Wind energy: backbone of the EU global leadership in renewables

SEPTEMBER 2016

INTRODUCTION

The European wind industry has steadily delivered on technological innovation and cost reductions. In terms of LCOE, onshore wind is today the cheapest new power generation technology in Europe[1] whilst offshore wind holds the potential to become competitive with conventional technologies by 2025 depending on deployment volumes[2].

Thanks to its early-mover advantage, the European wind industry played a crucial role in the development of wind energy in non-European markets. By 2015, 49% of the cumulative capacity installed worldwide came from European wind turbine manufacturers. Wind energy products also represent the bulk of the €35 bn. annual EU renewable energy exports. As a result of domestic and international activity, the wind energy industry is emerging as a strategic sector for the European economy – it delivers an annual turnover of over €72 bn. and currently employs over 330 000 people.

Keeping this momentum will be critical in making the EU's the "world number one in renewables" – an objective set by the European Commission's President Jean-Claude Juncker in 2014. Wind energy is set to be the backbone of the EU's global leadership in renewables as it will provide the largest contribution - 23,9% - to the 2030 EU-wide renewable energy target[3].

However, under business-as-usual policies, Europe will be number one neither in renewables, nor in wind energy. Key international competitors, such as China and India, have raised their ambition in the COP21 aftermath and made concrete deployment volume commitments for wind (200GW and 60GW respectively) for the period beyond 2020 in view of promoting their national wind turbine manufacturers. Emerging economies allocated billions to renewable energy in 2015 with record increases (e.g. a four-fold increase in South Africa amounting to $4.5bn)[4].

Meanwhile, European markets are characterised by declining policy ambition and unstable regulatory environments. Last year alone, renewable energy investments in Europe fell by 21% to their lowest level since 2006. The lack of visibility on post-2020 project pipelines and the lack of clarity over the Energy Union governance system exacerbate investor uncertainty and put into question the delivery of the 2030 renewables target and the cost-effective transition to a renewables-based economy by 2050.

A vibrant home market is the key prerequisite for maintaining the European wind companies' lead over competitors. An ambitious post-2020 Renewable Energy Directive and market design legislative proposals will set the framework for the European global leadership. However, proactive innovation and trade policies should reinforce industrial policies to keep the EU wind industry's competitive edge and technology innovation efforts. This paper, therefore, aims to input to the Energy Union Integrated strategy for research, innovation and competitiveness and the European Union's trade agenda.

The following elements will allow the EU to maintain its global leadership in renewables beyond 2020:

- Dedicated EU R&I strategy and funding opportunities aligned with industry priorities;
- proactive EU trade policy removing trade barriers for renewable energy technologies; and
- higher policy ambition with a binding EU-wide renewables target of at least 30% by 2030; and
- reliable governance mechanism and a revised market design.

[1] BNEF, Levelised Cost of Electricity Update – H2 2015.
[2] WindEurope press release – "Offshore can reduce costs to below €80/MWh by 2025", June 2016. In addition, the latest offshore wind tender for Dutch Borssele Offshore wind farm was contracted with a strike price of €72,7/MWh (without grid connection) in July 2016.
[3] European Commission, SWG(2014)15 final, Impact Assessment to 2030 climate and energy framework
[4] BNEF, January 2016

SUPPORTING STRATEGIC SECTORS THROUGH DEDICATED R&I & FUNDING POLICIES

1. ALIGNING EU R&I STRATEGY WITH INDUSTRY PRIORITIES WILL DELIVER ON EU ENERGY COMMITMENTS

The European wind industry welcomes the emphasis given by the European Commission to the R&I dimension in the Energy Union project. The industry believes that the upcoming Energy Union R&I and competitiveness strategy should be aligned with the industry priorities if it is to act as enabler for the cost-effective fulfilment of the EU long-term decarbonisation objectives and global leadership pledges. National research strategies should reinforce and build upon the European research agenda for wind energy to maximise results on common priorities.

The European wind industry has traditionally invested around 10% of its annual turnover in R&I to stay ahead of the competition. However, decreasing policy ambition and/or abrupt changes to regulatory regimes in many EU markets had a negative impact on private R&D funding[5], which is today comparable to that of the major Chinese wind turbine manufacturer - Goldwind. A 13% decrease in patent applications from leading European companies between 2013 and 2015[6] signals that the EU technology leadership in innovative wind turbine technologies may be at risk in the coming decades.

