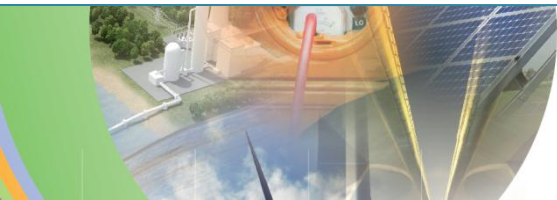


Introduction to Energy Technology Roadmaps

Energy technology roadmaps

Overview

- **About technology roadmaps**
- **IEA Generic Roadmap Guide**
- **Examples of IEA roadmaps**



ABOUT TECHNOLOGY ROADMAPS



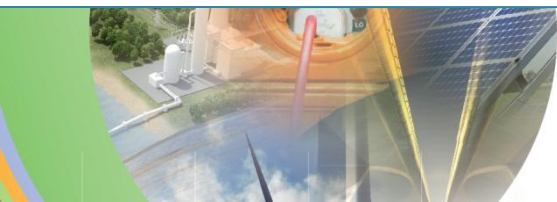
Energy technology roadmaps



IEA Roadmap Definition

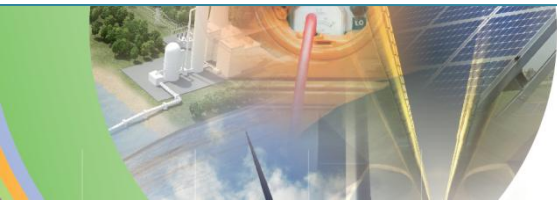
“A technology roadmap is a dynamic set of technical, policy, legal, financial, market & organizational requirements identified by all stakeholders involved in its development. The effort shall lead to improved and enhanced sharing and collaboration of all related technology-specific RDD&D information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



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



Technology roadmaps status

2009

2010

2011

2012 / 2013

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



And.....Wind (China) and Cement (India)
National roadmaps



IEA GENERIC ROADMAP GUIDE



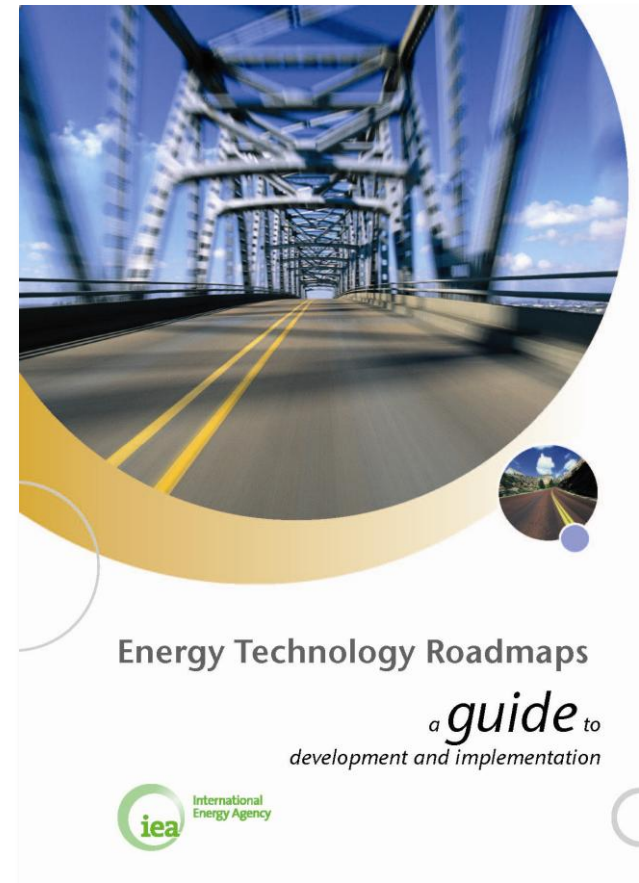
Energy technology roadmaps



Energy technology roadmaps guide

- **Guide published in 2010 by IEA**
 - **Understanding roadmaps**
 - **Roadmap development process**
 - **Tailoring the roadmap process**

