



# The Role of Integrating Electricity Networks and Markets for the Energy Transition

*14 November, Marrakesh*

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

**enabled by real-world SOLUTIONS**

**supported by ANALYSIS**

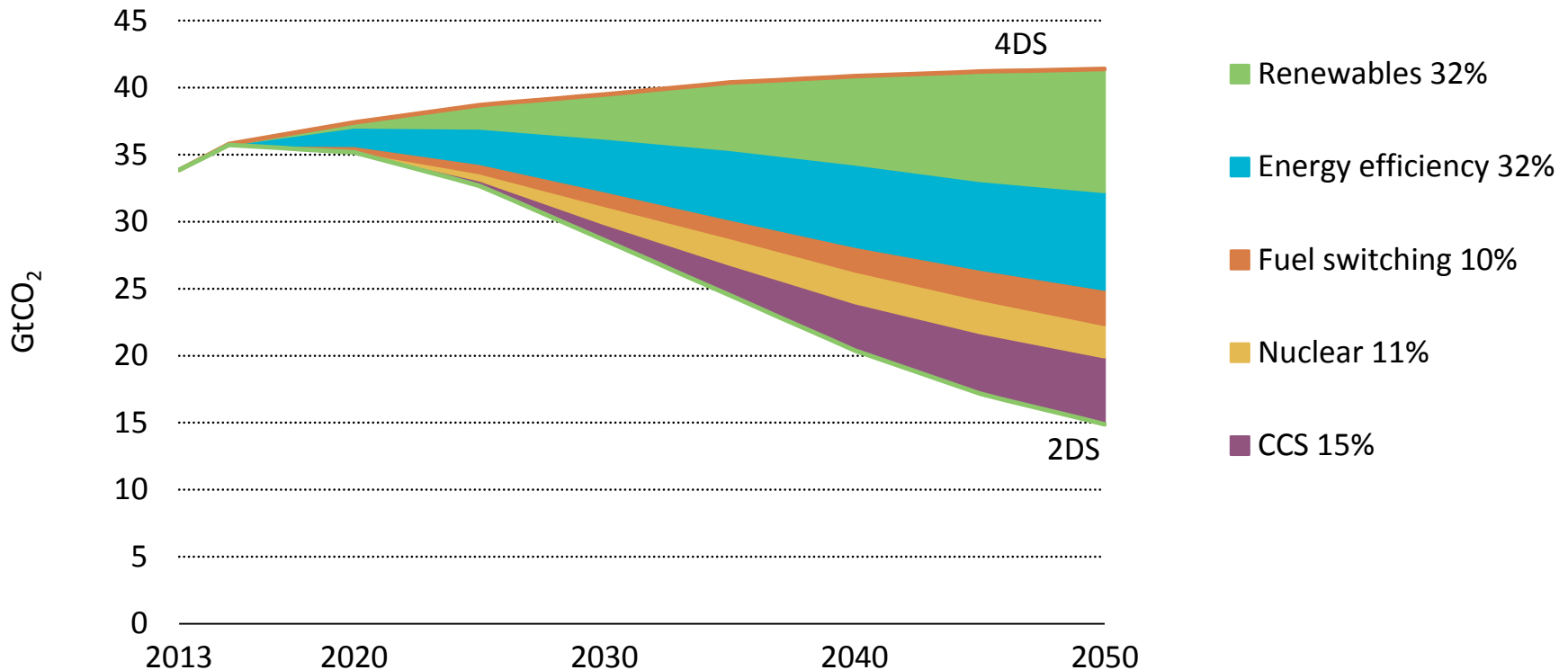
**and built on DATA**

# 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**