An enhanced public-private dialogue is therefore necessary to maintain the region as a pioneer in ground-breaking wind technologies in the face of tougher international competition. The industry encourages the European Commission to reinforce its R&I focus on energy technologies, such as wind energy, where Europe is already a global leader.

To this end, the European wind energy sector has identified five key common research and innovation priorities[7]:

1) Developing grid integration systems, infrastructure and innovation including storage;
2) improving operation and maintenance in particular via digitisation;
3) driving industrialisation and standardisation;
4) addressing and reducing the cost of offshore balance of plant; and
5) enabling research for next generation technologies.

While the volume of wind farms is increasing, so are the costs related to grid systems, infrastructure and grid integration. The key to further cost reductions will hinge upon the ability for incremental and radical innovation on both the turbine and its external structures. With growing size comes a demand for greater reliability. This requires innovation in the operation and maintenance of future turbine models and the roll-out of digital technologies optimising the integration of the variable wind generation in electricity grids. Complementary research in the areas of decommissioning, recycling and

[5]MAKE, December 2015 - based on a comparison between three leading European manufacturers R&D spending and their Chinese counterpart – Goldwind, demonstrated a 2,2% decrease in European spending between 2011 and 2015.
[6] MAKE, December 2015
[7] ETIPWind, Strategic Research and Innovation Agenda 2016

waste handling of wind farms that have reached the end of their operation life would additionally ensure the sustainable use of resources and materials.

Research efforts to keep developing the technology and deployment of onshore wind must be kept on a steady course. The installation costs of onshore wind power have declined by 7% every time global installed capacity has doubled. This has allowed for onshore wind to be today one the cheapest energy generating technologies worldwide.

Further cost reductions will be driven by increasing economies of scale, more competitive supply chains and a variety of technology improvements aimed at managing wind power integration into the grid more efficiently. Onshore wind costs could fall by 26% by 2025 and by 41% by 2040. To that end, industrialisation and standardisation offer opportunities for the industry to keep fulfilling its leading role and deliver a competitive climate mitigation technology to the world.

The EU is also the first region where offshore wind has been deployed at commercial scale with 11,5 GW of installed capacity by mid-2016[8]. As the undisputed leader with 92% of global installations and technical expertise now in European waters, the EU has a clear opportunity to spearhead the technology uptake in other parts of the world.

R&I efforts in offshore should capitalise on the progressive turbine size optimisation and the positive cost reduction path of the industry. The average size of offshore wind turbines installed in 2015 was 4.2MW, up from 3.7MW in 2014. Capacity factors of new offshore wind turbines have been increasing and the average now stands at 42%. The industry is on track to deliver on self-imposed cost reduction targets (€100/MWh by 2020) and is working to make offshore wind cost-competitive by 2025[9].

A dedicated R&I strategy for wind energy, alongside a visible and reliable post-2020 project pipeline, would be key prerequisite for driving the industry towards full market maturity. To maintain offshore wind's first-mover advantage, the European Commission's Strategic Energy Technologies Plan (SET-Plan) identified it as a priority technology[10]. The European wind industry recommends that further R&I efforts envisage the roll-out of an integrated offshore grid also in the framework of enhanced regional cooperation efforts between EU Member States for the delivery of the 2030 EU-wide binding target.

2. LEVERAGING PUBLIC FUNDING WILL UNLOCK PRIVATE INVESTMENT IN R&I

Public funding should be leveraged to unlock private investments in R&I. Funding from the European Commission should be targeted to 1) drive further cost reductions, 2) facilitate the sustainable integration of large shares of wind into the EU grids and 3) maintain and reinforce the technological leadership of the European wind industry as a whole.

To fulfill the key R&I objectives set by the industry, the process for accessing EU funding needs to be optimised in order to make it more attractive for industry to engage in projects. This will be instrumental in reaching the ambitious SET-Plan targets and to maintain global leadership in the sector.

[8] WindEurope, The European offshore wind industry – Key trends and statistics 1st half 2016, July 2016
[9] WindEurope press release – "Offshore can reduce costs to below €80/MWh by 2025", June 2016

[10] SET-Plan Secretariat, Declaration on Strategic Targets in the context of an Initiative for Global Leadership in Offshore Wind. In the framework of the SET-Plan, the industry has committed to strategic cost reduction targets depending on the volumes. An annual deployment of 4-4.5GW/y will bring costs down to €85/MWh but higher deployment of 7-7.5GW/y will result in help the industry drive costs down to €79/MWh.

