Asia-Pacific
Economic Cooperation

APEC Workshop on
Best Practices on Financing Renewable Energy

Ha Noi, Viet Nam
4 – 5 June 2013

Summary Report and Presentations

APEC Energy Working Group

June 2013

APEC Project EWG 21/2012A

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APEC Workshop on Best Practices on Financing Renewable Energy

Ha Noi, Viet Nam

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Summary Report

I. Introduction

On 4-5 June 2013, the APEC Workshop on Best Practices on Financing Renewable Energy, initiated by Viet Nam and co-sponsored by Canada, Indonesia and the United States, was held in Ha Noi, Viet Nam. The 17 speakers and 68 other participants in the workshop included representatives from eight APEC member economies (China, Indonesia, Japan, Malaysia, Chinese Taipei, Thailand, USA, Viet Nam) and three international organizations (OECD – the Organisation for Economic Co-operation and Development, UNEP – the United Nations Environment Programme, and the International Copper Association), as well as from the business community, industry and academia.

The Workshop was targeted to analyze the current situation, statistics and experiences with financing renewable energy in the APEC region. It aimed also at presenting best practices and encouraging an exchange of views among policy-makers, regulators, academic and business representatives on financing renewable energy. Last but not least, the Workshop provided an opportunity to develop recommendations for more effective financing of renewable energy in the APEC region.

II. Background

This project was designed to support the Leaders' and Ministers' statements in 2008 that "access to adequate, reliable, clean and affordable energy resources is vital to sustaining economic prosperity in the region." At the 4th APEC Energy Ministerial Meeting in 2012, Ministers reiterated the need to work to "develop renewable energy sources" to increase energy security, and contribute to APEC's "economic development and reduce emissions of carbon dioxide and other pollutants into the atmosphere."

In addition, this project directly supported the Action Plan in the APEC Leaders' Growth Strategy (2010) with regard to renewable energy development and market-based financing. It directly responded to instructions from APEC Leaders and Ministers in 2012 to ensure energy efficiency as well as free and open energy-trade

markets and transparent investment regimes to advance regional energy security, economic growth and the prosperity of the APEC region.

Themes covered during the two-day event included: *(i) Overview of financing renewable energy in APEC: History and achievements; (ii) Different perspectives on financing renewable energy in APEC; (iii) Best practices in creating the environment to facilitate financing for renewable energy projects in APEC economies; (iv) Public – private partnership in financing renewable energy; (v) Case studies: best practices in financing for renewable energy projects in APEC economies; and (vi) Recommendations for future activities.*

III. Discussion

Outcomes

The APEC Workshop on Best Practices on Financing Renewable Energy included 2 days for presentations and discussions on renewable energy finance and potential future activities of APEC relating to this topic. The last session (recommendations for future activities) was overwhelmed with enthusiasm and active discussions of all speakers and participants who all had an opportunity to share what they can take away from the Workshop as well as to suggest potential APEC activities related to renewable-energy financing. Overall, the Workshop achieved its main objectives as described in the project proposal in presenting best practices and providing a forum for the exchange of views among policy-makers, regulators, academic and business representatives on financing renewable energy. Moreover, all participants considered this as a valuable chance for networking among experts in the field of financing renewable energy within and outside the APEC region.

Key Issues Discussed

Opening remarks

In his opening remarks, **Mr Luong Hoang Thai, Viet Nam's Senior Official to APEC**, stressed the importance of the Workshop for APEC developing economies – including Viet Nam – where renewable energy is a relatively new industry and makes only a modest contribution to their total energy output. He reiterated that most of APEC developing economies share the same charactistic such as insufficient infrastructure and limited resources, especially financial resources. This, in turn, is one of the reasons for the lack of practical experiences and expertise of APEC developing economies in financing renewable energy, especially given the fact that renewable-energy projects require huge financial and human resources. He expressed hope that the information-rich presentations of speakers and active discussion among Workshop participants would offer a valuable opportunity for policy makers, academic scholars, businesses and

international finance agencies to discuss openly and fruitfully renewable-energy financing, and to suggest appropriate follow-up APEC activities. He expected also that APEC economies would have an opportunity to enhance their experiences and capacities in future renewable-energy financing activities.

