Asia-Pacific
Economic Cooperation

Summary Report

APEC WORKSHOP ON PROMOTING THE DEVELOPMENT OF WIND ENERGY

Ha Noi, Viet Nam, 26-26 November 2013

APEC Energy Working Group

December 2013

APEC Project: EWG 14 2013A

Produced by

The Ministry of Industry and Trade of Viet Nam
54 Hai Ba Trung Street, Ha Noi, Viet Nam

For
Asia-Pacific Economic Cooperation Secretariat
35 Heng Mui Keng Terrace
Singapore 119616
Tel: (65) 68919 600
Fax: (65) 68919 690
Email: info@apec.org
Website: www.apec.org

APEC#214-RE-01.2

DRAFT SUMMARY REPORT
EWG 14 2013A
APEC WORKSHOP ON PROMOTING THE DEVELOPMENT OF WIND ENERGY
25& 26 November 2013
Ha Noi, Viet Nam

The APEC Workshop on Promoting the Development of Wind Energy was held on 25 and 26 November 2013, in Hanoi, Viet Nam. Attendance at the Workshop includes speakers, experts, officials, representatives from APEC member economies, namely: Brunei Darussalam, Chile, China, Hong Kong, China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, USA, Viet Nam; and international organizations, corporations and associations in renewable energy in general, wind energy in particular, namely a few International Center for Trade and Sustainable Development (ICTSD), USAID/USAID Viet Nam Clean Energy Program, International Copper Association (ICA), International Energy Agency (IEA), ADB, GE, VESTAS, etc. The Workshop provided the opportunities for experts, participants to share experiences, discussed and exchanged good practices in promoting wind energy.

OPENING REMARK

Ms. Pham Quynh Mai, Project Overseer, on behalf of the host, the Ministry of Industry and Trade of S.R of Viet Nam made a welcome remark. Given APEC's strong commitments to pursue sustainable development in which highlights the importance of clean and efficient renewable energy, she made it clear how potential and important roles wind energy can play and how meaningful APEC can pioneer and take the leading roles in promoting wind energy for the sake of sustainability, stability and development in the APEC region though there still remain a lot of obstacles and challenges to address.

SESSION 1: OVERVIEW OF WIND ENERGY DEVELOPMENT IN THE APEC REGION

Mr Heymi Bahar, Market Analyst, Renewable Energy Division, International Energy Agency (IEA) helped portrait an overview of wind energy development in the APEC region and the global context, with a focus on market trends and projections to 2018. According to the IEA's speaker, renewable electricity will scale up by 40% from 2012 to 2018.

Onshore wind is increasingly spreading across the world and China, OECD Americas, OECD Europe are taking the leading growth rates. However, other regions also start to accelerate. In the APEC region, it is projected that onshore wind deployment will increase gradually and Canada, China and the USA will be the leading in wind energy growth. Other emerging economies such as Chile, Japan, Korea, New Zealand, Peru, the Philippines Russia, Thailand and Viet Nam, are expected to grow fast in the area. Though growing fast, they still face a lot of challenges namely: availability and high cost of capital, administrative issues, fossil fuel subsidies, and grid integration and costs.

Dr Terry Surles, from the University of Hawaii, USA help participants get a better understanding of "recent US Renewable and anciliary energy services activities – with a focus on wind". In the US, total renewable energy (including hydropower) consumption accounts for 8% of the total energy consumption (2010 Statistics) in which wind accounts for 11%. Though wind turbines in the US were the leading technology installed on the electricity grid in 2012, US still significantly lags in wind penetration percentage, less than 5%. However, it is worth noting that US is currently in favourable conditions to develop wind energy as installation of wind systems continues to grow, turbine prices and installed costs are decreasing with technology advances and, after the repeal of Public Utilities Regulatory Policies Act (PURPA), the development of Power Purchase Agreements that include requirements for maintaining power quality on the grid.

