

Multi-stakeholder workshop on Wind Energy

13-15 April, 2012

Copenhagen, Denmark

Background

Renewable energy investments are continuously growing. The total global investment in renewable energy broke a new record in 2011, reaching \$260 billion.

In 2010, 118 countries had a policy target or a renewable support policy. However, the major part of the investments in new renewable energy capacity was captured by only five countries: China (24%), Germany (19%), the USA (14%), Italy (7%) and Brazil (3%), totaling two thirds of the investment with USD 142 billion. This high concentration of the investments in a limited number of countries raises questions about the specificities of successful policy frameworks:

- What are the major policy elements that need to be considered to develop a market for renewable energy?
- How does the private sector evaluate the policy environment of a country, what are the major elements investors are looking for?
- What policy and technical challenges are countries facing today?
- How can countries learn from past experiences, and how is it possible to adapt the ingredients for success to specific environments?

IRENA is partnering with the industry to assess those elements, based on concrete ground experience. Starting with wind energy as a pilot, and in partnership with the Global Wind Energy Council (GWEC), a thorough assessment of the successful policy environment for promoting the development of wind power is carried out.

The report provides an analysis of policy and regulatory practices having the most impact in strengthening the uptake and development of wind energy, based on comparative country-based analyses for 10-15 representative markets, representing an overview of the existing policy landscapes.

The main objective of this workshop is to develop a common understanding of political, regulatory and economic parameters across key markets, and engage the dialogue with selected countries. The limited audience will initiate a concrete dialogue between industry representatives, countries having a successful experience in developing wind energy, and countries having a significant potential to deploy the technology.

This working session should lead to common elements from successful markets, and engage the discussion with countries having a high replication potential, towards the definition of concrete policy action plans.

The programme includes a field visit to a renewable energy power plant, and access to the European Wind Energy Conference and Exhibition, gathering 9,000 participants from 84 countries, and 450 exhibiting companies.

Documents: Draft analysis on the assessment of the successful policy environment for promoting the development of wind power, to be circulated.

Draft agenda, next page.

Date: 13 – 15 April 2012

Location: Danish Wind Industry Association, Rosenørns Allé 9, 5. Sal, Frederiksberg, Copenhagen, DK-1970

Accommodation: Accommodation is arranged by IRENA, **see annex 3 for details.**

Contact: For further inquiries, please contact the IRENA Secretariat mhobeiche@irena.org, cc: nfichaux@irena.org

Confirmed participants as of Apr. 1st:

Participating countries¹: Columbia, Denmark, Ethiopia, India, Mongolia, Oman, Peru, Senegal, Sri Lanka, Tanzania.

Participating companies/institutes: GL-Garrad Hassan, Risoe Wind, Siemens, Suzlon, Vestas.

Participating financial organisations: Asian Development Bank (ADB), Investitionbank Schleswig-Holstein, International Finance Corporation (IFC), Brazilian Development Bank (BNDES), BNP Paribas.

Participating associations: Abeeolica (Brazil), Chatham House (UK), DWIA (Denmark), EWEA (Europe), GWEC (Global), IWTMA (India)

¹ Pending visa approval

Agenda

| DAY 1 : Friday April 13th, 2012 | | |
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| 9:00- 9:10 | Welcome of all participants | Jan Hylleberg, CEO Danish Wind Industry Association |
| 9:10 – 9:30 | Introduction | Gauri Singh, Director KMTC, IRENA followed by a short introduction from each participant |
| 9:30 – 10:00 | Presentation of workshop context, objectives and follow up | N. Fichaux, Project Officer, IRENA |
| 10 :00 – 10 :30 | Introduction to development of the global wind energy industry | Steve Sawyer, Secretary General, GWEC |
| 10:30 – 11:00 | Open discussion | All |
| 11:00 – 11:15 | Coffee break | |
| 11:15 – 12:00 | Quick facts about wind: technology status and development | Poul-Erik Morthorst, Risoe |
| 12:00 – 13:15 | Sharing experience: successful policies for attracting wind investments | Presentations on mature markets followed by a discussion [10 Minutes each] Denmark: H. Windemuller, Director, Energy Supply, Danish Energy Agency India : D. Nigam, Director-Wind, Ministry of New and Renewable Energy Brazil : P. Perelli, Executive Director, Abeolica China : L. Qiao , China Director , GWEC |
| 13:15 – 14:00 | Lunch | |
| 14:00 – 15:45 | Sharing expectations: countries in the process of creating a policy environment to attract renewable energy investments (on-grid or off-grid) | Presentations from 4 countries followed by a discussion [10 Minutes each] Columbia: S. Garzon, Engineer, Institute of Planification and Promotion of Energetic Solution Ethiopia: G. Mengistie, Director, Energy Studies and Development Directorate, Ministry of Water and Energy, Addis Ababa, Ethiopia Mongolia: J. Osgonbataar, Director, National Center for Renewable Energy Peru: C. Cáceres, DGEE - MINEM |
| 15:45 – 16:00 | Coffee break | |

