European Wind Energy Technology Platform

European Wind Initiative:

"Main EU instrument to ensure technological development"

The 2013 – 2015 Implementation Plan

The 2013 Work Programme

Seventh Wind EII Team meeting

09 October, 2012

Resumen de Situación

VII Asamblea General REOLTEC

Madrid, 16 de octubre / 2012. Salón de Actos, CIEMAT

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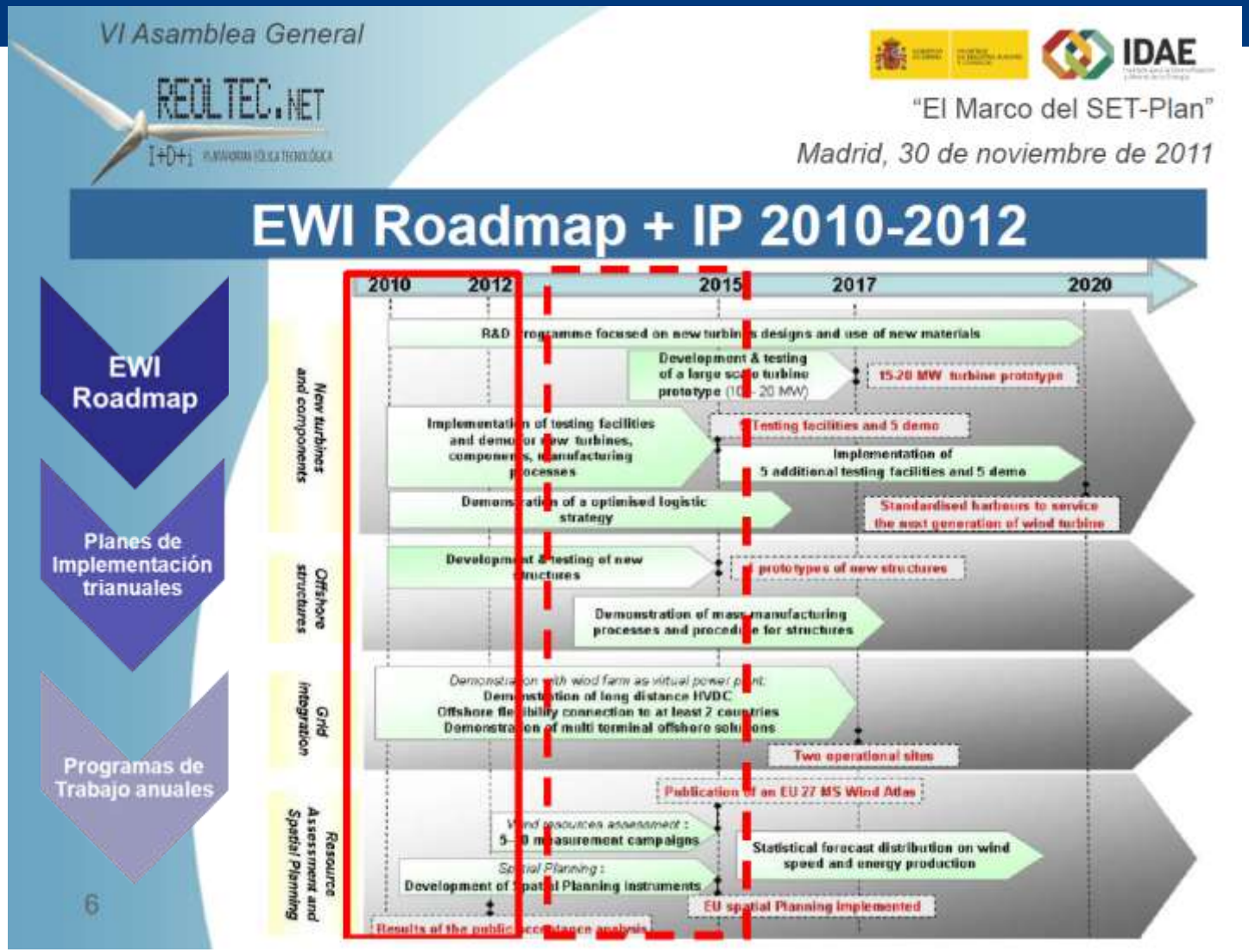
Antecedentes: VI AG REOLTEC.



