

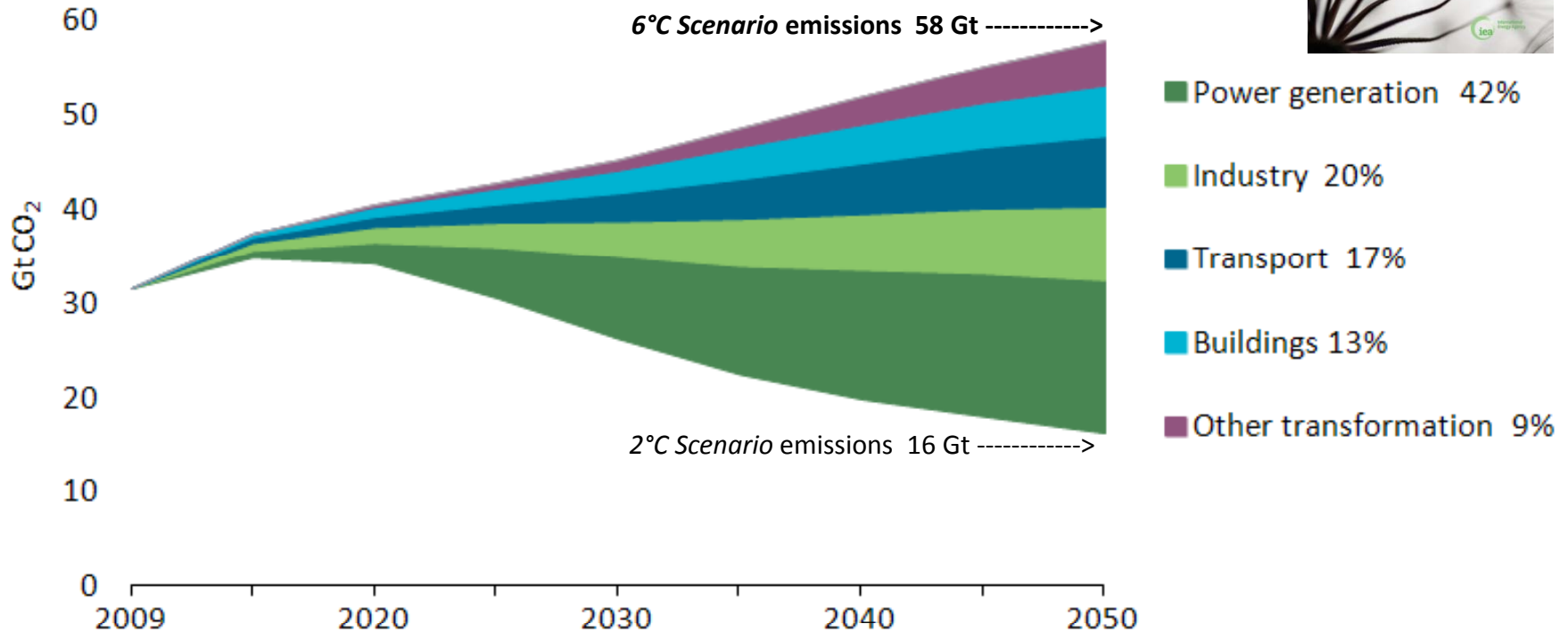
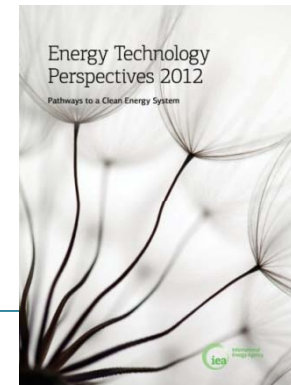


Technology Roadmaps:

Cecilia Tam
9 July 2013

Low-carbon energy technology roadmaps

Key technologies for reducing global CO₂ emissions



Source: Energy Technology Perspectives 2012

- 6°C Scenario – business-as-usual; no adoption of new energy and climate policies
- 2°C Scenario - energy-related CO₂-emissions halved by 2050 through CO₂-price and strong policies



