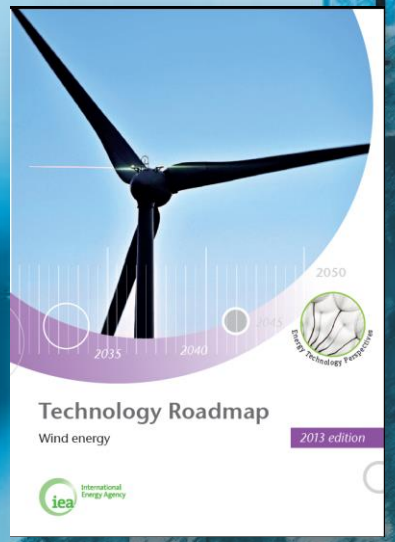
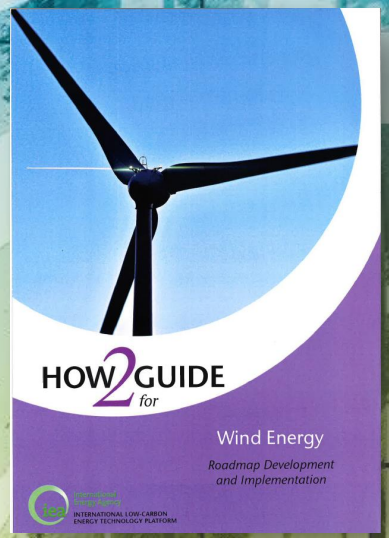
INTERNATIONAL LOW-CARBON ENERGY TECHNOLOGY PLATFORM



The IEA Technology Roadmap for Wind Energy and the How2Guide conceptual framework

New Delhi, India, 16 September 2015

Dagmar Graczyk, IEA



International Energy Agency

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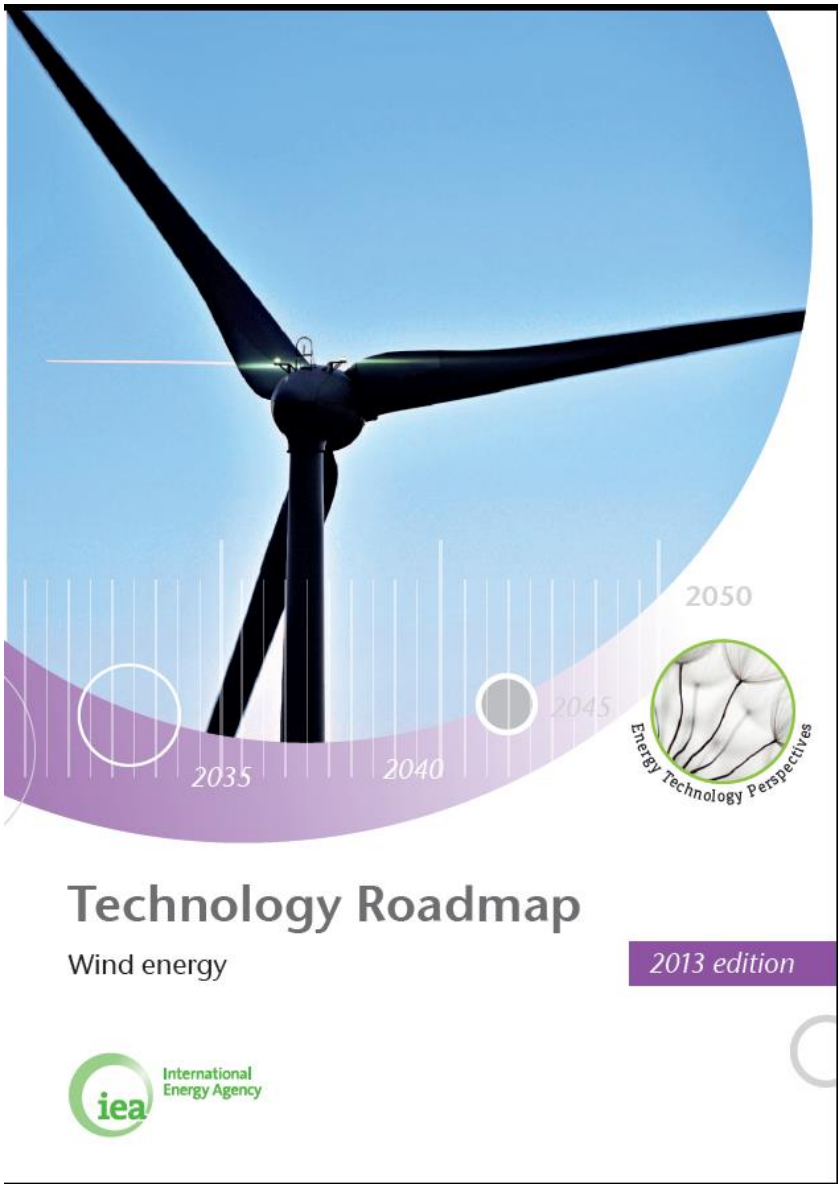
IEA Wind Power Roadmap 2013