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| 16:00 – 17 :00 | Draft GWEC/IRENA report on the effectiveness of clean energy policies in promoting wind energy | Shruti Shukla, Sr. Policy Advisor, GWEC Nicolas Fichaux, Project Officer, IRENA Comments from the audience |
| 17:00 | Closure day 1 | |
| 18:30 | DINNER | |
| DAY 2 : Saturday April 14th, 2012 | | |
| 9:00 – 11:00 | Panel Discussion : Influence of policies in attracting finance for wind power development | <ul style="list-style-type: none"> • Dr Klaus Rave, Managing Director of the <i>Investitionsbank Schleswig-Holstein</i> and GWEC Chairman <p><i>Short presentation on Financing Wind Power Development - capital sources, costs and prospects, framework conditions</i></p> <ul style="list-style-type: none"> • Jitu Shah ,Asian Development Bank • Sean Whittaker , IFC • Jaime Gornsztejn, BNDES • Kirsty Hamilton , Chatham House • Nick Gardiner , BNP Paribas (tbc) |
| 11:00 – 11:20 | Coffee break | |
| 11:20 – 11:30 | Break-out groups : policy challenges and opportunities for the increased uptake of wind energy | Introduction to the session : Nicolas Fichaux, IRENA |
| 11:30 to 13:00 | | Audience breaks in small groups to discuss major barriers, challenges and opportunities in country/region. |
| 13:00 – 13:45 | WORKING LUNCH | |
| 13:45 – 15:15 | Presentations from the breakout groups and discussion with the audience | 15 minutes <u>per group</u> |
| 15:15 – 15:30 | Coffee break | |
| 15:30 – 15:50 | Summary from the moderator: key points raised by breakout groups | IRENA |
| 15:50 – 17:00 | Taking up the policy challenge: discussion on the scope of work for IRENA activities on policy advice for wind development. | Discussion chaired by IRENA |
| 17:00 | Closure day 2 | |
| 19:00 | DINNER | |

| DAY 3 : Sunday April 15th, 2012 | |
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| 8:00 – 12:00 | Field visit: visit to Onshore and Offshore wind farms in Copenhagen |
| | Lunch [Packed] |
| 12:30 – 17:30 | <p><i>Seminar and workshop organised by the Danish Wind Industry Association in collaboration with the European Wind Energy Association (see Annex 2)</i></p> <p>Focus: Crucial steps to efficiently integrate wind power in the electricity system.</p> <p>Fee: Entrance fee are graciously offered by the workshop organisers.</p> <p>Venue : Bella Centre, Copenhagen</p> <p>Followed by Networking Dinner at the Bella Centre</p> |

| DAY 4 : Monday April 16th, 2012 | |
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| 9:00 – 17:00 | Complimentary access to the European Wind Energy Conference (EWEA 2012) - http://events.ewea.org/annual2012/ |
| | Flight back |

Annex 1: Proposed discussion points for breakout groups and final session

The below discussion points are proposed as guidelines for the breakout groups and following discussions, on Day 2, 11:20 to 17:00.

- Based on your experience, which are the main obstacles to overcome while initiating and expanding wind markets?
- What are the most important elements for the private/finance sector to decide investing in a country, and how do they assess the policy environment in the country?
- Considering also the discussions that took place during the workshop, and the IRENA/GWEC report on wind energy policies:
 - Which are the main factors to be taken into consideration when identifying and designing policies dedicated to support wind development (technology deployment, supply chain development)?
 - And, which are the necessary 'preconditions' for guaranteeing the effectiveness of such policies?
- Taking into consideration that IRENA is not a funding institution, how can IRENA provide policy advice on wind technology deployment most effectively to Member Countries?
- IRENA is building an expert group on policy advice for wind development. The group will include policy makers, academia and private sector representatives and will have the form of a virtual network. Such network will facilitate assistance to member countries in deploying wind energy, also by making them able to receive, on demand, advice on specific issues from other countries and/or from different experts participating in the group. This network may merge in the future with other existing fora in order to avoid duplication of efforts.
 - Which should be the scope of work of the group and what are the policy topics that the group should take up in order to effectively expand new markets?
 - How could the group be shaped and how can the expertise mobilised by such network be most effectively used?