Workshop's sessions

Experts provided presentations on the following topics:

1/ To introduce the history and achievements in renewable-energy financing in APEC, *Dr Cary Bloyd (Senior Staff Scientist, Electricity Infrastructure and Buildings Division, Pacific Northwest National Laboratory, USA)* reviewed activities of the APEC Expert Group on New and Renewable Energy Technologies (EGNRET). His comprehensive presentation included the following points: introduction to the APEC Energy Working Group; APEC Expert Group on New and Renewable Energy Technologies (EGNRET); EGNRET finance activities; EGNRET focus for 2013. Since 1998, it is noticeable that there have been several renewable-energy financing activities under the EGNRET, such as *(i) Guidebook for Financing New and Renewable Energy Projects (1998), (ii) APEC 21st Century Renewable Energy Development Initiative VIII): Financial Roadmap for the APEC Region (2003), (iii) Development of Renewable and Energy Efficiency (Small Scale Projects) Financing Best Practices and Guidelines for APEC Region Capital Market Development (2005), (iv) APEC 21st Century Renewable Energy Development Initiative (Collaborative V III) Local Banks Training Program for Financing Energy Efficiency and Renewable Energy Projects (2006), (v) APEC 21st Century Renewable Energy Development Initiative (Collaborative V III) Information Sharing on Financing Public Sector Energy Efficiency and Renewable Energy Projects (2006), (vi) APEC 21st Century Renewable Energy Development Initiative (Collaborative VIII): Workshop on Recent Advances in Utility Based Financial Mechanisms that Support Renewable Energy and Energy Efficiency (2007), etc.*

2/ Speakers from public, private, and multilateral sectors and international finance agencies provided various presentations during Session 2, "Perspectives in Financing Renewable Energy in APEC":

- **Mr Nguyen Duc Cuong (Director, Center for Clean and Renewable Energy, Institute of Energy, Viet Nam)** shared the experiences from the public sector perspective. His presentation was divided into 5 parts: *overview; excellent fundament for renewable energy development; public finance for renewable energy: current activities; key challenges; summary and conclusions.* He highlighted that Viet Nam has huge potentials in developing renewable energy due to its diversified resources of small

hydro, biomass, biogas, solar energy, wind energy, geothermal energy, solid waste, and ocean energy. Mr Nguyen Duc Cuong insisted that Viet Nam intended to increase the share of renewable energy in its total energy output, to 4.5 per cent by 2020 and 6.5 per cent by 2030. He mentioned that Viet Nam prioritized off-grid projects in its electrification program in remote mountainous areas, and is favoring renewable energy development in areas where their cost is lower than producing power with diesel generators or extending the national power grid. It is also important to ensure that renewable-energy development supports the national goals of improving social security, alleviating poverty, protecting the environment, and contributing to energy security and sustainable development. In conclusion, Mr Nguyen Duc Cuong reiterated that the Government of Viet Nam has an interest in renewable energy development due to its rapidly increasing power demand (which is part of sustainable socio-economic development) and has recently shown its commitment to promote renewable-energy development through several incentives (taxation incentives, feed-in tariff, land use fee, environmental fee, etc.). However, these incentives are still not strong enough to attract investors.

- **Mr Ronald Steenblik, Senior Trade Policy Analyst, OECD Trade and Agriculture Directorate** approached the issue from the views of an international organisation. In an in-depth presentation, Mr Steenblik noted that investment in renewable energy could refer to manufacturing (of technologies), to services, or to the generation of electric power from renewable energy. He also stressed the kinds of conditions that are likely to make a country attractive to investment in renewable energy by institutional investors: *(i) Policy stability, which provides investors with clear and long-term policy frameworks; (ii) Support for financial structures, which serves to create steady and predictable cash-flows and mitigate various risks; (iii) Better governance and education of institutional investors, to enable them to understand the different investments channels available across the capital structure and build the necessary capabilities to manage the risks associated with these investments; and (iv) Enhanced data collection on green infrastructure investments and their historical performance, and better standardization of the information collected*. A few simple but true lessons are summarized from his presentation: There are many places to invest in renewable energy; First things first: assess local power markets (looking for barriers to remove), international component markets, and policies towards investment; Get prices, and pricing, right; Give investors reason to have confidence; Don’t forget the important role of renewable-energy-related services; Avoid domestic-content requirements.

