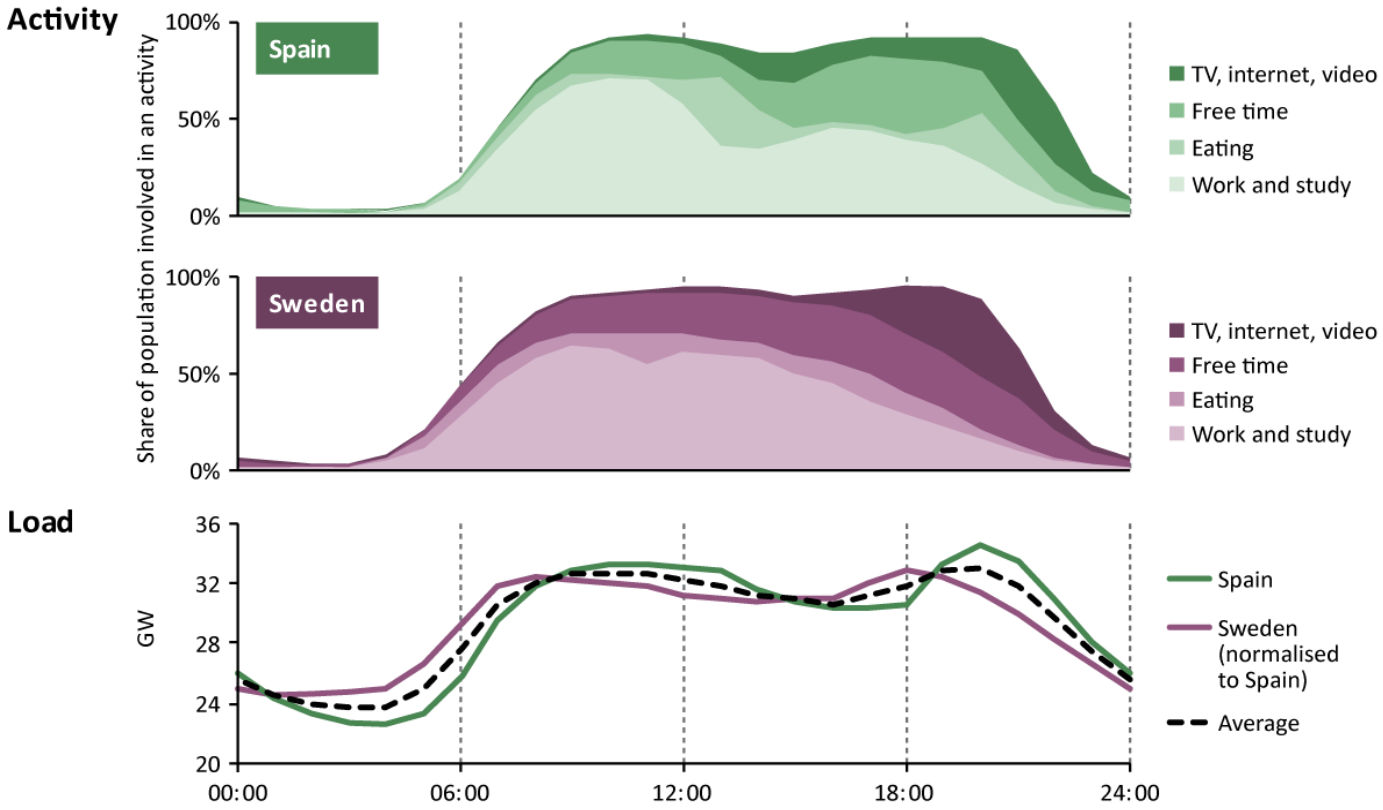
www.iea.org

Demand smoothing

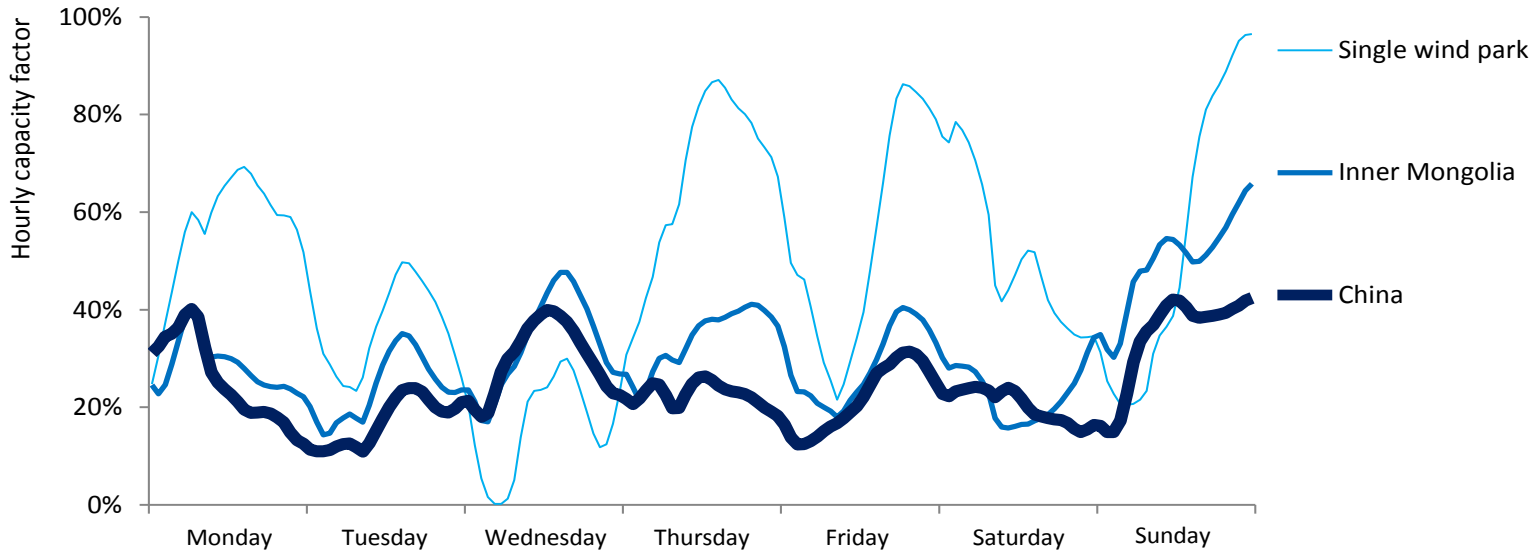


Peak reduction





