



International
Energy Agency

The role of electricity in deep CO₂ emission cuts

Insights from Energy Technology Perspectives 2010

Electricity at the core of climate mitigation

IEA Side Event at COP16, Cancún, 6 December 2010

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The context

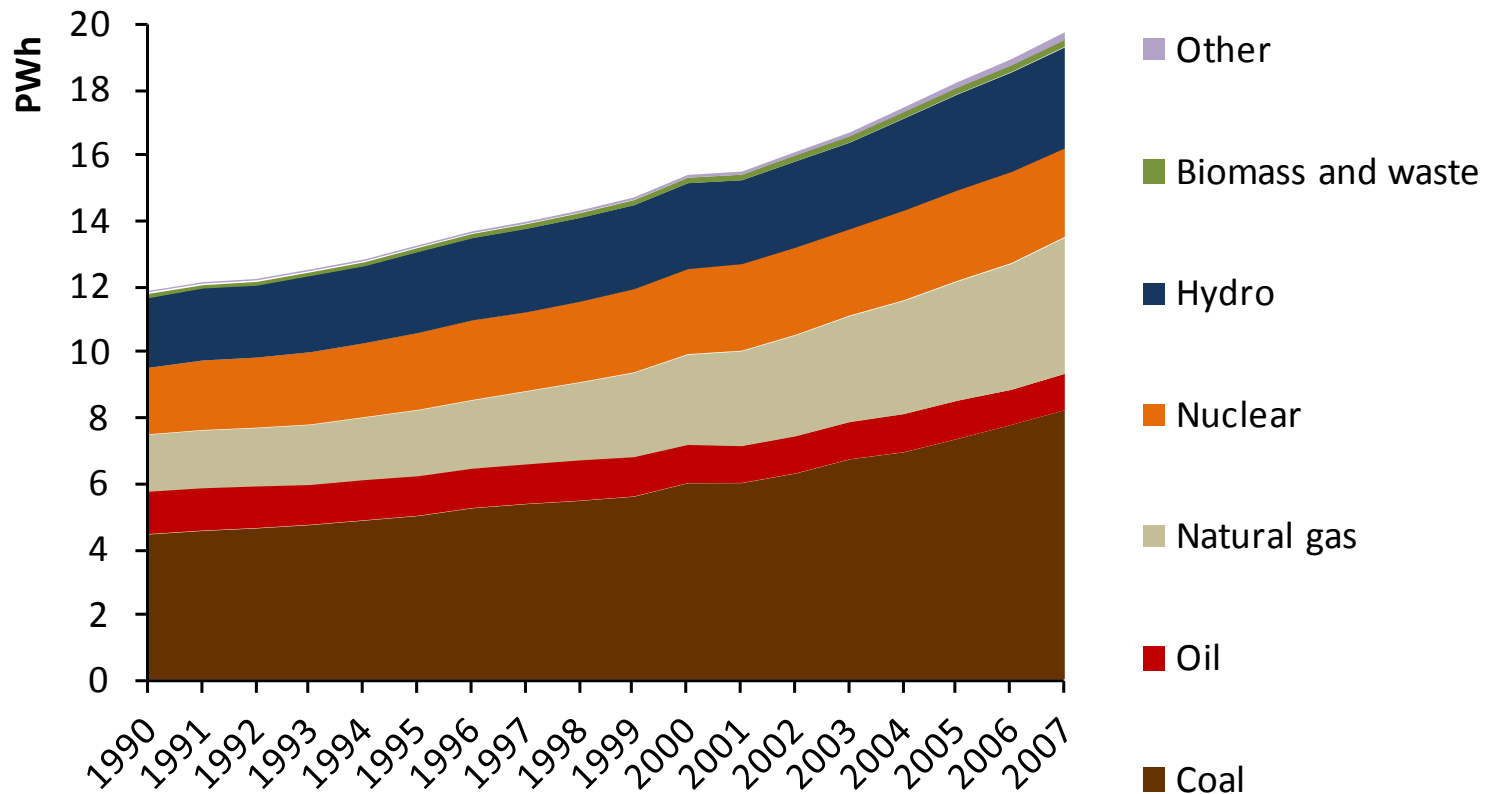
- **Need a global energy technology revolution to meet climate change and energy security challenges.**

- **Decarbonising electricity generation and use will be crucial**
 - **Which technologies can play a role?**