SESSION 2: WIND ENERGY DEVELOPMENT – PERSPECTIVES FROM THE PUBLIC SECTOR

Mr. Nguyen Duc Cuong, Director, Center for Clean and Renewable Energy, Institute of Energy, Viet Nam presented on the development of renewable energy/wind energy in Viet Nam, from the aspect of policy and strategy. Viet Nam's government outlines a master energy plan which focuses on wind energy, biomass and other sources of renewable energy. It is planned to account for 5.6% of total installed capacity by 2020, in which wind energy reaches 1,000 MW, biomass 500 MW and other sources 2,700 MW. By the year 2030, these figures are estimated to rise further to increase the percentage of renewable energy for the purpose of sustainable and stable development. It is projected to account for 9.4% of the total installed capacity, in which wind energy is 6,200 MW, biomass is 2,000 MW and other sources of renewable energy is 5,600 MW. To realize the master plan, Viet Nam's government has launched incentives to promote wind energy development, including incentives for

infrastructure and land use. The wind energy project investors can enjoy exemption and/or reduction of land use rent up to 50%. The Local People's Committees are authorized to provide available land to wind power projects.

Mr. Toru Nagao, Director for Research and Planning Center, New Energy Foundation presented the experiences of Japan in general and it's roles in particular on developing wind energy. New Energy Foundation was established in 1980 in Tokyo, Japan as a public and non-profit organization which is supported by industrial companies, aim to foster and contribute to business industry in New and Renewable Energy.

Japan has launched new energy policy with a zero based thinking, which aim to reduce dependence on nuclear and fossil fuel energy, as well as promote renewable energy (including wind energy) and energy saving. Installed capacity of wind is 2.6GW at April 2013 and rapid capacity increase is expected after introduction of Feed in Tariff in 2012. However, on its way, Japan has faced a lot of challenges in promoting wind energy under severe environmental condition of Japan such as typhoons, turbulent wind induced by complex terrain, lightning strike and earthquakes, etc. Japan has been developing countermeasure technologies against these difficulties over ten years. Outcomes of these developments are "Wind turbine design guide and exposition for structure and support", "Design guide for Typhoon", "Design guide for turbulence", "Design guide for lightning" and so on. Japan is also working to add tropical cyclone and high turbulent wind condition to the international wind turbine design standard. These guides and standards are applicable and useful not only in Japan but also in other APEC region with similar environmental condition to Japan.

Japan is carrying out research and development regarding offshore wind turbine as the national project from 2008. Various type of fixed bottom and floating wind turbines are designed and demonstrated until 2015. A numbers of international cooperation programs on renewable energy including wind energy are carried out.

SESSION 3: WIND ENERGY DEVELOPMENT – PERSPECTIVES FROM THE BUSINESS COMMUNITY

Mr. Eric Pyle, CEO, New Zealand Wind Energy Association presented on how to develop wind sector. It is a combination of comprehensive approaches, namely an industry ecosystem, long term policies, system operator comfortable with wind, tools for managing wind in the

electricity system, wind in the grid, etc. Governments certainly play significant roles by providing timely assistance to help the industry develop, for examples: outlining clear carbon policies, providing long term and stable contracts in wind power projects, establishing renewable certificate schemes, building expertise in understanding wind and weather (by assisting universities, institutes, etc.), training wind experts and technicians.

Mr. Peter Cowling, from GE, presented on GE's work in wind power projects in Viet Nam. Through 20 years of presence in Viet Nam, GE has significantly contributed to the development of renewable energy in Viet Nam in general, wind energy in particular with the success of wind power projects in Bac Lieu, Hai Phong. Through these projects, GE has provided assistance in wind farm layout, grid advice, AEP estimate, funding advice and engineering advice.