- First published in 2009
- Update considers recent trends and revised long-term targets
- Technology and cost evolution
- 2050 “Vision” based on **global** energy context and system optimization
- Barriers and policy recommendations



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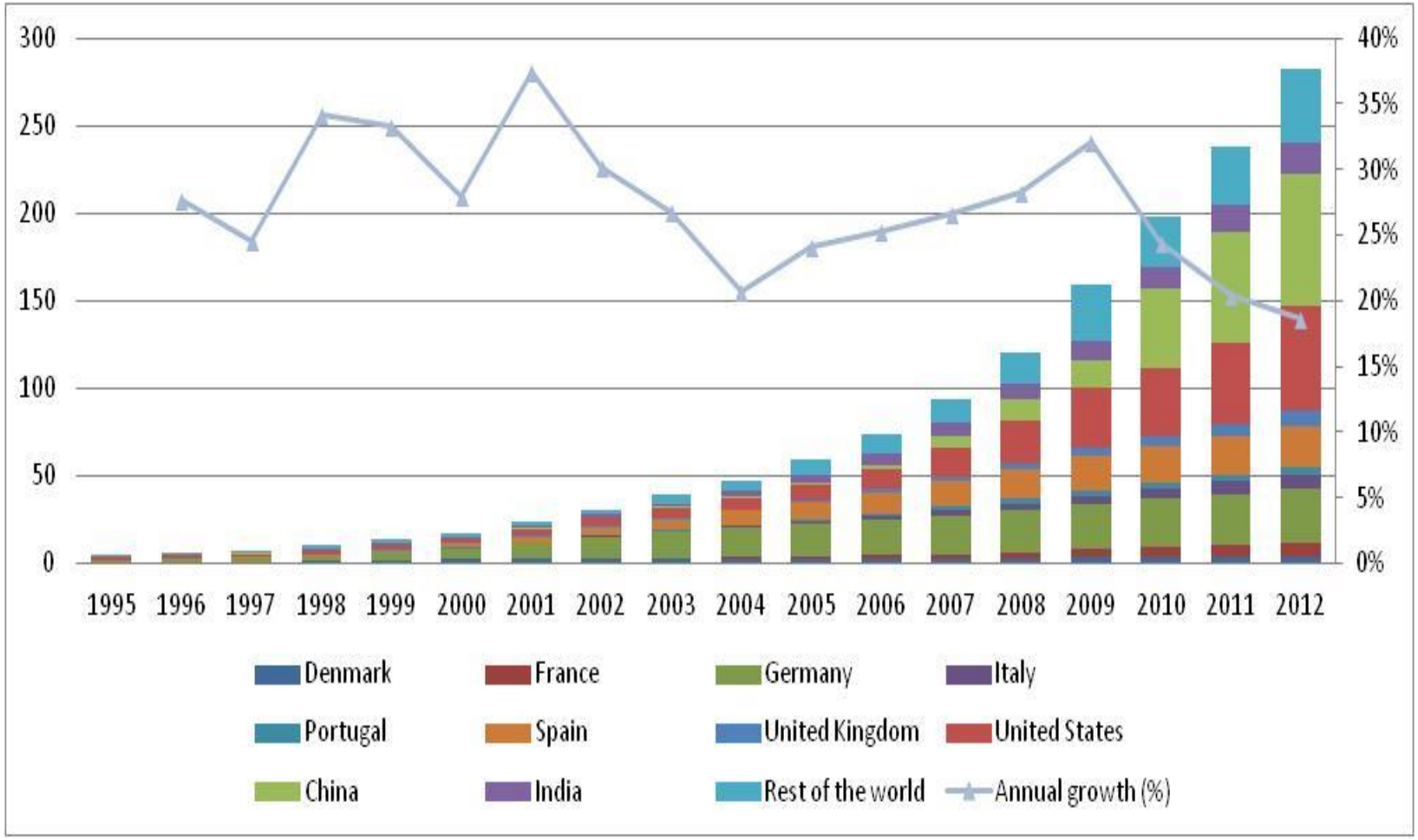
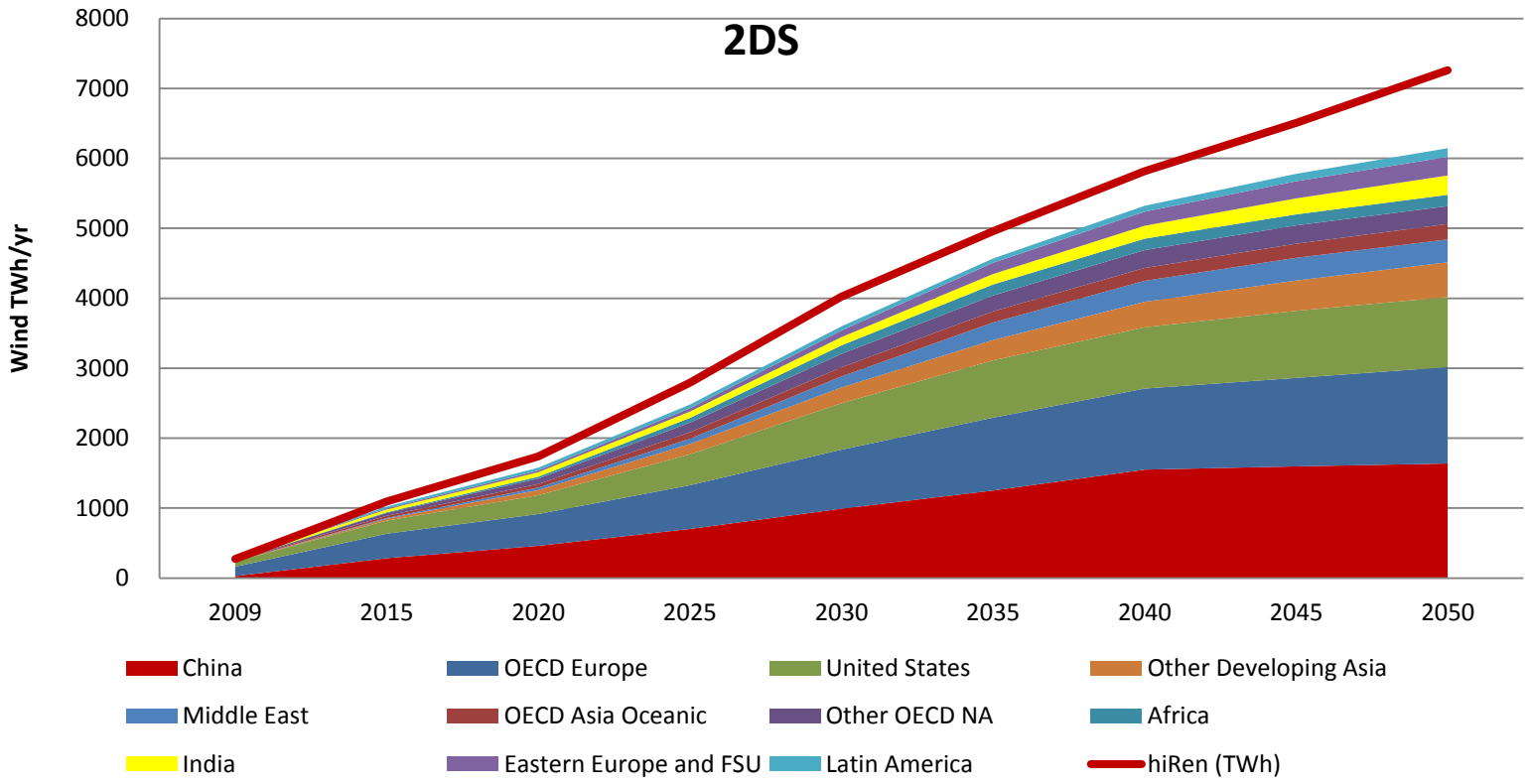
Global cumulative growth