- **Ms Anja von Moltke, Head of Trade, Policy and Planning Unit, Economics and Trade Branch, Division of Technology, Industry and Economics, United Nations Environment Programme** highlighted 4 main points in her presentations: *(i) Why invest in renewable energy; (ii) Renewable energy financing: Key concepts and status quo; (iii) UNEP work on renewable energy financing; (iv) Financing renewable energies in Viet Nam.* According to statistics published in UNEP's *Green Economy Report* (GER, 2011), "an average annual investment of approximately US$ 327 billion over the next 40 years in power generation could raise the share of renewable energy in global electricity generation to 45 per cent by 2050, compared with 24 per cent under BAU". Ms Anja von Moltke explained 3 golden rules to mobilizing private finance, including: *Create a level playing field for renewable energy (subsidies, carbon tax); allow for easy market access (for example: through market liberalization); mitigate the investment risk (politically, regulatory) – through consistent and predictable rules*. She also introduced UNEP's project work in Viet Nam, such as the finance for access to clean energy technologies (FACET) project, facilitating implementation and readiness for mitigation (FIRM), and technology needs assessment (TNA).

- **Ms Kristin Paulson (Senior Director, ASEAN Government Affairs and Policy, General Electric, USA)** made a presentation on "Renewable Energy Financing – Best Practices from a Private Sector Perspective". She briefed the attendees on GE's renewable portfolio, which includes wind and solar power and associated services. Ms Paulson stated that renewable energy is expected to provide a much larger percentage of the total energy mix in the future; however, barriers to the financing of renewable energy remain. Those are: *(i) Awareness barriers to renewable energy financing and risk; (ii) Political barriers, associated with regulatory and policy issues and governmental leadership; (iii) Analytical barriers, relating to the quality and availability of information necessary for prudent policy planning; and (iv) Lack of financial and legal frameworks*. In the views of Ms Paulson, a multifaceted approach is needed in financing renewable energy: the role of export credit agencies (which reduce risks for developers, where gaps exist in private-sector financing), the role of multilateral institutions (finance pilots and projects in developing countries using new technologies), the role of private-sector lending institutions (to complement export credit agencies and multilateral institutions in financing) and the role of Governments (to provide a stable policy environment for renewable energy). She then mentioned as examples two interesting projects: the Bac Lieu II Wind Energy project in Viet Nam, and the Salkhit Wind Energy project in Mongolia. Concluding, Ms Paulson

summarized critical points needed to assure success in financing renewable energy, inter alia: stability and clear national strategy and policies, incentives for renewable technology and energy, efficiency improvements, removal of trade and investment barriers, funding for innovation and capacity building, and empowerment of local and regional governments.

- **The Honorable Director: Ms Patricia M. Loui (Member, Board of Directors, Export – Import Bank of the United States)** highlighted that worldwide investments in clean energy went up by 5 times from 2004 to 2012, and reached USD 269 billion in 2012. It is expected that through 2020 the average growth rate of worldwide investment will be from 10 to 18 per cent per year. Some two-thirds of energy demand came from [is coming from?] the Asia-Pacific region. Ms Loui mentioned that Eximbank financing of renewable energy to date is USD 1.4 billion. A typical renewable energy project of Eximbank in Viet Nam is the Bac Lieu II Wind Energy project, with terms of up to 18 years, up to 30 percent local cost support, capitalization of interest and low fixed rates.

- **Ms Julia Brickell (Head, Hong Kong Office, Regional Climate Business Anchor, International Finance Corporation)** emphasized that renewable-energy investments are driving the IFC's investment growth. Statistics show that renewable energy investments of USD 1 billion in 2012, a 3.7 times increase compared with that of 2007. Ms Brickell revealed that over half of the IFC's global power sector exposure is now in renewable energy. In addition, she stated that IFC has a strong and differing role in supporting each renewable technology, for example, hydro-electricity, biomass, and wind, solar, and geothermal energy. Ms Brickell stressed a few factors for successful private sector market development and participation, such as: *a renewable resource, government will, commercial and financial drivers, and a private-sector value chain.*

