

# Energy Technology Perspectives 2014

## Energy Technology Perspectives 2014: Harnessing Electricity's Potential

Didier Houssin

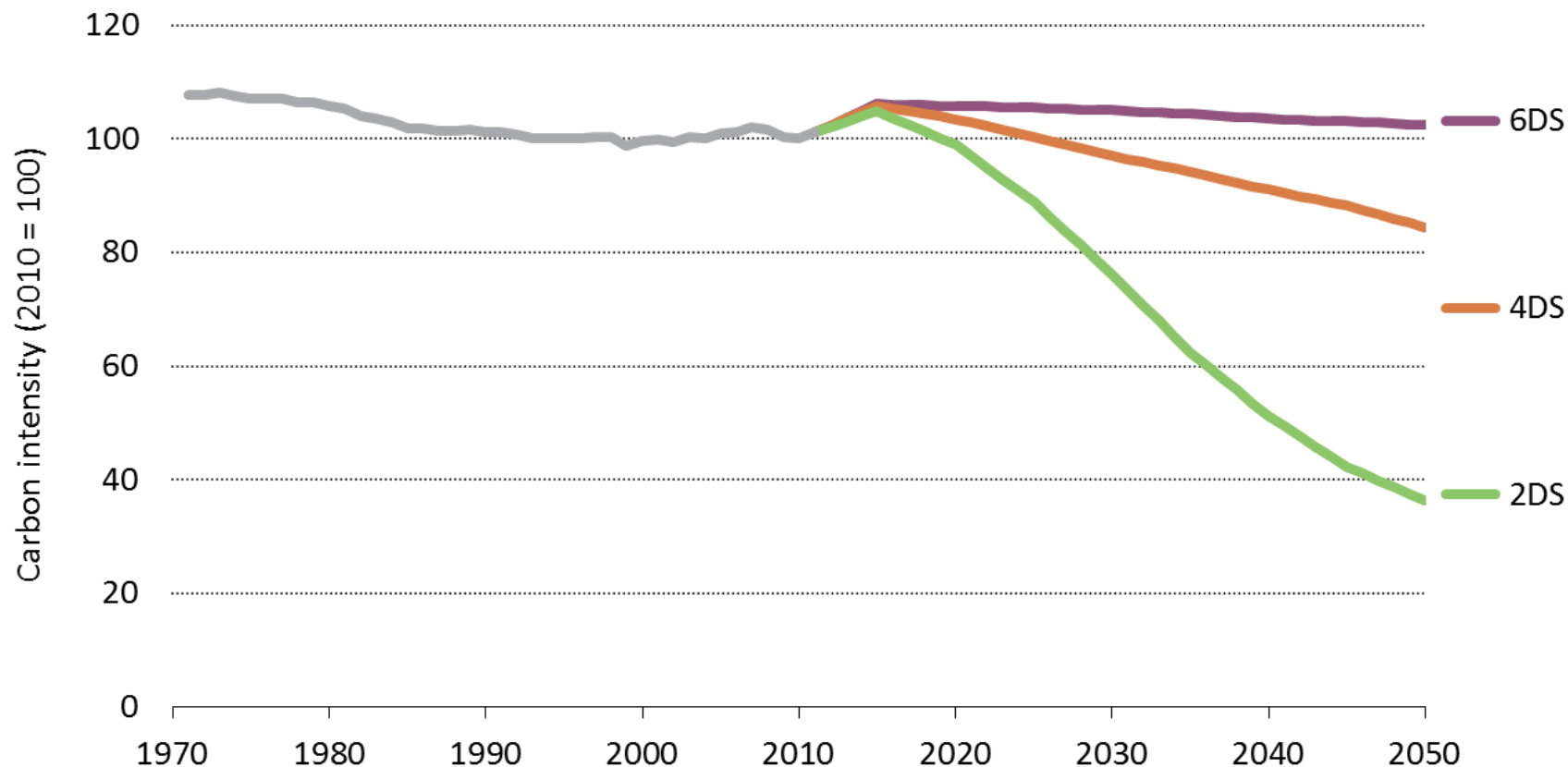
Director, Sustainable Energy Policy and Technology  
International Energy Agency

**Paris, France**

**30 June 2014**

# Carbon Intensity of supply is stuck

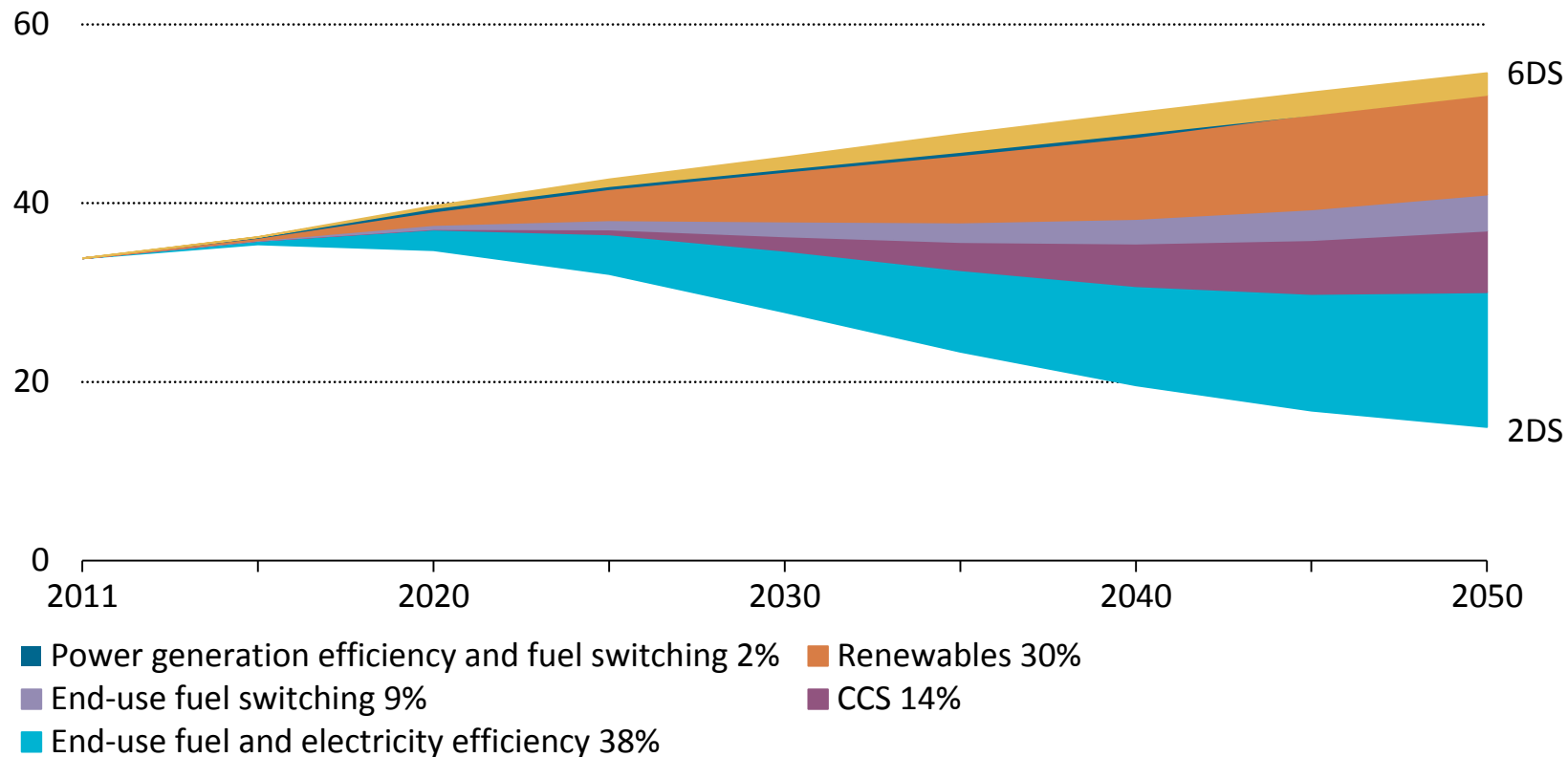
ETP  
2014



*The political will to make meaningful progress at a global scale has yet to be demonstrated*

