Energy Technology Perspectives 2014: Harnessing Electricity's Potential

CSIS, Washington DC

25 June, 2014

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Carbon Intensity of supply is stuck

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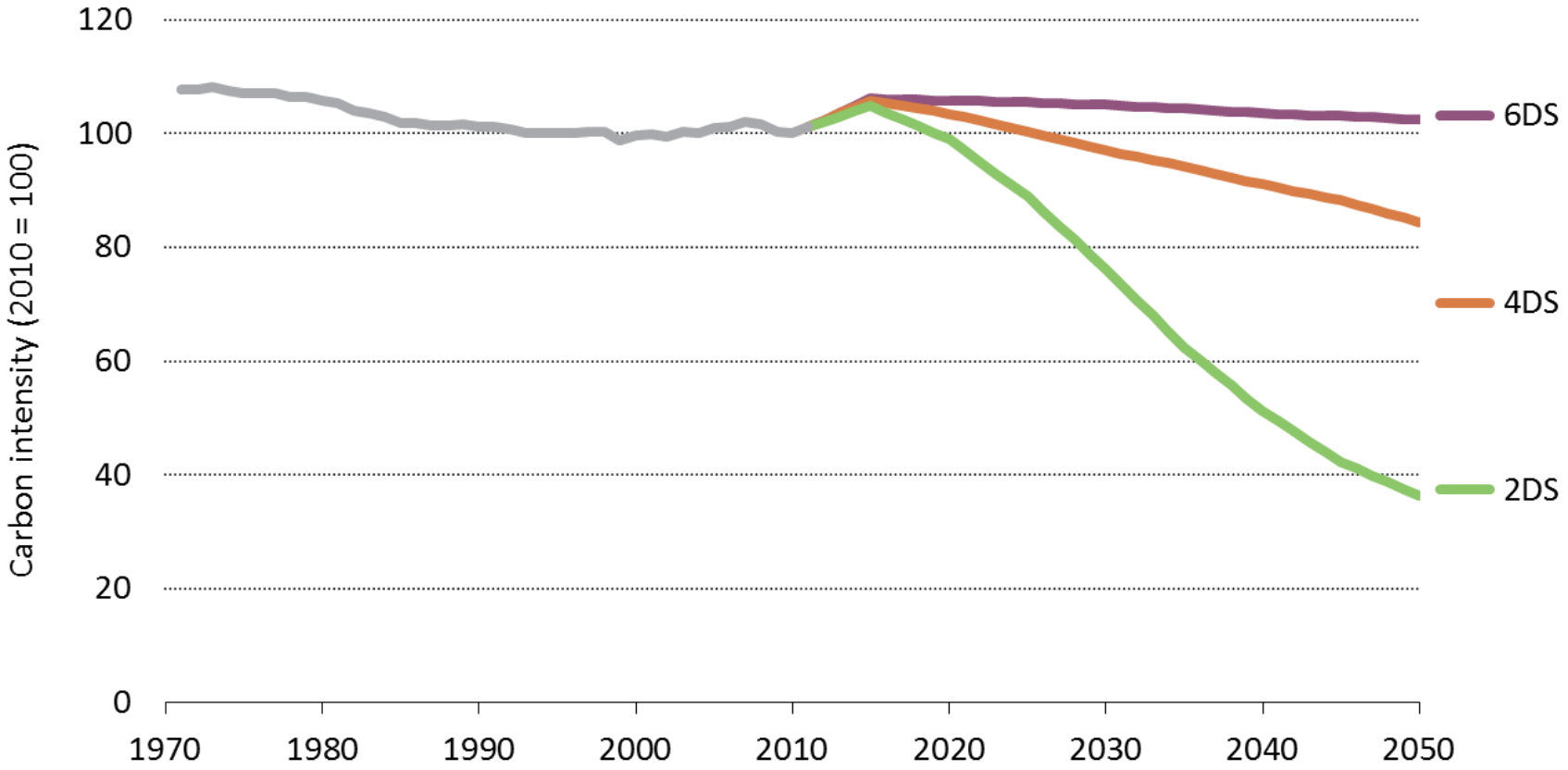

The political will to make meaningful progress at a global scale has yet to be demonstrated

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A transformation is needed…

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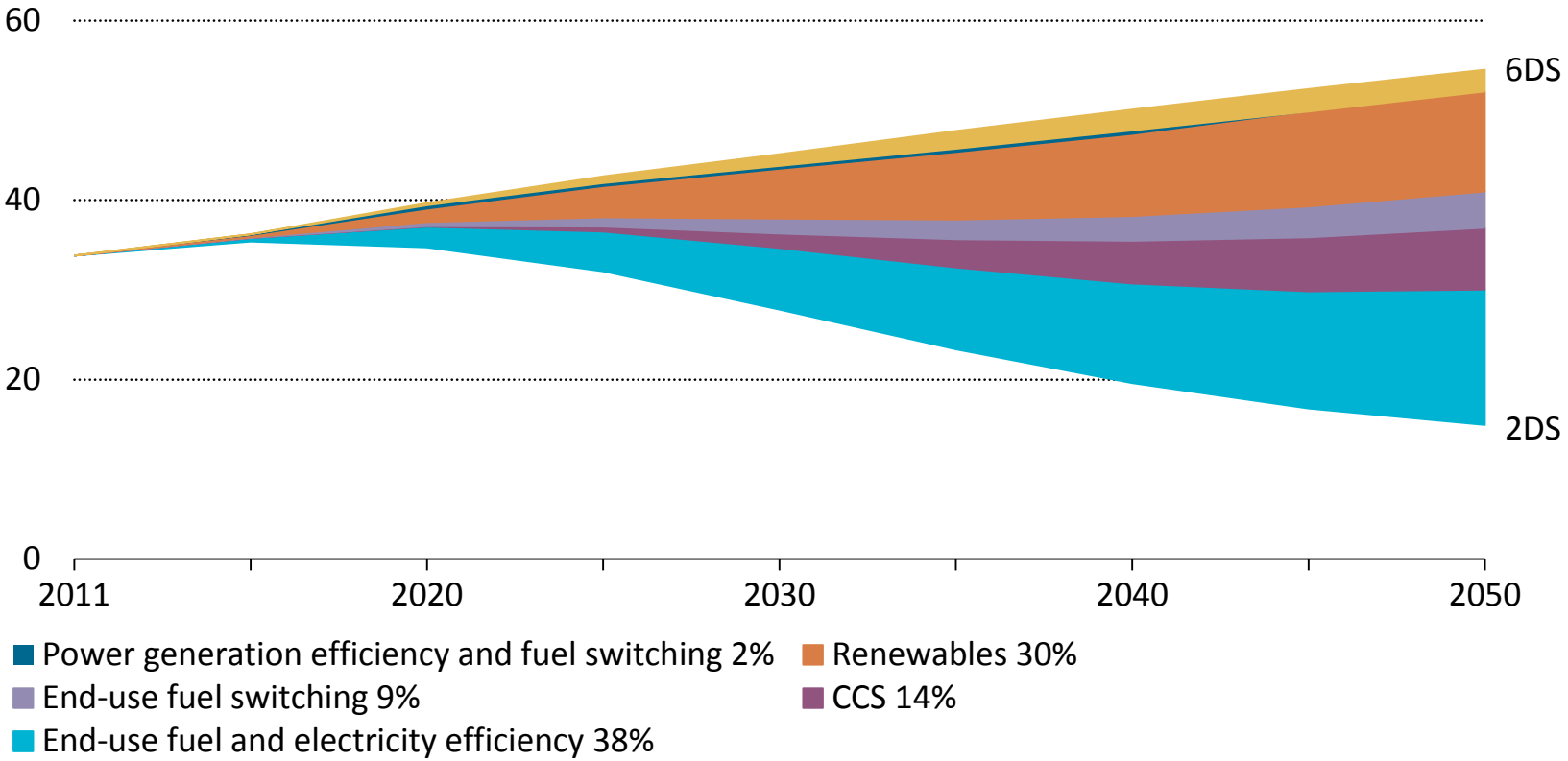

..and we to have the tools to develop a strategy and be proactive.