Wind power deployment to 2050 in the IEA Roadmap Vision

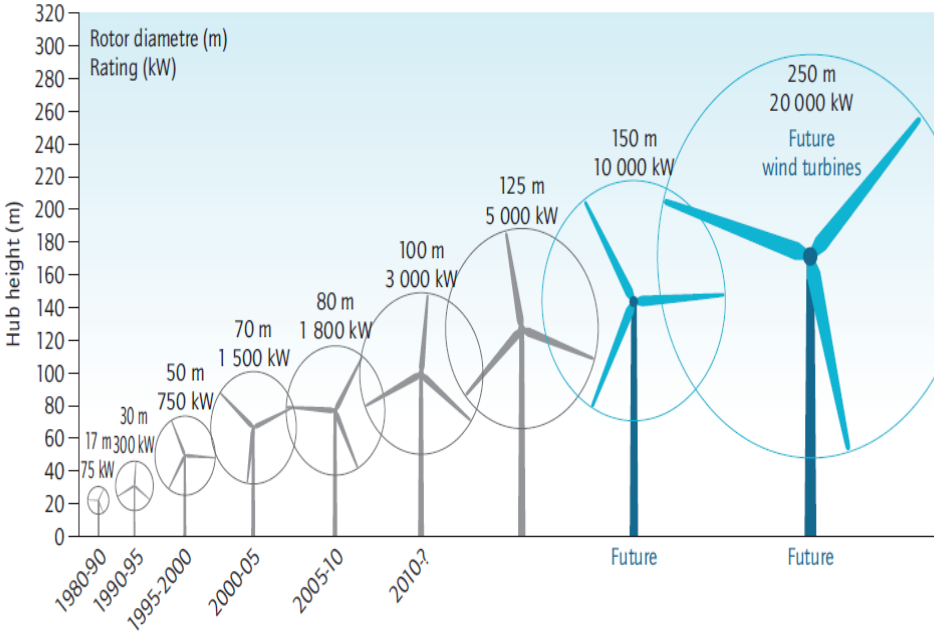


Source: IEA Technology Roadmap for Wind Energy (2013)

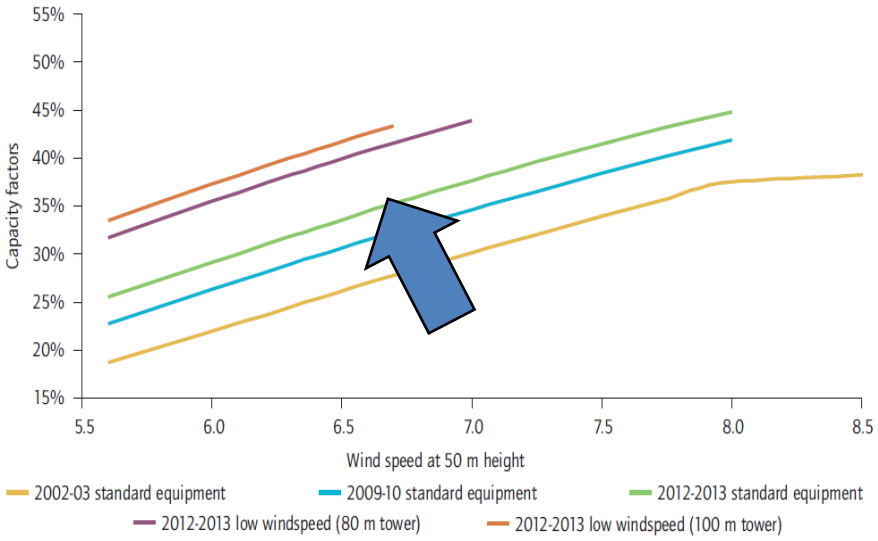
- Wind power to provide 15% to 18% of global electricity
- China, Europe and the USA together account for 2/3
- India's projected contribution (yellow): 5% by 2050

Technology evolution

Turbine size



Capacity Factors



- Growth in size, height and capacity
  - Greater capacity factors,
  - Exploiting sites with lower-speed winds,
  - More power system-friendly making grid integration easier