# A transformation is needed...

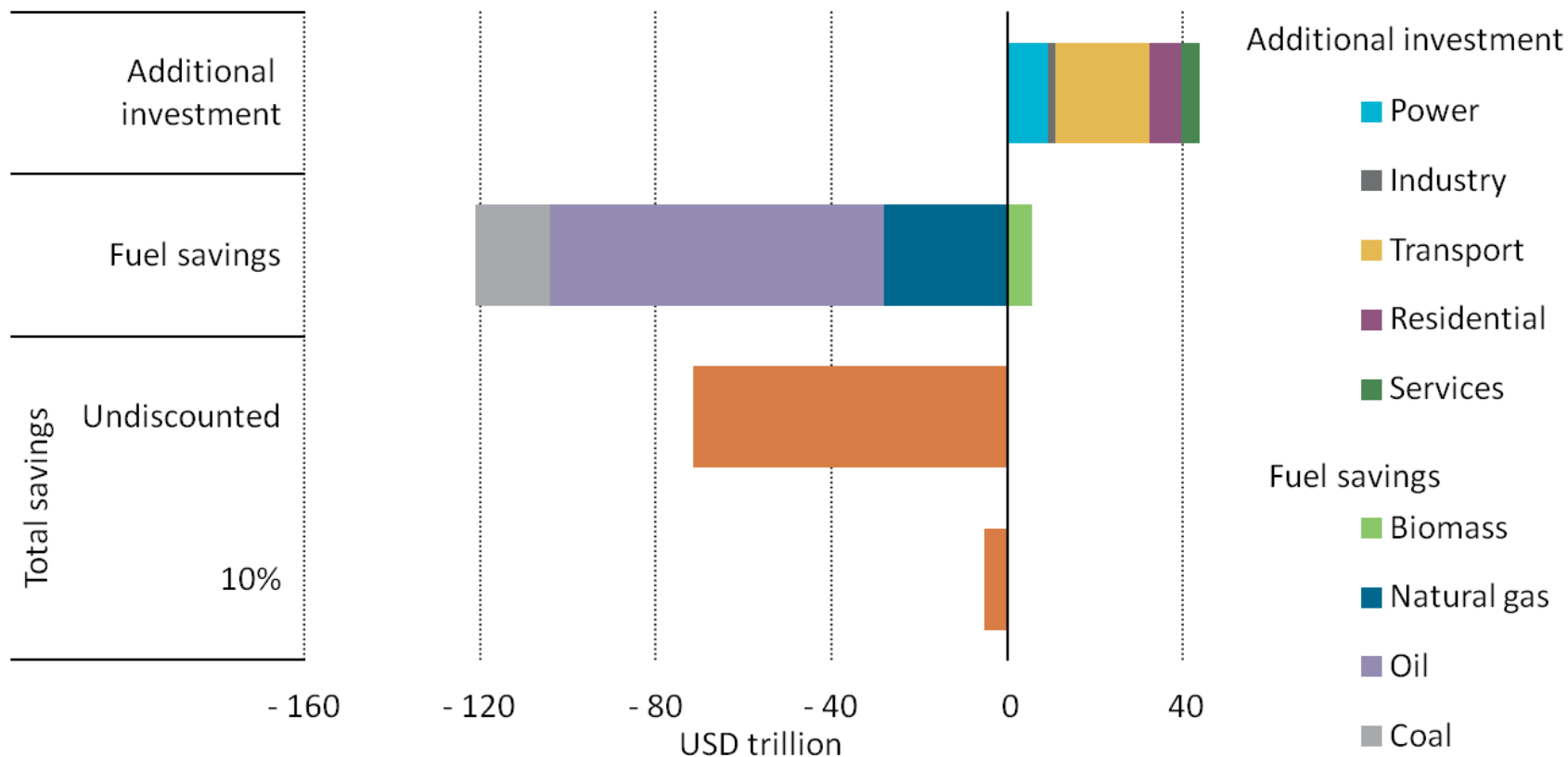
ETP  
2014



*..and we to have the tools to develop a strategy and be proactive.*

# Investment in our future pays off...

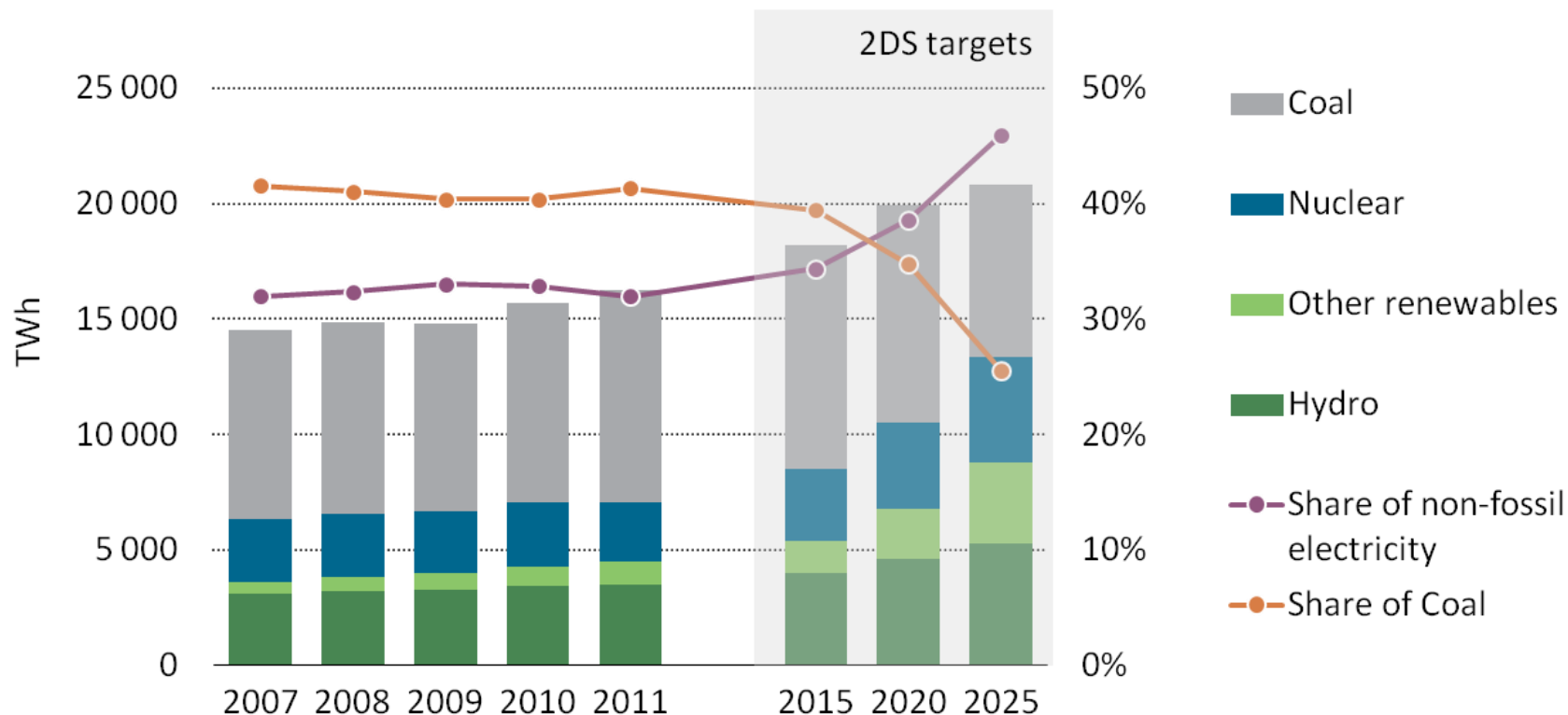
ETP  
2014



*...and it is cost effective to make the transition*

# Going in the wrong direction globally

ETP  
2014

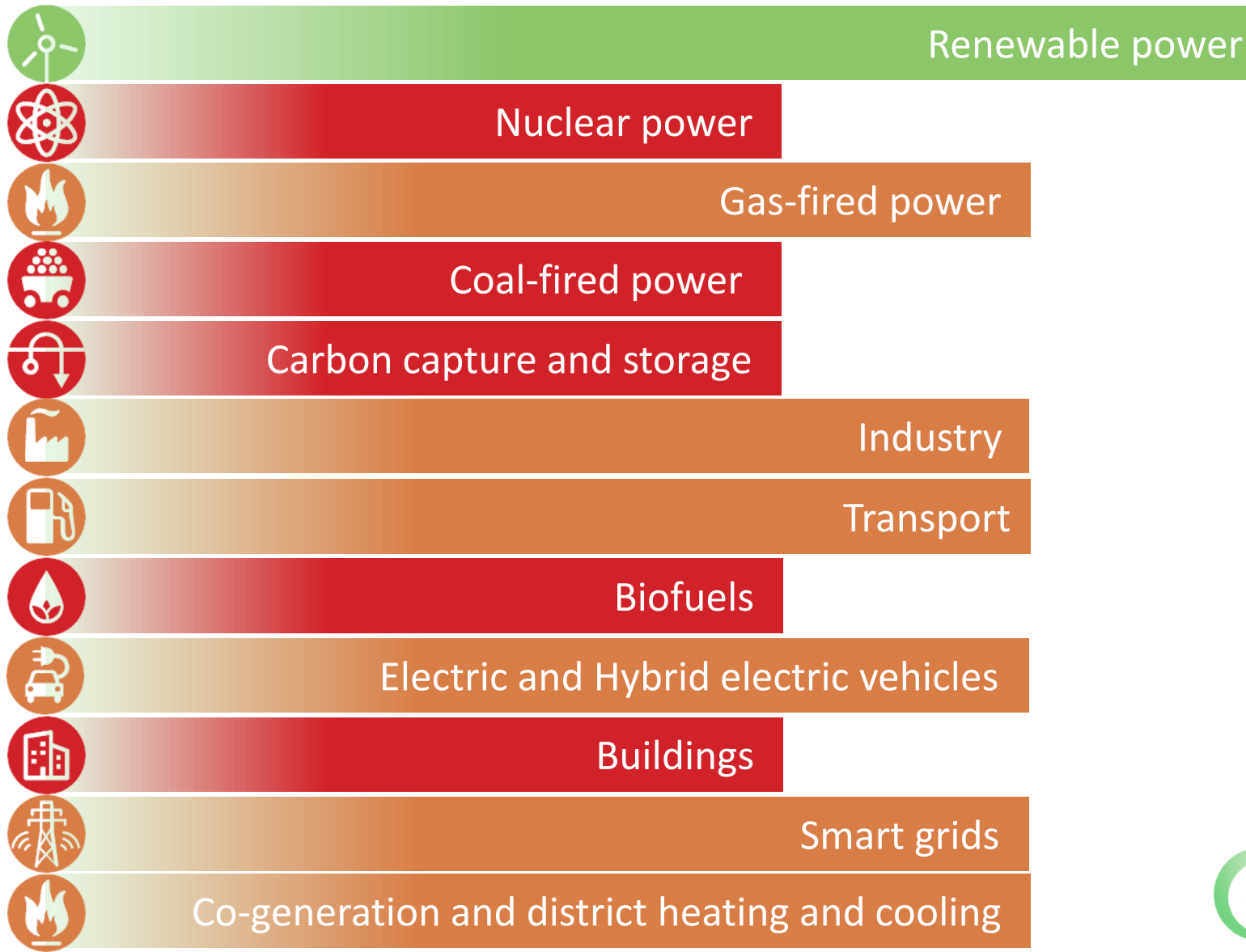


*Unabated coal use in electricity generation is incompatible with 2DS objectives*