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Investment in our future pays off…

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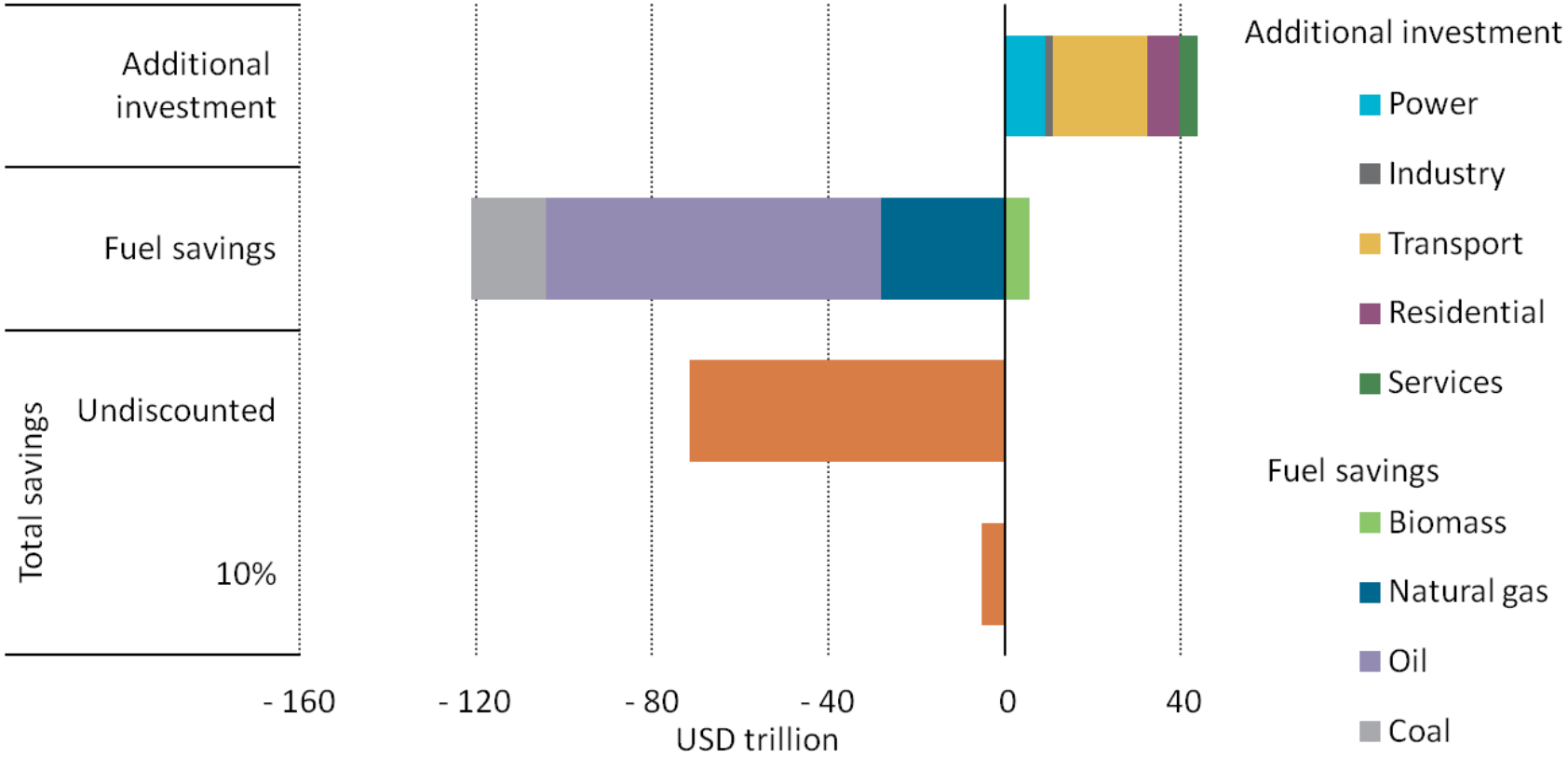

…and it is cost effective to make the transition

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We are not on track

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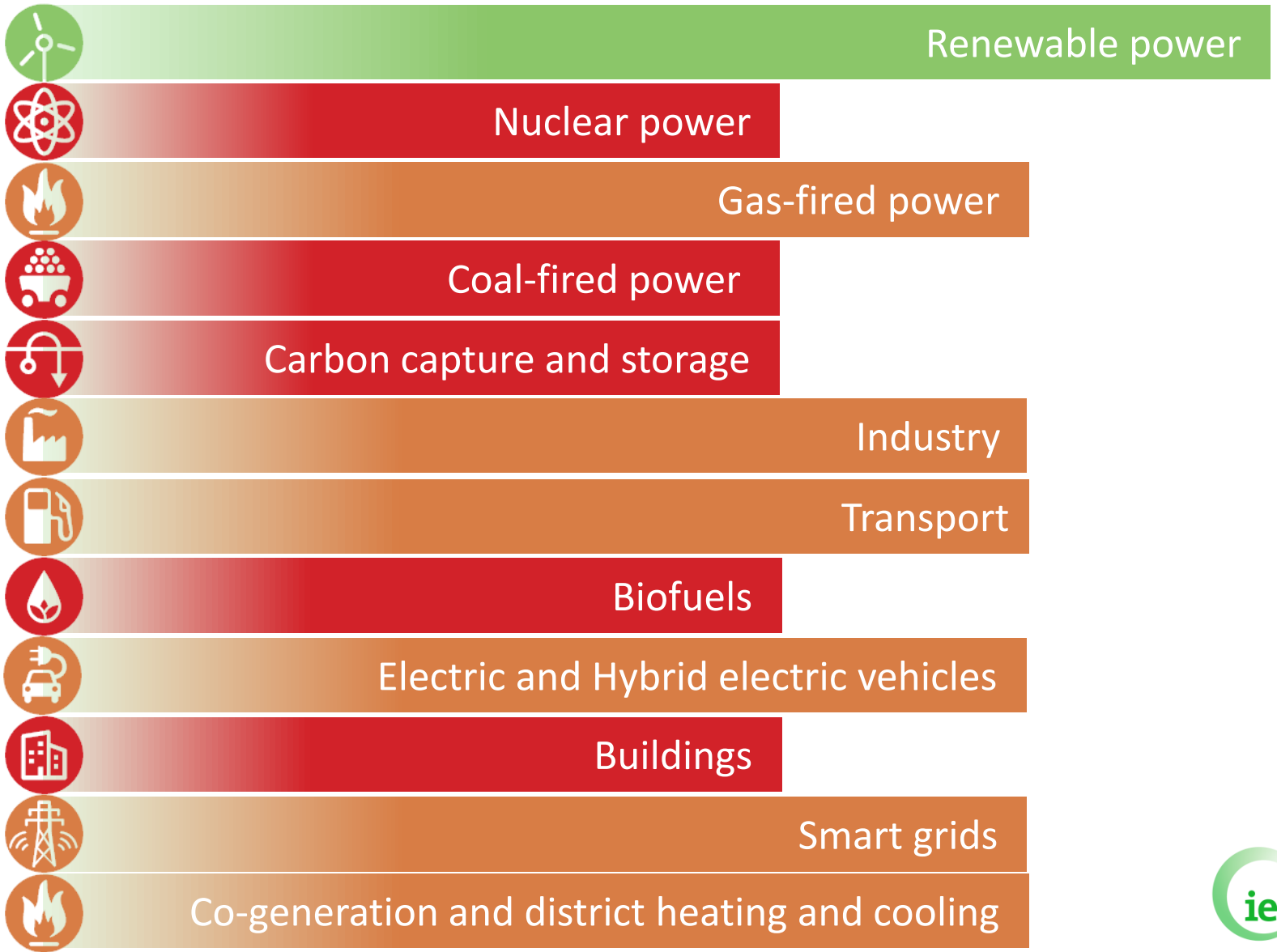

