




New Trends in Energy

Smart grids

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Introductory lecture – Energy commodities and technologies

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Motivation for energy technology research and development



Why innovate?



Energy Efficiency – Cost Efficiency

- The cheapest kWh is a kWh not generated
- Making the best out of the available resources

Energy Security

- Resilient and robust energy system
- Taking advantage of domestic energy sources leads to reduced reliance on fuel imports

Climate Change

- Transition to low-carbon economy

Health and environment

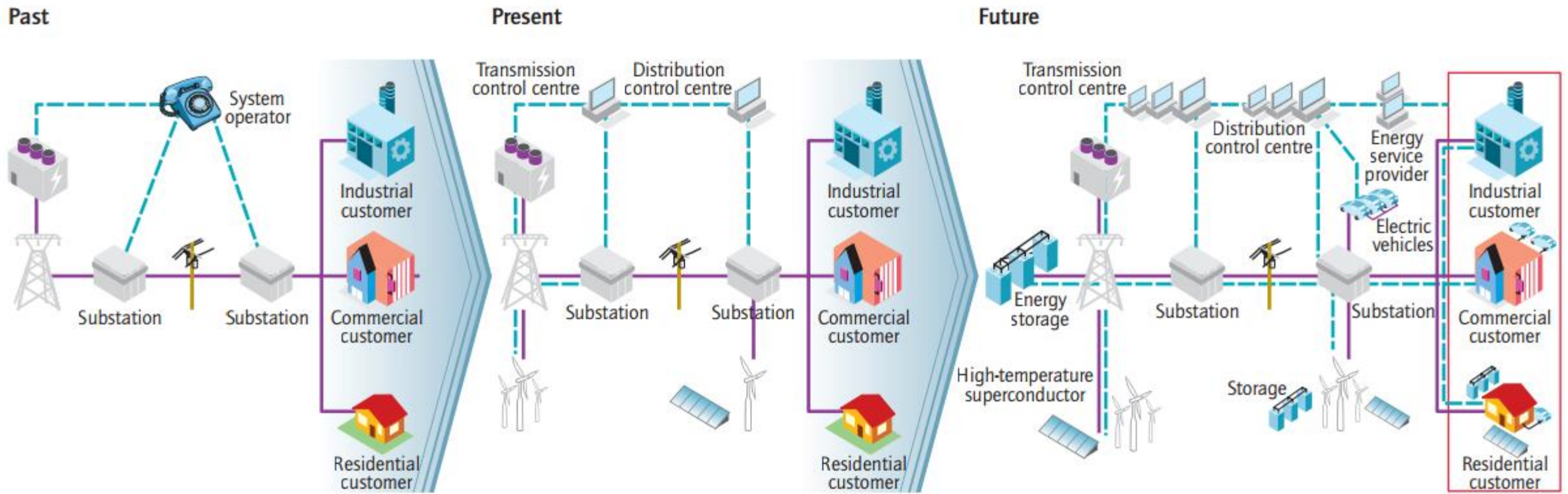
- Reduced emission of air and water pollutants that adversely affect health



Smart grids

Smart Grids

Built on a significant increase in the level of communication, automation and control based on a **two-way flow of information and electricity**, between supplier and consumer.