# We are not on track

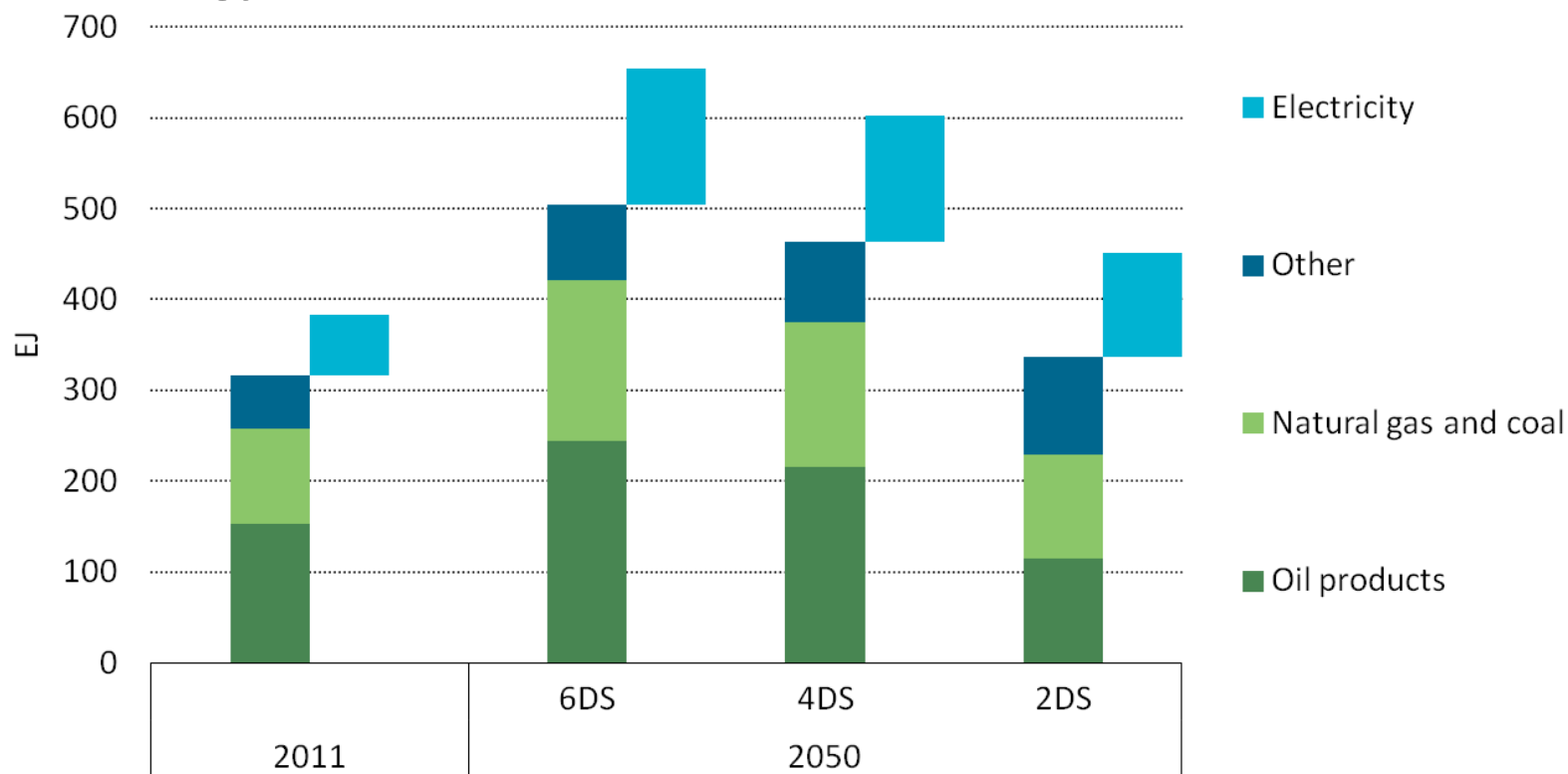
ETP  
2014



# Harnessing Electricity's Potential

ETP  
2014

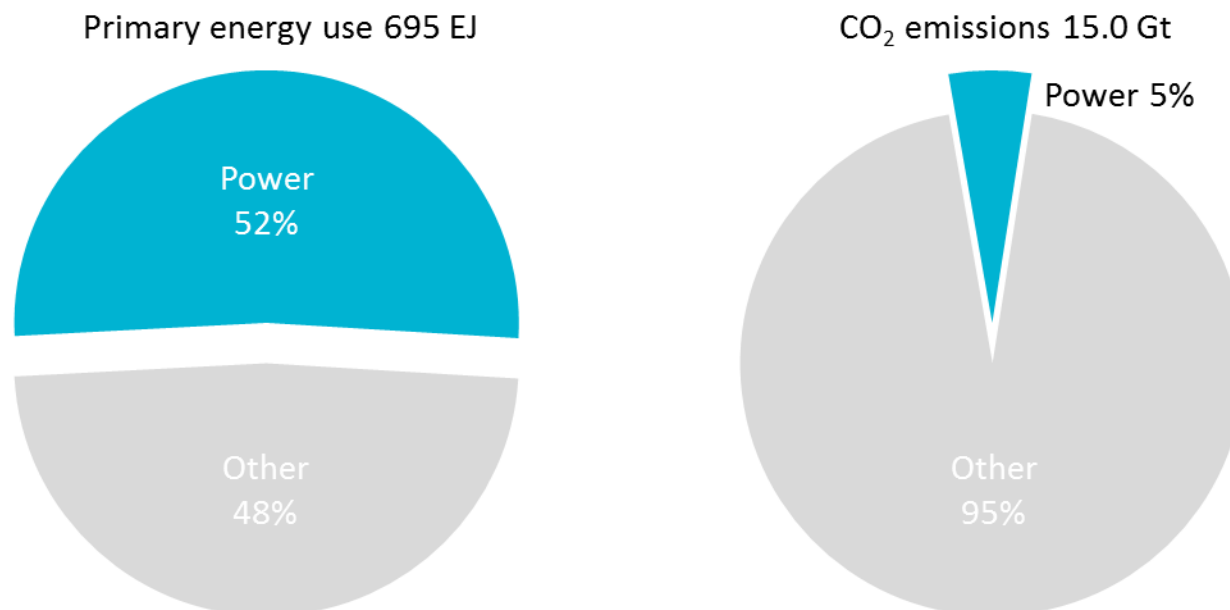
## Global energy demand



*Increasing electricity consumption and share of overall energy usage— for **ALL** forward looking scenarios*

