



International
Energy Agency

Energy storage roadmap

IEA

Outline

- **What are IEA Energy Technology Roadmap?**
- **Storage Technology Roadmap Scope and Schedule?**
- **Key thoughts at this stage**
- **Discussion**

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

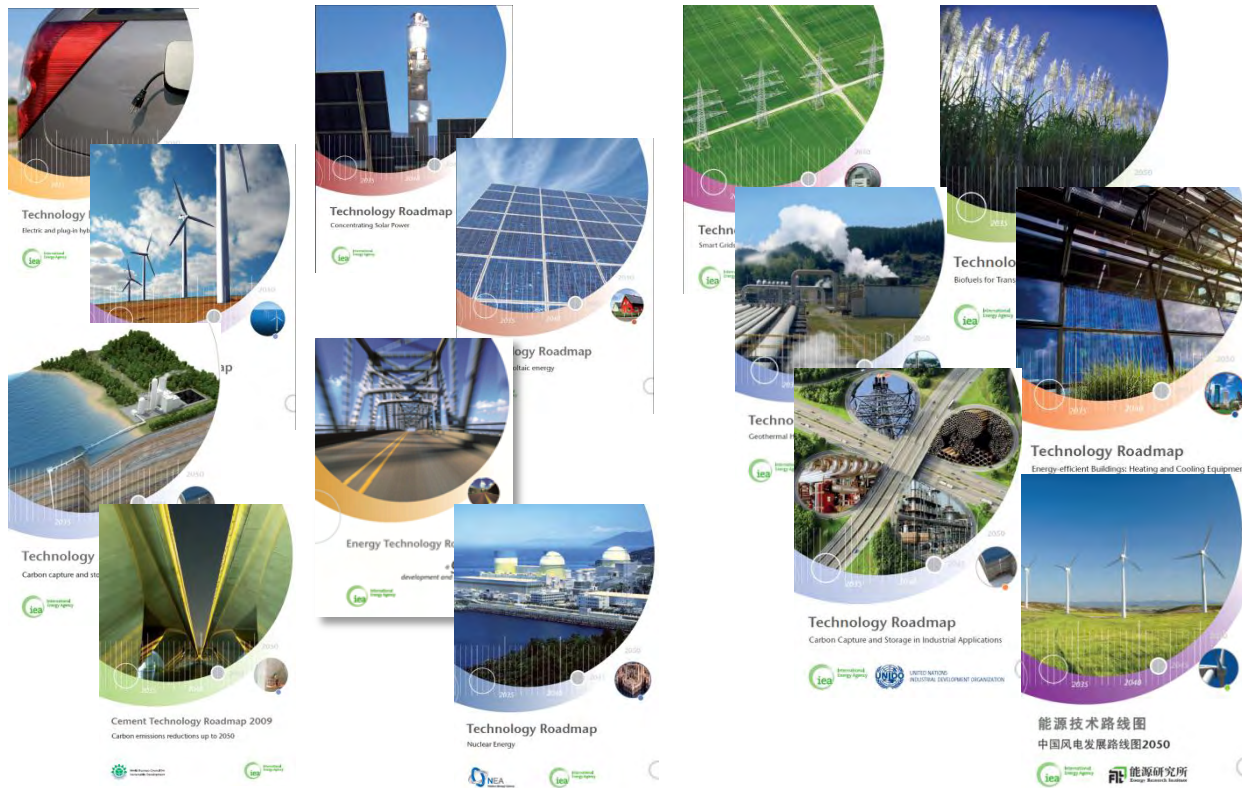
2009

2010

2011

2012 / 2013

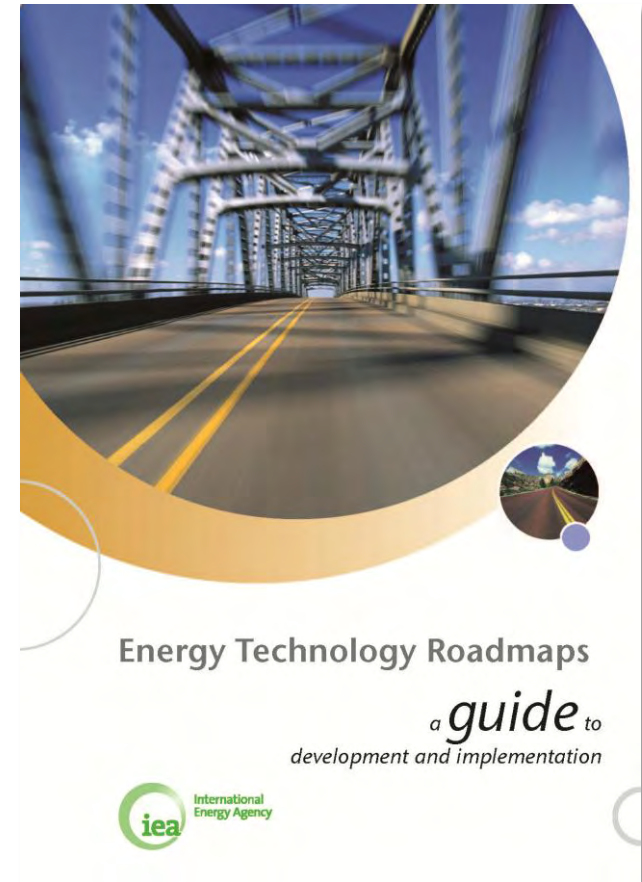
- Bioenergy for heat and power
- Vehicle Fuel Economy
- Solar heating & cooling
- High efficiency, low emissions coal
- Chemical catalysis
- Hydropower
- Energy efficient building envelopes
- Energy Storage



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

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



Energy storage roadmap outline

Purpose

- Examine and categorise the benefits of energy storage in energy systems
- Exploring new ways to achieve the benefits of storage at lower cost and to identify (and where possible address) barriers to deployment
- Perform competitive analysis against other technologies (i.e.: flexible generation and demand response)

Technology scope

- Electricity storage: mechanical conversion (Pumped, CAES), chemical conversion (Flow-battery, Li-ion) and other
- Heat storage: water, ice storage, thermo-chemical storage.

Energy storage roadmap schedule

1. Outline and scoping : Sept 2012
2. Data collection, selection : Oct-Nov 2012
3. Simulation and Drafting : Dec-May 2013
4. Expert advisory review : June-July 2013
5. Finalization : Fall 2013