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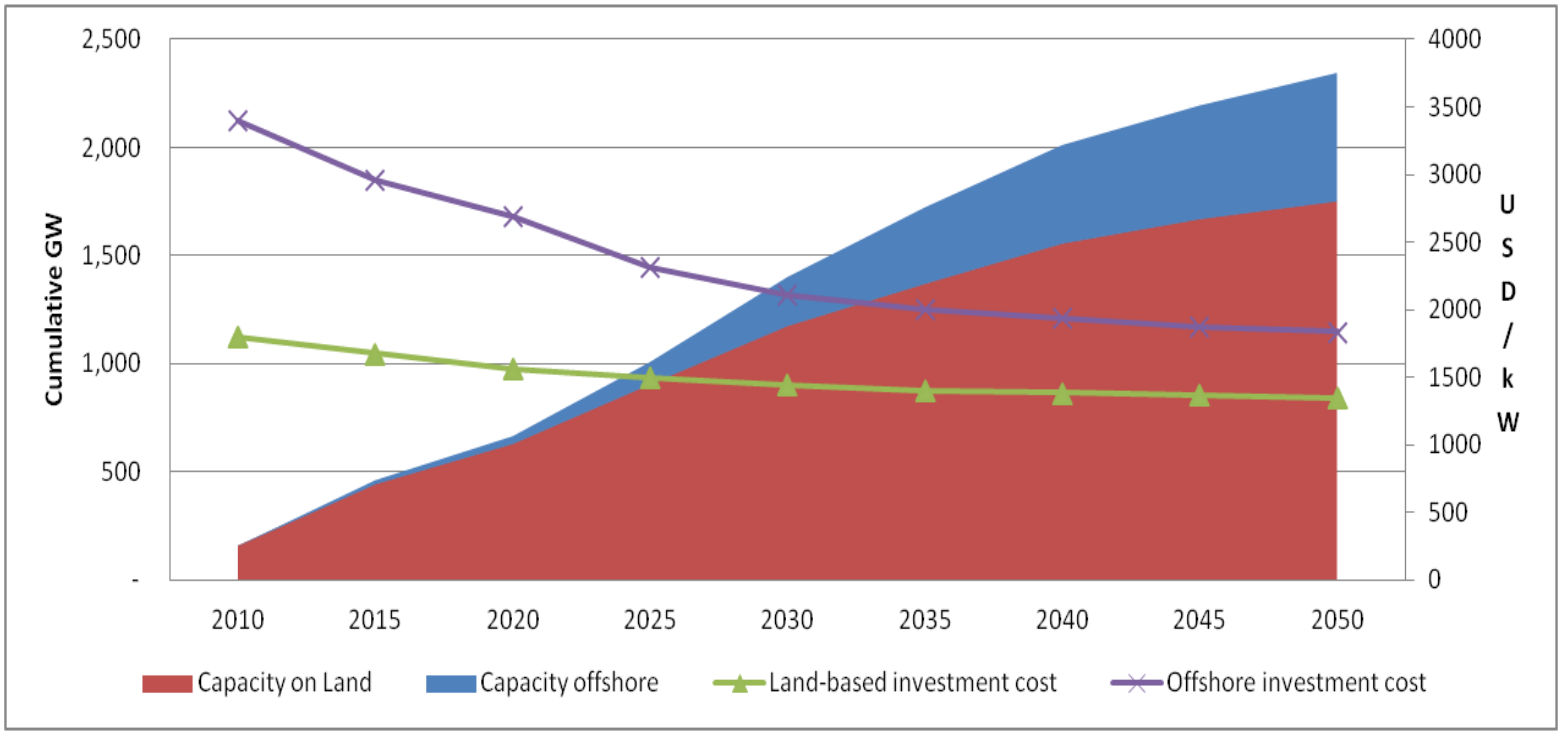
Land-based and offshore deployment and costs



- By 2050, 25% of total global wind capacity to be located at sea, up from 6% in 2020
- Investment costs for wind power to decrease by 25% on land and 45% off shore by 2050