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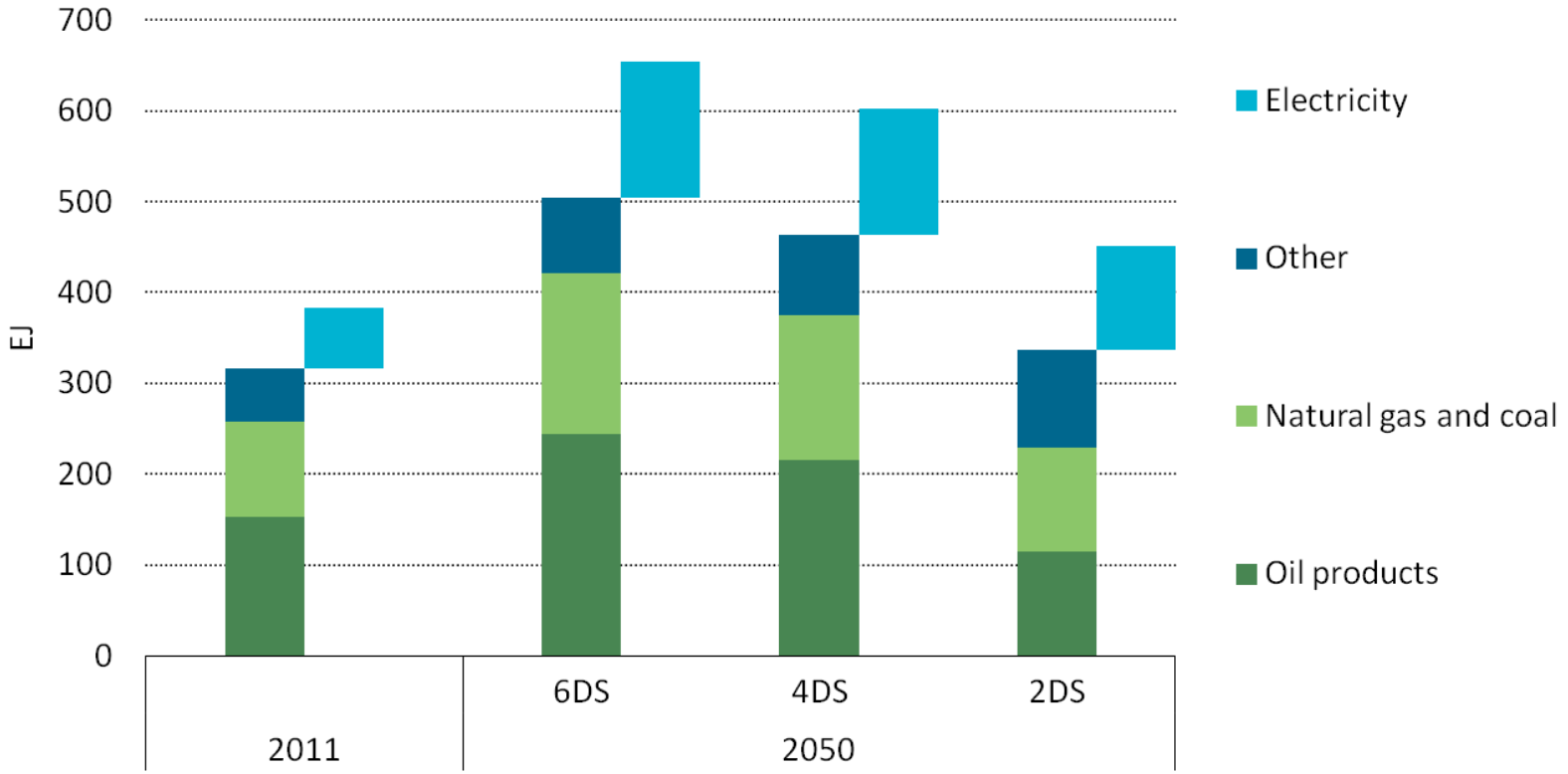
Global energy demand



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

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Electricity dominates the energy system

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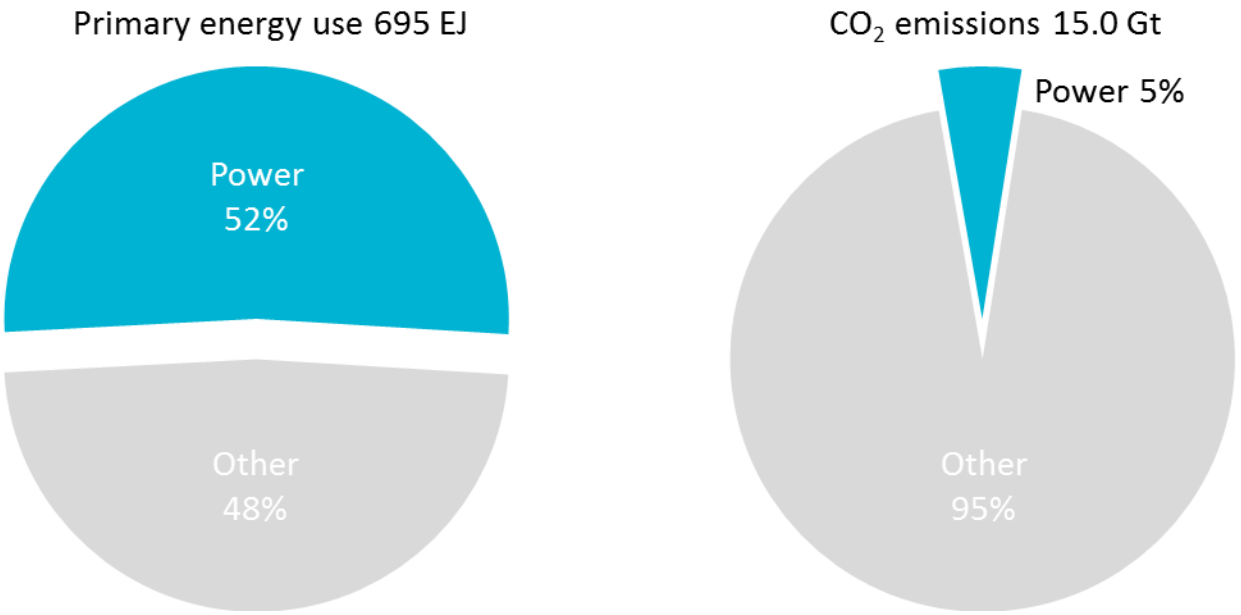
2050 2DS



