



Strategic Research Agenda **Market Deployment Strategy**

FROM 2008 TO 2030

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European Wind Energy
Technology Platform



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Executive Summary

In 2006, the European wind energy sector launched the European Wind Energy Technology Platform (TPWind). TPWind's tasks are to identify and prioritise areas for increased innovation, and new and existing research and development (R&D) tasks. Its primary objective is to reduce the social, environmental and technological costs of wind energy.

In 2030, wind energy will be a major modern energy source; reliable and cost-competitive in terms of cost per kWh. The market will be driven by concerns over:

- the impacts of climate change;
- oil and gas depletion;
- high costs and the unpredictable availability of fuel (security of supply); and
- CO₂ allowance prices and sustainability.

Developments will take place within the current context of decentralisation, decarbonisation and globalisation.

Wind energy is expected to develop in three phases:

- **Phase 1: Short term (2020)** – The market matures in western Europe and develops in central and eastern Europe. Competition from low labour cost countries increases further. Large-scale deployment of offshore wind energy begins. The installed capacity reaches 180 GW, including 40 GW offshore.
- **Phase 2: Medium term (2020-30)** – Wind energy continues to mature in all its applications, both on-shore and offshore. The main developments are further cost reductions and high penetration technology. Deep offshore technology develops on an industrial scale. Exports from Europe grow. Installed capacity reaches 300 GW in 2030, when annual installations reach 20 GW, of which half is offshore and 7.5 GW is re-powering.
- **Phase 3: Long term (2030-50)** – The main European markets are in offshore and re-powering. Exports from Europe are strong.

The European industry will continue to lead the global market. Depending on future electricity demand, some 25% of EU electricity consumption, or a total of 300 GW, will be provided by wind, corresponding to annual CO₂ savings of nearly 600 Mt. This will be supported by an optimal industrial expansion in Europe. The European power markets will be much better integrated, with full separation in ownership of transmission and production activities, larger inter-connectors, an effective wholesale market and well-functioning balancing markets.

To make this vision a reality, four thematic areas have been identified: **wind conditions, wind turbine technology, wind energy integration** and **offshore deployment and operation**.

Wind conditions

TPWind proposes an ambitious long-term '3% vision'. Current techniques must be improved so that, given the geographic coordinates of any wind farm (flat terrain, complex terrain or offshore, in a region covered by extensive data sets or largely unknown) predictions **with an uncertainty of less than 3%** can be made concerning:

- the annual energy production ('resource');
- the wind conditions that will affect the design of the turbine ('design conditions'); and
- a short-term forecasting scheme for power production and wind conditions.

Wind power systems

The aim of the research prioritised by TPWind is to ensure that, by 2030, wind energy will be the most cost-efficient energy source on the market. This can only be achieved by developing technology that enables the European industry to deliver highly cost-efficient wind turbines.

Wind energy integration

TPWind focuses on the large-scale integration of wind power. The goal is to enable high penetration levels with low integration costs, while maintaining system reliability (security of electricity supply).



Photo: <http://energypicturesonline.com>

Offshore deployment and operations

The objective is to achieve the following:

- More than 10% of Europe's electricity demand to be covered by offshore wind
- Offshore generating costs that are competitive with other sources of electricity generation
- Commercially mature technology for sites with a water depth of up to 50m, at any distance from shore
- Technology for sites in deeper water, proven through full-scale demonstration

In order to implement the TPWind 2030 vision and enable the large-scale deployment of wind energy, the support of a stable and well-defined market, policy and regulatory environment is essential. In the Market Deployment Strategy, the following areas are considered:

- Enabling market deployment
- Cost reduction
- Adapting policies
- Optimising administrative procedures
- Integrating wind into the natural environment
- Ensuring public support

In light of the recently changed energy, socio-political and environmental paradigm, there is a serious and urgent need to reprioritise the financing of Research, Development and Demonstration (RD&D) for energy.

Current instruments should be revised to take this new paradigm into account. Those that are compatible should be adapted and, where appropriate, new instruments should be developed.

The forthcoming European Wind Initiative, which is outlined in the Strategic Energy Technology Plan (SET-Plan), is a key opportunity to reinforce Europe's world leadership in RD&D financing and execution frameworks. TPWind's considerations are fully in line with the SET-Plan.



About TPWind

The European Technology Platform for Wind Energy (TPWind) is the indispensable forum for the crystallisation of policy and technology research and development pathways for the wind energy sector; as well as a new opportunity for informal collaboration among Member States, including those less developed in wind energy terms.

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