The European wind energy industry therefore recommends:

- Maintaining focus on key value parameters (LCOE, integration, etc.) when drafting calls and assessing proposals;
- considering a "challenge approach" by setting ambitious objectives with proposals to achieve them;
- shortening the duration of (at least certain types of) call processes for example via the introduction of a fast track procedure;
- allowing for in-process adjustments;
- assessing proposals on execution and implementation capabilities;
- requesting large consortia only where clearly justified by nature of project scope;
- structuring calls to reflect respect of intellectual property and confidentiality; and
- reducing bureaucracy drawing from the experience of efficient national schemes, e.g. Carbon Trust.

Furthermore, the European Union funding process for innovative projects should be made clearer and easier to combine with other funds. EU financial instruments should be directed towards first-of-a-kind projects and specifically close-to-market demonstration projects. Test and demonstration facilities for innovative technologies need to be made available for wind technology manufacturers.

The European wind industry also believes that the upcoming revision of the EU Multi-Annual Financial Framework for the period 2021-2027 should put a growing emphasis on renewable energy-related expenditure. Structural and Cohesion Funds alongside a prolongation of the Horizon 2020 programme should serve as enablers for the fulfilment of the 2030 renewable energy target and the EU's global leadership commitment.

The European wind energy industry therefore recommends that European funding:

- Be directed to close-to-market demonstration projects; and
- reinforces renewable energy expenditure lines in the EU Multi-Annual Financial Framework 2021-2027.

OPENING NEW MARKETS THROUGH PROACTIVE ENGAGEMENT OVERSEAS

1. MAINTAINING A STRONG EXPORT PERFORMANCE WILL KEEP ECONOMIC BENEFITS AT HOME

Over 48% of European wind energy companies work outside the EU creating opportunities for exporting goods and expertise[11]. Wind energy accounts for the bulk of the €35 bn. annual EU renewable energy exports. Whereas European wind turbine manufacturers hold a 49% share of the global market, foreign competitors are already gaining market shares in traditional EU export countries.

[11] EWEA, Aiming High, November 2015

The Paris climate agreement opened an unprecedented opportunity for the EU to spearhead the global energy transition through trade. With more than 70 countries highlighting wind energy in their national action plans (INDCs) submitted ahead of COP21, the EU could provide scalable and cheap technology to an increasing number of markets, thus generating economic profit for the EU economy.

The European wind industry considers that the Energy Diplomacy Action Plan[12], agreed by Member States in July 2015, is a positive first step in complementing the Energy Union framework with an external dimension. The Action Plan should be implemented as a matter of priority to follow through the EU global climate commitments and promote leading European zero-carbon technologies to the world, such as wind energy.

2. REMOVING TRADE BARRIERS WILL ENHANCE EU COMPETITIVENESS

Global leadership requires a comprehensive trade policy favouring open markets and a level playing field in international trade. Access to raw materials and semi-finished products in foreign markets and at reasonable prices would be key to the EU wind industry competitiveness beyond 2020.

Building upon the European Energy Action Plan, the European wind industry believes that the European Commission should put in place strategic energy partnerships with key non-European markets. An enhanced energy political dialogue allows the EU to share its wind energy expertise and help foreign countries in implementing their clean energy national strategies.

The industry believes that tariff liberalisation on a comprehensive list of climate-related goods done in a bilateral or multilateral basis is of key importance. Trading renewables technology without tariff restrictions will sustain growth in the wind industry in Europe and its trade partners and will reduce the cost of wind energy through the elimination of duties.

With the industry becoming even more competitive, the ability for international companies to compete has been hindered by regulations that unfairly tilt the playing field in domestic companies' favour. These so-called non-tariff barriers, such as local content requirements, standards, technical rules and procurement practices, are a growing impediment to the development of the industry in non-European markets[13]. They undermine the attractiveness of the wind sector compared to conventional technologies, limit job creation and slow the development and cost reduction pathway of climate change mitigation technologies.

Local content requirements (LCRs) are a particular challenge for wind energy exports. LCRs push the industry to invest in production facilities that might not be economically viable over the long-term. This contributes to higher costs for the end consumers. In order to be competitive, the industry needs to draw on a lean and efficient global supply chain for which LCRs are incompatible.

