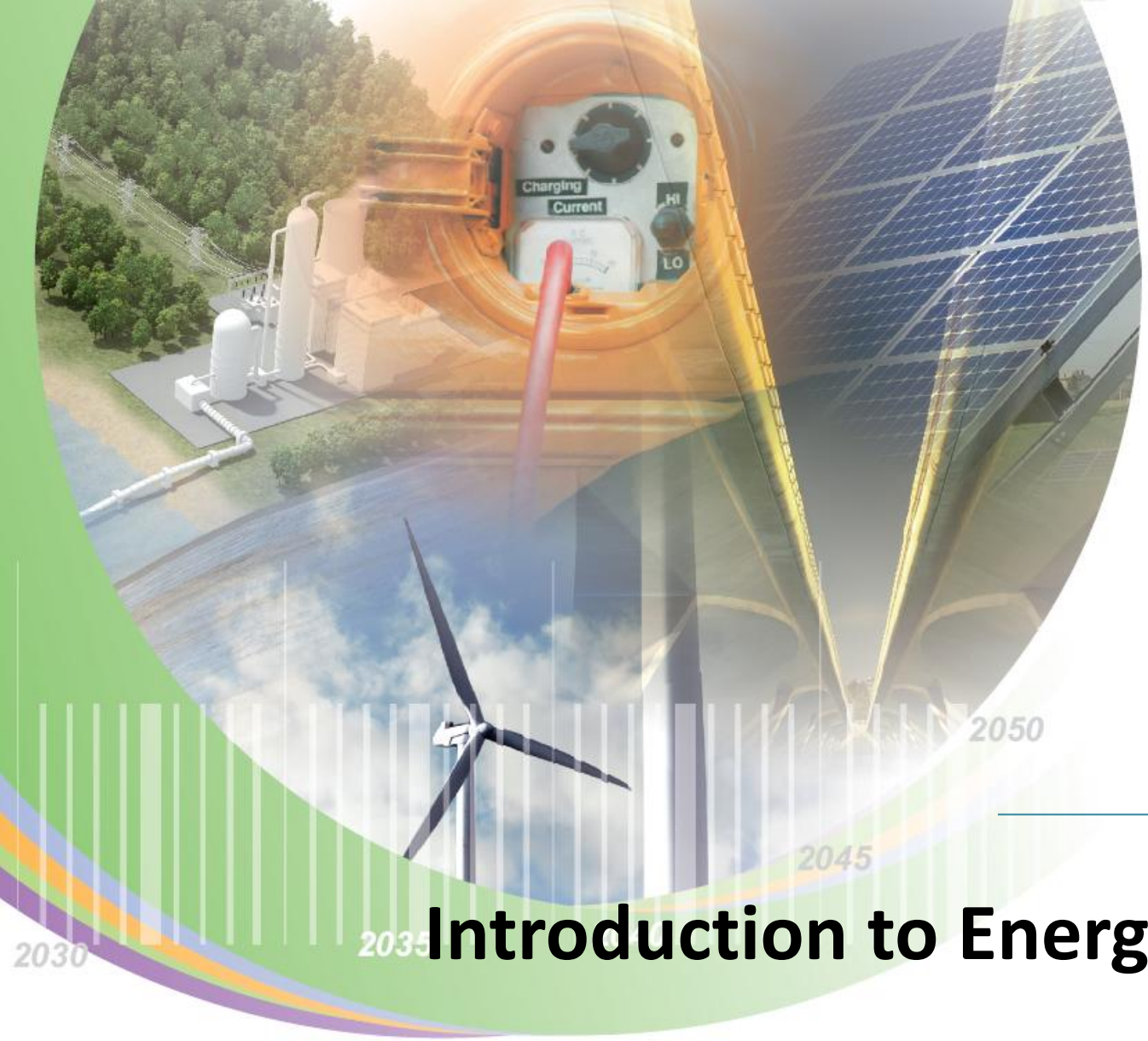

Introduction to Energy Technology Roadmaps

Energy technology roadmaps

International Energy Agency

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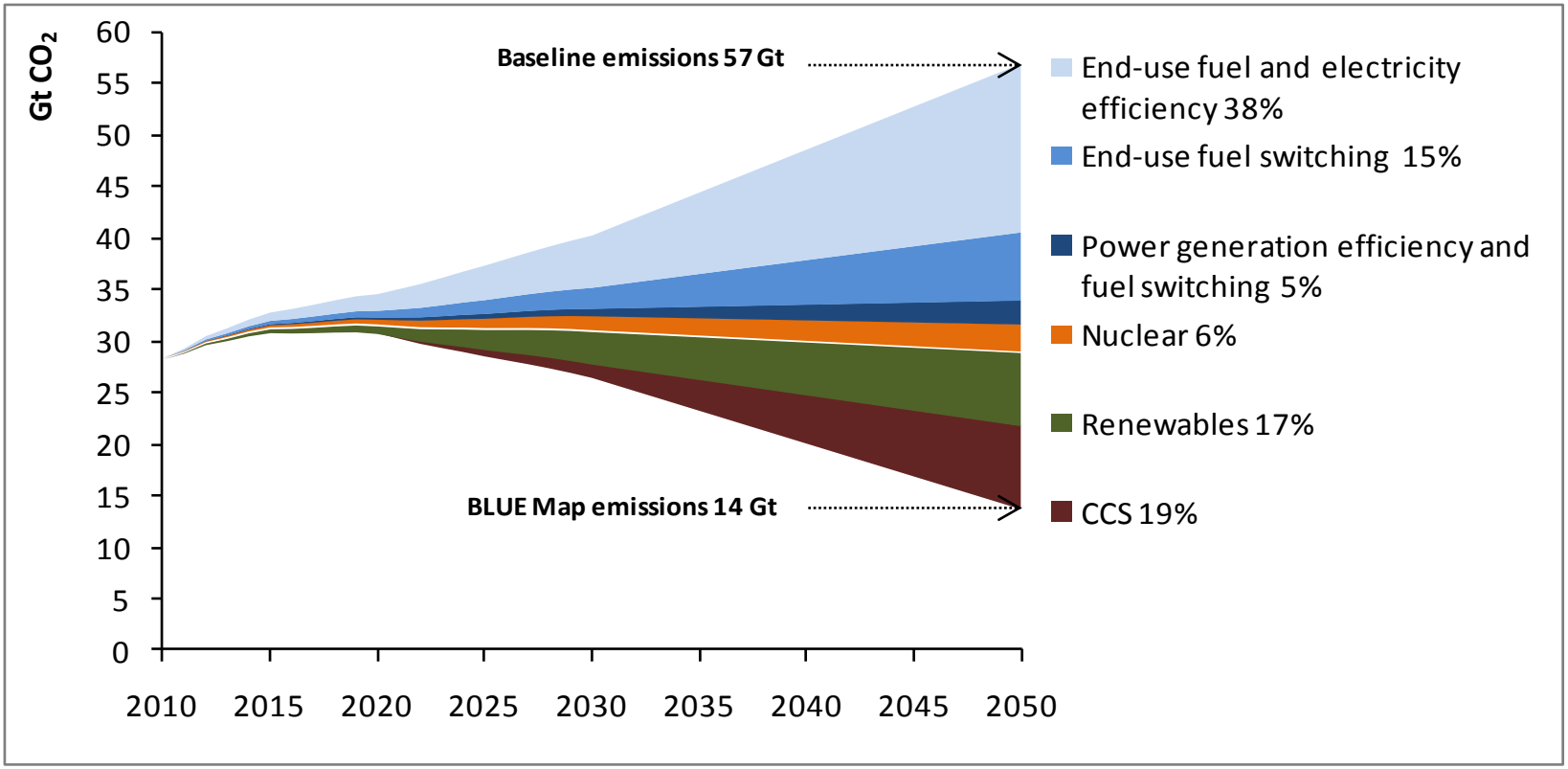
Key technologies for reducing global CO_2 emissions



source: IEA Energy Technology Perspectives 2010

A wide range of technologies will be necessary to reduce energy-related CO_2 emissions substantially.