Annex 2: Danish Pre-conference: Integration of wind power

Sunday 15 April 2012 , 12:30-19:00
Room 19, Bella Center, Copenhagen

The **purpose** of the grid seminar is to give insights in the important steps to efficiently integrate wind energy in the grid going from 0 – 25 pct. wind penetration and how to exploit the value of wind from the beginning.

Participants: Stakeholders from emerging and growth markets, such as public authorities, DSO's, TSO's, utilities, developers, manufacturers of wind turbines and grid technology.

Participation fees - Pre-conference: 'Integration of wind power', 15 April 2012 (including VAT):

EWEA/DWIA Member: €195

Non-Member: €275

Academic / NGO / Government: €225

Student: €110

Programme

Power of wind: 5 important steps to integrate wind energy in the grid and ensure the value of wind

The seminar will start with a plenum presentation that highlights 5 important steps from the first wind turbines to above 15 pct. wind penetration. The plenum session will be followed by 2 rounds of workshops, where each of the steps will be elaborated on individually. The two rounds of workshops will be identical giving the participants the possibility to go in to depth with 2 of the 5 subjects.

The 5 workshop groups will each be led by 2 or 3 experts. The workshop session will be wrapped up through a process, where the experts will collect the essential conclusions from the workshops in a checklist. The checklist will be finalized and distributed to the participants at the end of seminar.

The seminar will be finished with a panel debate focusing on how to reach 25 pct. wind penetration in less than a decade based on handling the 5 important steps in an efficient manner.

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| 11:30 – 12:30 | Registration and lunch |
| 12:30 – 12:35 | Welcome, Jakob Lau Holst, COO, Danish Wind Industry Association |
| 12:35 – 12:45 | Introduction to the day by the chair, Claus Madsen, CEO, ABB Denmark |
| 12:45 – 13:15 | 5 important steps from 0 - 25 pct. wind penetration, Dorthe Vinther, Vice President, Electricity System Development, Energinet.dk |
| 13:15 – 14:15 | First round of 5 workshops Each of the 5 workshops will focus on a specific step. |

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| | See below for the list of the specific topics and speakers. |
| 14:15 – 14:30 | Coffee break |
| 14:30 – 15:00 | Socioeconomic benefits from wind energy in emerging markets, Nynne Norman Scheuer, Policy Analyst, Vestas Wind Systems |
| 15:00 – 16:00 | Second round of 5 workshops Each of the 5 workshops from the first workshop round will be repeated. See below for the list of the specific topics and speakers. |
| 16:00 – 16:30 | Coffee break |
| 16:30 – 16:45 | Presentation of the checklist on policies, financial and technical requirements and regulation |
| 16:45 – 17:30 | Panel debate: How to reach 25 pct. wind penetration in less than a decade Panel: Dr. Lawrence E. Jones, Vice President, Regulatory Affairs, Policy and Industry Relations, Alstom Grid Inc. Dorthe Vinther, Vice President, Electricity System Development, Energinet.dk Erik Kjær Sørensen, Director Governmental Relations, Vestas Wind Systems Søren Krohn, CEO, SKPower |
| 17:30 – 19:00 | Network and refreshment |

| Political requirements | Speaker |
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| <p>How to get started with wind integration - an overview</p> <ul style="list-style-type: none"> - Political will - The state of the grid and the generation mix today - Grid codes, the basic needs and coordination with your neighboring countries, international standards - Financial opportunities - Coordination between planning authorities, developers and DSO's/TSO's - Continuous grid planning, how to be prepared for future development vs the risk for sunk cost due to early development | <p>Jørgen S. Christensen, CTO, Danish Energy Association</p> |

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| <p>Necessary preparations for the TSO before connecting the first wind farms. A case story from South Africa</p> <ul style="list-style-type: none"> - Analysis of the potential wind penetration - Handling the stakeholders - Connecting a new 140 MW wind farm | <p>Pervelan Govender, Chief Engineer, ESKOM</p> |
| <p>Financial requirements and regulation</p> | <p>Speaker</p> |
| <p>Financing grid connection and extension</p> <ul style="list-style-type: none"> - Who pays for the connection, extensions and enforcement - Sunk cost - Cooperation - Regulatory body – responsibilities and tasks | <p>Stephanie Ropenus, PhD, German Wind Energy Association</p> |
| <p>Financing grid connection seen from the developers perspective – Two case stories from Bulgaria and Romania</p> | <p>Nicky Mads Larsen, Senior Business Advisor, Global Wind Power</p> |
| <p>Investing in grid infrastructure in developing countries</p> | <p>Sean Whittaker, Senior renewable energy specialist, IFC, Climate Business Group</p> |
| <p>Grid requirements and solutions</p> | <p>Speaker</p> |
| <p>Grid requirements and regulation</p> <ul style="list-style-type: none"> - Priority access - Grid codes, best practice - Conducting the needed grid analysis in order to know the impact from a new wind farm. - How to challenge your grid? - Where are the barriers and how do you handle them? | <p>Niels Andersen, Engineer, SEAS-NVE</p> |
| <p>Upgrading to higher levels of voltage</p> <ul style="list-style-type: none"> - Congestion in the grid - Long distance transmission <p>The need for interconnectors</p> <ul style="list-style-type: none"> - Take advantage of your neighboring electrical systems - Taking account of socioeconomic benefits | <p>Peter Børre, Head of analysis, Energinet.dk</p> |
| <p>Market based operation of the power system</p> | <p>Speaker</p> |