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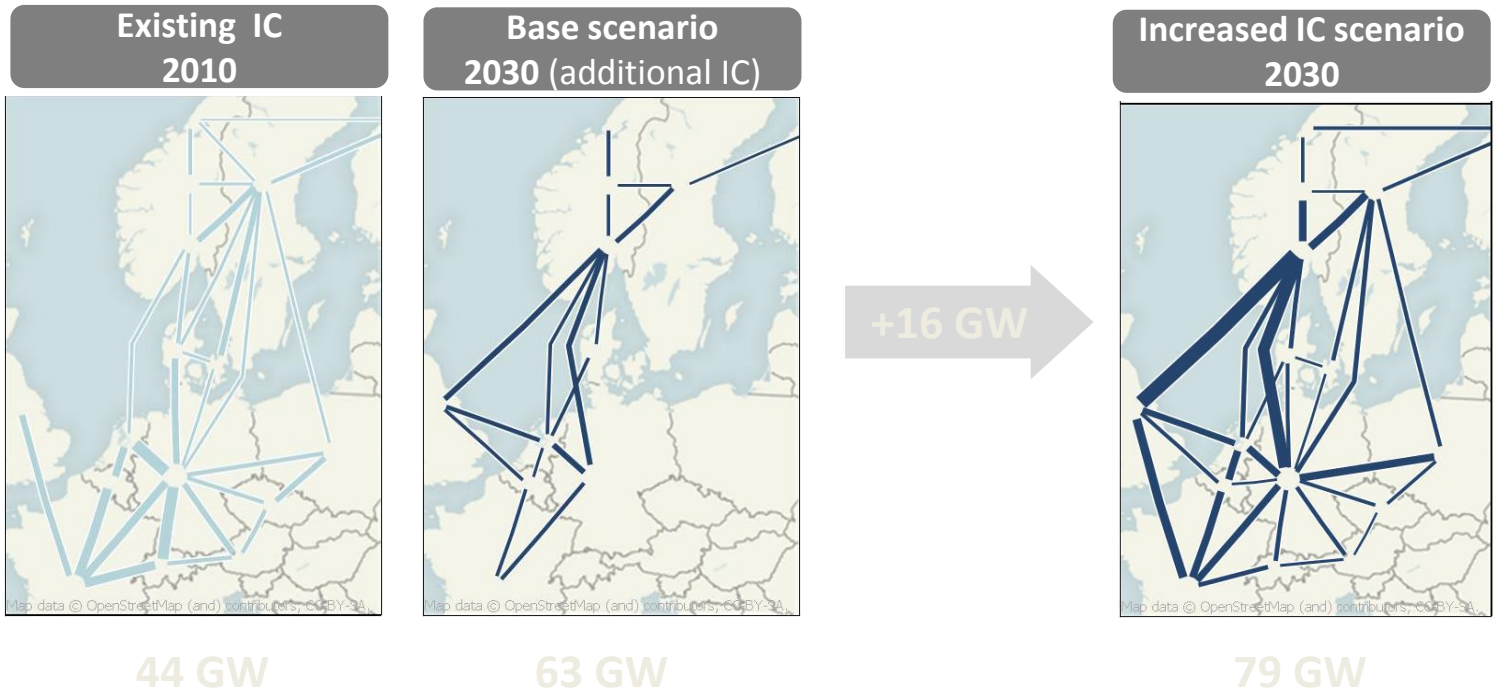
Transmission and integration are key to long-term continued growth

Present and future interconnections in NW-Europe



Source: Pöyry for IEA, 2013

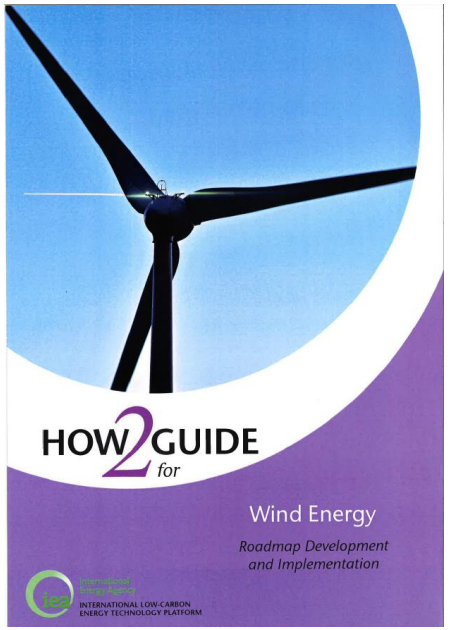
- Ensuring integration may become more important than lowering wind generation costs
- Importance of transmission corridors

INTERNATIONAL LOW-CARBON ENERGY TECHNOLOGY PLATFORM

The How2Guide for Wind Energy

- **A Manual for policy and decision makers to develop technology roadmaps tailored to national or regional context.**