Antecedentes: VI AG REOLTEC.

VI Asamblea General

REOLTEC.NET

I+D+i PLATAFORMA TECNOLÓGICA

IDAE

"El Marco del SET-Plan"

Madrid, 30 de noviembre de 2011

Wind EII Team: Próximas acciones 2012

- Elaboración del Plan de Implementación para los próximos tres años **IP 2013-2015**.
  (Propuesta en desarrollo por TPWind)
- Elaboración del **EWI WP 2013**.
- Coordinación EC - EEMM para el lanzamiento (Julio/2012) de la **FP7 ERANET+ topic** para el nuevo **"EU Wind Atlas"**.
- Otros: Sistemas de Referencia (KPI's), Coordinación de la "Hoja de Ruta de Materiales (eólica)", Interacción con otras Iniciativas Industriales, nuevas directrices del 'Steering Group',...

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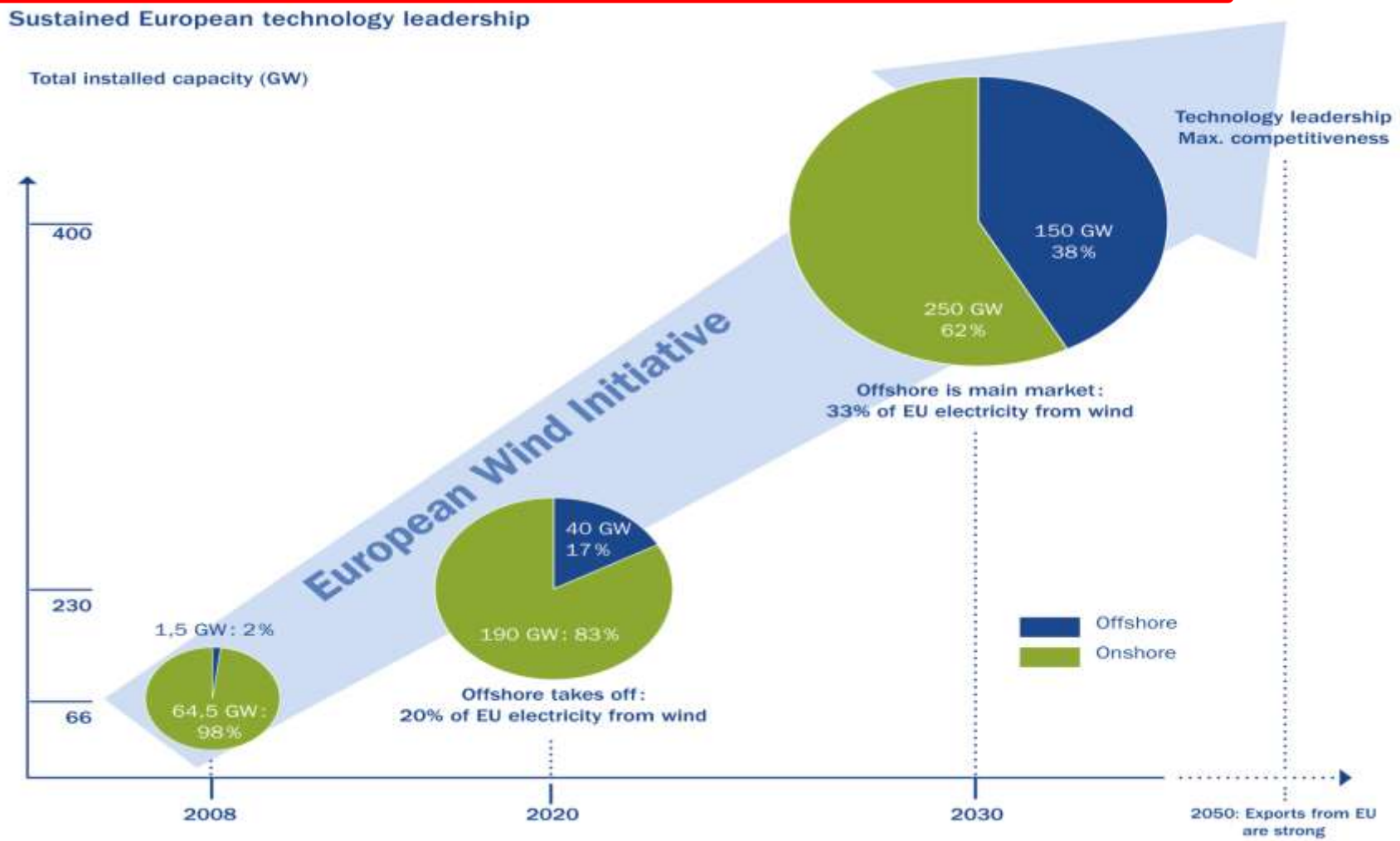
The EWI: the main EU instrument to ensure technological development