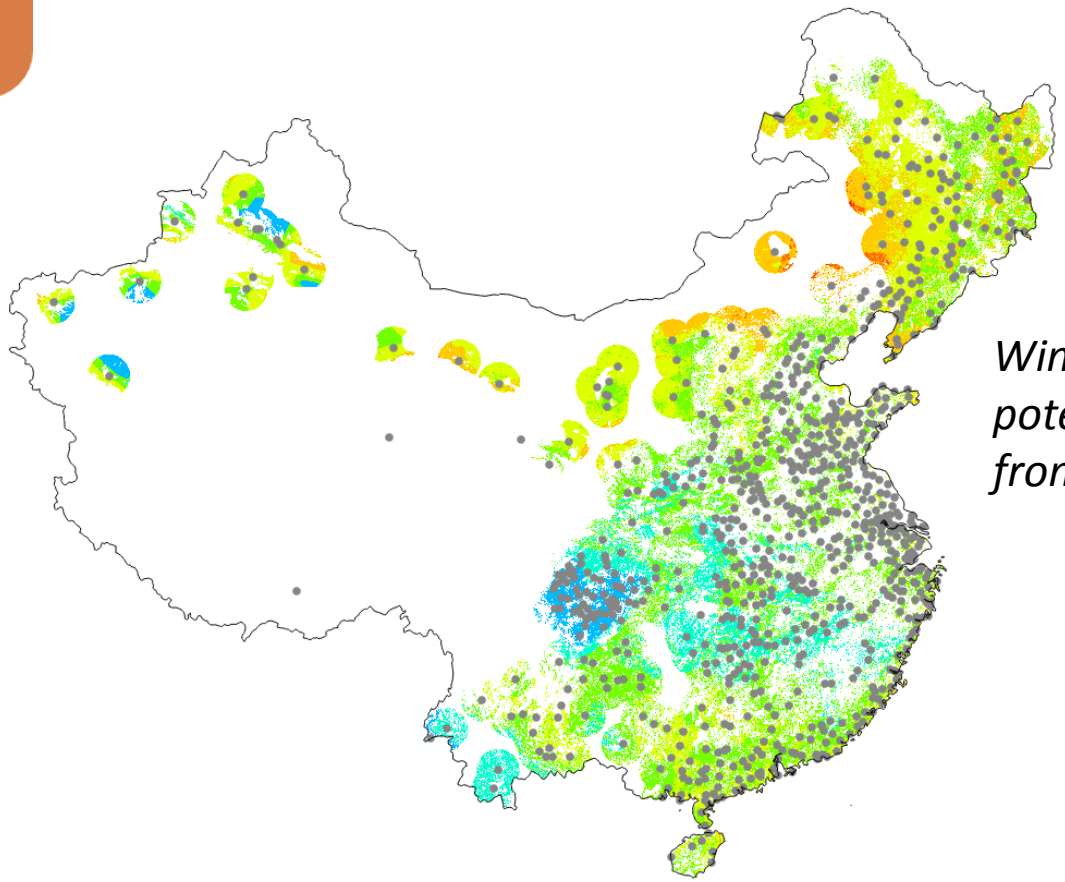
Interconnection can provide a range of benefits to achieve sustainable, secure electricity systems