The presentation "Towards a sustainable wind energy growth in Viet Nam" by Mr. Giorgio Fortunato, Business Development Manager, Marketing & Business Development, Asia Pacific & China, Vestas Wind Systems focused on wind energy market in Viet Nam. Viet Nam has great potentials in promoting wind energy thanks to abundant wind resources, favorable energy situation (rapid industrialization creating soaring demand for energy while supplies are still challenged), high developer interest. However, in reality, only 3 out of 37 approved projects have been constructed so far as a lot of constraints are still on the way, namely a few: lack of reasonable financing options, ownership monopoly, lack of wind database of the quality needed, limited project feasibility assessment capabilities, weak grid capacity and transmission, poor transport infrastructure, corruption, lack of a PPA legislation that allows end users of electricity to purchase wind power directly from independent power producers through bilateral agreements with wheeling fees to EVN, low FIT (7.8 USD cents/kWh), lack of legal framework for ensuring that wind projects are connected to the EVN grid, which limit foreign investor interest.

SESSION 4: WIND ENERGY DEVELOPMENT – PERSPECTIVES FROM INTERNATIONAL ORGANIZATIONS

Mr. Mark Tribble, Program Chief of Party, USAID Viet Nam Clean Energy Program briefed 3 current wind power projects in Viet Nam, namely (i) Wind Farm in Tuy Phong District, Binh Thuan Province; (ii) Wind-Diesel Hybrid Power Plant Phu Quy Island, Binh Thuan Province; and (iii) Bac Lieu Wind Farm, in Bac Lieu Province. These projects are

strongly supported and financed by international institutions such as JICA (Credit Program for EE & RE Projects); World Bank (Renewable Energy Development Program); KFW (Global Climate Partnership Fund); and European Investment Bank. Institutions from the USA also support these projects such as the EXIMBank, Oversea Private Investment Corporation (OPIC); US Trade and Development Agency (USTDA). Other institutions such as Dragon Capital Group, Indochina Capital, Viet Nam Business Challenge Fund, Climate Technology Initiative Private Financing Advisory Network (CTI-PFAN) also financially contribute to the establishment and operation of these projects. However, wind energy development still faces quite a lot of challenges in the long run. It is believed that it is hard to get funds from banks here as they are still very careful and conservative in giving loans to these kinds of projects. Besides, the current feed-in tariff (FIT) of 7.8 US cent/kWh is low and not attractive enough for investors. It is also worth noting other difficulties in promoting wind energy, for example: lack of reliable wind data, under developed infrastructure, insufficient human resources, costly administrative procedures, high interest rates, lack of long term financing mechanisms, investors' lack of collateral, bankers' weak capacity to evaluate projects and revenue streams, no preferential treatment of renewable energy projects to attract investors and promote wind energy development.

In this session, Mr Mahesh Sugathan, Senior Research Fellow, from International Center for Trade and Sustainable Development (ICTSD) presented on the trade perspectives and policy implications for wind energy in the APEC region. In the context of overriding challenges, sustainable energy scale-up play important roles: (i) climate challenge: Drastic action required to check global warming - private sector will have to drive mitigation action; (ii) Energy-access challenge: Providing low-carbon energy to millions in the developing world unconnected to the grid; and (iii) Energy-security challenge: Need to reduce import dependence on fossil-fuels.

From a job perspective, sustainable energy holds more promise than fossil-fuels in terms of creating more jobs. However, there is a conflict between creating jobs while maintaining low cost.

The investment has dropped because of many reasons including uncertainty in policy (tax etc.). In terms of tariff, it raises a question of what tariff should we apply to the final product? What tariff should we apply to components?

There are also some classification issues that should be considered:

- Wind-powered generating sets (HS 850231) are among the handful of "environmental goods" that can be clearly identified at the HS 6-digit level.

- Wind-related components are important in international trade but difficult to track from the perspective of global trades statistics. However, many national tariff schedules provide for more detailed tariff line descriptions for certain components.

- Wind turbine towers are classified under HS 730820 which also includes towers used for other purposes such as telecommunication towers. United States has introduced a specific tariff line (TL) for turbular towers (HTS 730820.0020) which are mainly wind towers. Although probably still not entirely specific for wind, it provides for a narrower description of towers that may have wind applications.

- US under its 2012 HTS has also introduced new wind-specific 10-digit national tariff lines for wind turbine blades (HTS 841290.9081), AC generators for wind-powered generating sets (HTS 850164.0021) and parts for these generators (HTS 8503.00.9546).

