

Leadership in renewables

Wind: the impact of EU R&D funding

Bioenergy | Biofuels | Geothermal | Hydropower | Ocean | Solar PV | Solar thermal | Wind

OBJECTIVES

A comprehensive study of wind energy research and development (R&D) support within the EU over the past 20 years

1 Identify the impact of EU R&D support of the wind energy sector

2 Understand how the wind energy sector has developed

METHODOLOGY

EFFECTIVE DATA COLLECTION ACTIVITIES USING A RANGE OF METHODS

DATA FROM EXISTING DATABASES

STAKEHOLDER QUESTIONNAIRE

CASE STUDIES

EXPERT INTERVIEWS

LITERATURE REVIEW

KEY FIGURES: FUNDING OF R&D

EU Framework Programmes funding

225

wind energy projects funded through the Framework Programmes (FP5-Horizon 2020)

€565 m

EU funding through the Framework Programmes (FP5-Horizon 2020) for wind technologies

23 %

of funding to component development (e.g. large turbines), followed by fixed-bottom offshore (20 %) and grid integration (20 %)

Member State funding

€164 m

R&D budget grew from an average of €68 m per year (1995-2008) to an average of €164 m per year (2008-2015)

Top 5

1. Germany
2. Denmark
3. UK
4. Netherlands
5. Spain

82 %

of Member State wind energy funding is from the top 5 Member States

International funding

The EU is the top region globally for wind energy R&D funding with an average of €126 m per year (1995-2015), followed by the USA with an average of €55 m per year

IMPACT ON KNOWLEDGE GENERATION

Patents

EU share of global patents has declined from 43 % in 2000 to 12 % in 2014

The number of EU patents filed grew from less than 1 000 per year in the early 2000s to approximately 2 000 per year (2008-2012), after which it declined to less than 1 500 per year

Publications

EU-based authors were involved in 43 % of the global publications between 1995 and 2017, making it the global leader

The EU is producing close to 600 publications per year. The USA and China produce around 220 publications per year

The top five Member States for publication development include four of the largest funders for R&D

Additional impacts

EU-funded R&D has been crucial for the development of increasingly large and powerful wind turbines and of technology for fixed-bottom and floating offshore wind power

EU funding has promoted the optimisation of offshore wind-farm design, maintenance and operation (e.g. the Wind & Economy software tool), contributing to significant cost reductions

IMPACT ON SECTOR DEVELOPMENT

169 000 MW

installed capacity for electricity generation in 2017, growing from 2 400 MW in 2000

Installed capacity

9.6 %

gross final electricity consumption from wind energy in 2016

EU electricity

€9 billion

average exports per year (2011-2015) to the rest of the world

Exports

€40 billion

EU wind energy sector turnover in 2016

Turnover

300 000

people employed in the EU wind energy sector in 2016

Jobs

More than 50 % Levelised Cost of Electricity (LCOE) reduction between 2000 and 2017 (onshore wind)

Wind energy cost

EXAMPLES OF IMPACT FROM R&D PROJECTS

Demonstration of the WindFloat Technology (DEMOWFLOAT)

- FP7 project that demonstrated the performance and reliability of the WindFloat technology with a 2 MW pilot turbine in Portugal
- WindFloat uses innovative floating structures that enable the harvesting of abundant wind resources in deep waters where bottom-mounted foundations are not feasible
- EU also supports the technology on its path to full commercialisation through the 25 MW WindFloat Atlantic project. It benefits from a EU-backed loan of €60 million by InnovFin Energy Demonstration Projects

Innovative Wind Conversion Systems (10-20 MW) for Offshore Applications (INNWINDEU)

- FP7 project that designed models for state-of-the-art 10 MW to 20 MW offshore wind turbines
- Developed innovative rotors, drivetrain components and floating substructures to reduce fatigue loading on the turbines while increasing energy production
- Completed proof-of-concept tests for components of the turbine and tested key innovations (e.g. smart blades, pseudo-magnetic direct-drive generators and superconducting generators)