 - **What are the costs and benefits?**

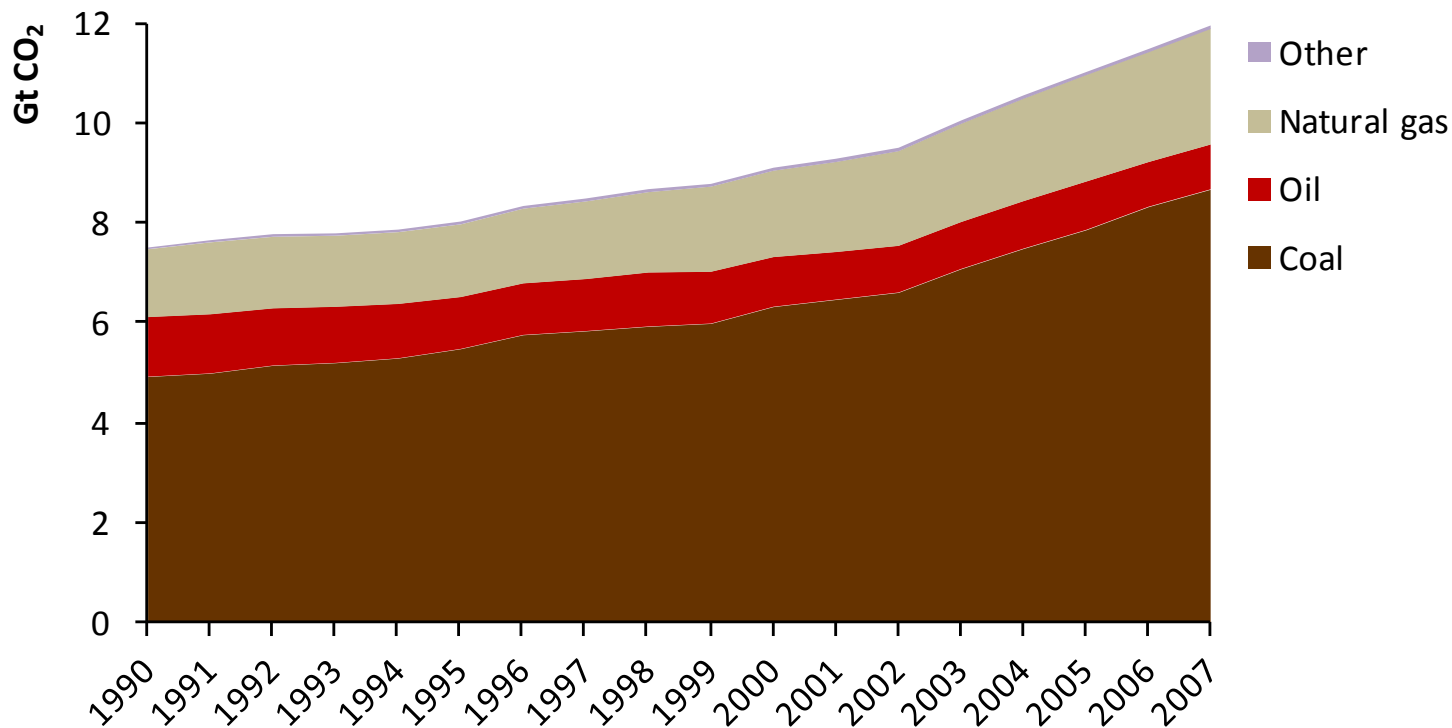
 - **What policies are needed?**

Historical trends in global electricity production



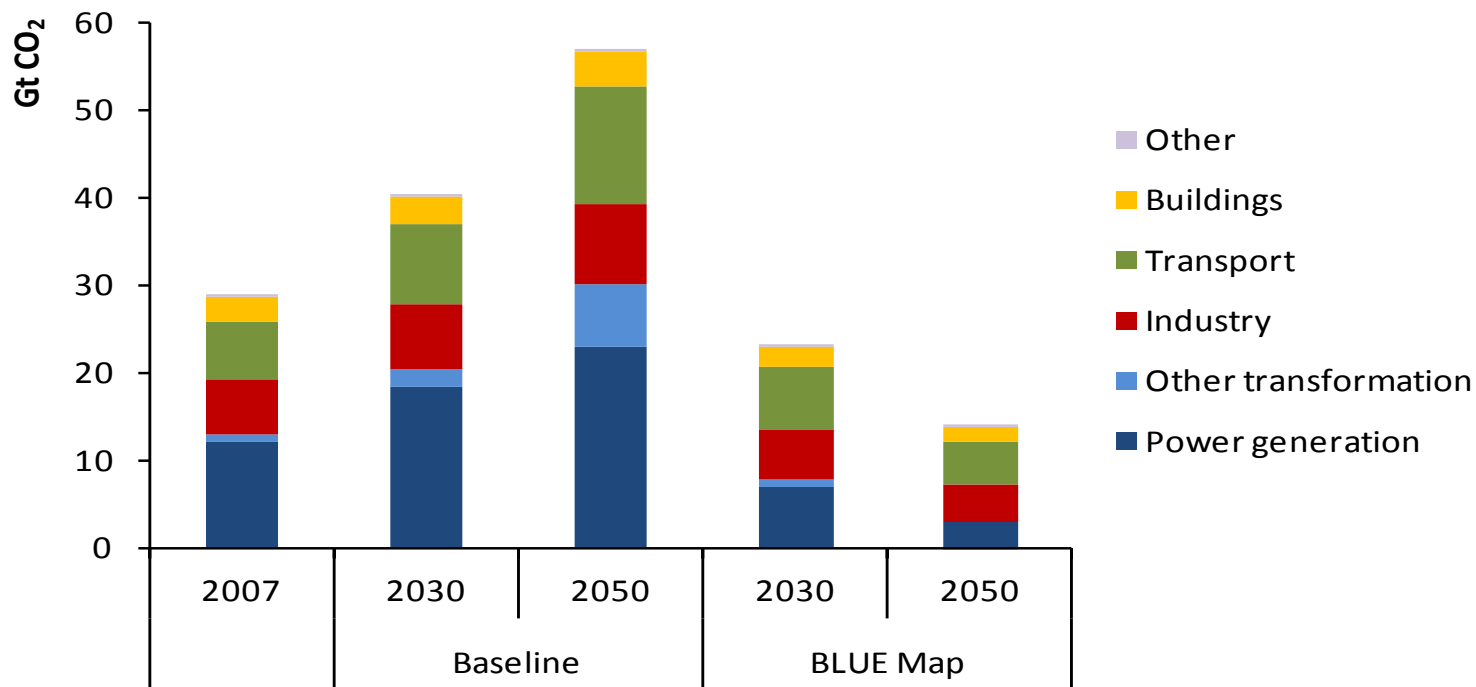
Electricity production has increased rapidly in recent years and continues to be dominated by fossil fuels.