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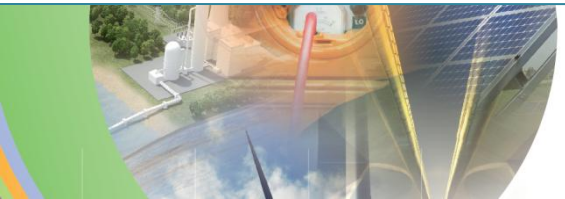
The Role of Roadmaps

- A global price for carbon is necessary
  - …but by itself insufficient to accelerate the needed energy technology advancements in time
- Greater focus on energy technology policies needed
- Technology roadmaps can support GHG goals by:
  - Identifying and addressing technology-specific barriers
  - Highlighting necessary deployment policies and incentives
  - Directing increased RD&D funding for new technologies
  - Supporting technology diffusion, knowledge sharing among countries



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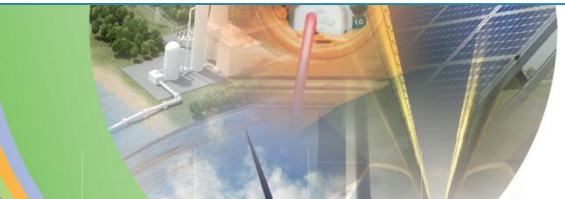
Technology roadmaps provide answers

- **Where is technology today?**
  - GW installed capacity/kWh of savings
  - Leading countries/regions
  - Cost, efficiency
- **What is the deployment pathway needed to achieve 2050 goals?**
  - Use IEA Energy Technology Perspectives BLUE Map scenarios
- **What are the priority near-term actions?**
  - R&D gaps and how to fill them
  - Identify barriers and obstacles and how to overcome
  - Market requirements and policy needs
  - Technology diffusion/transfer and international collaboration needs



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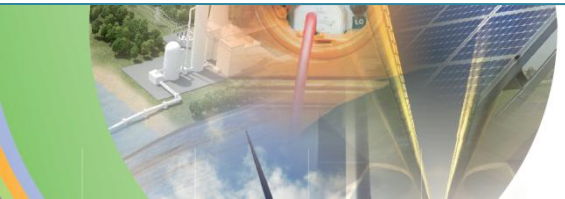
Roadmap logic

- Goal to achieve
- Milestones to be met
- Gaps to be filled
- Actions to overcome gaps and barriers
- What and when things need to be achieved