Turbines of tomorrow – where to move from now? (I)

- Upscaling existing designs will certainly not represent the only answer
- Integrated design for large scale turbines will be needed as well as technological breakthroughs to make very large wind turbines viable
- Relevant R&D actions, as defined by the EWI, will therefore be essential!
- The **UPWIND** project lead by DTU Wind and funded by the EC through the FP6 explored the feasibility of large scale designs, hence playing an essential part in the implementation of the EWI
- **UPWIND** is therefore one of the major achievements of the EU wind energy industry and R&D community in studying the turbines of tomorrow
- Some of its key results are the following:
  - Manufacturing, transport and installation of large scale machines is technically possible
  - However, this does not mean that a 20MW version of a current state-of-the-art 5MW machine will offer any cost/performance advantages
  - In the energy industry, economies of scale generally lead to larger designs for cost-effectiveness but does not necessarily apply after a certain size

Turbines of tomorrow – where to move from now? (II)

- In order to develop the turbines of tomorrow effectively, the cost of energy needs to go down
- The following strategies could therefore be explored through dedicated R&D:
  - Aerodynamic improvements
  - New control systems for enhanced wind utilization
  - Weight reduction, also through use of dedicated materials (e.g. composites, bamboo and carbon fibers for new blades, lightweight generators, alternatives to steel for towers, resistant lightweight anti-corrosion alloys for medium depths offshore substructures, coating of turbines to reduce radar visibility)
  - New, automated manufacturing techniques
  - Improved load calculations: rationalization of safety factors
  - Increased availability of turbines
  - Reliability-based design
  - Better condition monitoring

Turbines of tomorrow – offshore turbines

- Offshore O&M still very much in its infancy: each project has its own approach
- Some ideas that may be introduced into the O&M market are as follows:
  - swing off systems enabling a spare nacelle to replace a nacelle in need of service
  - preventive and automatic systems that can carry out oil, brush and filter changes independently of human presence
  - multi–coated blades keeping blade maintenance to a minimum;
  - modular drive trains should be introduced making heavy part replacement easier.
- Today, there is no standard offshore substructure design, and at depths of over 25m the foundation costs start to increase dramatically
- Today the majority of foundations are monopiles and gravity-based
- As turbine size increases and the industry migrates into deeper waters, new designs will be required, such as fixed structures with three or four legs (tripods/quadropods) or jackets (suitable for water depths of up to 50-60m)
- Over that, only floating structures could be used, but they will probably reach the market over the next decade

Source: EWEA

The 2013 – 2015 Implementation Plan and The 2013 Work Programme (current Drafts)

Wind European Industrial Initiative Team
EWI 2013 – 2015 Implementation Plan

Produced by the TPWind Secretariat

Version 1

August 2012

Wind European Industrial Initiative Team

EWI 2013 Work Programme

Produced by the TPWind Secretariat

Version 1
August 2012

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Strand 1: New turbines and components – recommended activities (I)

Activity number	Description	Budget 2013 - 2015
1.1.1	Large-scale turbines • Characterisation and development of **materials and components** for wind turbines, including up-scaling effects. • Development and integration of **drive trains** – mechanical transmission, generator and power electronics. • Sensing, algorithms and actuation in **control strategies and systems**. • Design approaches and methods for very large wind turbines: flow in wind farms, on- and offshore. • Integrated analysis of the influence of grid and fault control on electrical and mechanical design and stresses on wind turbines. • **Floating structures: new designs and concepts**. • Silent installations methods for offshore applications.	€ 80m
1.1.2	Improved reliability of large turbines and wind farms. • Analysis of flow in and around large wind farms through control optimisation of power performance and minimising dynamic loading. • Analysis of flow from one large wind farm to the next large wind farm both looking on resources and design conditions using CFD, LIDARS and satellite images. • Increased reliability **of current large offshore designs**: smarter O&M with preventive maintenance and condition monitoring; **optimising life-cycle cost**.	€ 50m
1.1.3	Turbine and wind farm **optimisation to complex terrain and extreme climates**	€ 30m
TOTAL		€ 160m