CO₂ emissions from global electricity generation



Electricity production from coal is the main source of CO₂ emissions from the sector.

Global energy-related CO₂ emissions in the Baseline and BLUE Map scenarios

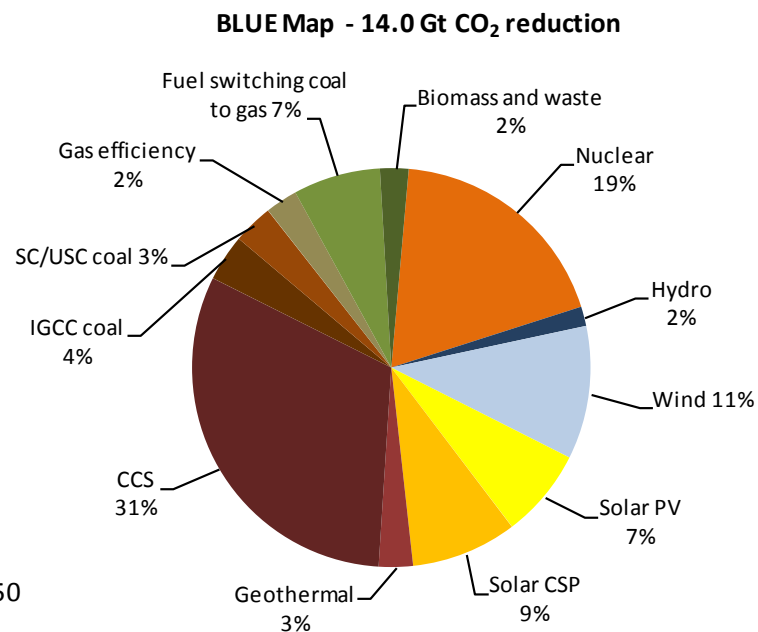
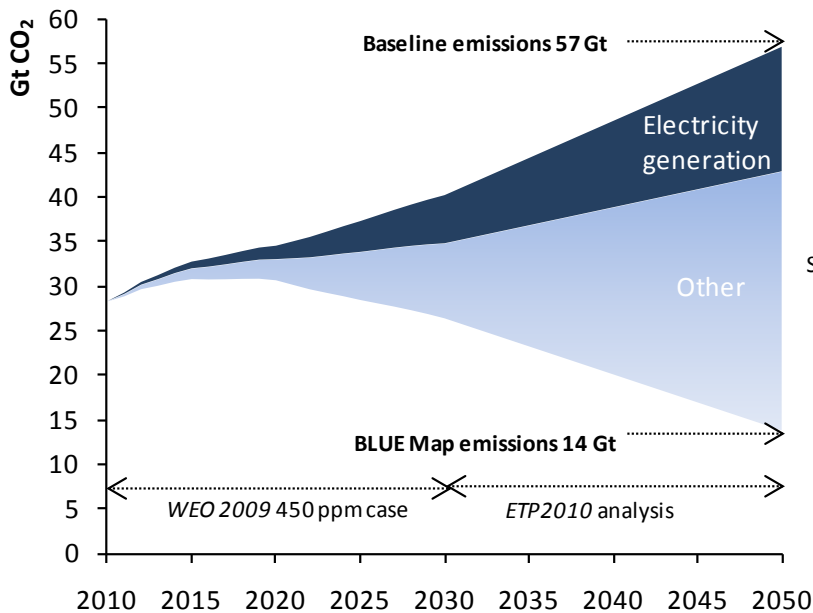


Global CO₂ emissions double in the Baseline, but in the BLUE Map scenario abatement across all sectors reduces emissions to half 2005 levels by 2050.