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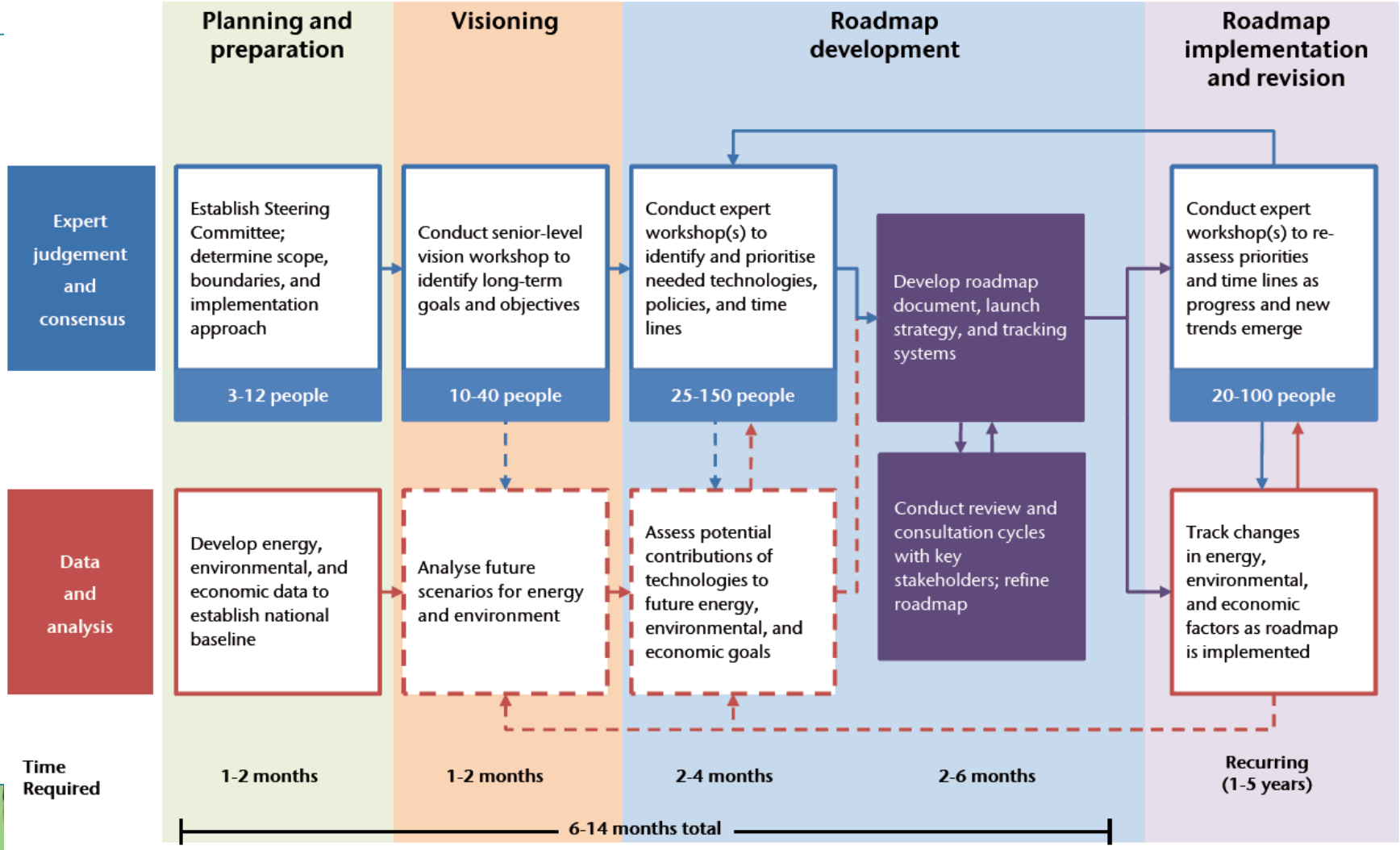
Roadmap process outline



Note: Dotted lines indicate optional steps, based on analysis capabilities and resources.

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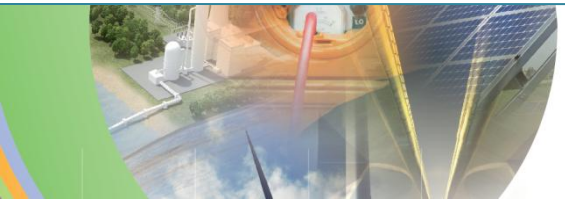
Roadmap Tasks

- Scoping phase reviewing existing work and identifying issues
- One or more workshops with 15-30 experts from industry, government, academia...
- Develop draft roadmap
- Circulate draft of roadmap to wider stakeholder group
- Carry out missing analysis and refine roadmap
- Re-circulate second draft for further comment
- Publish roadmap