Strand 1: New turbines and components – recommended activities (II)

Activity number	Description	Budget 2013 - 2015
1.2.1	Definition of methods and standards for testing large wind turbine components	€ 20m
1.2.2	Improvement of size and capabilities of system-lab testing facilities for 10 – 20 MW turbines	€ 150m
1.2.3	Field testing facilities for 10 – 20 MW turbines aimed at increasing reliability	€ 150m
TOTAL		€ 320m

Activity number	Description	Budget 2013 - 2015
1.3.1	Development of five large scale manufacturing and logistics processes, both size and numbers for in and out-of-factory and site erection	€ 150m
TOTAL		€ 150m

Strand 2: Offshore technology – recommended activities (I)

Activity number	Description	Budget 2013 - 2015
2.1.1	New bottom fixed substructures to minimise lifecycle costs. • New concepts and designs. • Improved reliability. • New installation methods.	€ 150m
2.1.2	Mass manufacturing of substructures and improved logistics. • Increased output and quality in manufacturing. • Improved logistics.	€ 150m
2.1.3	New modelling techniques. • Detailed soil-pile (structure) interaction models for stiffness and damping estimation and verification with tests on different soil beds. • Numerical tools for integrated modelling of floating wind turbines.	€ 50m
2.1.4	Development and demonstration of multi-MW floating platforms.	€ 150m
TOTAL		€ 500m

Activity number	Description	Budget 2013 - 2015
2.2.1	Facilities, infrastructures and logistics for offshore wind. • New and better ports management strategies. • New and better vessels management strategies. • Improved installation methods and logistics.	€ 100m
2.2.2	Reducing installation noise and environmental impact	€ 50m
TOTAL		€ 150m

Strand 2: Offshore technology – recommended activities (II)

Activity number	Description	Budget 2013 - 2015
2.3.1	Increased reliability and better O&M strategies. • Component failure. • SCADA and condition monitoring. • O&M strategies.	€ 50m
2.3.2	Turbine life-time extension and decommissioning.	€ 10m
TOTAL		€ 60m

Activity number	Description	Budget 2013 - 2015
2.4.1	Development and validation of improved design models and practices: • Design tools; • Control systems for reduced fatigue and improved production; • Database of environmental conditions, turbine loads and power production (for validation); • EU best practices.	€ 50m
2.4.2	Improved measurement technology	€ 20m
2.4.3	EU offshore atlas capturing wind, wave, soil and bathymetry	€ 10m
TOTAL		€ 80m

Strand 3: Grid integration – recommended activities

Activity number	Description	Budget 2013 - 2015
3.1.1	Connection to multi-terminal offshore grids	€ 30m
3.1.2	Electrical design of wind power plants and connection to networks (AC or DC, onshore or offshore)	€ 20m
3.1.3	Experience from existing HVDC connected wind power plants	€ 15m
TOTAL		€ 65m

Activity number	Description	Budget 2013 - 2015
3.2.1	Wind plant modelling for system studies	€ 10m
3.2.2	Ancillary services: • Ancillary services design and provision; • VPPs.	€ 50m
3.2.3	Testing of wind power plant capabilities (methods and facilities)	€ 50m
TOTAL		€ 110m

Activity number	Description	Budget 2013 - 2015
3.3.1	Impact and operation of wind power on electricity markets	€ 30m
3.3.2	Improving wind power forecasting techniques	€ 30m
TOTAL		€ 60m

Strand 4: Resource assessment, spatial planning and social acceptance – recommended activities (I)

Activity number	Description	Budget 2013 - 2015
4.1.1	Design conditions for very large wind turbines (20MW) and large wind farms: • Experimental campaigns (wind, loads and so on). • Ad-hoc models tailored to large rotors and large wind farms. • Updated synthetic data for wind turbine codes. • New standards. • "Open Platform" for design condition models.	€ 30m
4.1.2	Quantification of other climatic risks through: • Mapping. • Improved sensors for cold climates. • Load measurement campaigns. • Development of cold climate standards • Mitigation strategies for icing conditions • Uncertainties in resource assessment and their impact on design conditions	€ 10m
TOTAL		€ 40m