Current Sponsors

US DOE, KPX, Japan government

Potential Sponsors

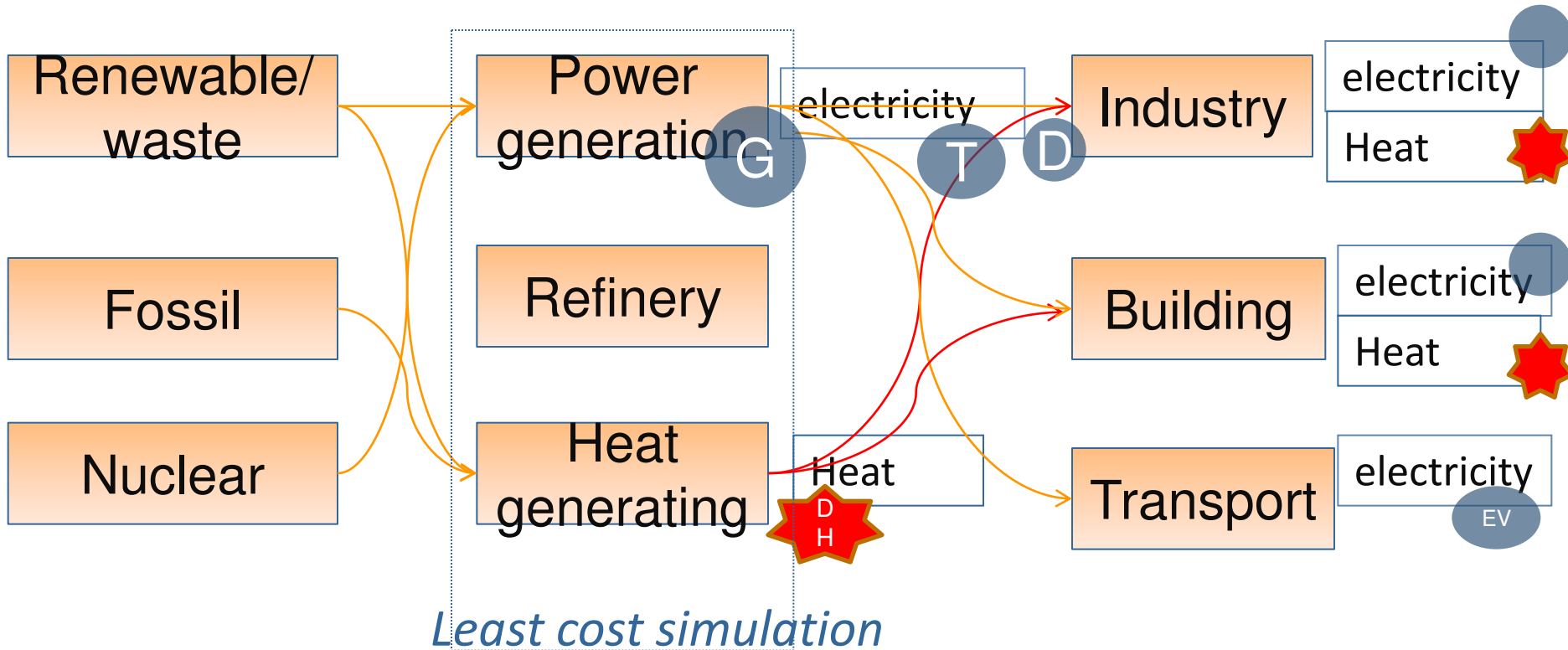
VLPGO, France Total



Energy storage in energy flow

Primary energy

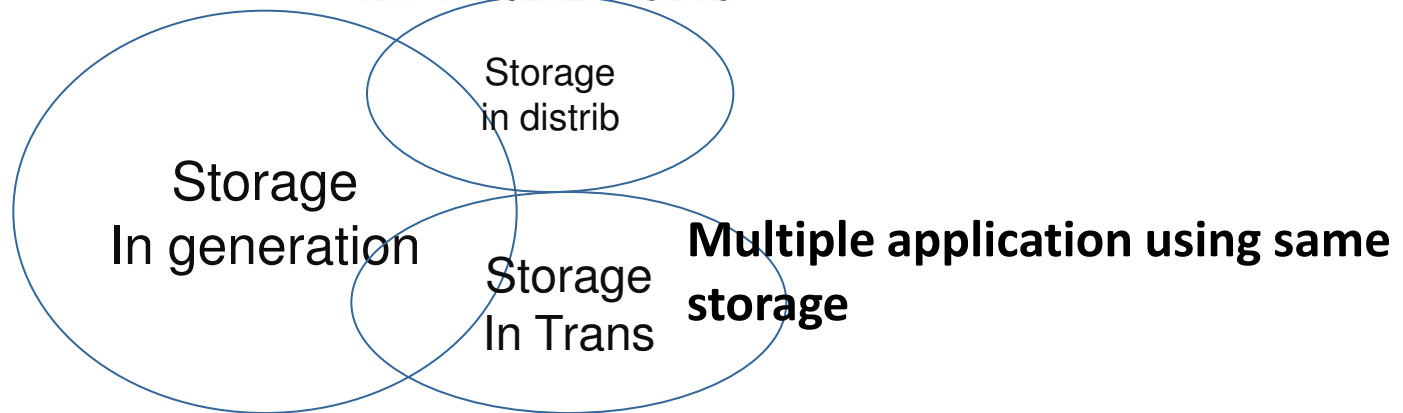
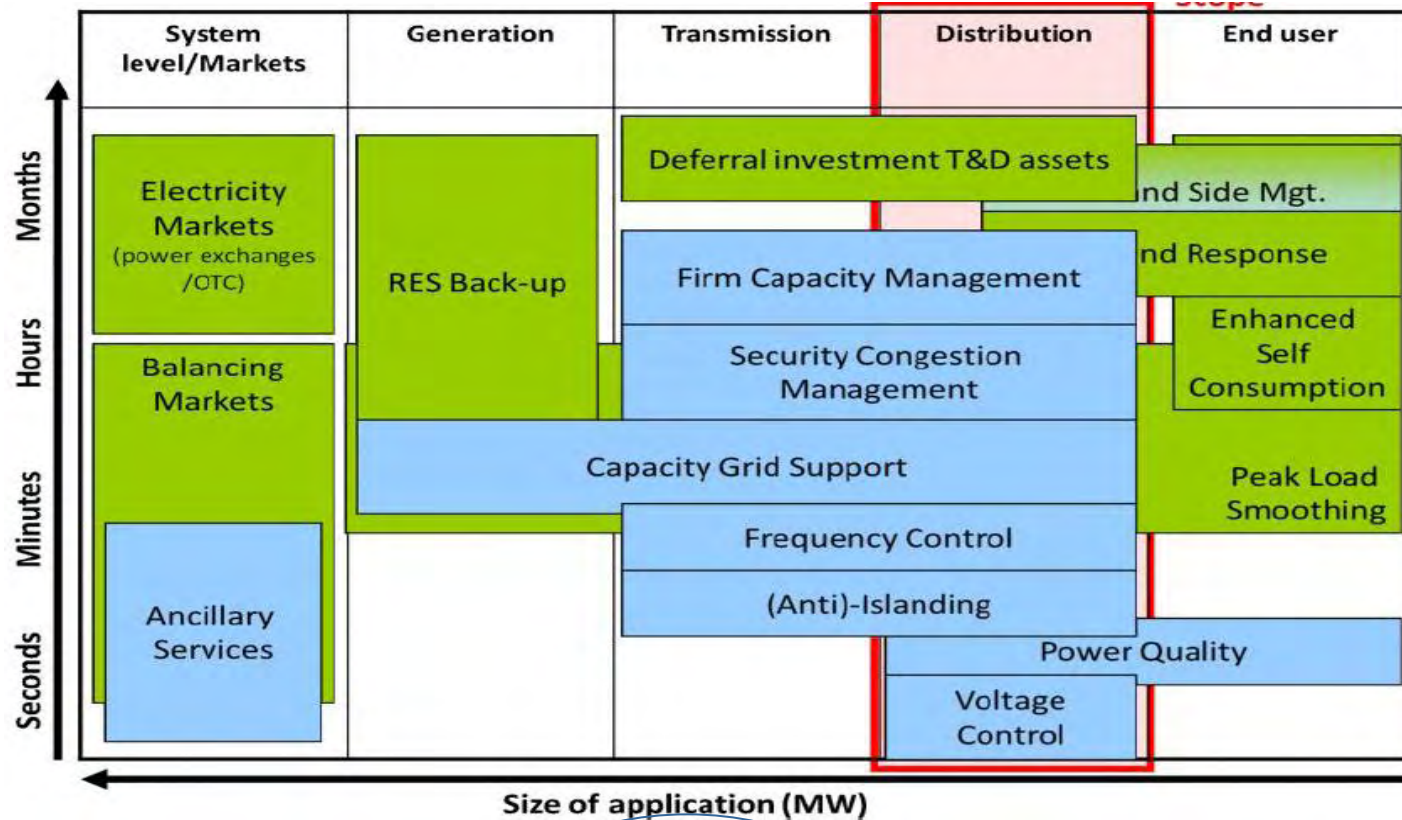
Transforming/secondary energy

Final demand



-  Electricity storage
-  Thermal storage

Electricity storage application



T&D investment deferral

■ Extension for demand growth

-Which storage technology ? Li-ion, flywheel..

-How much % expansion will be replaced with storage?

By regional, by reliability for strong or weak grid

* TO, DO install storage instead of network building?

* VLPGO(Transmission System operator association) surveying storage

■ Renewable integration

■ Replacement

Thermal storage application

Centralized district heating (Heat T&D network)	Individual heat (Heat end user)	
Arbitrage -Intraday	Peak shaving	Industry
-Interday -Seasonal		Building (commercial)
Peak shaving		Building (residential)

Relation between Electricity network and Heat network