Role of electricity in reducing global CO₂ emissions

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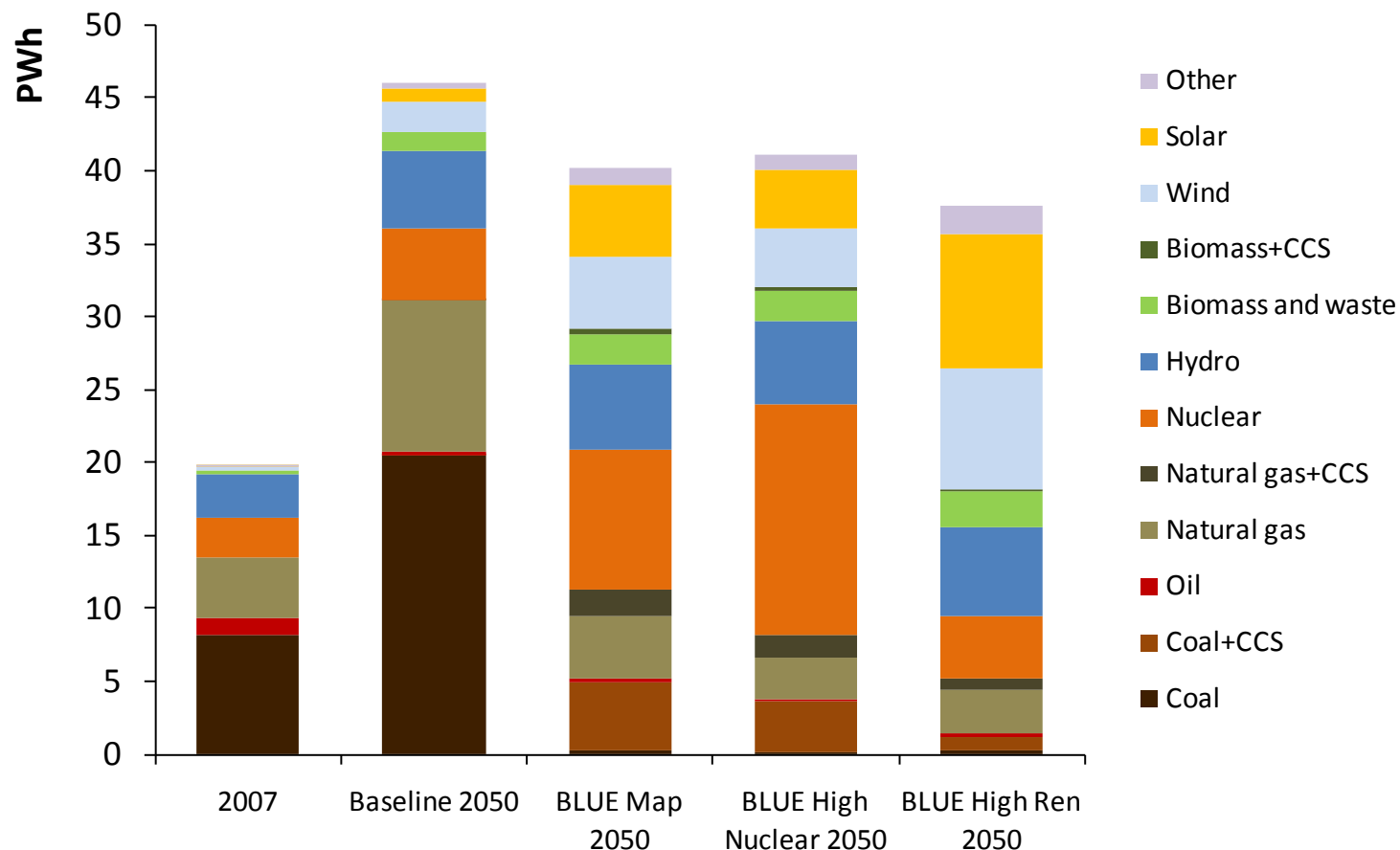
Scenarios &
Strategies
to 2050



Electricity generation accounts for almost one-third of the total CO₂ emissions reduction in 2050.