Strand 4: Resource assessment, spatial planning and social acceptance – recommended activities (II)

Activity number	Description	Budget 2013 - 2015
4.2.1	**Noise:** • Underwater noise; • Atmospheric propagation; • Monitoring and control; • Human perception of wind turbine noise.	**€ 19m**
4.2.2	Recycling and end-of-life scenarios	€ 3m
4.2.3	Passive and active aerial markings	€ 4m
4.2.4	**Environmental impacts and benefits:** • Bats; • Cumulative impacts; • Positive effects.	€ 8m
TOTAL		€ 34m

Activity number	Description	Budget 2013 - 2015
4.3.1	Offshore planning	€ 2m
TOTAL		€ 2m

Strand 4: Resource assessment, spatial planning and social acceptance – recommended activities (III)

Activity number	Description	Budget 2013 - 2015
4.4.1	Present and future **wind energy cost**: • Wind energy cost and LCOE; • Scenarios; • Rare earth materials; • Impact of uncertainties; • Impact of financial crisis.	€ 5m
4.4.2	Economic and social costs and benefits of wind power: • Impact of wind energy on industry and the economy; • Wind energy support schemes; • Social perception.	€ 4m
4.4.3	Industrial policy: • Competitiveness of the European wind power sector in the global market; • Energy policy impact.	€ 1m
TOTAL		€ 10m

EWI 2013 – 2015 Implementation Plan budget

EWI Strand	Total budget (€ m)	2013 – 2015 budget (€ m)	2013 – 2015 budget intensity
1. New turbines and components	2,500	630 *(763 in 2010 – 2012)*	25%
2. Offshore technology	1,200	790 *(315 in 2010 – 2012)*	66%
3. Grid integration	2,100	235 *(337.33 in 2010 – 2012)*	11%
4. Resource assessment, social acceptance and spatial planning	200	86 *(36 in 2010 – 2012)*	43%
TOTAL	**6,000**	**1,741**	**29%**

Funding player	Indicative annual funding targets for the 2013 - 2015 period
Wind Energy Industry	€ 301.77m
EU Member States	€ 98.66m
EU Institutions	€ 179.90m
TOTAL	€ 580.33m

The development of the EWI 2013-2015 IP & 2013 WP

Time / Action	July	August	September	October	November	December
First draft of EWI 2013 Work Programme						
Presentation to the Wind EII Team, together with the new EWI 2013 – 2015 Implementation Plan						
Second draft of EWI 2013 Work Programme and 2013 – 2015 Implementation Plan. Submission to the Wind EII Team						
Approval of EWI 2013 Work Programme and 2013 – 2015 Implementation Plan by Wind EII Team. Submission to SET-Plan SG						
Development of Horizon 2020 topics required for implementation in 2013 in cooperation with the EC						

Fecha límite para Comentarios de Estados Miembros: 23/Oct. /2012

Conclusions and next steps (EWI 2013 WP)

- Nine **funding recommendations** were put forward in the EWI 2011 Work Programme and eleven in 2012. There are **seventeen in 2013** due to:
  - the **revision of the R&D priorities for the 2013–2015 cycle** (see the new EWI 2013–2015 Implementation Plan),
  - the absence of a new round of EEPR funding, which had a significant impact over the 2010–2012 period (and considerably reduced the budgets of the 2011 and 2012 Work Programmes).
- The EWI 2013 Work Programme **should be approved by the Wind EII Team and the SET-Plan High Level SG before the end of 2012** and be implemented in 2013 (and / or 2014, depending on the launch of Horizon 2020)
- **In 2013, the Wind EII Team will focus on the development of the EWI 2014 Work Programme**, which will be based on the new EWI 2013 – 2015 Implementation Plan
- Due to the difficulties in coordinating EU and national funds (mainly due to the fact that national programmes differ from one another), **the Wind EII Team should not undertake new joint-programming initiatives before the launch of Horizon 2020 and of the new EU Wind Atlas project**