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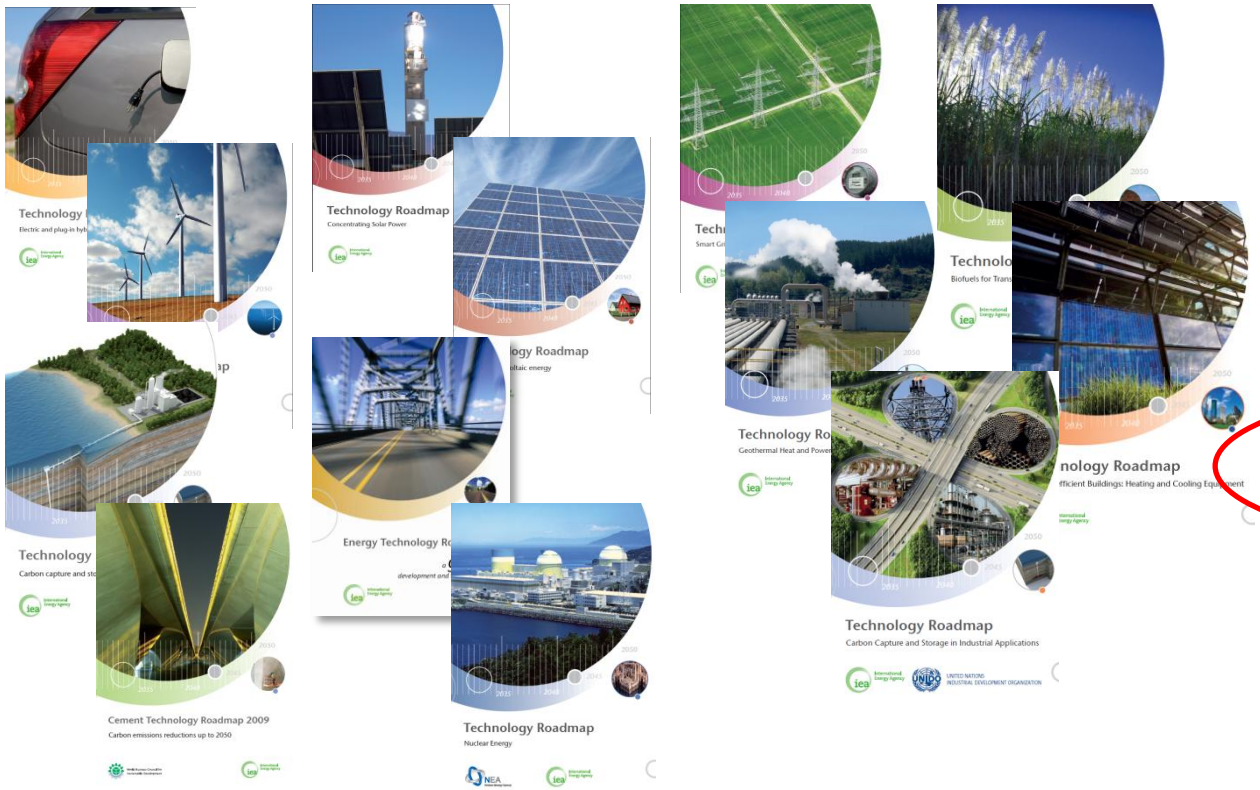
Technology roadmaps

2009 **2010** **2011**



2012

- **Vehicle Fuel Economy**
- **High efficiency, low emissions coal**
- **Hydropower**
- **Bioenergy**
- **Solar heating & cooling**
- **Energy efficient building envelopes**
- **Chemical catalysis**

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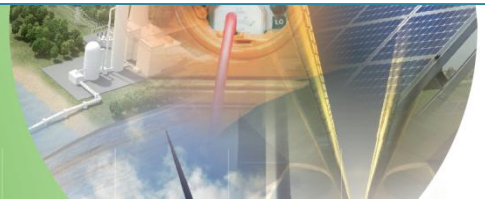
IEA ROADMAP EXAMPLES