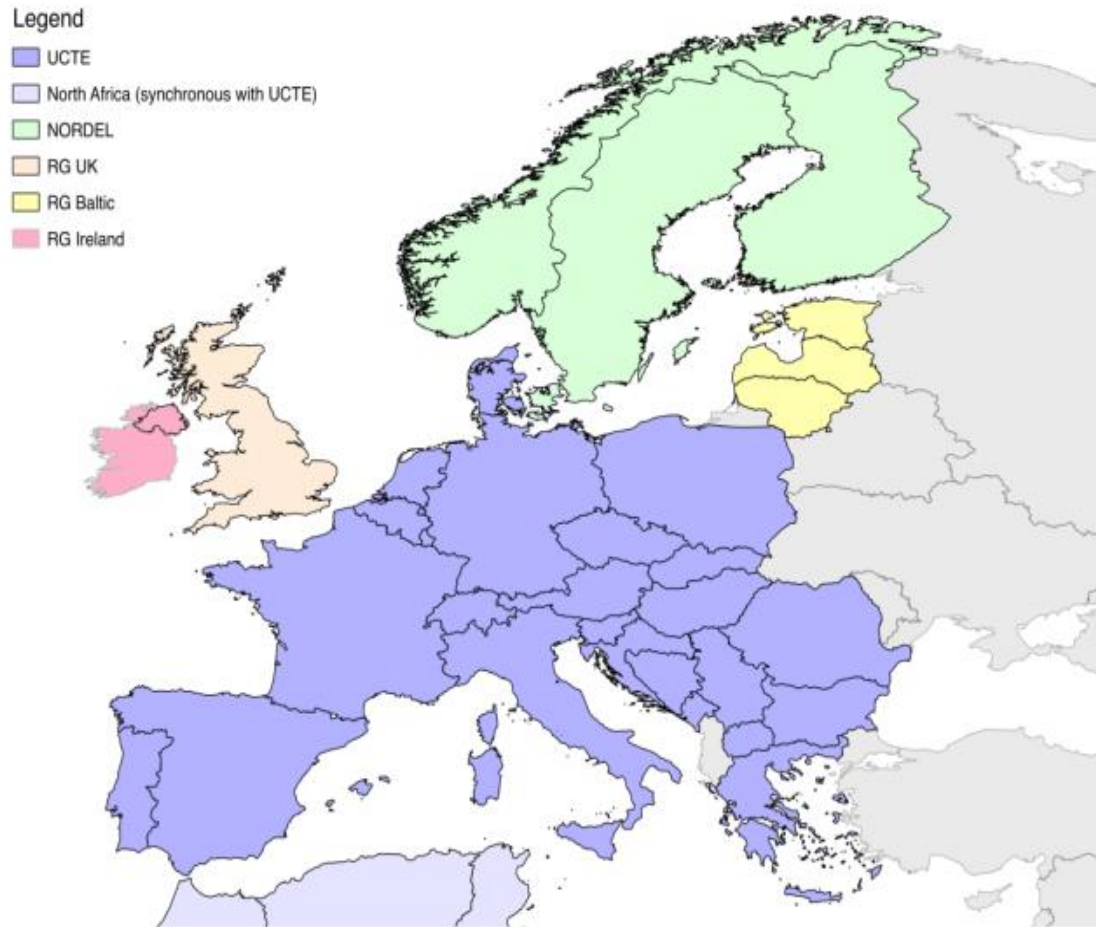
# Renewables and efficiency are at the heart of the energy transition

## Contribution of mitigation actions to global cumulative CO<sub>2</sub> reductions



***Cost-effective system integration of high shares of variable renewables is possible - with the right policies & investments***