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

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Electricity Generation: a share reversal

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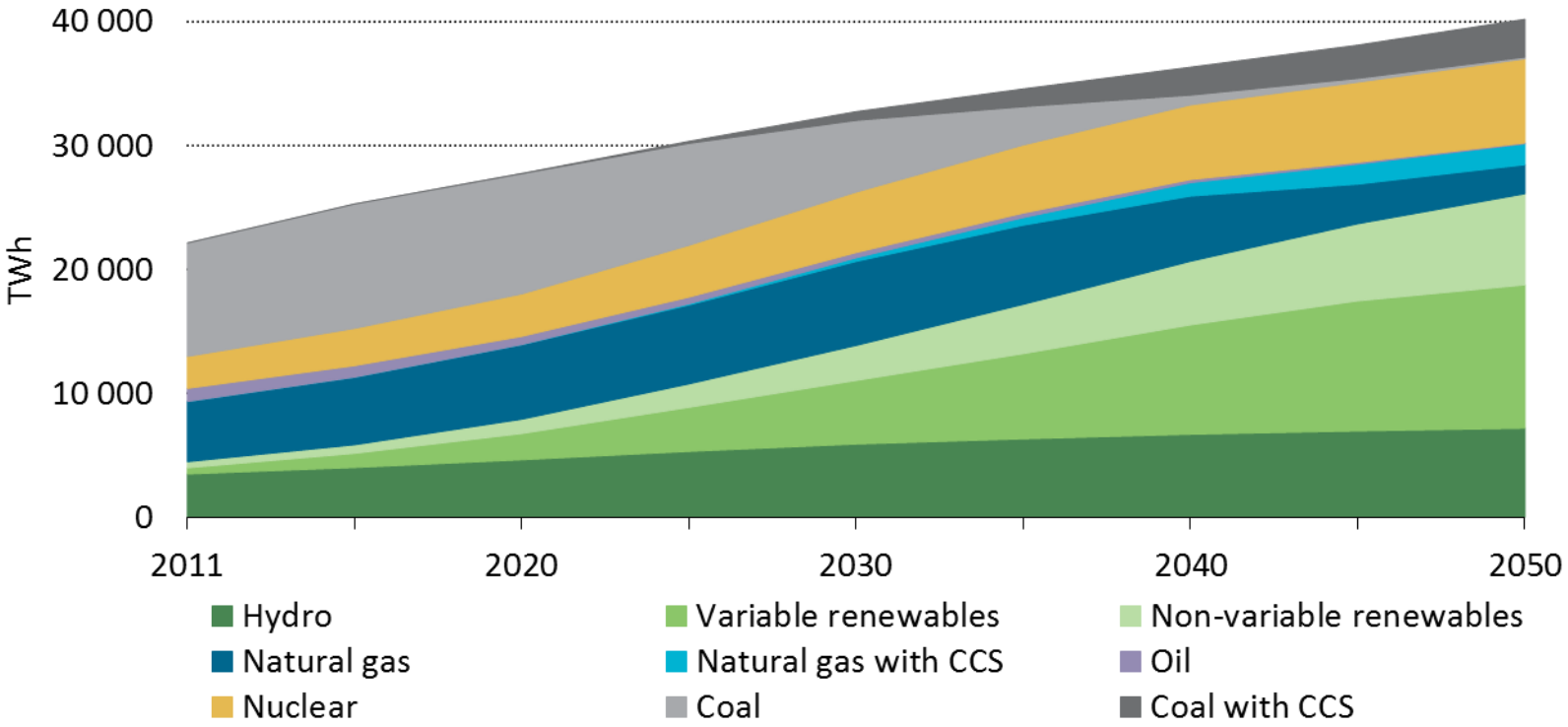

- Generation today:
  - Fossil fuels: 68%
  - Renewables: 20%
- Generation 2DS 2050:
  - Renewables: 65%
  - Fossil fuels: 20%

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Understanding the regional context in the 2DS

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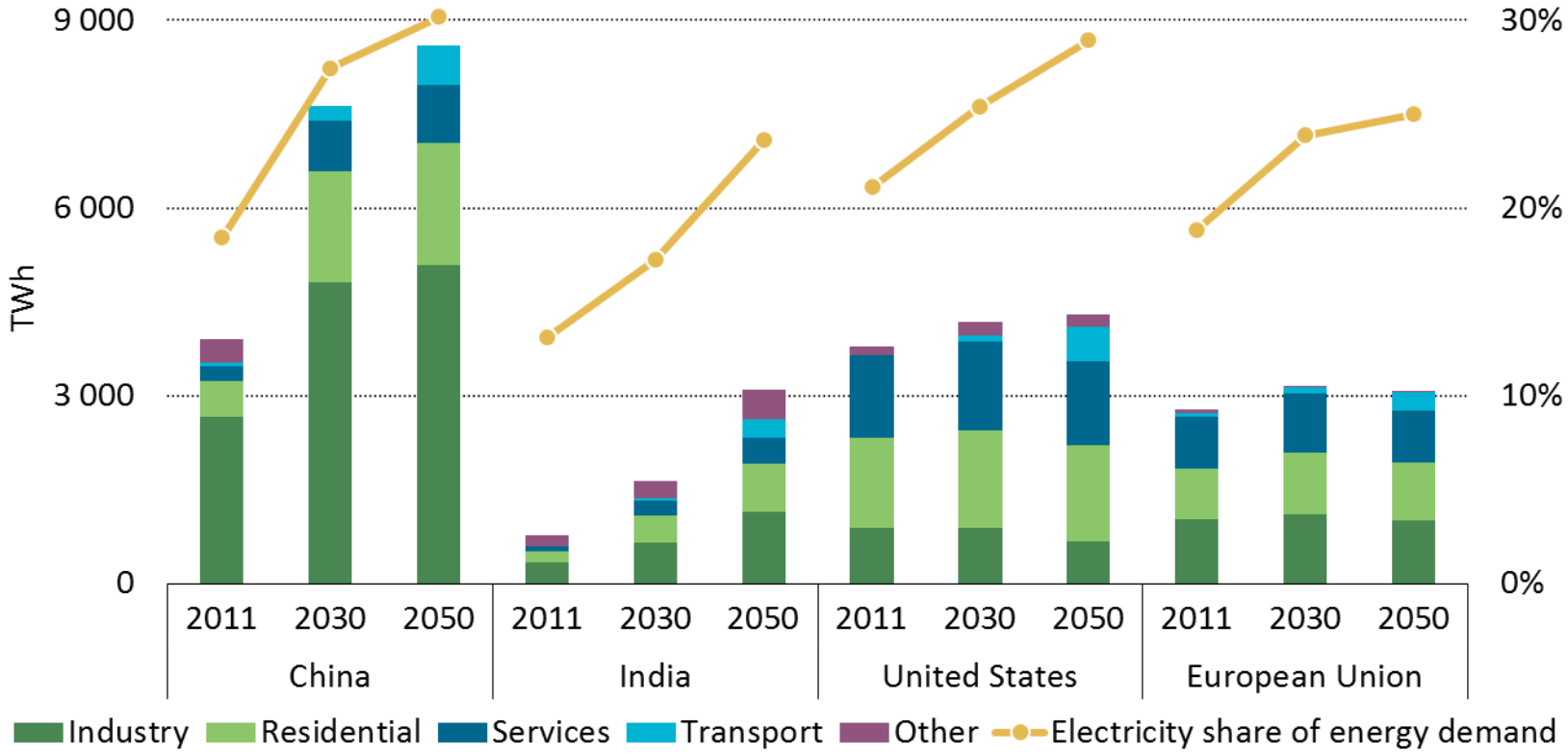