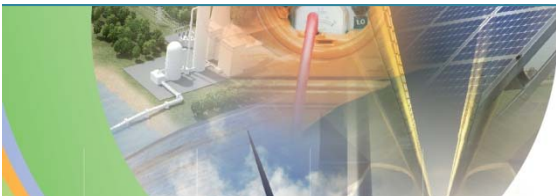
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IEA Roadmap Definition

“A technology roadmap is a dynamic set of technical, policy, legal, financial, market & organizational requirements identified by all stakeholders involved in its development. The effort shall lead to improved and enhanced sharing and collaboration of all related technology-specific RDD&D information among participants.

The goal is to accelerate the overall RDD&D process in order to deliver an earlier uptake of the specific energy technology into the marketplace”.



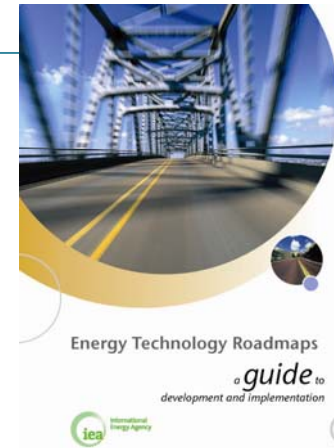
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Overview of IEA roadmap process

- Engage cross-section of stakeholders
- Identify a baseline:
 - Where is technology today?
- Establish a vision:
 - What is the deployment path needed to achieve 2050 goals?
- Identify technical, regulatory, policy, financial, public acceptance barriers
 - What are the near term action items?
- Develop implementation action items for stakeholders



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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**

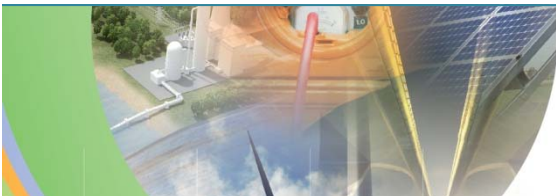


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Roadmap Tasks

- **Scoping phase reviewing existing work and identifying issues**
- **One or more workshops with 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**