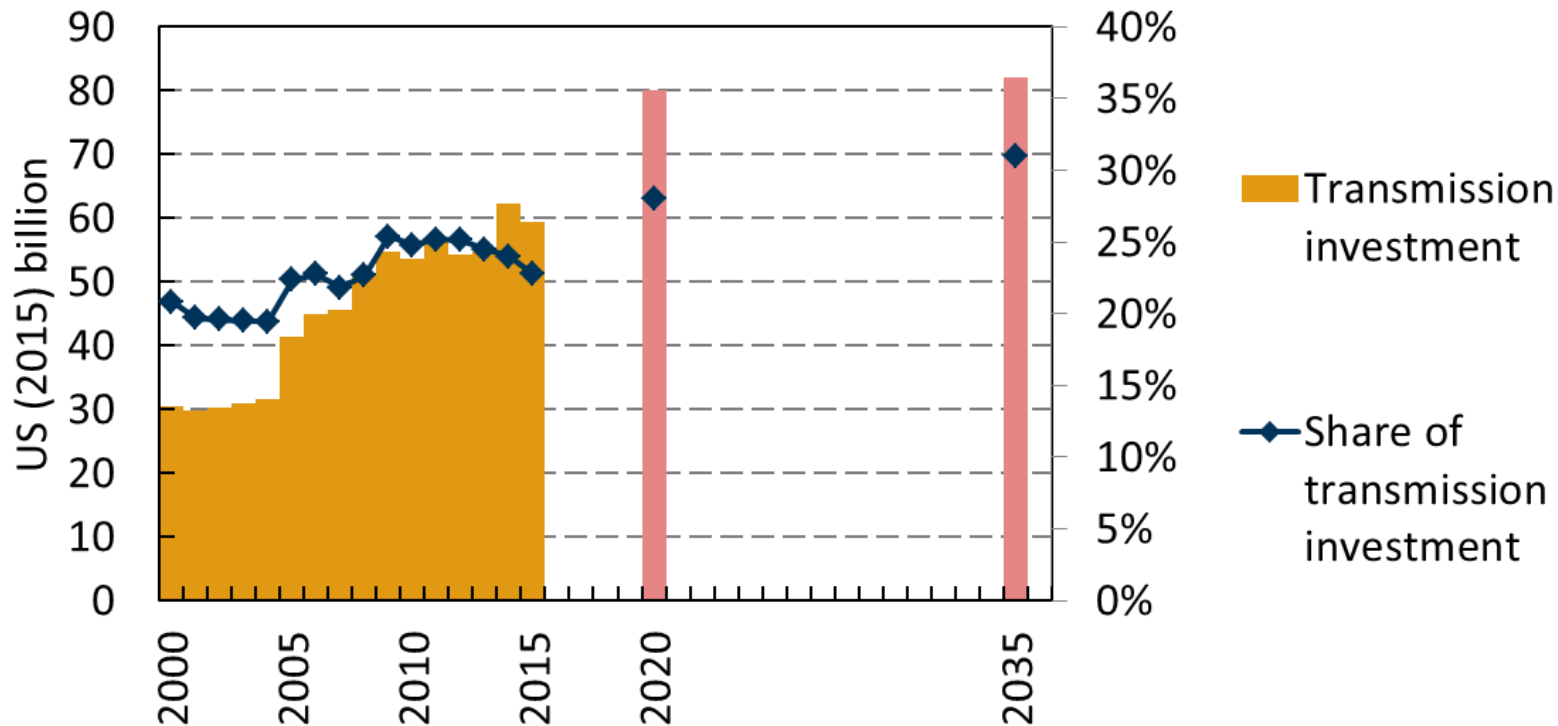
# Integration of networks and markets key enabler of flexibility and 21<sup>st</sup> century electricity systems