# Electricity dominates the energy system

2050 2DS

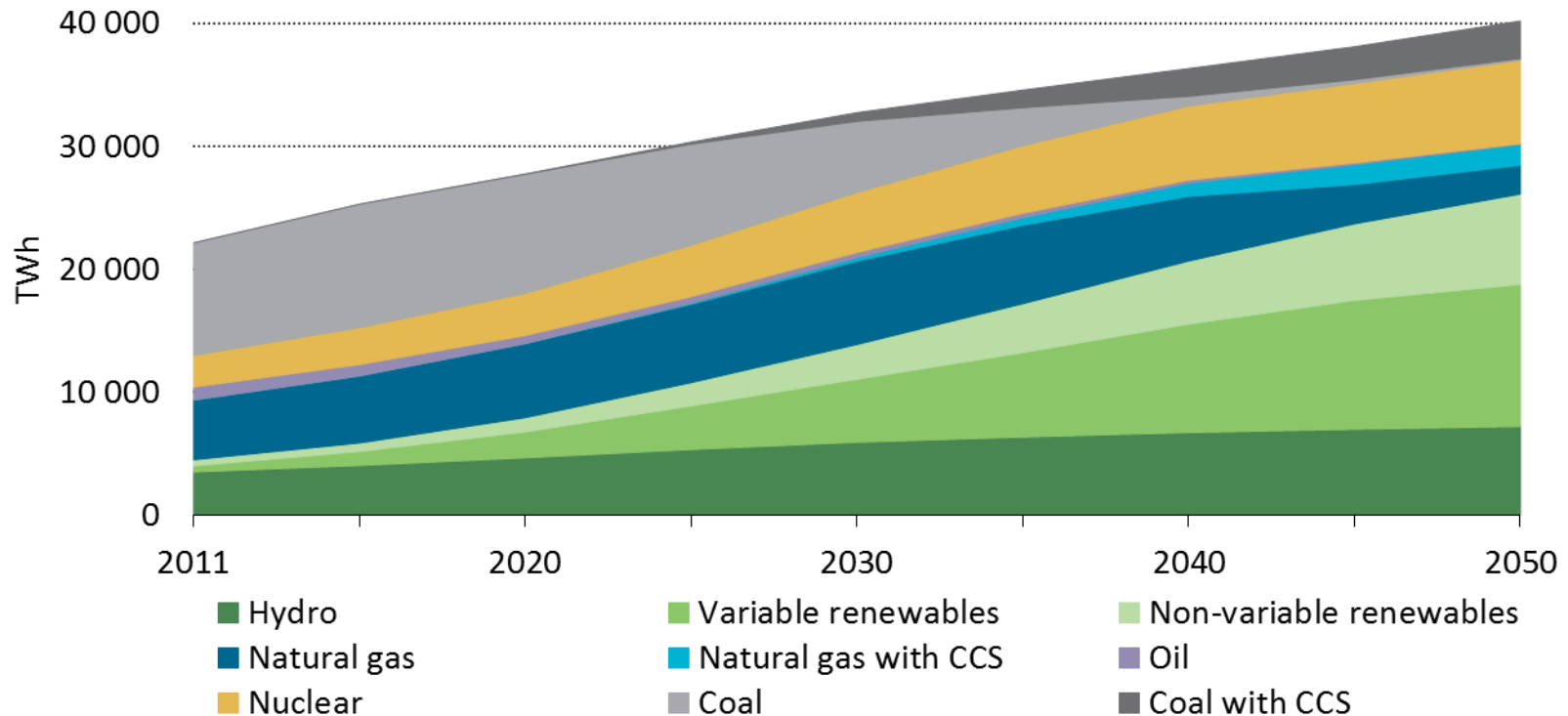


*The 2DS pathway disconnects primary energy used in generation from emissions*



# Electricity Generation: a share reversal

ETP  
2014



## ■ Generation today:

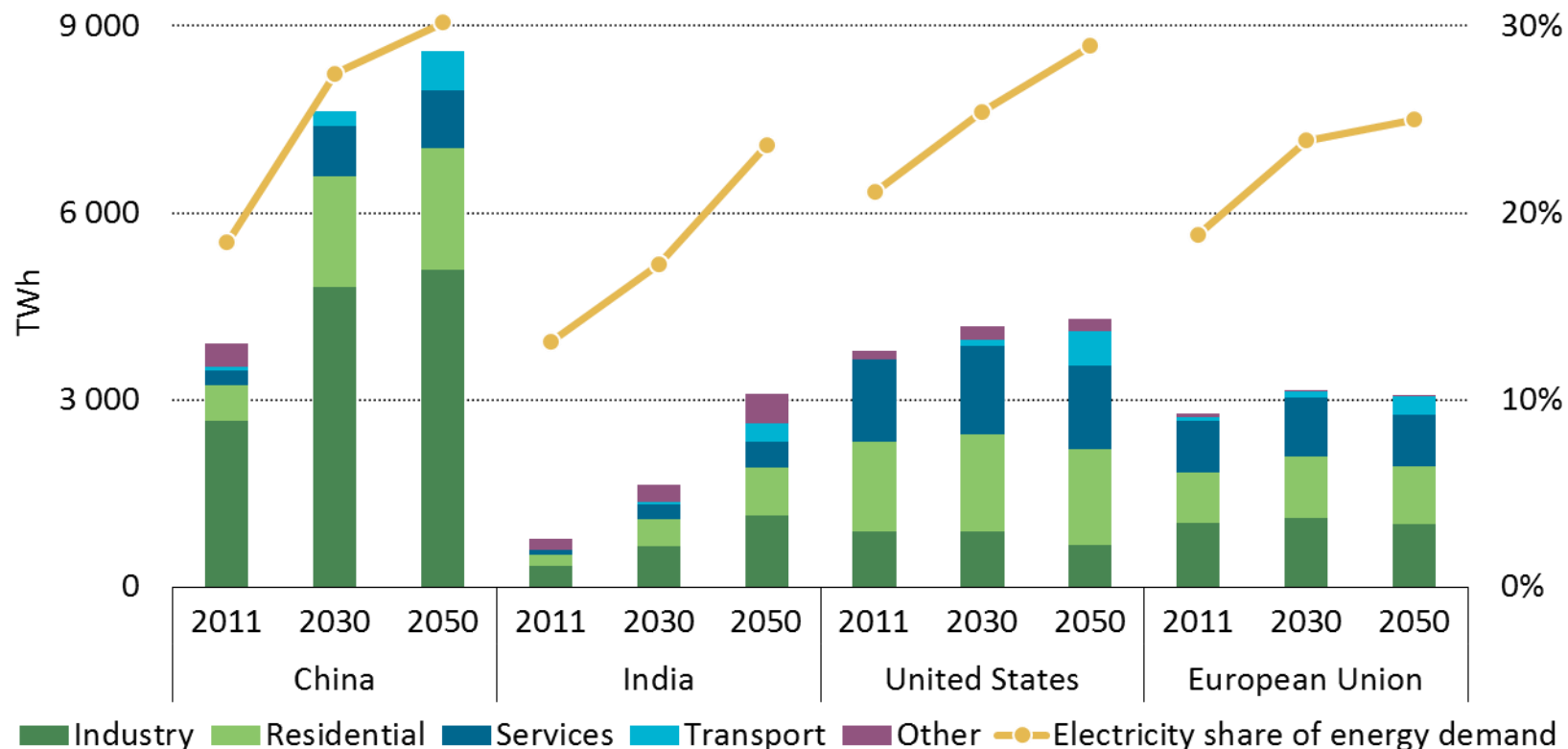
- Fossil fuels: 68%
- Renewables: 20%

## ■ Generation 2DS 2050:

- Renewables: 65%
- Fossil fuels: 20%

# Understanding the regional context in the 2DS

ETP  
2014



Differences in growth of *electricity* demand and sectoral distribution require targeted systems development plans. All regions show high growth in VRE deployment

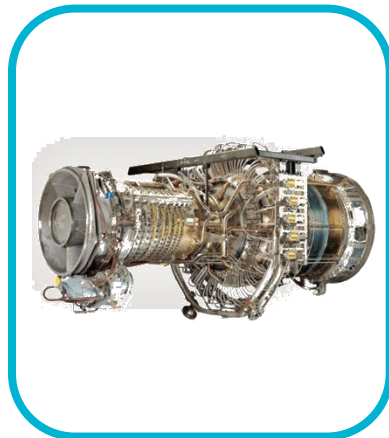
# We have the flexible resources

ETP  
2014

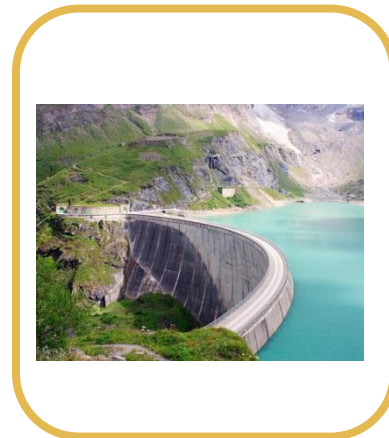
## Four sources of flexibility ...