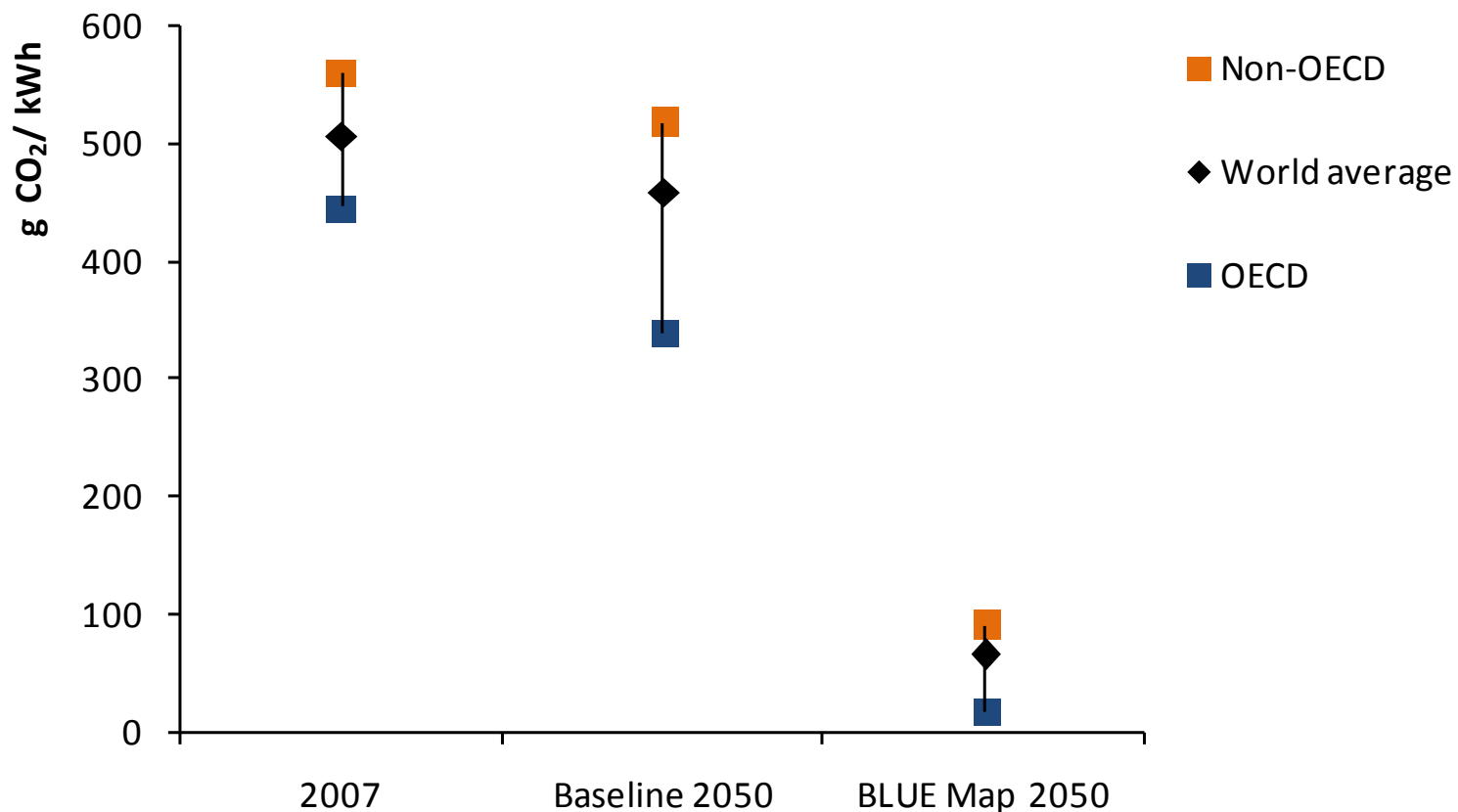


Decarbonising the power sector – a new age of electrification?



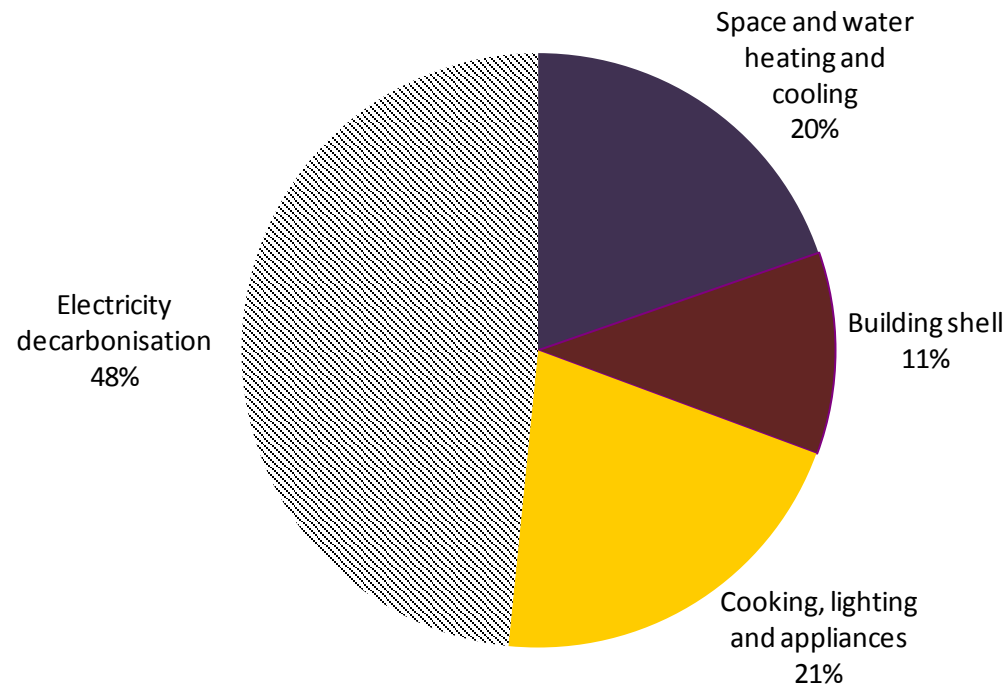
A mix of renewables, nuclear and fossil-fuels with CCS will be needed to decarbonise the electricity sector.