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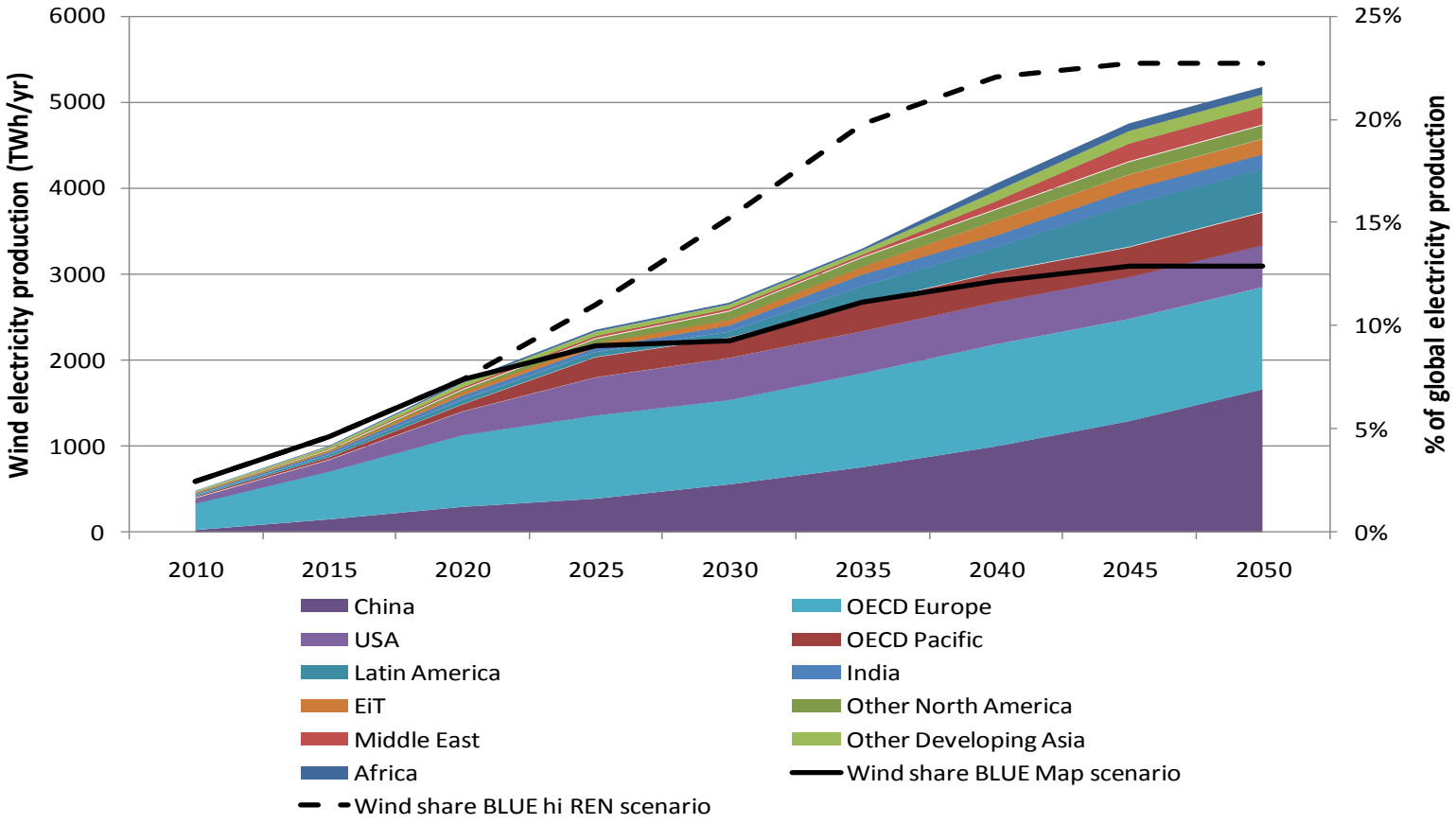
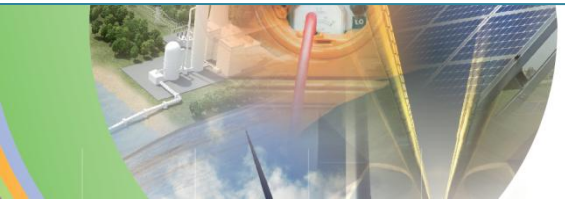
Roadmap example:
Wind - an ambitious growth pathway