**Grid  
infrastructure**



**Dispatchable  
generation**



**Storage**

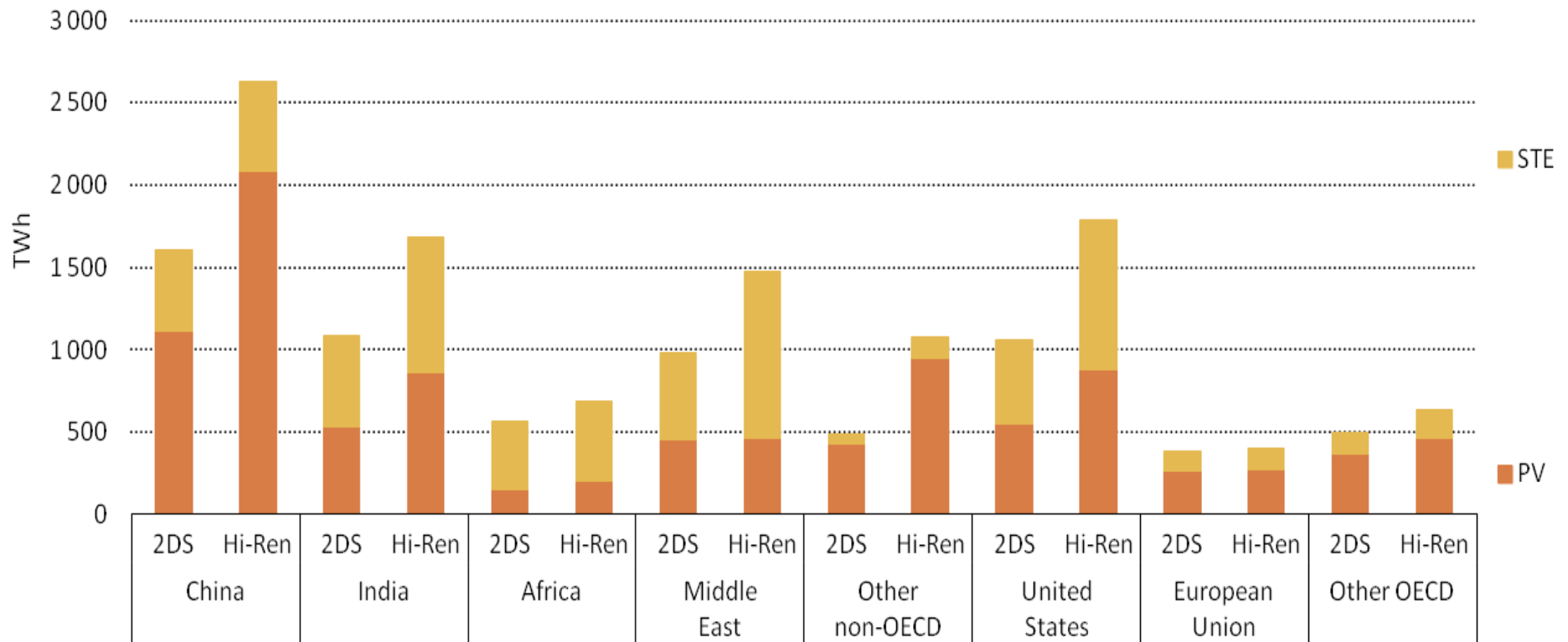


**Demand side  
integration**

*No one flexible resource meets all the needs.*

# Solar is more than PV

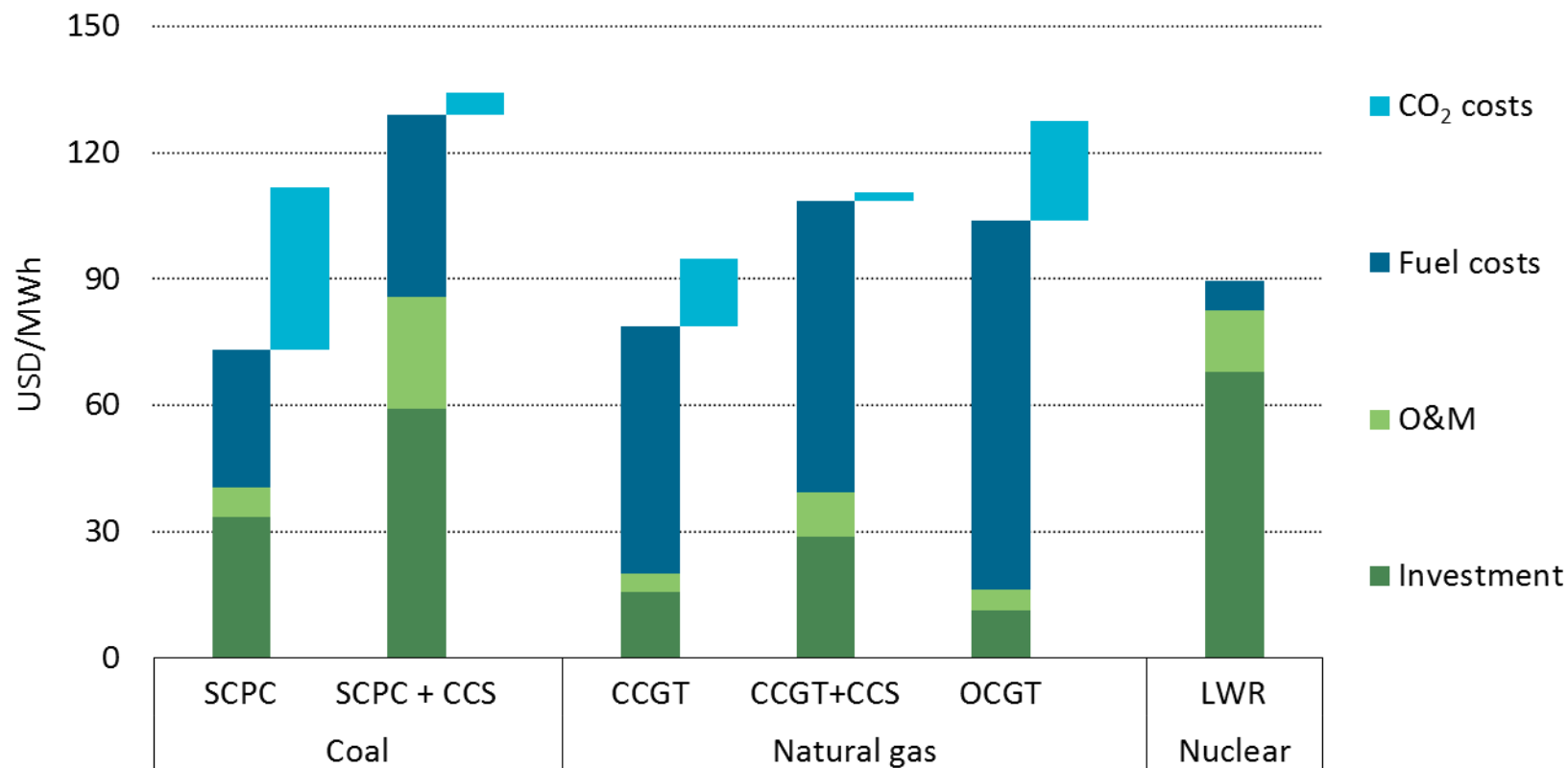
ETP  
2014



*In areas with excellent DNI, including Africa, Chile, Mexico and the Middle East, STE eventually dominates*