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

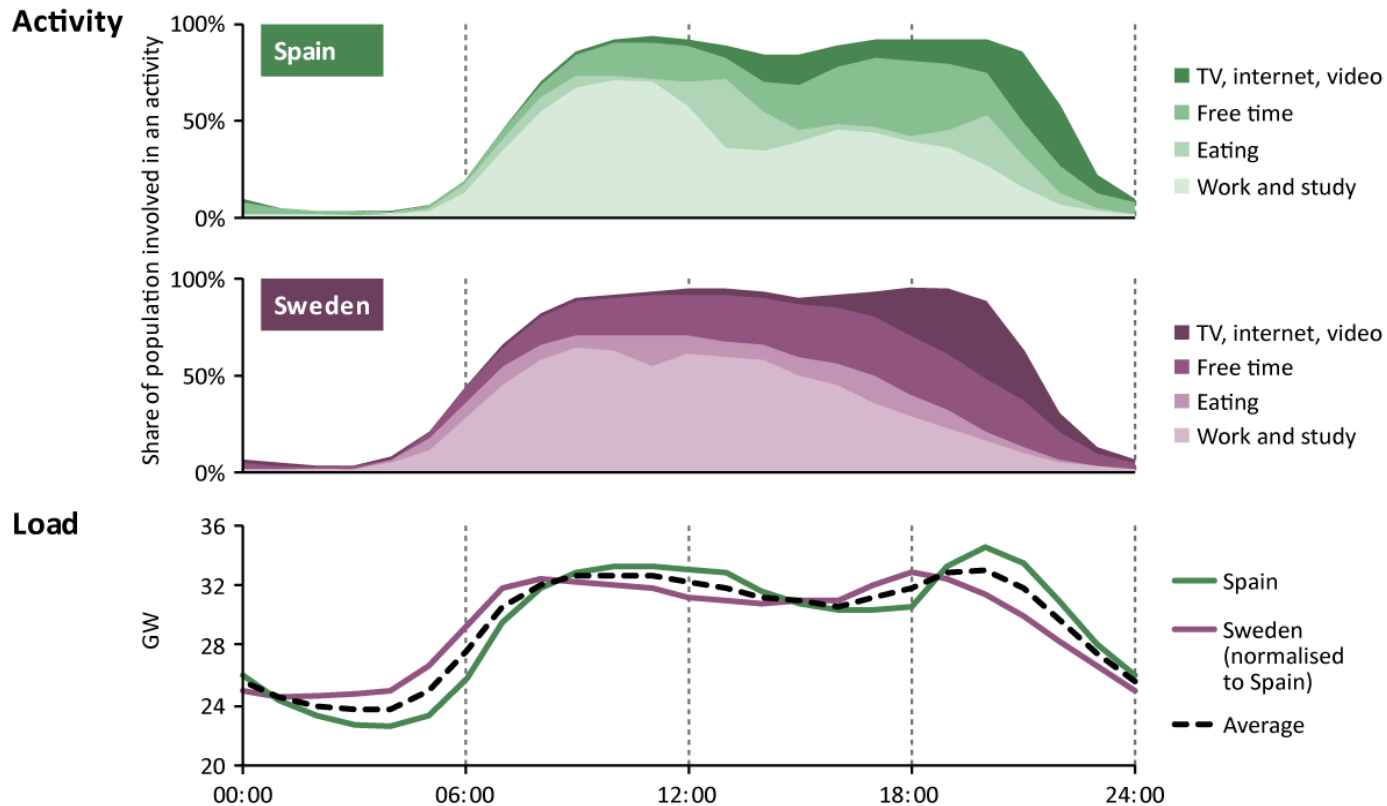
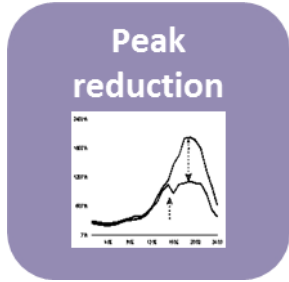
**Over 50 million kilometers of transmission lines – and yet less than 1% of this capacity for interconnection**