- Together with the HTS code for complete wind turbines, these TLs allow for a reasonably accurate estimate of imports generated by a significant part of the US wind supply chain, representing more than USD 3 billion of imports (i.e. more than 3 times the value of US imports of complete wind turbines alone).

Strengthening Trade: Some policy implications

- At present, capacity additions depend on credible and consistent policies/incentives being in place except in regions with exceptionally good wind-speeds like New Zealand (HIS Energy 2013). As markets mature these could eventually be phased out.

- Harmonized descriptions of wind-turbine components possibly at the Global Level (through World Customs Organization) could facilitate trade.

- Given that wind-industry is less trade-intensive (compared to solar PV) due to weight of components etc, regional opportunities in component

trade, final and intermediates assembly etc could hold promise. Scale created by domestic integration could be used for smaller economies

- Tariff policy should be conductive to eventually creating a competitive, viable domestic industry along segments of the wind-supply chain. Tariffs for example on intermediates and components are high in many economies. LCRs are inconsistent with WTO rules despite domestic policy attractiveness.

- Regional co-ordination among APEC economies to ensure standards and technical regulations as their evolution does not become barriers to trade (including new technology sectors such as offshore turbines).

- Off-shore wind may be a promising sector for further technology co-operation and cost-reduction.

- Trade in services associated with wind (monitoring, installation and operation) could be facilitated and encouraged together with complementary policies (training, skills development etc)

SESSION 5: CASE STUDIES IN WIND ENERGY

"Challenges in Promotion of Wind Energy in Viet Nam" by Mr. Nguyen Tuan Anh, Institute for Industrial Policy and Strategy.

Demand for energy in Viet Nam is projected to increase remarkably in the coming time. It is estimated that by the year 2030, the demand for electricity will increase 7 times. Meanwhile, conventional energy sources are being fast exploited and depleted and no new oil and gas fields are discovered. In that context, the importation from Lao and China is increasing. It appears that so as to ensure energy security, Viet Nam has to find alternatives to reduce its dependence on the importation and conventional energy sources.

It is figured out that Viet Nam has big potentials in developing wind energy compared to other countries in the region.

However, to develop wind energy, Viet Nam still has a lot of difficulties to overcome. Firstly, Viet Nam is not yet able to conduct full research, collection and analysis of wind measurement and data and there is no agency assigned to be responsible for the tasks. At provincial levels, there is a lack of wind plans, which might take a lot of time for legal procedures and cause delay in the process. Secondly, there are no specific

technical standards, equipments, designing or construction in place. Thirdly, due to lack of local experts in wind energy, Viet Nam still has to depend on foreign experts, which is a constraint in the long term if not addressed properly and timely. Fourthly, the electricity price with the feed-in tariff of 7.8 US cents/kWh is very low and can not attract investors, producers in wind power projects while coal and gas are still subsidized. Additionally, it is not easy to access funding or finance assistance in wind energy sector. In terms of legal framework and institutions, though Decision 37 has been issued to pave the way for wind energy development, no further concrete guidance or actions are in place to assist local authorities, investors, producers, etc., in wind sector. The fact that, so far Viet Nam Electricity (EVN) is still the only operator in Viet Nam also discourages many investors in the wind sector.

It is highly recommended that a master development plan for wind energy together with concrete technical standards should be promulgated timely to facilitate the development of wind energy. It is also necessary and important that the government should launch further incentives and assistance for wind energy.

"Technical Criterion for Connecting Wind Power to Viet Nam Power System and Development of Viet Nam Wind Grid Code" by Mr. Vu Quang Dang, Assistant Project Manager, International Copper Association Southeast Asia (ICA)

There has been a considerable progress on the wind energy potential assessment and development of wind resources in Viet Nam of 6,200 MW by 2030. However, the issues relating to technical requirements for their connection to the grid have not been fully addressed. International Copper Association South-East Asia (ICASEA) and Viet Nam Electricity (EVN) have embarked on the wind integration studies for technical manual on interconnection of wind power to Viet Nam power systems, and Viet Nam wind grid code.