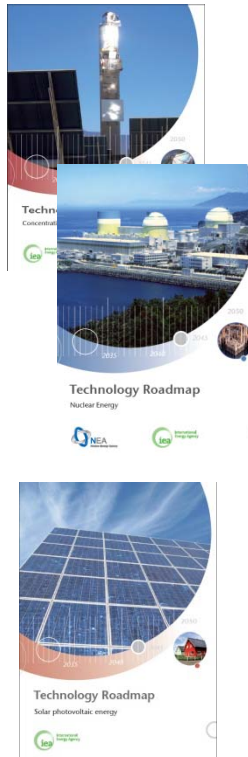


Technology roadmaps status

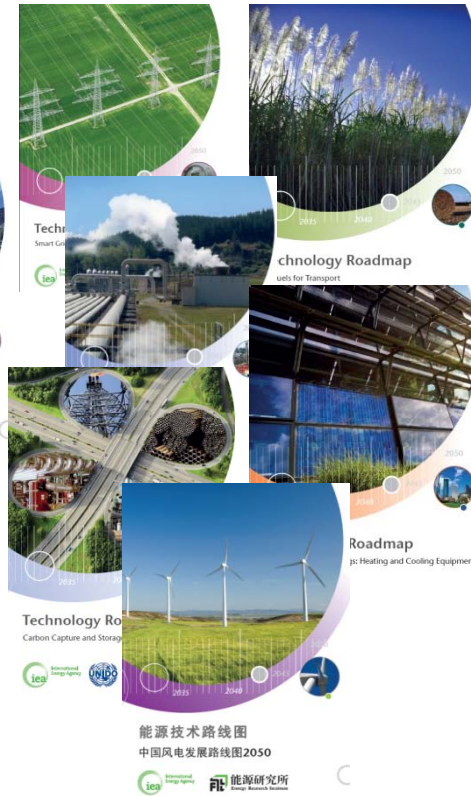
2009



2010



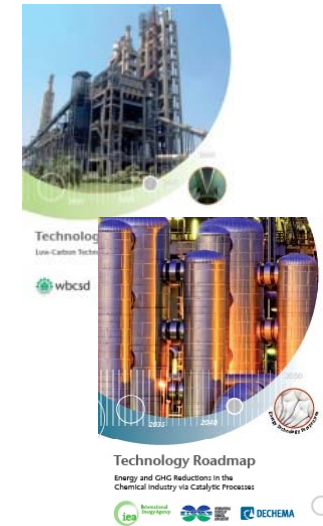
2011



2012



2013



- 2013 2014
- Building envelope
 - Energy Storage
 - Hydrogen



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IEA ROADMAP EXAMPLES

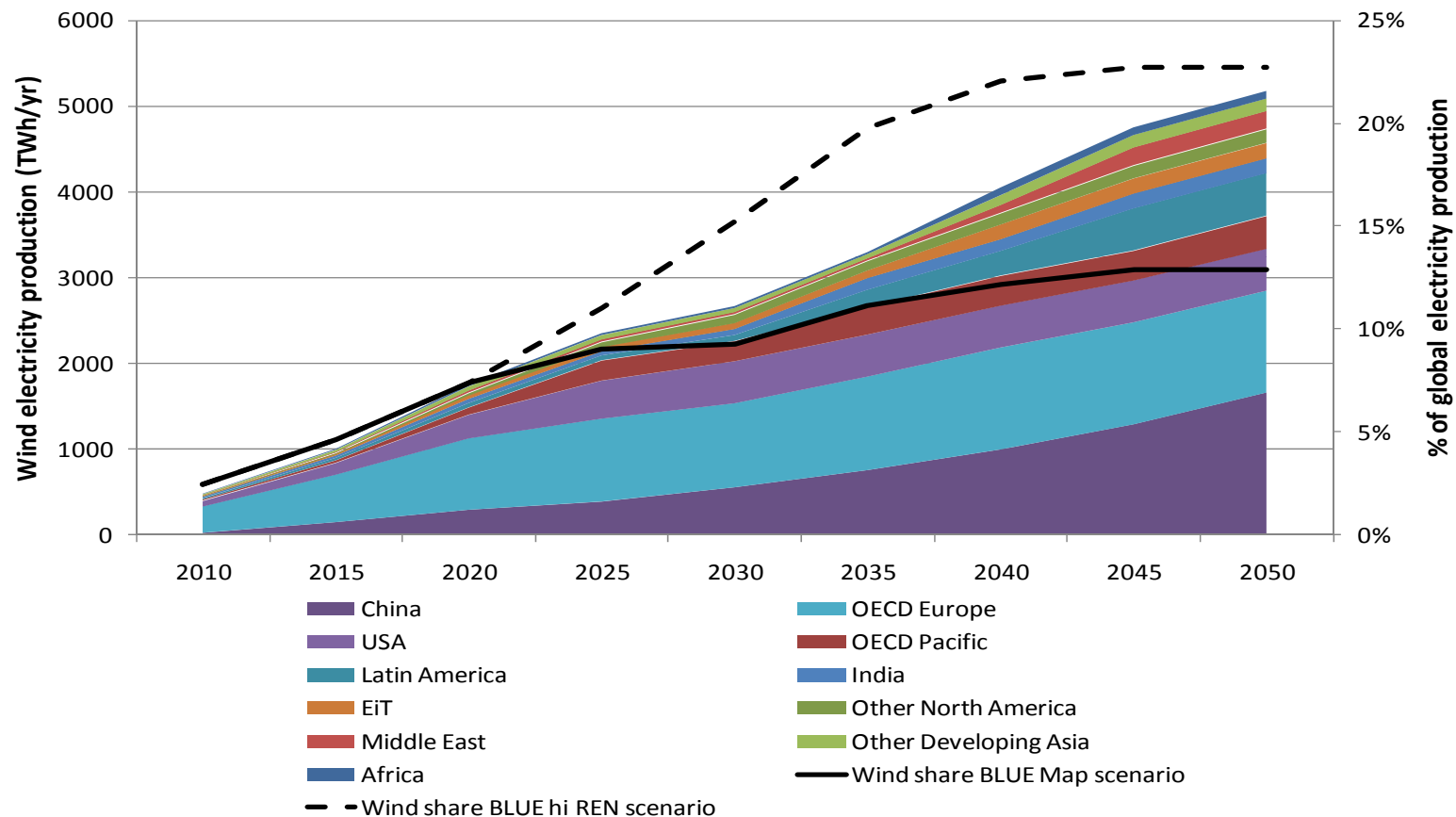


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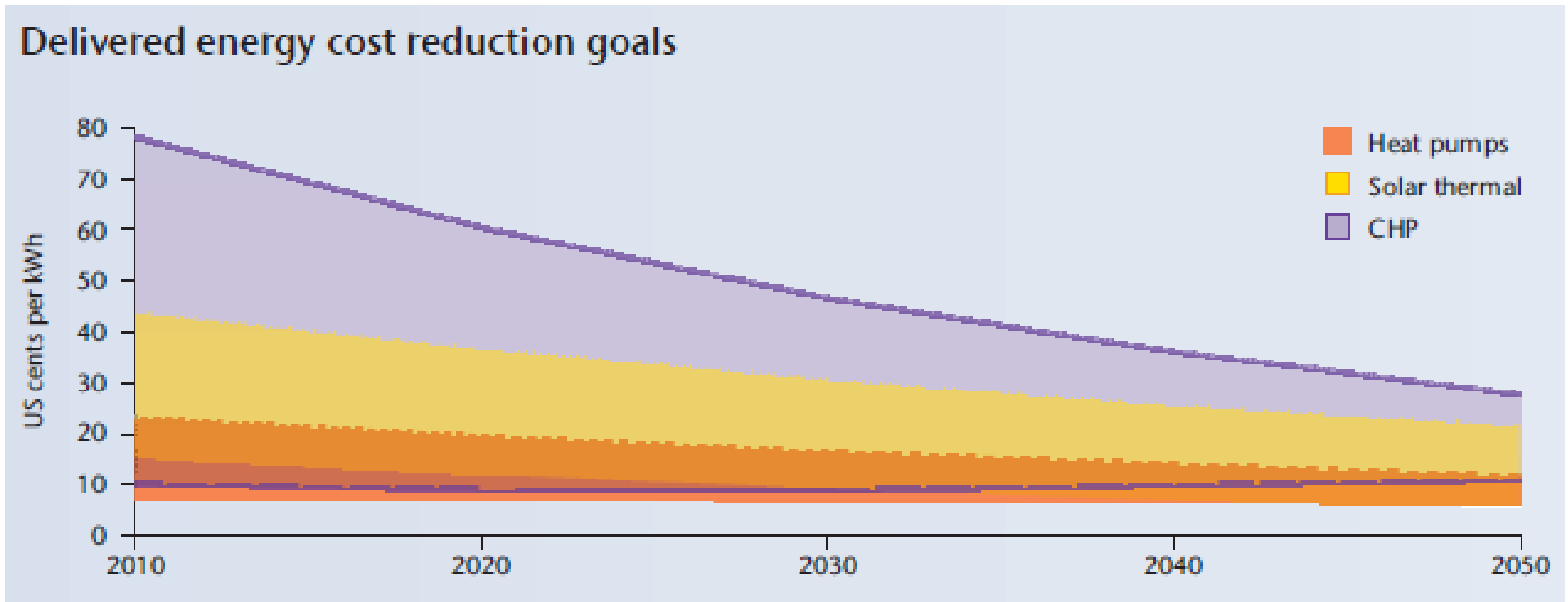
Roadmap example: Wind - an ambitious growth pathway



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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
<i>Policy framework</i>	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
<i>Vehicles / batteries</i>	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
<i>Codes / standards</i>	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
<i>Recharging / electricity infrastructure</i>	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
<i>RD&D</i>	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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