Interconnection can provide a range of benefits to achieve sustainable, secure electricity systems

www.iea.org

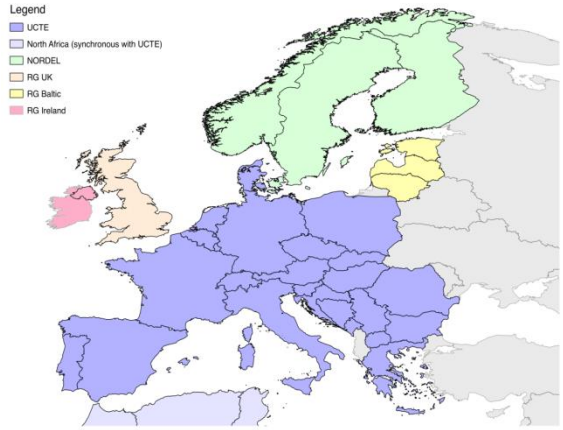
Long-distance transmission



Wind power potential <100km from cities

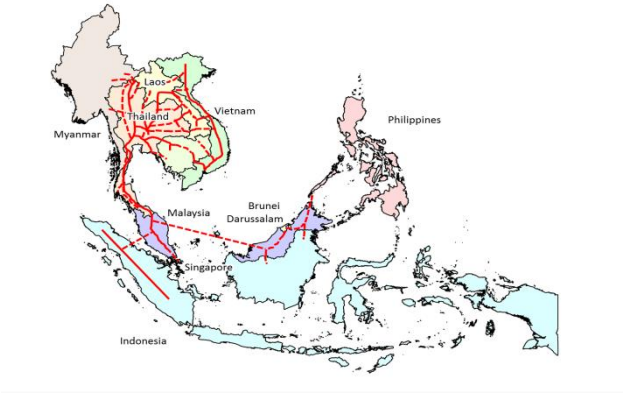
This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

Large-scale Electricity Interconnection: Technology and prospects for cross-regional energy networks

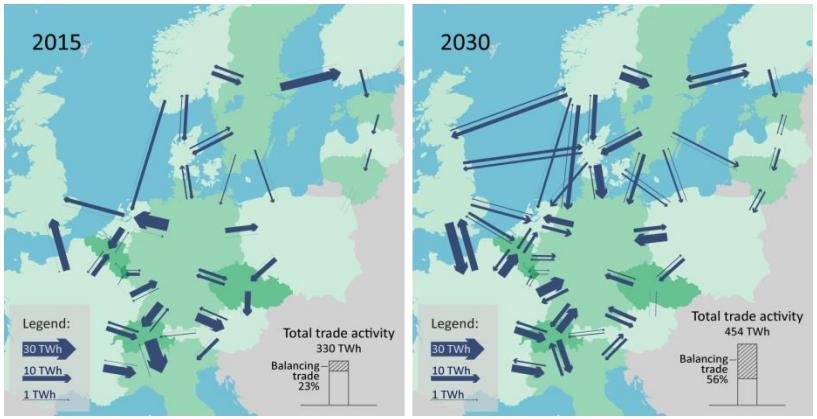


Europe and North Africa

Central America



South East Asia



Mid-term prospects (source: IEA/NER 2016)

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

Rigorous analysis of current technology and potential deployment trends in Europe and North Africa, South East Asia, Central America and Sub-Saharan Africa

Conclusions

- **Clear signs of progress**
  - Success of technology progress, market innovation and political leadership
- **An energy system approach is critical to achieve transformation**
  - Stronger integration of networks and markets key enabler for the transition
- **IEA analysis to shed light on the role of large-scale, regional interconnection**

The IEA works around the world to support an accelerated clean energy transition that is

enabled by real-world SOLUTIONS

supported by ANALYSIS

and built on DATA