Regulatory cooperation and standard convergence should also be a core objective of trade agreements with the goal of avoiding any national conflicts on product and trade standards. The European wind industry considers that the standards used should adhere to the World Trade Organisations "Principles for the Development of International Standards" applied by the International Organisation for

[12] Council of the European Union, Council conclusions on Energy Diplomacy, 20 July 2015
[13] OECD, Overcoming Barriers to International Investment in Clean Energy, June 2015

Standardisation (ISO), the International Electrotechnical Commission (IEC), or the International Telecommunication Union (ITU). Local certification adds costs for previously certified foreign wind turbine manufacturers and puts at risk the companies' intellectual property rights. Testing and certification should be performed according to international IEC / ISO standards.

The European wind industry also believes that the WTO negotiations on an Environmental Goods Agreement (EGA) should be concluded as a matter of priority. The liberalisation of trade tariffs for environmental goods would be a necessary step in globalising the wind energy supply chain and bringing the benefits of a clean and competitive climate mitigation technology to the world. The EU should also proactively seek to initiate negotiations on non-tariff barriers and services in view of boosting exports in leading renewable energy technologies.

With regards to the Transatlantic Trade Investment Partnership (TTIP), the European wind industry considers that the inclusion of a distinct and detailed chapter on energy should be a condition for concluding the deal. The industry stresses that the current EU text proposal does not live up to the EU ambition of being the number one in renewable and could sacrifice key provisions of the current regulatory framework.

This is in particular the case of Article 4 (1) regarding third-party access to gas and electricity transport infrastructure. The EU proposal reads:

> *"[…] access shall be granted on commercial terms that are reasonable, transparent and non-discriminatory, and at cost-reflective tariffs".*

This formulation put into question the current EU rules on priority access for renewables and the application of feed-in tariffs and market premiums which have been instrumental in driving the energy transition in key EU markets. Article 4 (2) of the EU proposal further reads:

> *"Notwithstanding paragraph 1 of this Article, a Party may introduce or maintain a limited list of derogations from the right to third party access based on objective criteria set out in legislation, provided that they are necessary to fulfil a legitimate policy objective."*

The European wind industry considers that the language of Article 4 (2) should be strengthened to include a guarantee that derogations for renewable energies would be included in the post-2020 Renewable energy directive.

The European Commission should privilege the following steps to open up new business opportunities for its leading wind energy technology companies:

- Negotiate tariff liberalisation for environmental goods in bilateral and multilateral treaties;
- negotiate removal of non-tariff barriers (e.g. local content requirements, divergent standards) in trade treaties;
- promote a quick conclusion of the Environmental Goods Agreement; and
- secure a separate Energy chapter under TTIP affirming the EU renewable energy commitments.

3. DEVELOP TOOLS TO SUPPORT FINANCING IN DEVELOPING COUNTRIES

With 1,3 bn. people lacking access to electricity around the world, the provision of modern forms of energy and supporting energy systems is a key opportunity for the EU to promote its leading climate mitigation technology and know-how.

As the most important international donor of development aid, the EU could link the export of regulatory and technical expertise to financial support for sustainable development outside its doorsteps. The Energy Union project between the 28 EU Member States should serve as an example of a successful energy transition to other regions of the world and allow for sharing best practice with various global initiative (e.g. the South African Power Pool).

A particular obstacle to wind energy deployment in developing countries is the lack of appropriate regulatory framework and the technical skills to plan for infrastructure development. European companies could provide capacity building trainings to raise the technical qualification of local workforce for the uptake of wind energy technologies.

Building the necessary infrastructure is a key prerequisite for wind energy deployment in developing countries. The EU has allocated over €3 bn. in grants to support sustainable energy in the developing world which is believed to unlock additional investment of more than €15 bn. for energy transport networks[14]. The European wind industry suggests that the EU additionally develops a financial instrument, replicating the European Fund for Strategic Investments, to navigate public financing to key renewable energy infrastructure projects. The Fund could gather money from key EU investment institutions alongside Member States' bilateral development agencies and regional development banks.

The industry proposes that the European Commission focuses its efforts in reinforcing the renewable energy component of its development instruments whilst expanding EU assistance to Asia and Latin America. This should take the form of dedicated partnerships with local organisations and should replicate the pillars of successful programmes such as the Africa-EU Renewable Energy Cooperation Programme (RECP).

For the EU development policies and instruments to mirror and maximise the EU renewable energy objectives, the European wind industry recommends the following actions:

- Promote capacity building programmes for developing countries with the participation of the European wind industry and European TSOs;
- establish a Fund for Strategic Investments in renewable energy infrastructure leveraging public financing from EU development instruments, bilateral development agencies and regional development banks; and
- establish dedicated renewable energy partnership programmes for regions outside of sub-Saharan Africa.