Differences in growth of *electricity* demand and sectoral distribution require targeted systems development plans. All regions show high growth in VRE deployment

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North America shifts away from fossil fuel electricity production

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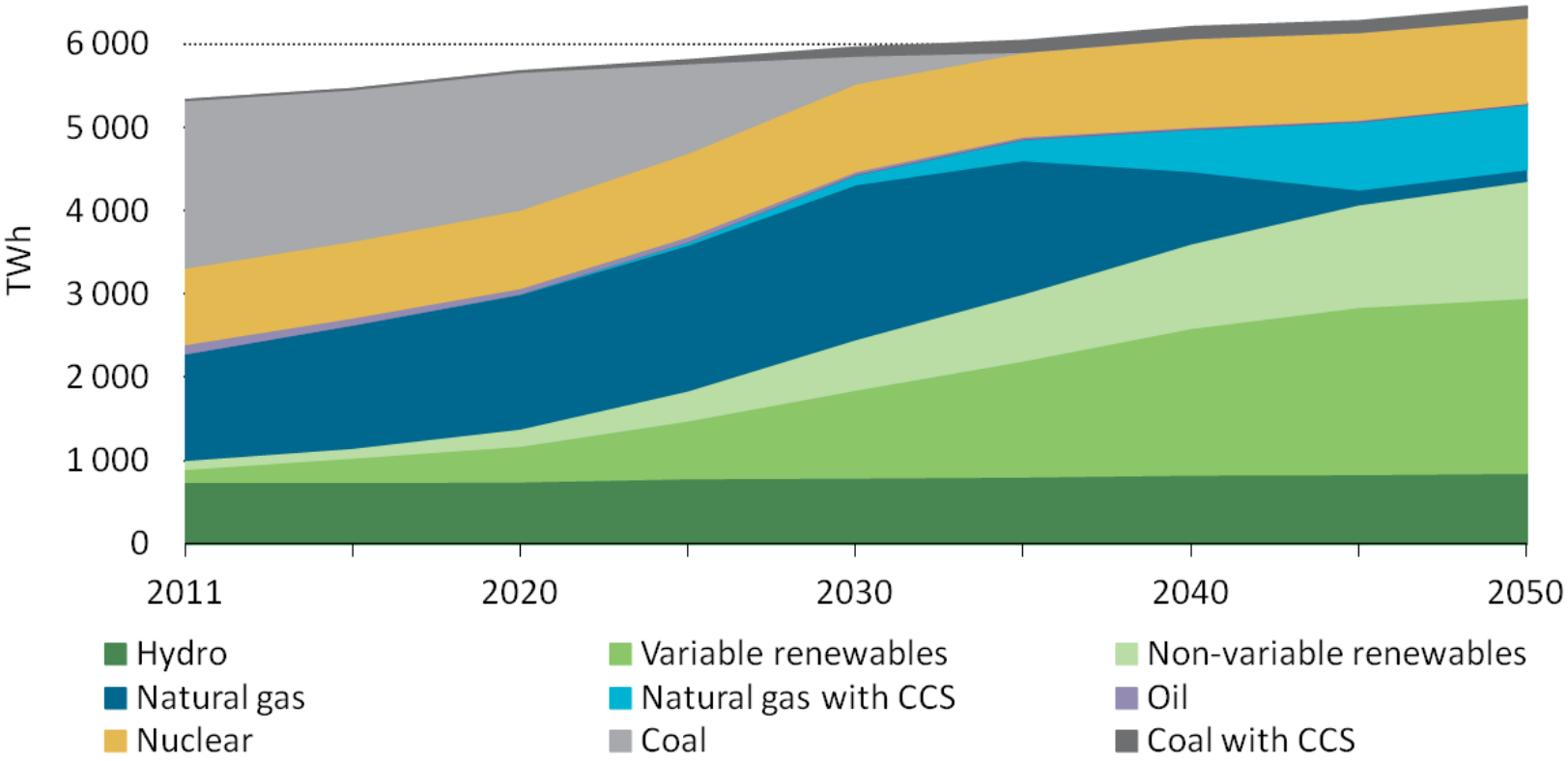

- Generation today:
  - Fossil fuels: 64%
  - Renewables: 19%
- Generation 2DS 2050:
  - Renewables: 68%
  - Fossil fuels: 16%

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We have the flexible resources

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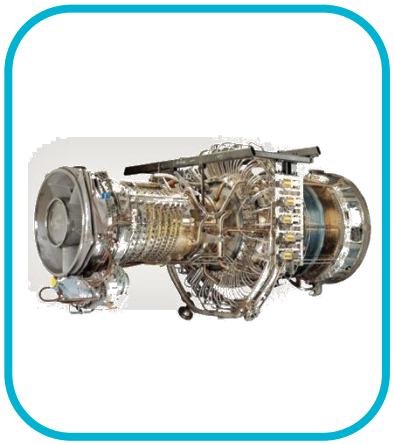
Four sources of flexibility …

Grid infrastructure



Dispatchable generation

Storage

Demand side integration

No one flexible resource meets all the needs.

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Without CCS natural gas power generation is not carbon free