# Without CCS natural gas power generation is not carbon free

ETP  
2014

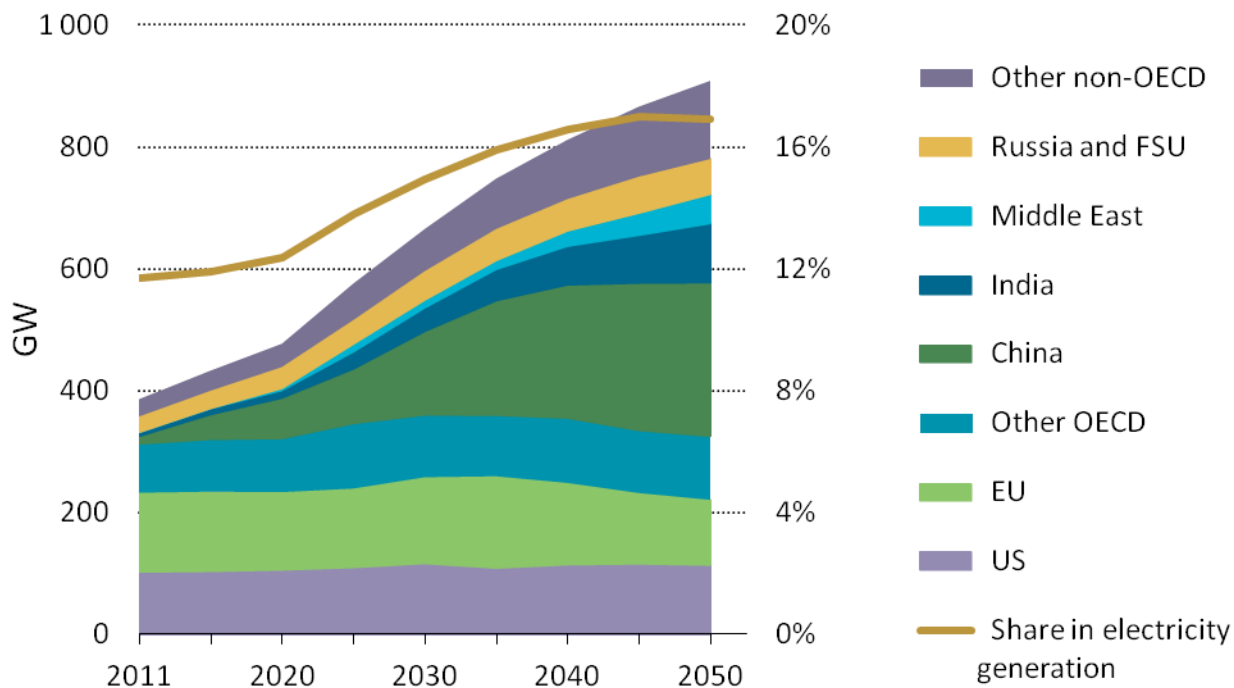


*CCS for natural gas power generation is less expensive than CCS for coal.*

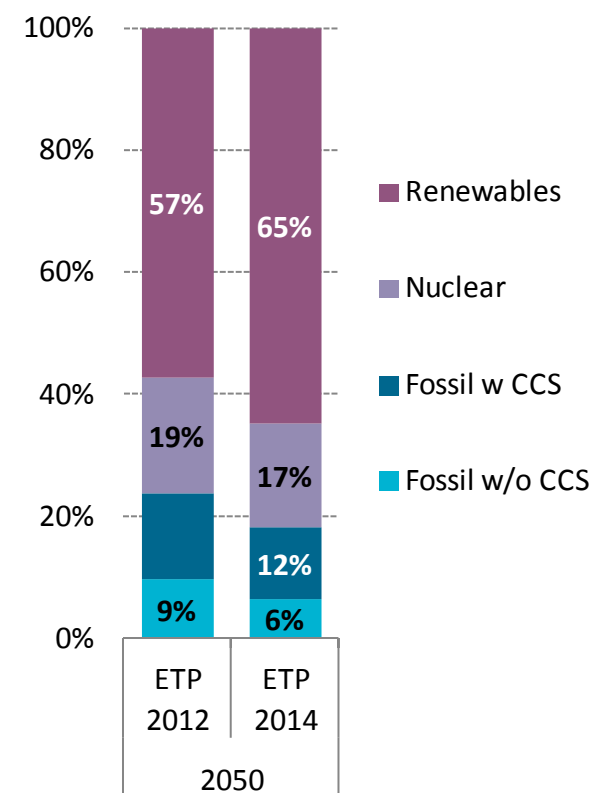
# Nuclear growth driven by non-OECD

ETP  
2014

Global nuclear capacity



Generation mix

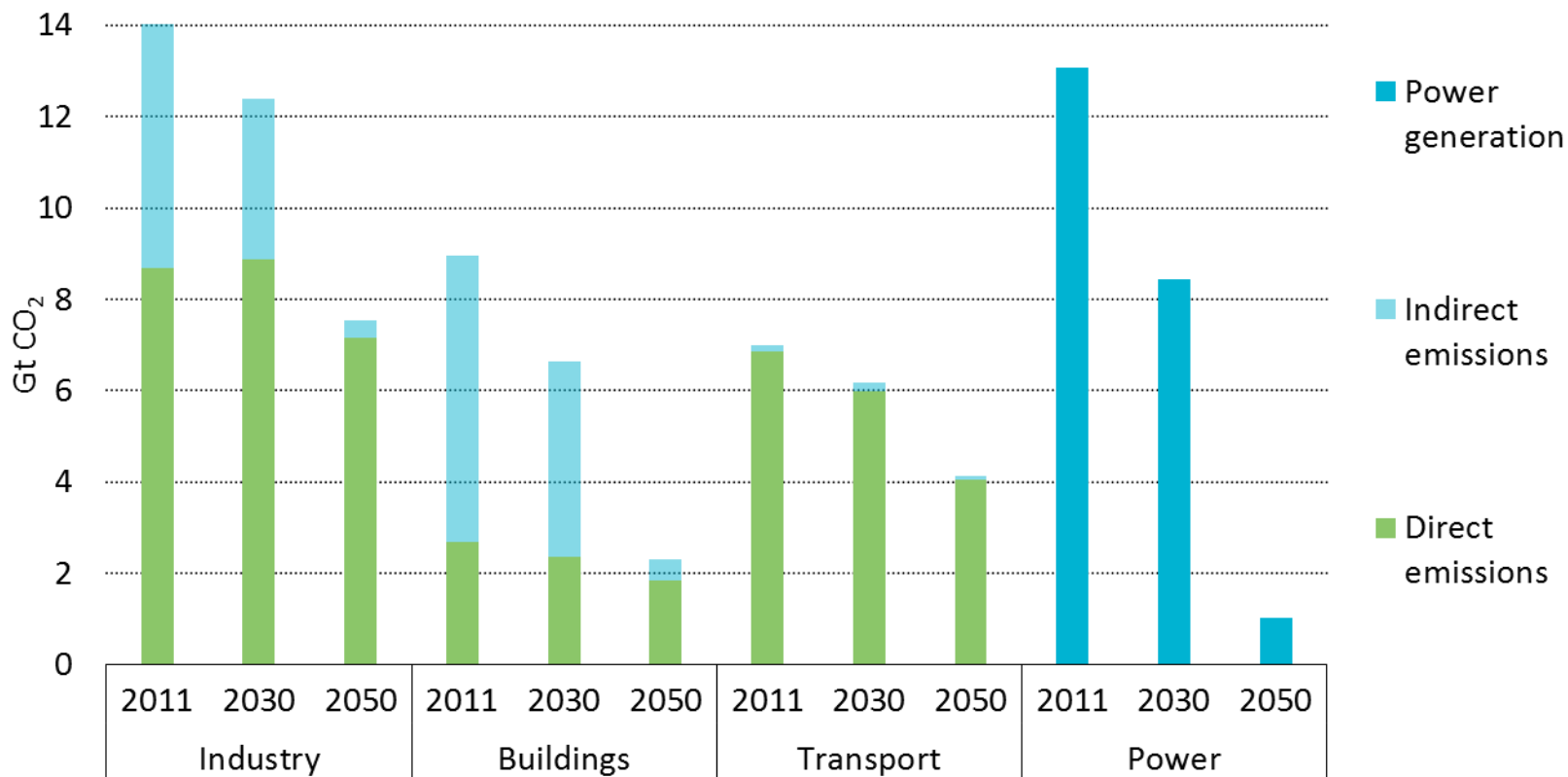