This project aims at preparing for the integration of wind power to the country's power system and evolving electricity market structure. The project is divided into 2 phases: (i) Phase 1 focuses on the interconnection of wind power to EVN's power system; and (ii) Phase 2 focuses on the Grid integration studies and Wind grid code.

Until August 2013, Viet Nam has 3 wind farm projects in operation which are Tuy Phong (Binh Thuan province), Phu Quy hybrid system and Bac Lieu wind farm (Bac Lieu province). The Draft National Wind

Power Master Plan has been submitted to Prime Minister for approval. Viet Nam is targeting wind power capacity of 1,000 MW by 2020 (1.5% of total system capacity) and 6,200 MW by 2030 (4.5% of total system capacity). The feed-in-tariff for wind power at 7.8 US cent/kWh while average retail electricity price at 7.5 US cent/kWh.

"Wind Power Development in Taiwan" by Mr. Jin-Sheng Su, Division Director, Bureau of Energy, MOEA, Chinese Taipei. Chinese Taipei has set the goals and strategies specifically to develop wind energy with 450 wind turbines onshore by the end of 2020 and 600 wind turbines offshore by the end of 2030. To do that, onshore, Chinese Taipei will start with economically feasible wind farms, and then move to potential wind farms. Offshore, they will start with technological demonstration, then promote zonal developments (start with the shallow water area and then expand to the deep water area).

Onshore wind development:

Until the end of October, 2013, there are 319 wind turbines (51% by Taipower), reaching 70% of available developments, with accumulative capacity of 632.1 MW. Electricity production in 2012 achieved 1.41 billion kWh (0.7% of total electricity production in Chinese Taipei). Economically feasible wind farms are located along the west coast of Taiwan.

Offshore wind development:

Offshore demonstration incentive program (DIP) was announced in 2012, awarded winners advertised in January, 2013 for Fuhai (Changhua coast), Formosa (Miaoli coast), Taipower (Changhua coast).

Onshore existing regulation: wind turbine installation

In the environmental impact assessment stage, environmental impact assessment (EIA) needs to be done if the straight distance between the center of foundation of wind turbine and the nearest border of building is less than 250 m. In the preparation assessment stage, the safety promise protocol needs to be signed between the households and the developers if households with registration are inside the radius of top height of a wind turbine. In the construction and operation stage, the standard for wind turbine noise control was amended in the standard of noise control by Environmental Protection Administration on August 5, 2013.

Onshore existing regulation: wind turbine safety

To ensure the safety, there are certain standards to be followed: wind turbine safety standard, facility safety standard and foundation safety standard.

Site evaluation

The site needs to be assessed carefully in advance in terms of wind energy and check whether the site is within restrictive areas for national defense and aviation.

Environmental impact assessment

The environmental impact assessment when required by law/regulations needs to be followed in a timing manner to avoid any delays for the project. In terms of regulation, environmental impact assessment method and standards of environmental impact assessment application should be taken into account.

Onshore obstacles

There are a number of difficulties that a wind energy project could face. Firstly, there could be doubt from local residents and environmentalists, Anti-wind turbine group requests that onshore wind turbine setback needs to be regulated. Secondly, local governments can be conservative. Thirdly, the land for wind farm development is in shortage, onshore economically feasible wind farms along the west coast of Taiwan have almost been developed, the rest of wind farms have been suffered from acquiring land. And finally, environmental protection law is more restrict. EIA needs to be done if the straight distance between the center of foundation of wind turbine and the nearest border of building is less than 250 m.

SESSION 6: GROUP BREAK OUT DISCUSSION

1. Recommendations on strategies to promote wind energy development in the APEC region

Participants indentify and analyze the barriers to wind generation in their economies as the following tables:

Economy	**Barriers**
Brunei Darussalam	• Increase the belief that wind can work in Brunei. • Bankable data.