# 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

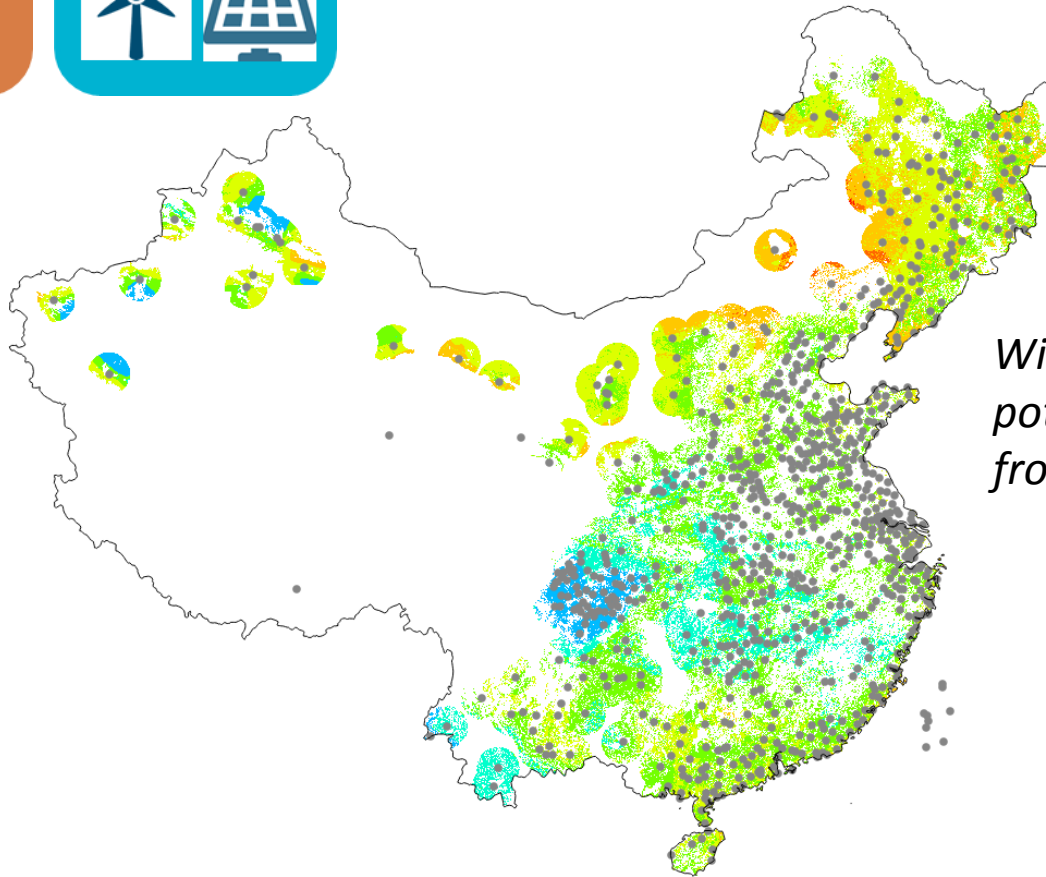


# Interconnection can provide a range of benefits to achieve sustainable, secure electricity systems

Long-distance  
transmission



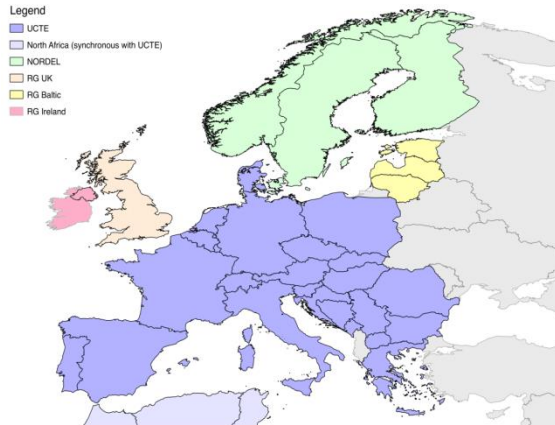
VRE  
Integration



*Wind power  
potential <100km  
from cities*



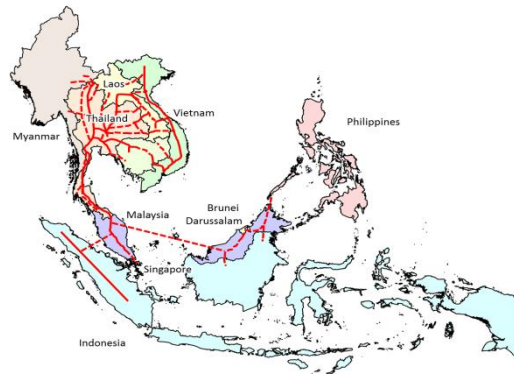
# Large-scale Electricity Interconnection: Technology and prospects for regional energy networks



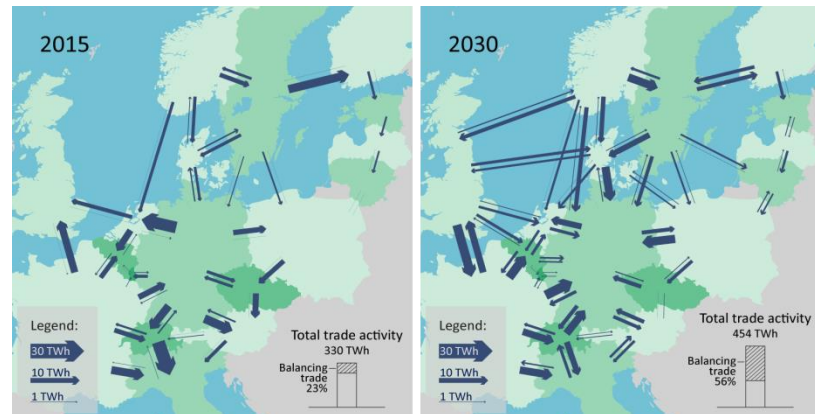
Europe and North Africa



Central America



South East Asia



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**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

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