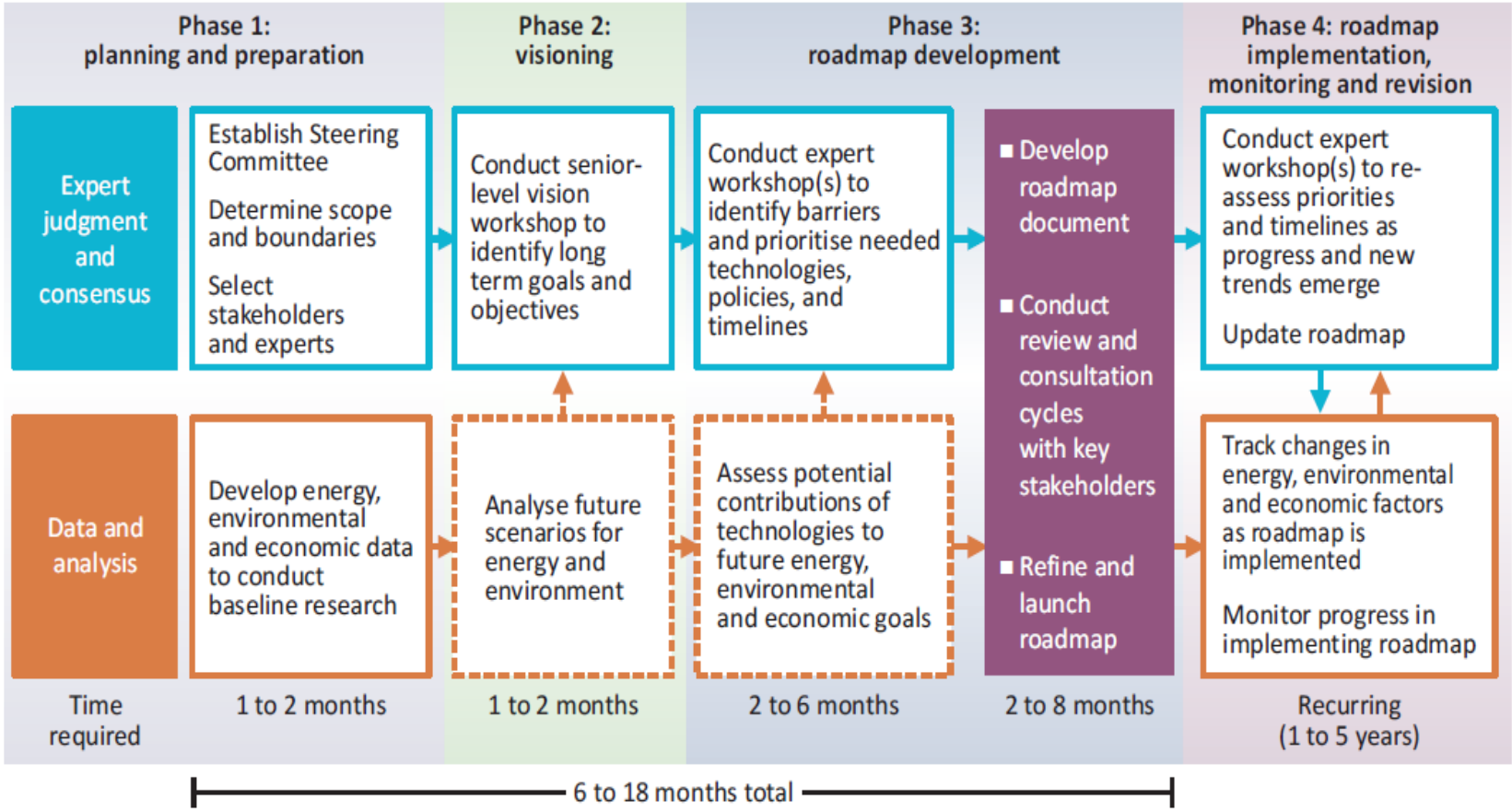
- Defines a **4-step process** of developing and implementing a wind energy roadmap
- **Case studies** from IEA Member and Partner countries (China, US, Brazil and South Africa)
- Focus on **utility-scale** wind energy installations (multi-MW WPPs)



How 2 Guide Bioenergy

COMING SOON!

The How2Guide roadmap process

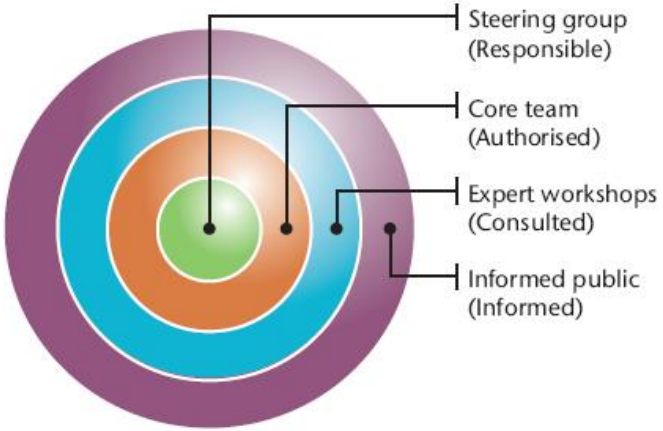


Adapted from IEA Roadmap Guide (2014). Note: Timescales are indicative.