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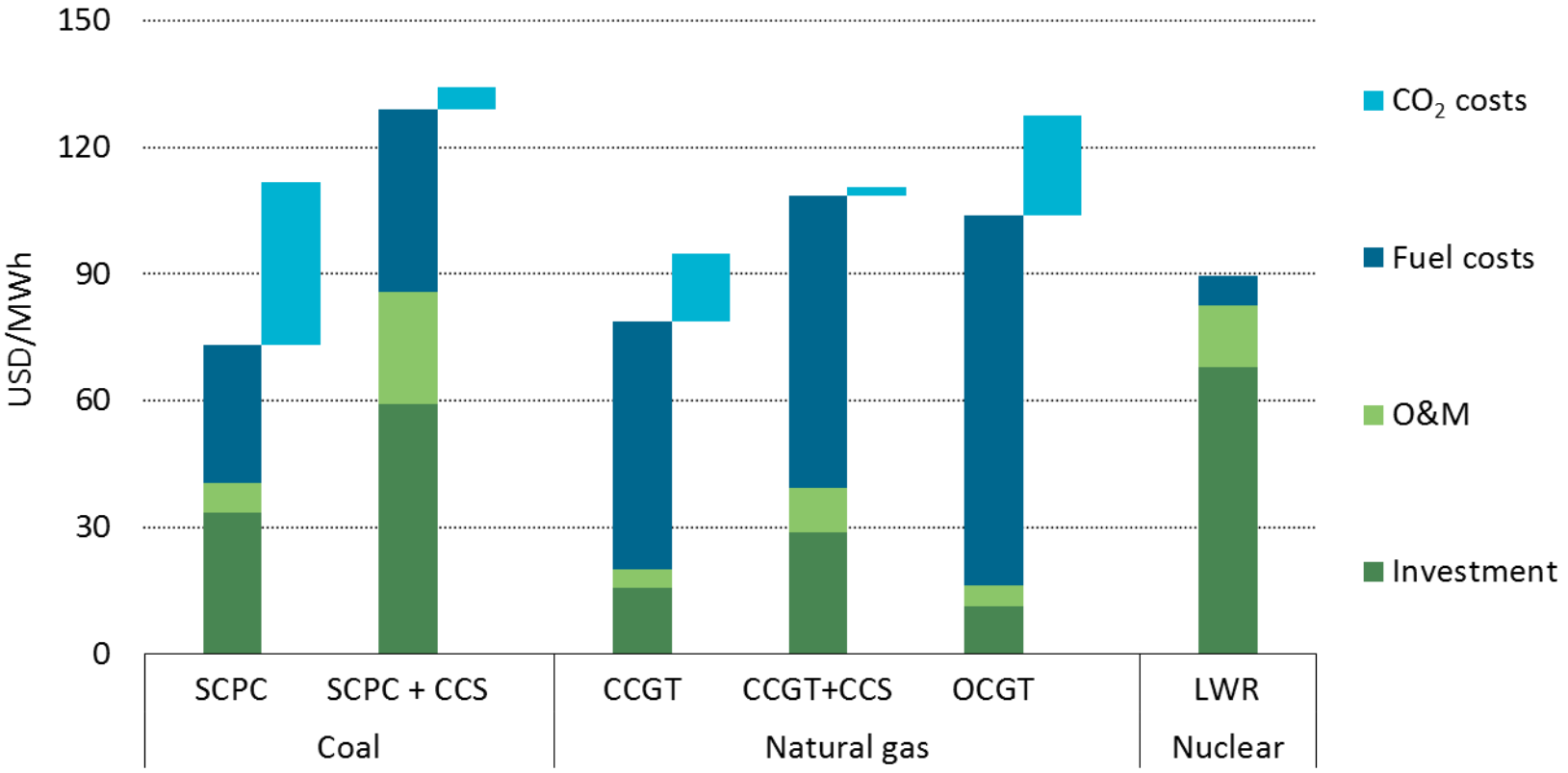

CCS for natural gas power generation is less expensive than CCS for coal.

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Spillover effect of decarbonising electricity in the 2DS

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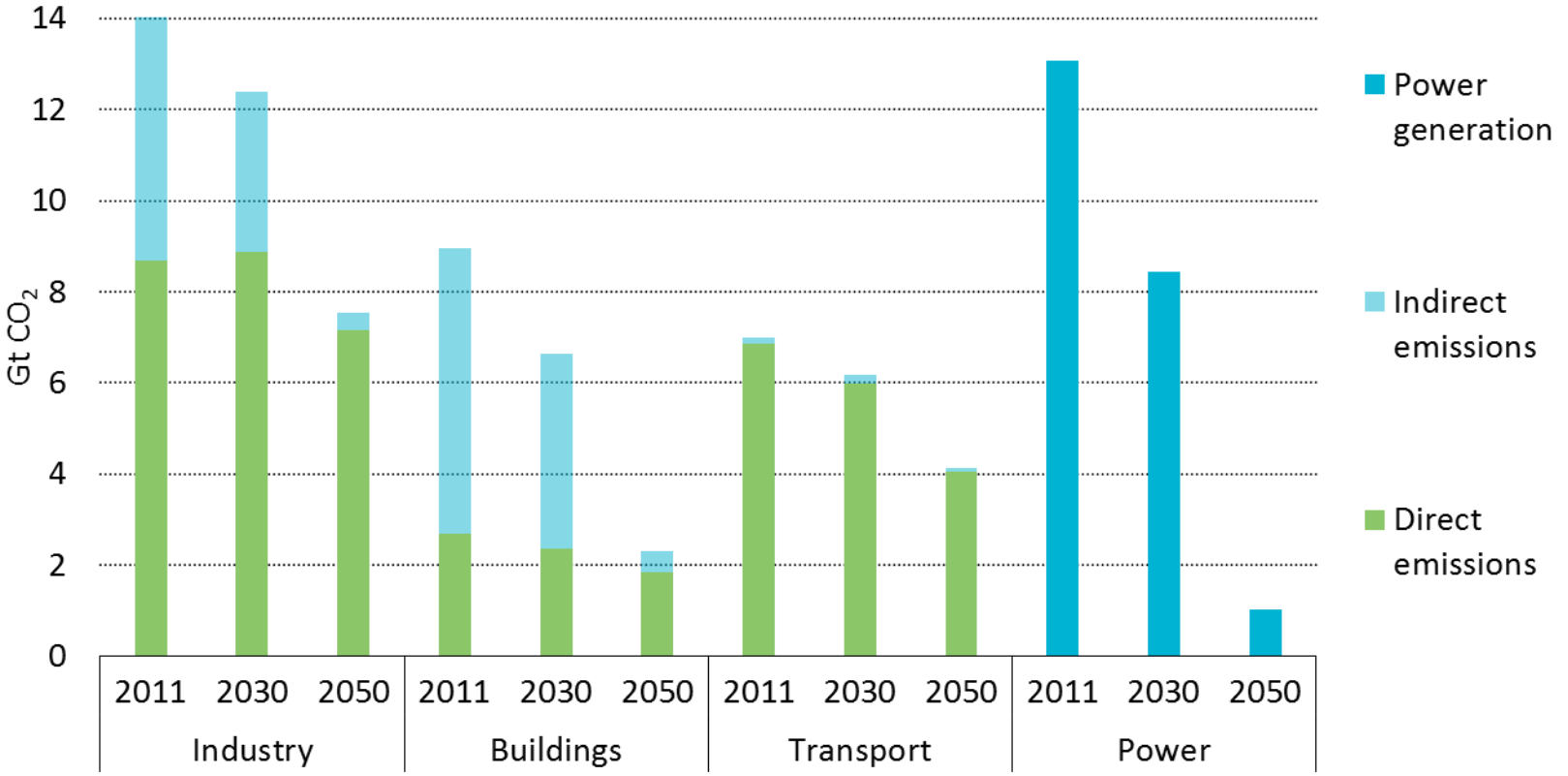

Electricity decarbonisation reduces emissions from sectors already electrified, without the need for further end-use investments.