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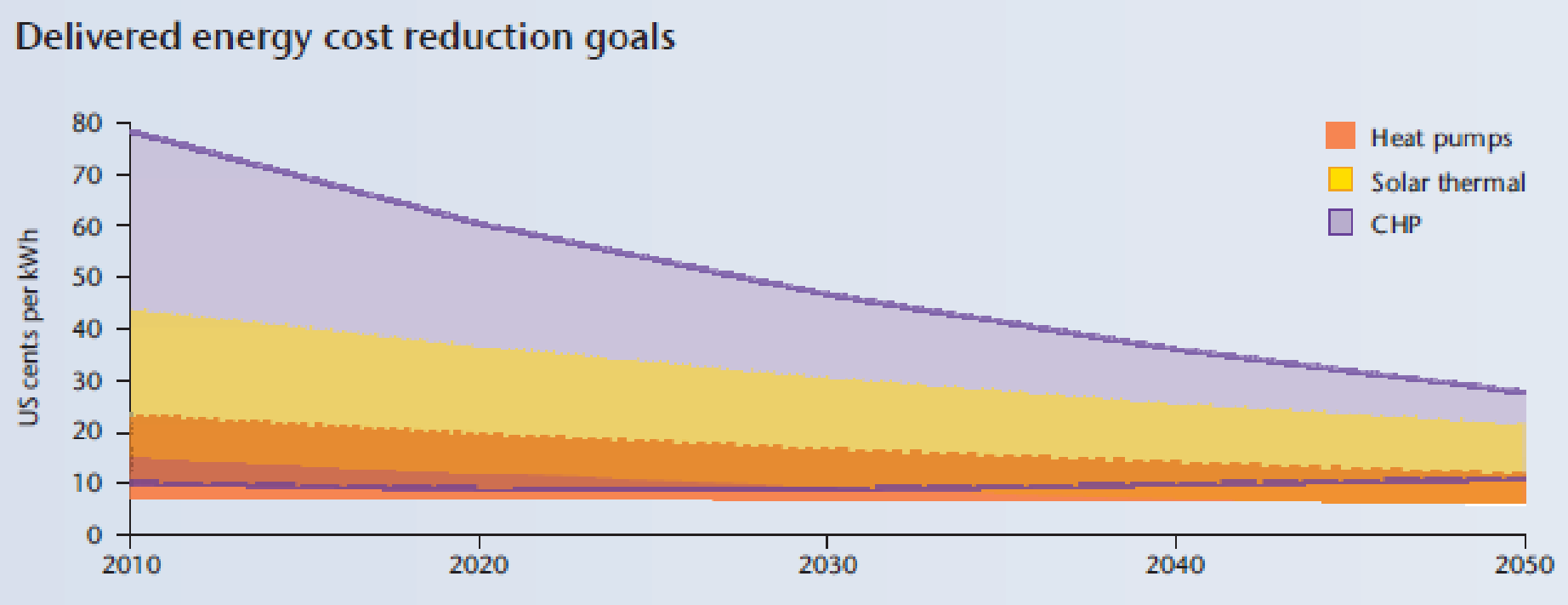
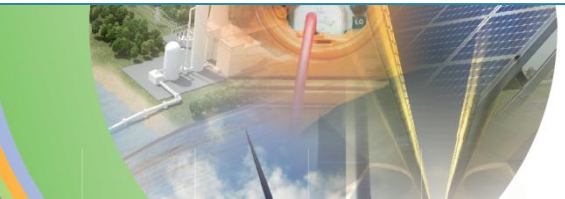
EE in Buildings roadmap example:
Cost reduction goals





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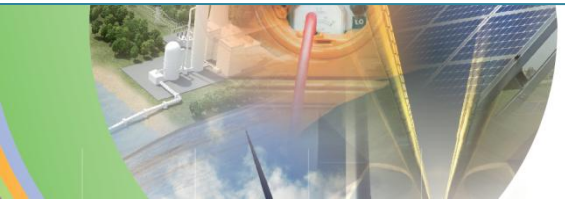
EV/PHEV roadmap example: milestones

Milestones:	2010-2012	2012-2015	2015-2020
Policy framework	Develop policy frameworks focused on early adopters with incentives for consumers / manufacturers		Review of policies and updates to reflect best practices; support for expansion of infrastructure and to ensure EV/PHEV sales are on track
Vehicles / batteries	Begin production of EV and PHEV models, low-production volume demonstrations to test batteries and controls, and assist design optimizations		Rapidly increase numbers of models offered and average production volumes; battery and other costs begin to decline
Codes / standards	Create common standards for plugs and recharging protocols in each major region		Ensure that smart metering is available for home recharging with dual tariffs in early adopter areas
Recharging / electricity infrastructure	Focus on areas likely to require recharging infrastructure through 2015; target early adopter homes and public locations		Begin major investments in increased street/office daytime commercial recharging, including rapid charging where possible
RD&D	Ensure early vehicle/battery models are safe; achieve near-term technical targets; continue RD&D on advanced battery designs		Progress toward battery cost targets of USD 300/ kWh; incorporate lessons learned from early experiences



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