CO₂ intensity of electricity production by scenario



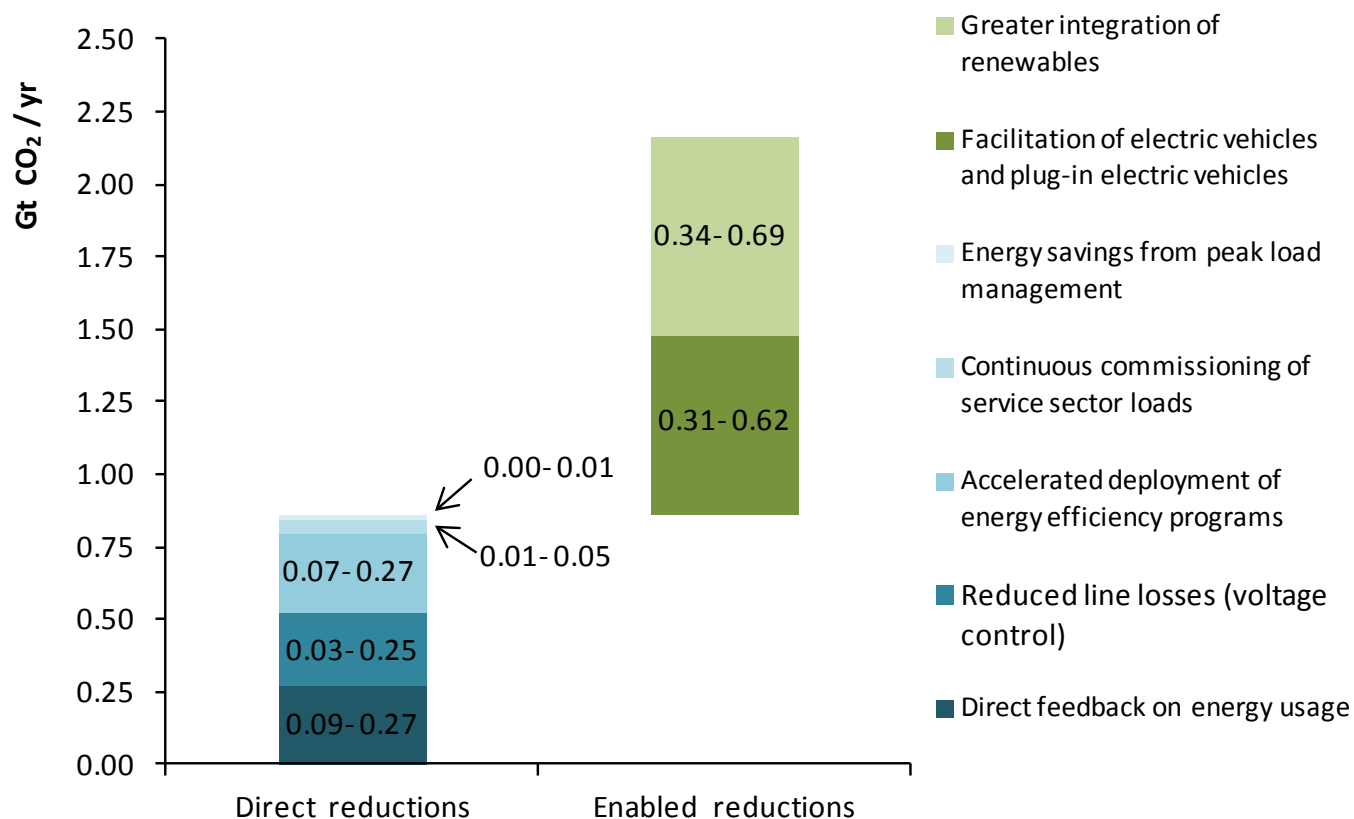
The power sector is virtually decarbonised by 2050 in the BLUE Map scenario.