http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=2291

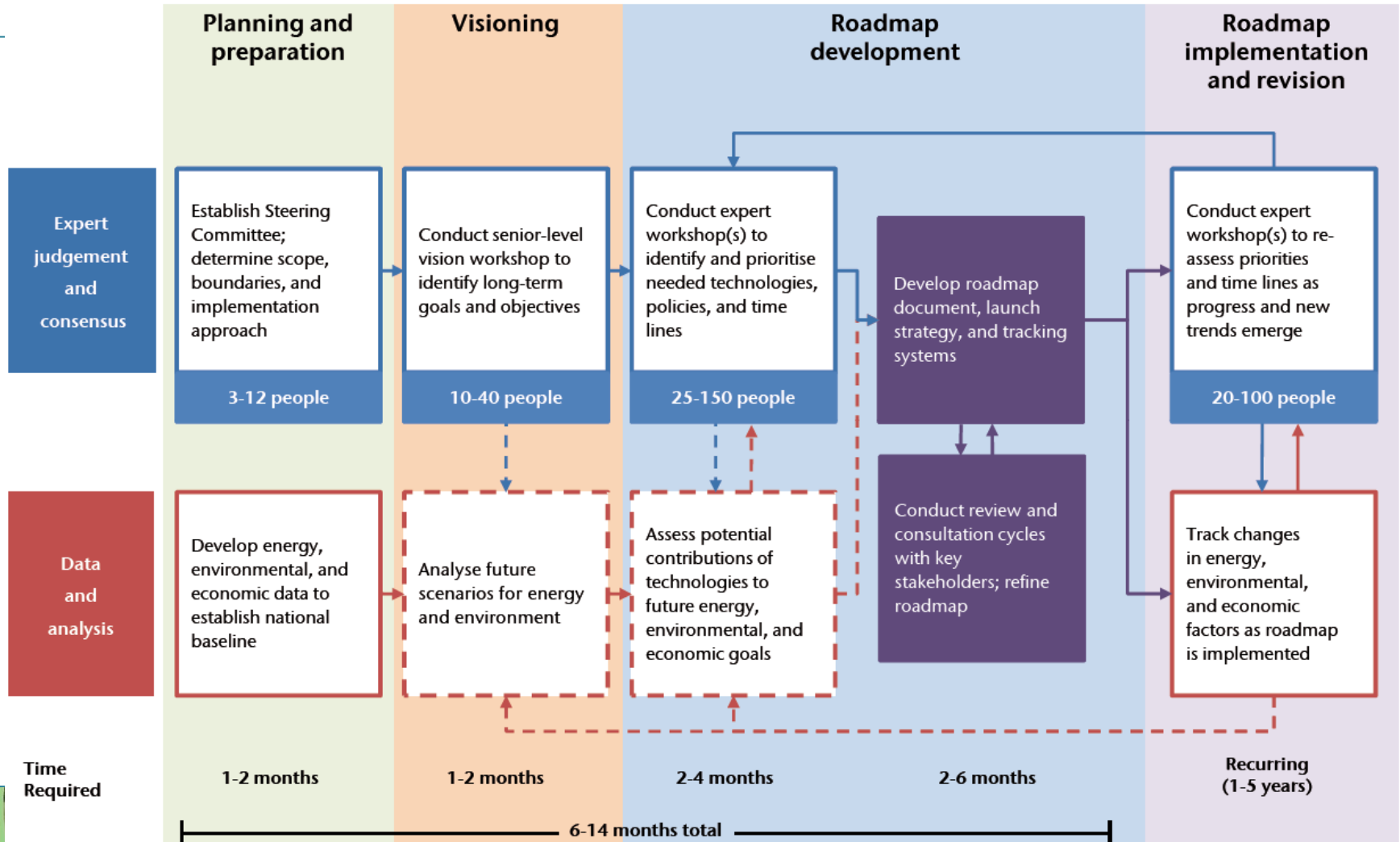


Roadmap logic

- **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**



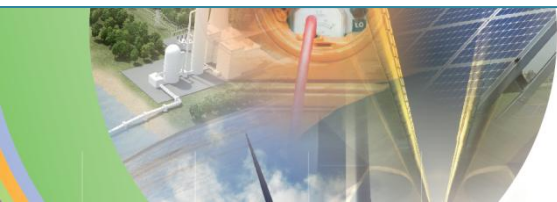
Roadmap process outline



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

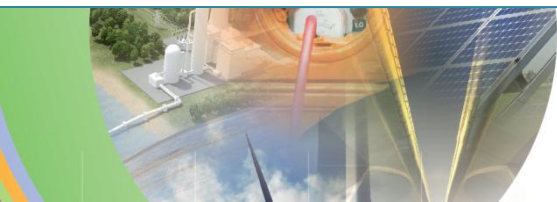
The Smart Grids Experience with the guide

- Principles apply – but some challenges
- Difficulties:
 - Lack of data and modeling
 - Lack of understanding (or misunderstanding) of Smart Grids
 - Systems based technology
 - Complex and highly regulated environment
 - Difficult to define baseline – where are we?



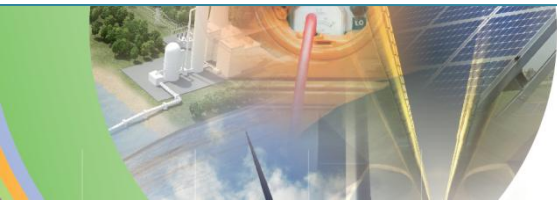
An imperfect process.....

- **Understood the IEA audience and IEA role**
- **Engaged broad based steering committee and stakeholder group** – manufacturers, utilities, government, industry associations, research organisations, implementing agreements.
- **6 workshops:**
 - What are smart grids? What are key technologies?
 - Role of Government and Private sector
 - Smart grid – smart customer policy
 - Developing country context
 - 2 joint workshop with ENARD implementing agreement



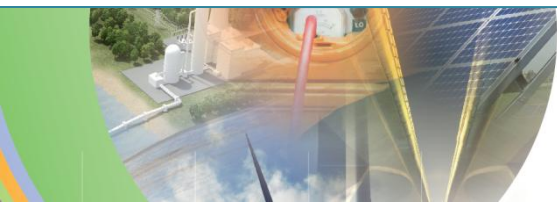
....for an imperfect technology area

- Engaged with a number of global experts and leveraged political interest.
- Tried to answer the key questions....
 - What are smart grids?
 - Why are they important? Why do we need them?
 - Can they do everything? (NO!!!)
 - New modeling to investigate peak demand and CO₂ reductions
- Defined future work, and key gaps.
- Did not attempt to be everything to everyone



A final thought

- **Roadmaps can be powerful tools for**
 - **Aligning interests and skills of diverse stakeholders**
 - **Identifying steps and timing needed to achieve a chosen future**
 - **Generating buy-in and support that leads to real action**
 - **Monitoring progress against stated milestones and adjusting the plan as needed**



But.....

- It is not a one size fits all
- Systems based technologies are difficult
- Defining why it is difficult is a challenge
- Over 35,000 downloads to date
- Discovered a large body of work that is not being adequately addressed



For more information

- Download the guide:

<http://www.iea.org/papers/roadmaps/guide.pdf>

- Smart Grid Technology Roadmap:

http://www.iea.org/publications/freepublications/publication/smartgrids_roadmap.pdf

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