	• Policies that engage the private sector.
China	• Greater price certainty for wind generation. • Grid connection, grid development and develop storage options. • Communication and sharing of knowledge, experience and cooperation to share expertise.
Japan	• Policies that encourage innovation and independent developers, including tariffs and policies that make projects bankable. • Planning frameworks and access to land, including public land. • Grid development. In some parts of the country with good wind resources the grid is not that strong.
Philippines	• Inform all levels of society of the benefits of wind, from politicians to pre-school. • Dependable technical assessments for wind generation. • Policy design and choosing the mix of policies that will work best. For example should a feed in tariff be implemented with a renewable portfolio standard?
Thailand	• Need for good wind data that is acceptable to the industry and is bankable. • A lack of technical experts who have experience in wind farm development • Investment, largely because the two points above are not met. Investors need to have a better understanding of wind, which is difficult given data quality is variable and few people have expertise in wind generation.
USA	• Inconsistent policy, e.g. the production tax credit is reviewed every couple of years creating a boom and bust cycle.
Viet Nam	• Developing an effective price for wind generation and developing effective policies. • Financing. • Logistical challenges such as transporting turbine components.
IEA's perspective	Overall policies are needed that de-risk financing. These policies need to: • Be specific to each economy and match each country's circumstances.

	• Be long term to provide investment certainty. • Set an effective price on wind generation in countries where there is not a wholesale market or where there are significant subsidies for other forms of generation. An independent agency may need to recommend a price.

Based on that, economies self assess how developed they are performing in wind energy development based on a set of criteria:

	Brunei Darussalam	China	Philippines	Chinese Taipei	Thailand	USA	Viet Nam
Technical issues	1	4	2	2	3	4	1
Policy	1	4	4	5	5	5	3
Social acceptance/understanding	1	3	3	3	2	2	3
Environmental regulation	1	3	2	3	2	1	3
Financial	4	4	3	3	4	3	2

5=excellent, 1=poor

The group noted that each economy was at a different stage of development in relation to wind generation. But the economies could be grouped in terms of wind development and wind resources. For example, Brunei, Philippines, Thailand and Viet Nam and had a number of similarities.

Recommendations:

(i) It is recommended to further support wind energy associations (WEAs) as they play supportive and professional roles in launching initiatives in promoting wind energy.
(ii) Regarding trade and investment policy, APEC can encourage trade between member economies in wind sector through governments' policies, preferential incentives, etc.

2. Recommendations on APEC's capacity building

Following the discussion, it is agreed that capacity building activities can be divided into 2 areas: (i) technologies capabilities; and (ii) knowledge accumulation.

It is well agreed that APEC should be the pioneer in promoting renewable energy in general and wind energy in particular. Energy Working Group (EWG) is the focal point, which leads APEC's efforts in promoting efficient and clean energy to ensure energy security for the long term and sustainable development in the region. EGRNET (under EWG), especially concentrates its attempt in promoting renewable energy, hence, is the appropriate one to promote cooperation in wind energy among APEC member economies. These cooperation activities might include, but not limited to:

(i) EGRNET takes the active roles in organizing and coordinating capacity building activities such as sharing experiences, best practices, strategies, public - private partnership (PPP) of economies in promoting wind energy. These activities might also includes exploration on barriers to wind energy development to help member economies to overcome the obstacles;

(ii) Under EGRNET, APEC's capacities building activities also should help raise the awareness of governments in strengthening the recognition of necessity for wind energy and other renewable energy sources;

(iii) Besides, it is practical and helpful that EGRNET provides technical assistance through information sharing, case studies of pilot project experiences, procedures and guidelines for feasibility studies and training programs on technical issues;

(iv) In term of financial perspectives, participants recommend that APEC should help fund feasibility studies for inexperienced countries as this might kick off wind energy in potential economies;

(v) It is also recommended to develop a wind network across APEC using the groupings of similar countries as a basis for the network (the grouping countries can be as outlined above as they share a number of similarities; and the theme for the network meetings/workshop would focus

on overcoming barriers in a particular group of economies each time).