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| <p>Wind power and the power market</p> <ul style="list-style-type: none"> - Power Purchase Agreements - Integration into the power market - Compensation of curtailment | <p>Sascha Thorsten Schröder, DTU Management Engineering</p> |
| <p>Handling of fluctuating wind production on the power spot market, a case story from a PBA</p> <ul style="list-style-type: none"> - Pooling of independent wind power producers - The use of wind forecasts - Handling of balancing | <p>Jens Tang, Vice President, Renewables Generation, Nordjysk Elhandel</p> |
| <p>Best practice for operational handling of wind power in the grid</p> <ul style="list-style-type: none"> - Wind power forecasts - Tools - Data - Situational awareness - Training - Procedures and processes | <p>Dr. Lawrence E. Jones, Alstom Vice President, Regulatory Affairs, Policy and Industry Relations Alstom Grid Inc.</p> |

The 5 important steps

1. Political requirements
 - A. Stakeholder involvement and coordination
2. Financial requirements and regulation
 - A. Financing grid connection and grid enforcement
3. Grid requirements and solutions
 - A. System planning
 - B. Grid planning and simulations of the impact from new wind farms
 - C. Grid codes and standardization
 - D. Transmission and interconnectors
4. Market based operation of the power system
 - A. Daily operation of the grid with fluctuating energy production
 - B. Payment solutions for wind power – Market or Power Purchase Agreements
5. Technology based balancing of fluctuating power production
 - A. Technologies to support the grid – wind turbines and grid supporting solutions
 - B. Wind powers interaction with other technologies – Gas, coal, hydro, biomass, solar and nuclear

Annex 3: location maps

Hotel:

Scandic Palace Hotel Copenhagen
Rådhuspladsen 57
1550 Copenhagen V
Phone +45 33 42 85 21
Email lena.donde@scandichotels.com
Contact person: Lena Donde, Reservation Manager

Location map:

<http://maps.google.com/maps?saddr=Rådhuspladsen+57,+1550+Copenhagen+V&hl=en&ll=55.681577,12.555248&sspn=0.00744,0.022638&mra=ls&num=10&t=m&z=15>



Directions:

The hotel is situated right on the Town Hall Square just next to Strøget, a pedestrian street with a huge variety of shops, and just across the Tivoli Gardens. The Copenhagen International Airport is just a 20-minute drive by car and the Copenhagen's main central station is at a 5-minute walking distance from the hotel.

Train from the airport:

The train from Copenhagen airport takes only 12 minutes to Central station and leaves every 10 minutes during the day, every 20 minutes during the evening and every hour during the night. You need a ticket

for 3 "Zoner" and you can buy a 10 trip fare at the airport. The Grand Central Station is located about 500 meters from the hotel and takes 5-10 minutes by walk.

Metro:

The Metro to Nørreport Station takes about 15 minutes to the hotel and runs every 5-10 minutes. You need a ticket for 3 "Zoner". The distance from the metro station to the hotel is app. 1 kilometer and it takes around 20 minutes to walk.

Taxi:

A taxi from the airport to the hotel, takes app. 20 minutes and costs about DKK 300.00.

Bus:

The bus terminal is 100 meters from the hotel and it takes only a few minutes to walk.

Meeting venue:

Danish Wind Industry Association

Rosenørns Allé 9, 5. sal

DK-1970 Frederiksberg C

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Fax: +45 3373 0333

E-mail: danish@windpower.org

Location map: <http://maps.google.com/maps?saddr=Rosen%C3%B8rns+All%C3%A9+9,+5.+sal,+DK-1970+Frederiksberg+Copenhagen&hl=en&ie=UTF8&ll=37.0625,-95.677068&sspn=42.631141,92.724609&doflg=ptk&mra=ls&t=m&z=16>