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Building sector benefits most from decarbonisation of power generation

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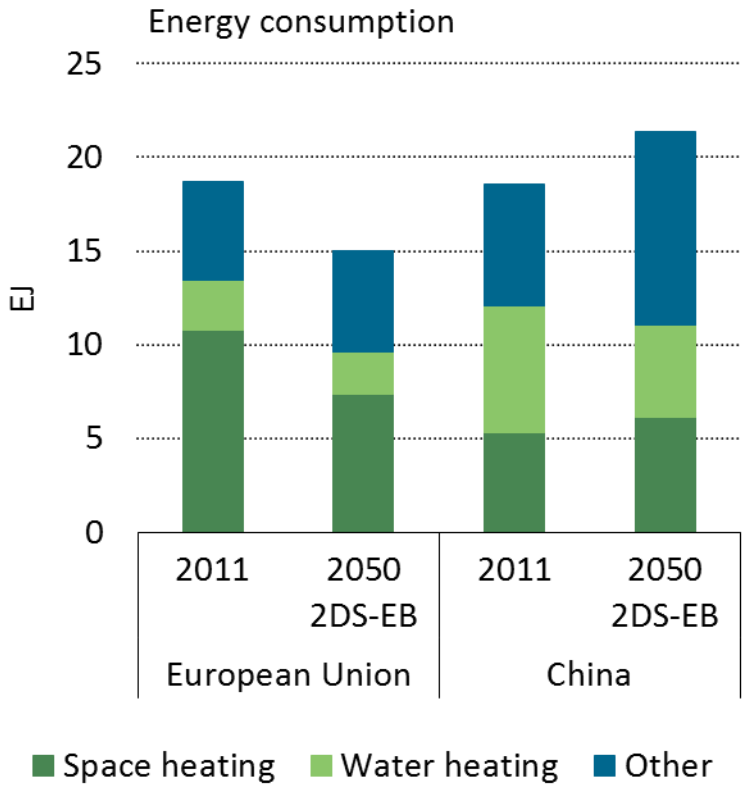

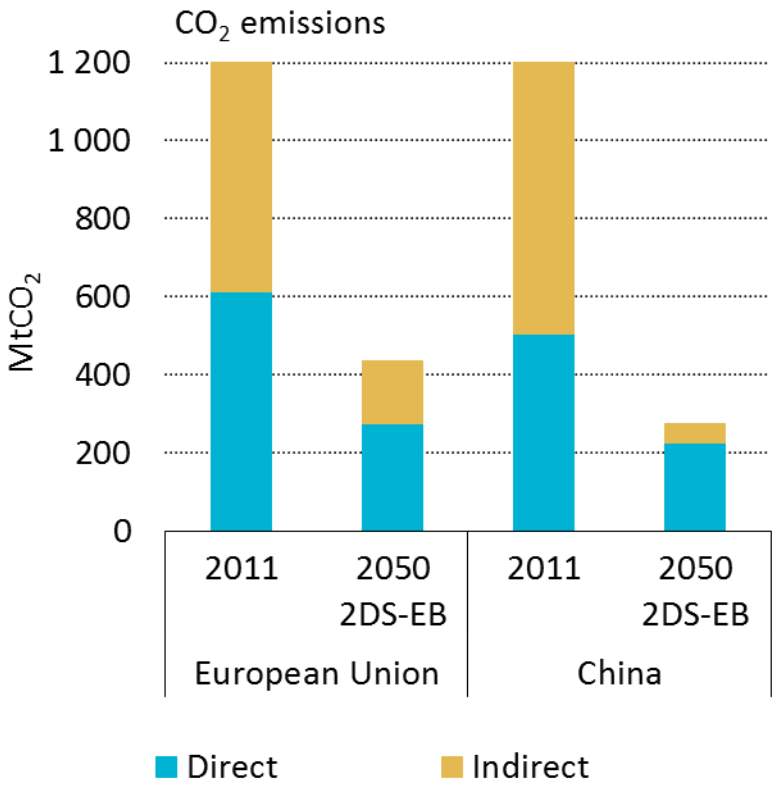

Increasing electricity use also helps to reduce natural gas demand in buildings

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Energy waste in Networked Devices

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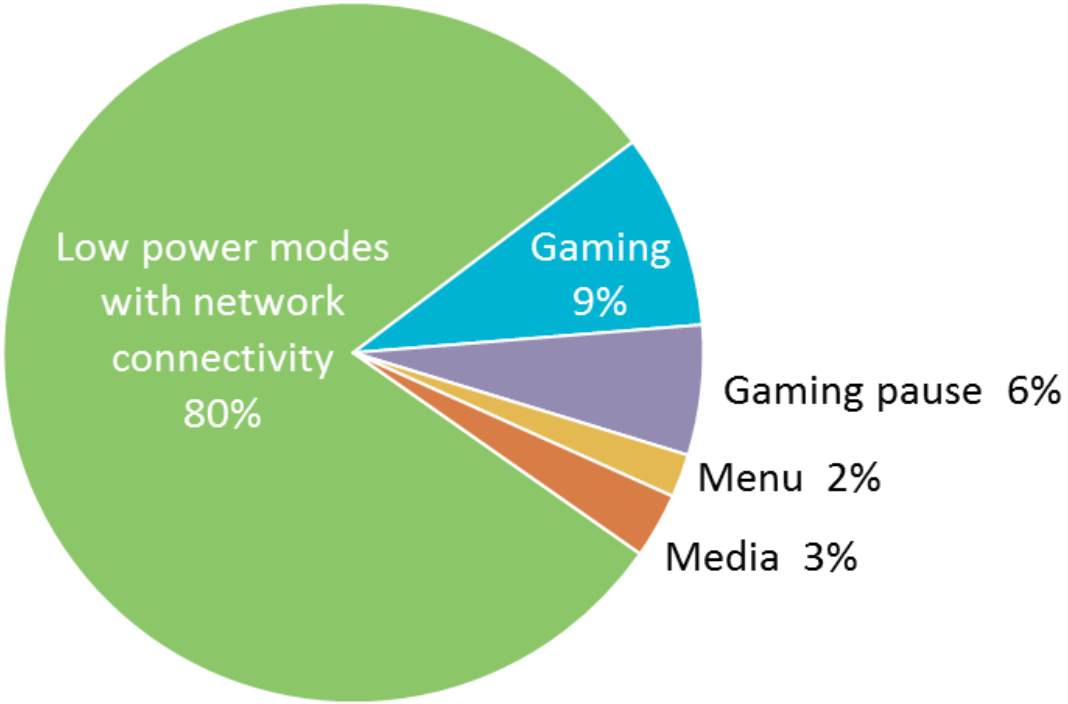
2010 games console typical energy consumption



Some devices use 80% of electricity demand just to maintain network connectivity and only 20% to provide main functions

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Financing low-carbon generation