Role of electricity in reducing CO₂ emissions from buildings



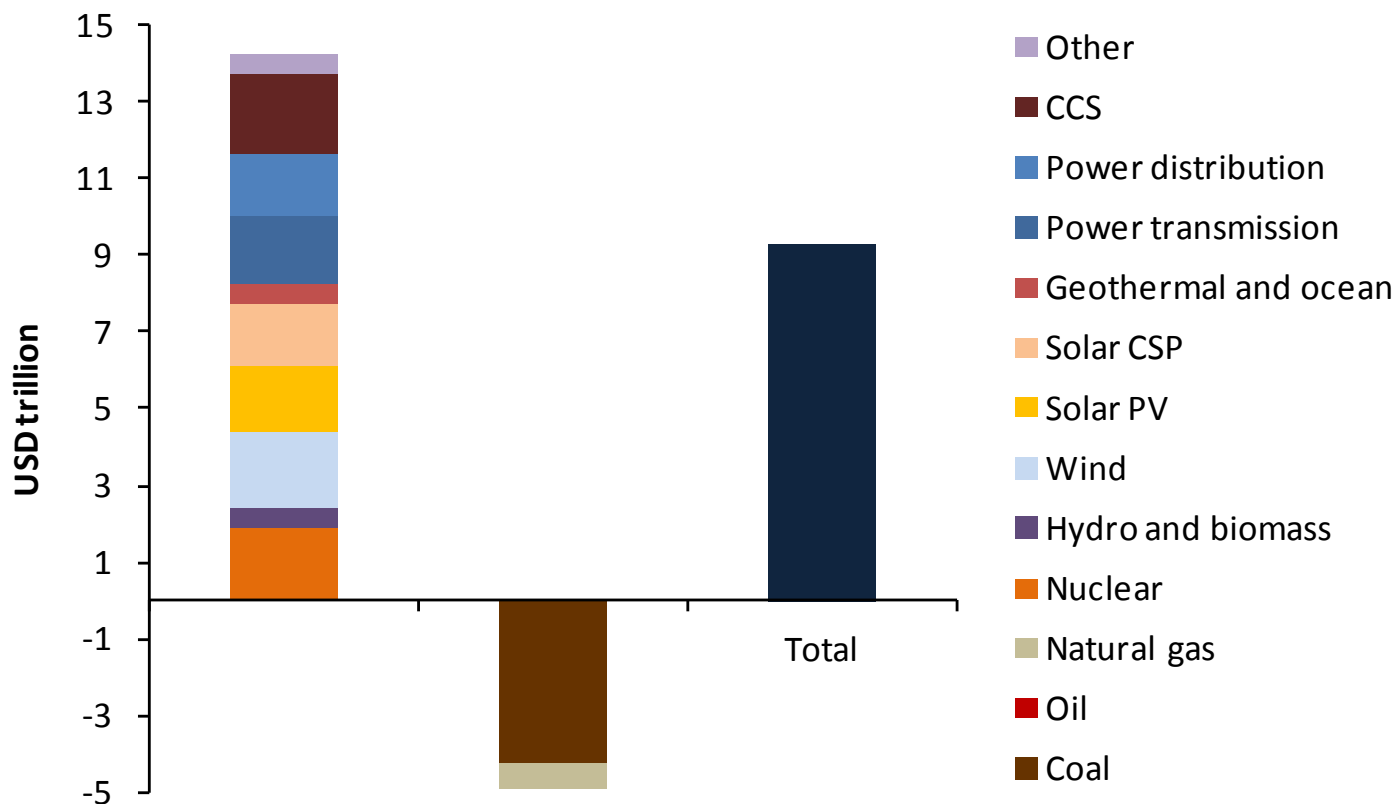
Decarbonisation of the electricity sector contributes around half of the emissions reduction in the buildings sector in 2050.