*In 2011, around 80% of global nuclear capacity was located in the OECD. By 2050, 70% of nuclear capacity is outside of the OECD in the 2DS.*



# Spillover effect of decarbonising electricity in the 2DS

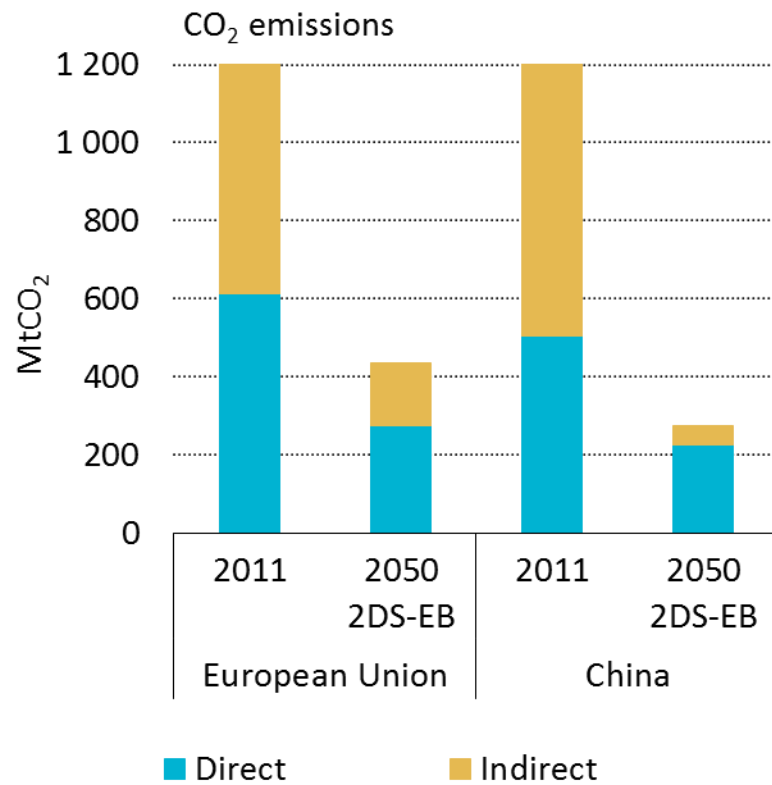
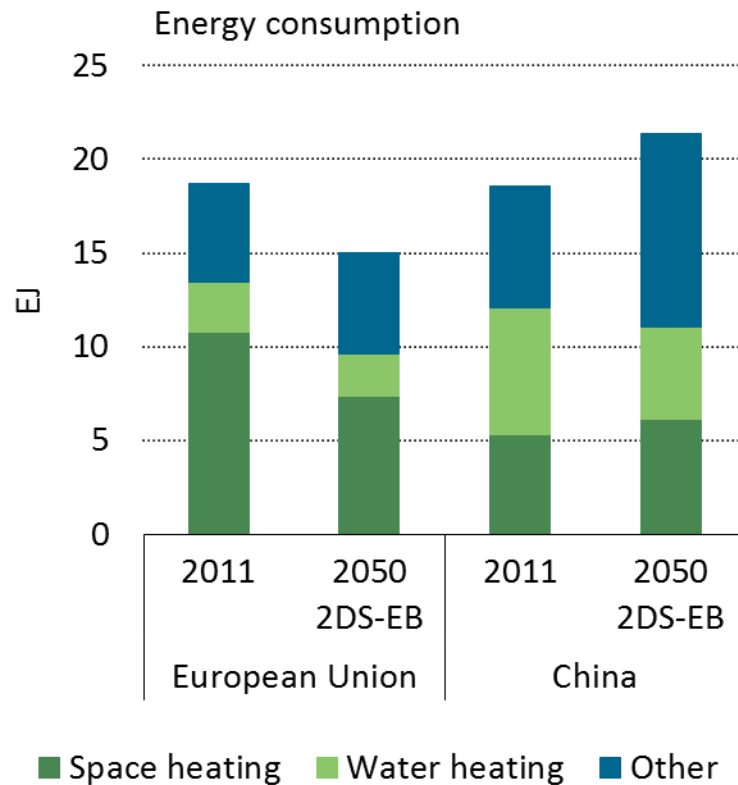
ETP  
2014



*Electricity decarbonisation reduces emissions from sectors already electrified, without the need for further end-use investments.*