[14] European Commission, Empowering development – Delivering results in the Decade of Sustainable Energy for All, 2015

MATCHING PLEDGES WITH ADEQUATE POST-2020 RENEWABLES LAWS

1. A ROBUST GOVERNANCE MECHANISM IS NECESSARY TO MAINTAIN STRONG HOME MARKET

Higher ambition from policy makers will be required to maintain a strong home market able to deliver on the EU's global leadership in renewable energy objective. WindEurope considers that Member States will need to raise ambition towards a collective EU renewables target of at least 30% to match international competition and keep the economic benefits of wind deployment at home.

Policy ambition needs to be translated into concrete and robust mechanisms for renewable energy deployment in the post-2020 Renewable Energy Directive to attract private investment. Guarantees should be in place to ensure well-defined national commitments beyond 2020 and efficient oversight of the European Commission over target delivery.

The governance system of the Energy Union should feature a reliable planning process enshrined in legislation. The European Commission should set indicative renewable energy benchmarks for each Member State which, aggregated, amount to the overall binding target. Only a detailed breakdown of national contributions with a legal basis can provide investors with a clear pathway for the next investment cycle and ensure that Member States will be accountable for their commitments.

The post-2020 EU renewables legislation should also grant the European Commission with concrete legal tools to secure target delivery and should provide for a complementary instrument (gap-filler) in case national contributions do not add up to the EU-wide target. Investor protection mechanisms, such as a grandfathering principles for existing plants, are indispensable in the post-2020 period to ensure that all Member States contribute their fair share to fulfil the collective binding renewables target and bring down the cost of capital for wind energy projects[15].

In addition, a regional approach to wind energy, based on voluntary cooperation between Member States, should be further developed in view of fulfilling, and exceeding, the EU-wide binding renewable energy target. The North Seas Offshore Grid and the Baltic Energy Market Interconnection Plan (BEMIP) should feature among the long term priorities for regional cooperation under the Energy Union.

The European wind industry considers that the following key elements should be enshrined in the post-2020 renewable energy legislation:

- a binding EU-wide renewables target of at least 30% by 2030;
- binding templates for national energy and climate plans;
- national renewable energy indicative benchmarks to factor in early ambition form Member States;
- clear safeguard measures and enforcement tools for the European Commission to oversee and ensure target delivery; and
- a gap-filler instrument to incentivise higher ambition from Member States from the onset.

[15] For further detail, refer to WindEurope, Post-2020 Renewable Energy Directive, June 2016

2. A MARKET DESIGN FIT FOR RENEWABLES IS KEY TO THEIR COST-EFFECTIVE DEPLOYMENT

The post-2020 renewable energy package will need to outline a revised market design that rewards flexibility and accommodates the large-scale integration of renewables in the post-2020 period[16].

The reform should prioritise the deployment of intraday and balancing markets to foster liquidity and cross-border integration in all timeframes. Priority dispatch and balancing responsibility exemptions should be maintained as long as market failures persist. The new market design should provide transparent curtailment and congestion management rules for TSOs and DSOs and a compensation mechanism for curtailment[17]. Capacity Remuneration Mechanisms should be considered as a last resort option and only after standardised system adequacy analyses. Completing the internal energy market will also require grid reinforcements at national, regional, EU level and institutional strengthening of ACER and ENTSO-E.

In addition, the post-2020 renewable energy legislative framework should provide for fair and shorter permitting and connection procedures and should table a one-stop-shop principle in the post-2020 Directive to ensure streamlining of administrative and permitting procedures.

The post-2020 Renewable Energy Directive should also outline general principles on the development of support schemes to give investors the necessary predictability on their future design. Support schemes' design will need to be transparent to reduce risk and attract finance.

The resulting policy clarity will enhance investor certainty on the compatibility of support mechanisms with internal market rules. As a supporting instrument to the implementation of the Directive, the State aid guidelines for the post-2020 period should be fully aligned with the revised sectorial legislation.

The European wind industry considers that the post-2020 market design reform should:

- maintain priority dispatch until market failures are addressed;
- defining curtailment and congestion management rules for TSOs/DSOs;
- setting up compensation mechanisms for curtailment;
- including a set of principles support schemes' design and allocation; and
- streamlining administrative procedures for wind projects.

[16] For further detail, refer to EWEA, Market design, June 2015
[17] For further detail, refer to WindEurope, Priority dispatch and curtailment, June 2016