Smart grid CO₂ reductions in 2050



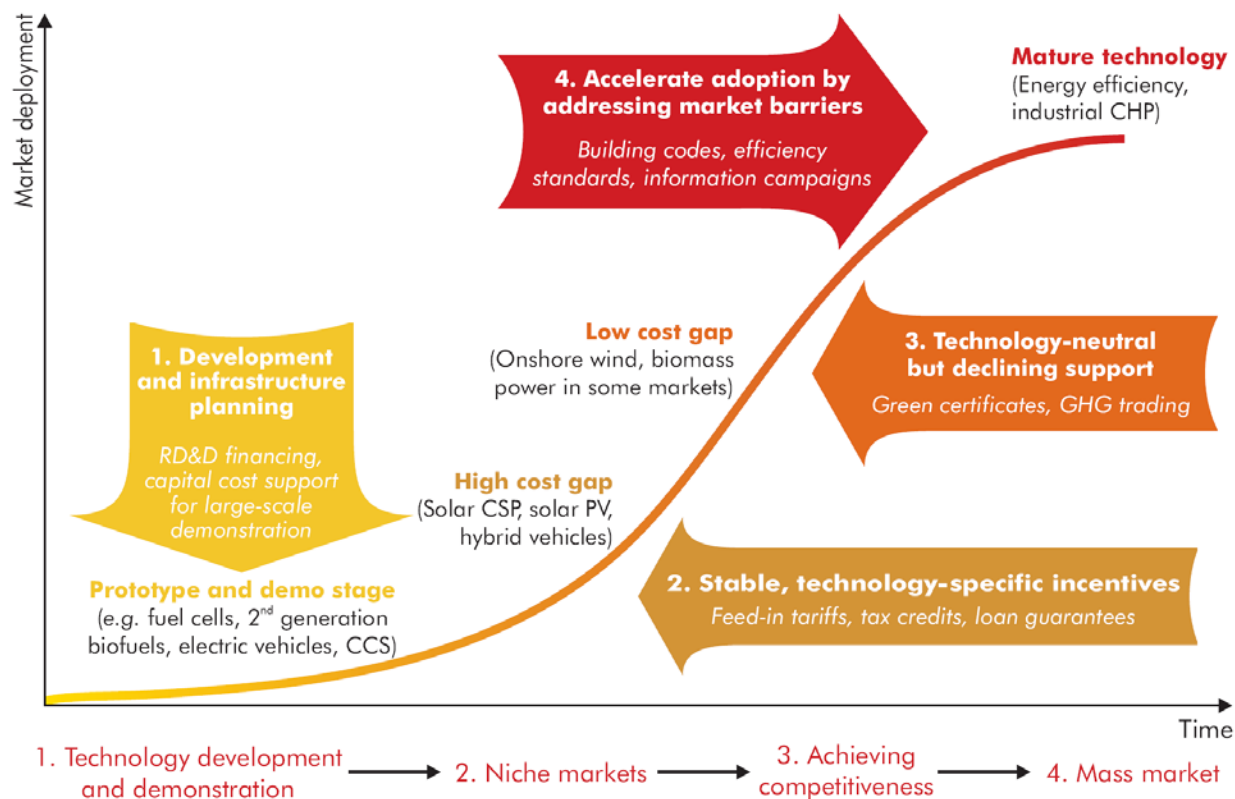
Smart grids allow better management of the grid and can facilitate the deployment of low-carbon technologies, such as renewables and electric vehicles.

Additional investment needs in the power sector, 2010-2050



Net additional investment costs needed to decarbonise the power sector are estimated at USD 9 trillion, mostly for renewables.

Different policies for supporting low-carbon technologies



Government support policies need to be appropriately tailored to the stage(s) of technological development.

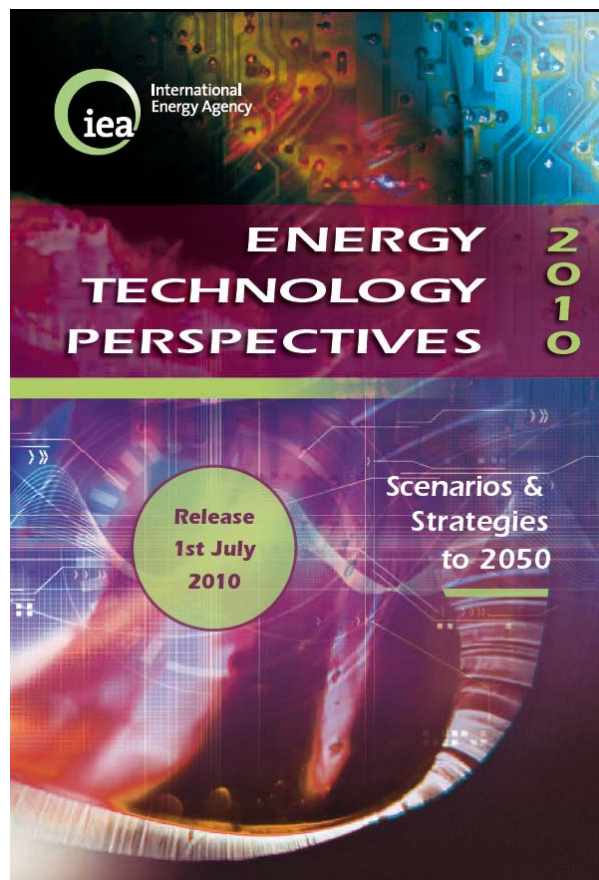
Conclusions

- Decarbonising the power sector will be at the heart of achieving deep CO₂ emissions cuts
- Renewables, fossil fuels with CCS and nuclear power will all have an important part to play
- Smarter grids will also be important
- Electrification could then become an emissions abatement solution in all demand sectors
- Significant investment will be needed in the next 40 years
- Government intervention in RDD&D will be needed to create markets and bring down costs
- Technology-specific issues will also need to be addressed e.g. integrating variable renewables, nuclear waste storage, regulation of CCS



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**Release
1st July
2010**

Thank You

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