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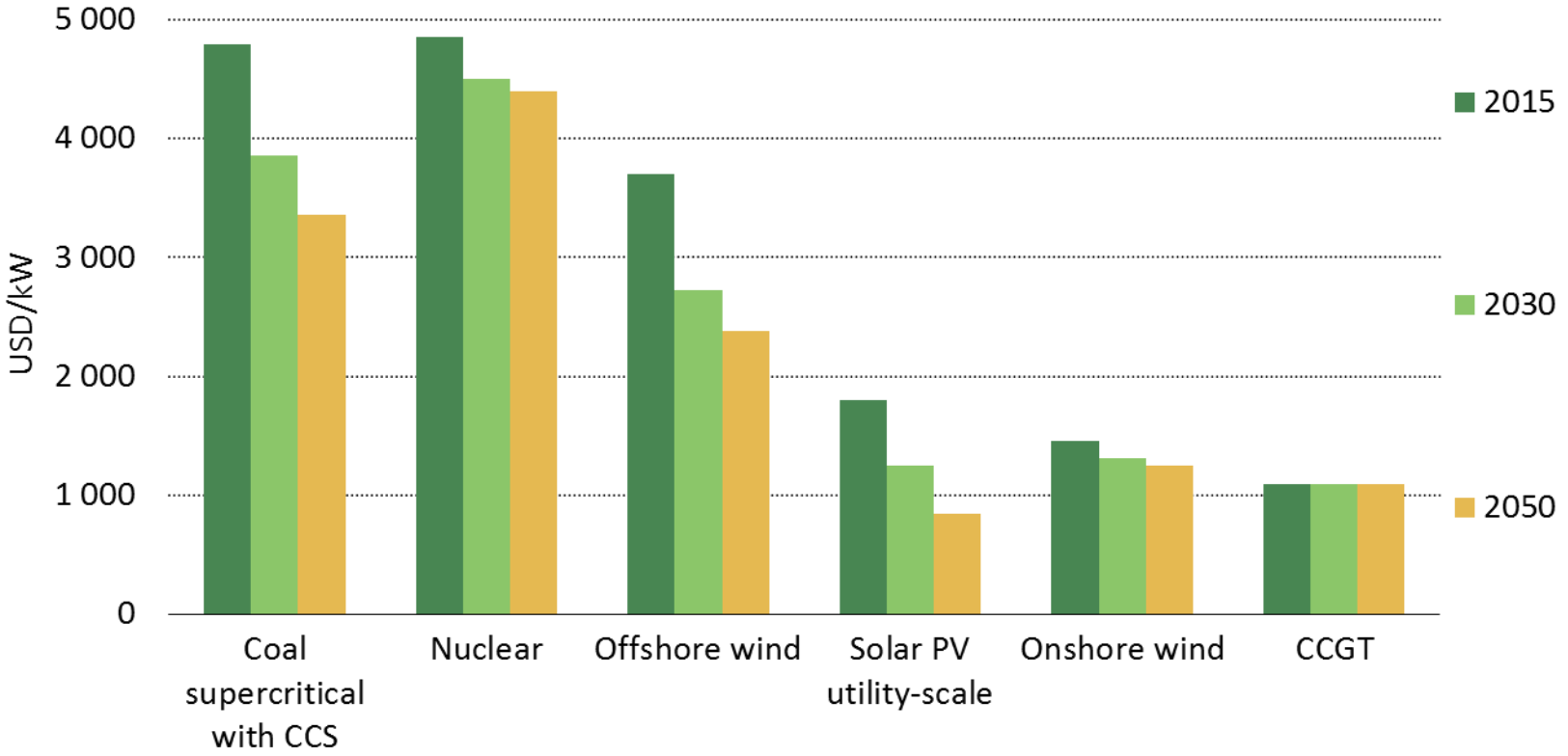

The upfront capital costs of low-carbon technologies are higher than gas fired generation – increasing the importance of financing

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Systems thinking and integration

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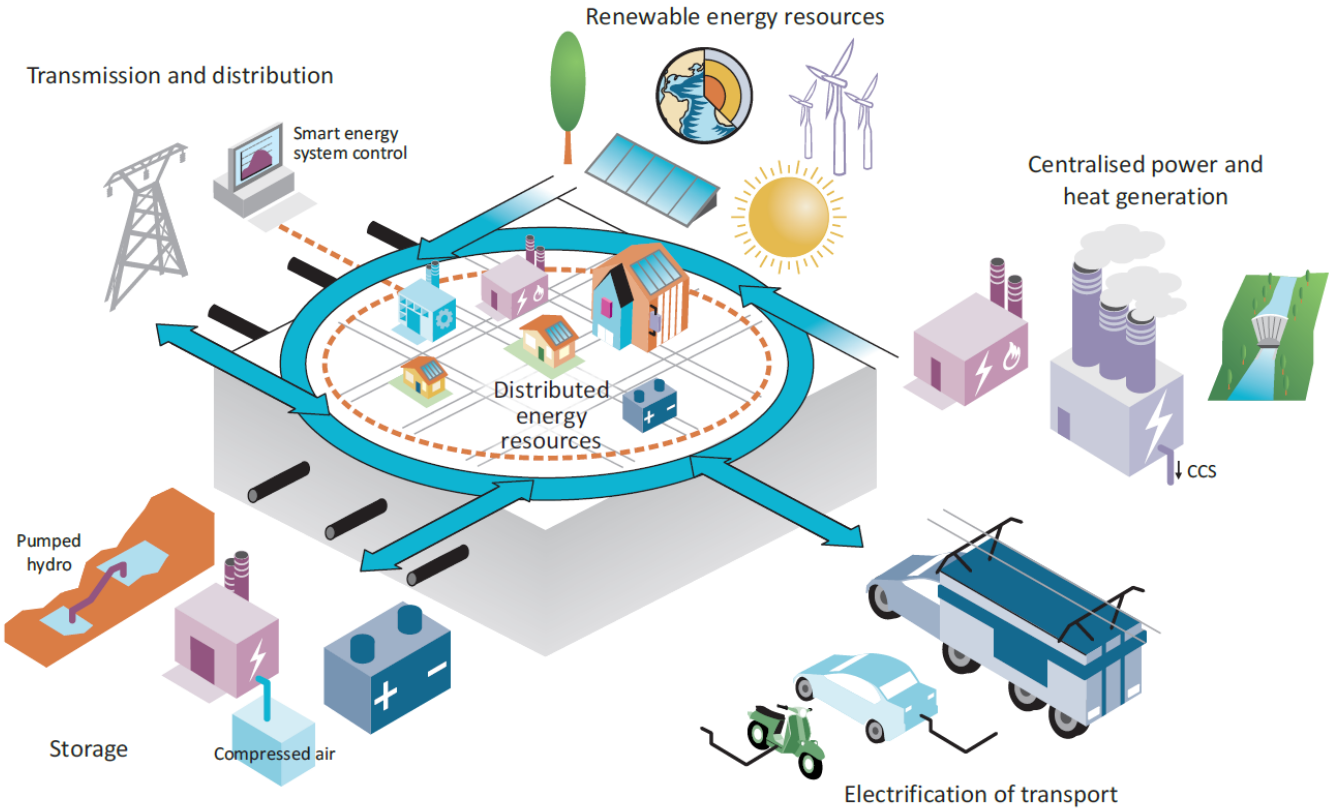

A sustainable electricity system is a smarter, multidirectional and integrated energy system that requires long-term planning for services delivery

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Harnessing Electricity's Potential

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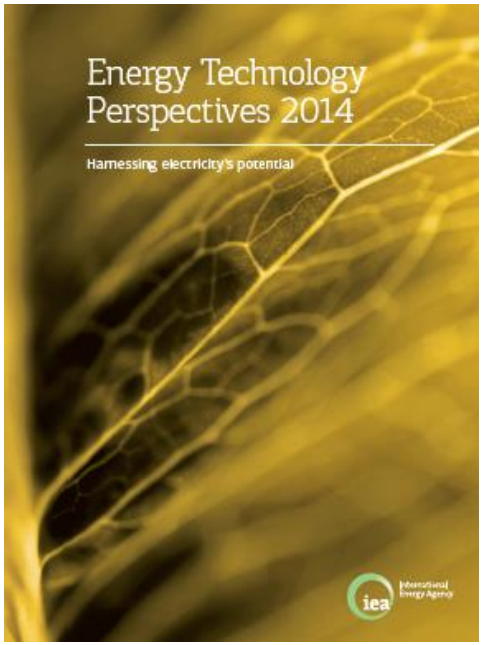
1. **Solar-The possible first resource by 2050?**
2. **The evolving role of Natural Gas in Low-C electricity systems: Flexibility vs. Base load**
3. **How Can e-mobility replace oil?**
4. **Electricity storage: Do we need a game changer?**
5. **Financing low carbon electricity generation during the transition**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



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Thank you

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