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

Phase 1: planning and preparation

Identifying wind energy stakeholders



A simple chart can help organise the stakeholders (RACI):

- **R**esponsible (final approval authority, “steering committee”)
- **A**uthorised (team responsible for the roadmap)
- **C**onsulted (stakeholders who attend workshops)
- **I**nformed (but not expected to provide inputs or feedback)

Phase 2: visioning

- A successful roadmap contains a clear statement of the desired outcome, followed by a specific pathway for reaching it.

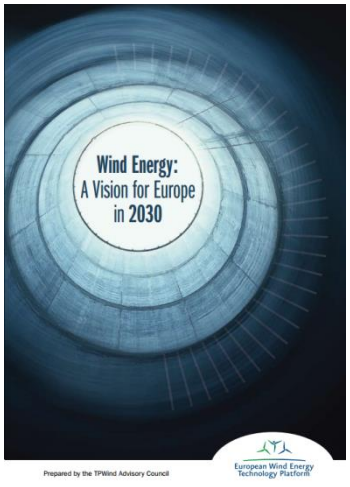
- Identify main drivers behind development of wind energy (diversify energy mix, CO2 reduction targets, domestic industry, etc)

- Why are drivers important?

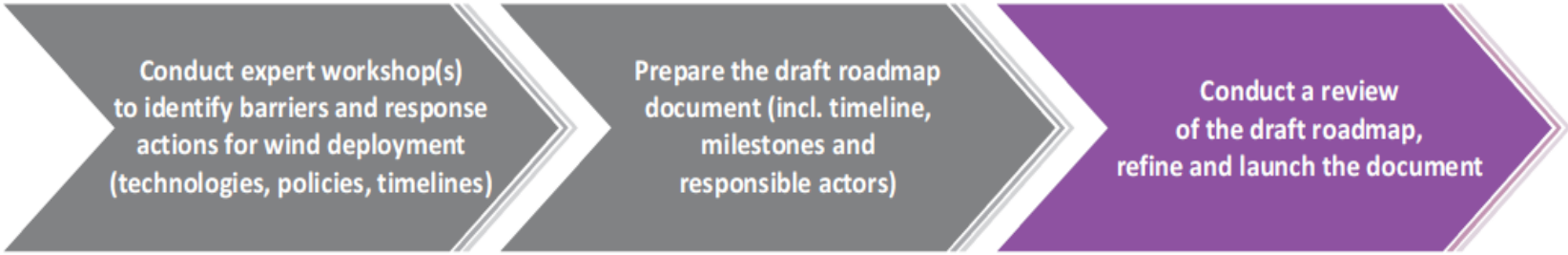
➢ They create a **common understanding** of why a higher share of wind is being considered for the energy mix.

➢ They are the pillars for defining a **vision** for wind energy.

➢ They provide rationale to reject undesirable technologies, project types and outcomes.



Phase 3: roadmap development



Identifying barriers and actions to overcome them within a given timeframe:

1. **Planning** relating to developing WPPs (including environment factors)
2. **Development** aspects (including social acceptance factors)
3. **Electricity market** and system aspects
4. **Financial** and economic aspects
5. **Infrastructure** aspects (including availability of specialised professionals).

Phase 4: implementation and revision

- Consider whether the roadmap itself needs adjustments in light of experiences gained through implementation
- Qualitative and quantitative **indicators** to track and monitor progress in implementing a wind energy roadmap
- The How2Guide for Wind Energy identifies 35 possible indicators, the choice of which one to use is country/region-specific
- For each indicator, identify stakeholders responsible for **monitoring** and reporting

Conclusions

- Wind power can contribute up to 18% of the world's electricity supply by 2050.
- **National and regional roadmaps can play a key role** in supporting wind energy development and implementation, helping countries to identify priorities and pathways which are tailored to local resources and markets.
- As India is on the verge of launching its **National Wind Mission**, the How2Guide could be a useful tool to inform decision-making and the IEA is always ready to provide advice.

Thank you for your attention…

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