# Building sector benefits most from decarbonisation of power generation

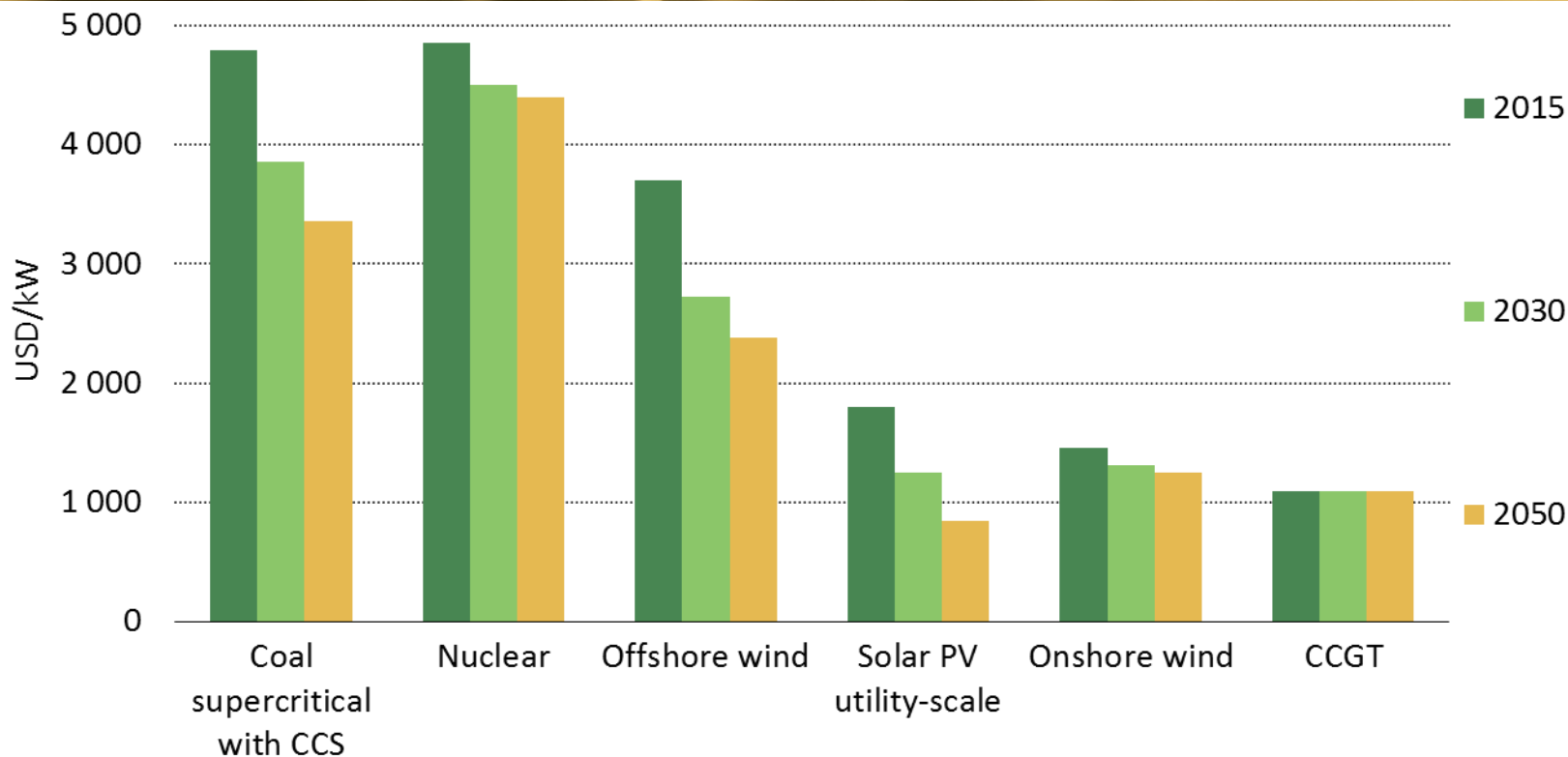
ETP  
2014



*Increasing electricity use also helps to reduce natural gas demand in buildings*

# Financing low-carbon generation

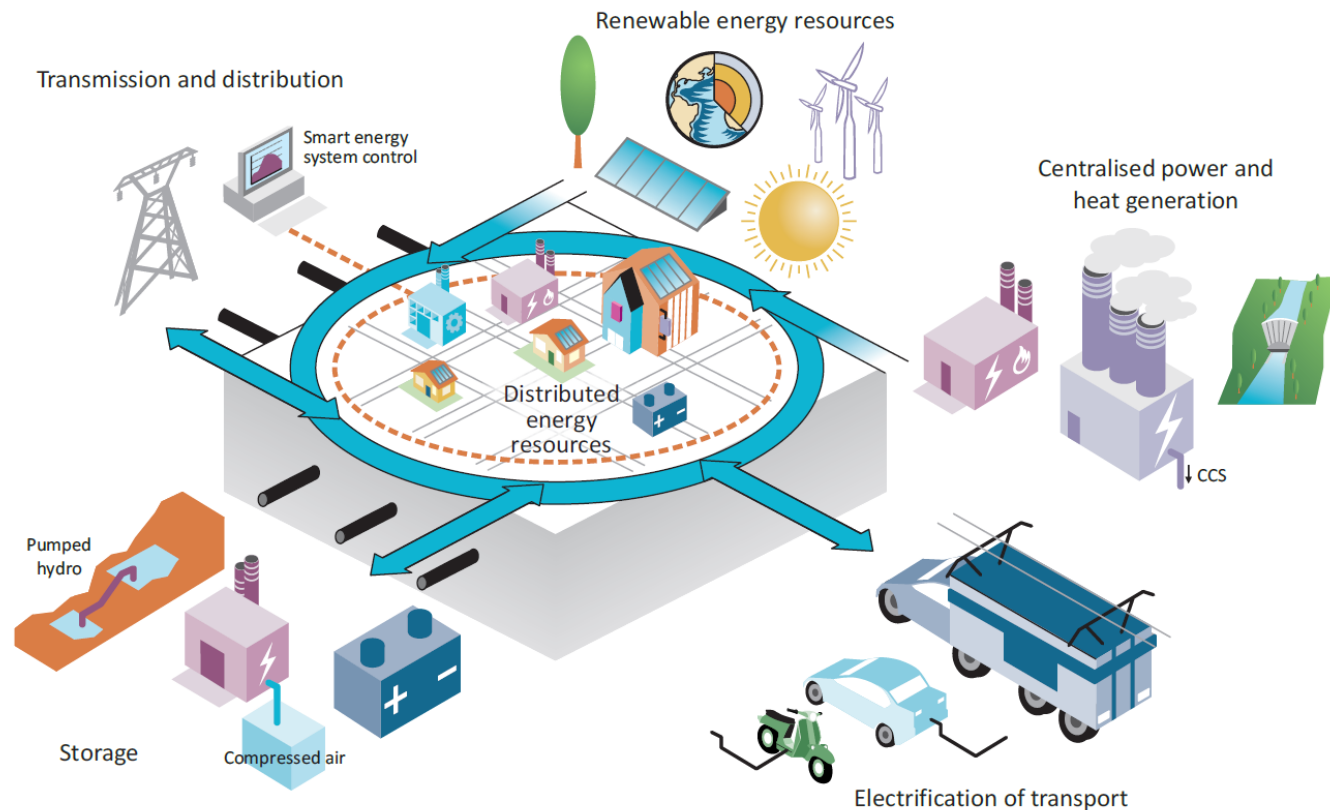
ETP  
2014



*The upfront capital costs of low-carbon technologies are higher than gas fired generation – increasing the importance of financing*

# Systems thinking and integration

ETP  
2014



*A sustainable electricity system is a smarter, multidirectional and integrated energy system that requires long-term planning for services delivery*

# Harnessing Electricity's Potential

ETP  
2014

- 1. Solar-The possible first resource by 2050?**
- 2. The evolving role of Natural Gas in Low-C electricity systems: Flexibility vs. Base load**
- 3. How Can e-mobility replace oil?**
- 4. Electricity storage: Do we need a game changer?**
- 5. Financing low carbon electricity generation during the transition**
- 6. High efficiency power generation in India**



Thank you

ETP  
2014



Explore the data behind ETP