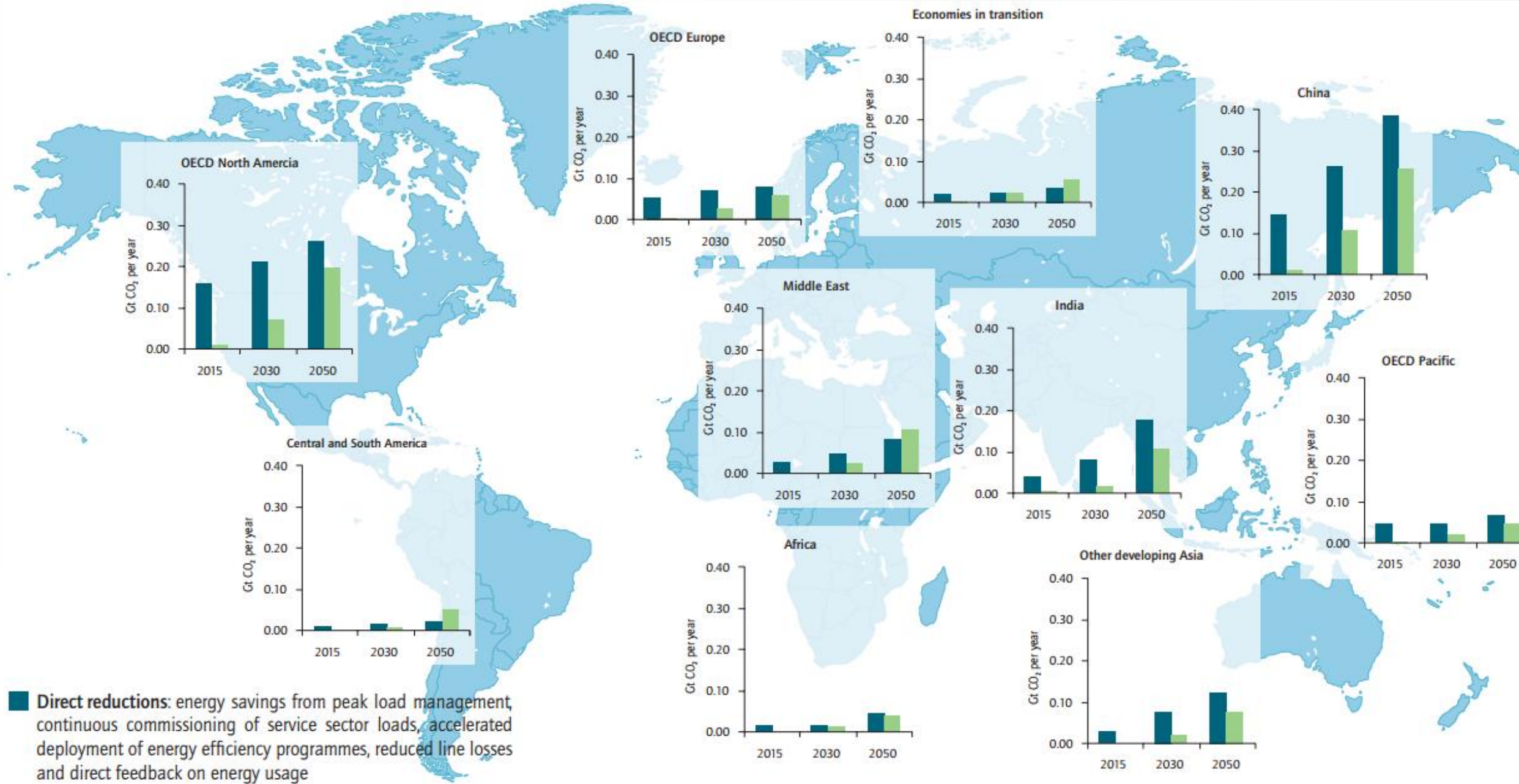


Smart Grids – What can they offer?



- Enable informed participation by customers
- Accommodate all generation and storage options
- Enable new products, services and markets
- Optimise asset utilisation and operating efficiency
- Provide resiliency to disturbances, attacks and natural disasters

Source: IEA, 2011. Smart Grids – Technology Roadmap



Direct reductions: energy savings from peak load management, continuous commissioning of service sector loads, accelerated deployment of energy efficiency programmes, reduced line losses and direct feedback on energy usage

Enabled reductions: greater integration of renewables and facilitation of EV and PHEV deployment

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Source: IEA, 2011. Smart Grids – Technology Roadmap



Suggested further reading



- IEA Technology Roadmap: Smart Grids

http://www.oecd-ilibrary.org/energy/technology-roadmap-smart-grids_9789264115071-en



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