3/ In the Session on "Best Practices in Creating the Environment to Facilitate Financing for Renewable Energy Projects in APEC Economies", **Dr Cary Bloyd (USA)** presented on **"Financial Incentives for Promoting New and Renewable Energy in the U.S."** He reiterated that the United States has a wide range of financial mechanisms that support electric-utility-specific renewable-energy systems at both the federal and state levels. These include tax credits, renewable energy credits, renewable energy portfolio standards, net metering and feed-in tariffs, and power-purchase- agreements. Statistics show that 29 States, Washington DC and 2 territories have renewable portfolio standards; 15 States, Washington DC and Puerto Rico have public benefits funds; 38 States, Washington DC and Puerto Rico offer property-tax incentives for renewables; 28 States and Puerto Rico offer sales tax incentives for renewables; 22 States and 2

territories offer grant programs for renewables; 43 States, Washington DC and 4 territories have adopted a net metering policy; at least 22 States, Washington DC and Puerto Rico authorize or allow 3rd-party solar PV power purchase agreements. In conclusion, Dr Bloyd pointed out that the U.S. is developing a number of innovative business models, including Power Purchase Agreements, installation aggregation, and "solar options" on new home construction.

4/ Speakers from the OECD and the United States provided 2 presentations on the topic of "Public – Private Partnership in Financing Renewable Energy":

- **Mr Ronald Steenblik (OECD)** gave an overview on the best practices on public – private partnership in financing renewable energy, including: *(1) Establish a well-informed champion who can play a critical role in minimizing misperceptions about the value to the public of an effectively developed PPP; (2) Create a statutory foundation for the implementation of each partnership; (3) Create a dedicated team for PPP projects or programs; (4) A PPP contract should include a detailed description of the responsibilities, risks and benefits of both the public and private partners; (5) Identify a revenue stream sufficient to retire the investment and provide an acceptable rate of return over the term of the partnership; (6) Ensure there is stakeholder support; (7) Pick your partner carefully***.** Mr Steenblik added that there are several policy issues to consider regarding public–private partnerships in financing renewable energy: investment policy, investment promotion and facilitation, competition policy, financial market policy and trade issues, public governance and regional co-operation, making and implementing the choice between public, private and mixed provision of clean energy.

- **Mr John F. Pierce (Partner, DLA Piper LLP, USA)** shared interesting views on public–private partnership in financing renewable energy. He noted that PPPs are essential in financing renewable energy due to shortcomings in public-sector investments, creating foundations for economic growth, new financing structures and improved quality of services. Mr Pierce briefly introduced two typical contractual models in financing renewable energy, namely build-own-operate-transfer (BOOT) and build-operate-transfer (BOT). Furthermore, he stressed that a typical contract will provide: *Descriptions of the service(s) to be provided; expected recovery by operator; tariffs and other financial arrangements; the guarantees going both ways; contract termination term and damages; and insurance coverages, among other things.*

5/ During the 5th Session on "Case studies: Best Practices in Financing Renewable Energy in APEC Economies", there were five speakers — from Japan, Thailand,

China and Indonesia — sharing best practices and the experiences of respective APEC economies:

- **Mr Ryota Sakakibara (Deputy General Manager, Mitsubishi Corporation, Japan)** outlined key factors on investing in renewable energy IPP business from the perspective of the equity owner. Those are: *Strong leadership of Government, long term power purchase agreement supported by a feed-in tariff, tax incentives, transmission capacity, and efficient environmental assess*. He clarified his points by giving typical examples in Thailand, Indonesia, Malaysia and the Philippines (leadership of Government, tax incentives). To give an example of a project in south-east Asia that involved best practice, Mr Sakakibara highlighted the NED project in Thailand. In his conclusion, Mr Sakakibara stressed that it is crucial to have a clear plan on renewable energy, there should be long term and stable earnings from the Power Purchase Agreements and a high-rated feed-in tariffs. What is more, renewable-energy projects should be exempted from corporate income tax, and they should be guaranteed access to the transmission line. Last but not least, the cost of conducting an environmental-impact assessment should be lowered.

- **Ms. Sukunya Phokhakul (Senior Vice President, Electricity Generating Public Company Limited, Thailand)** gave a presentation on **the Lopburi Solar Power Project (Thailand).** She highlighted on a non-recourse project financing structure, which is consisted of long term debt from ADB and Thai Commercial Banks (accounting for 70% of total project costs) and equity from DGA, EGCO, and CLP (accounting for 30% of total project costs). This project is actually the largest solar farm in Thailand and Southeast Asia, with the conduct of environmental impact assessment and on-site Green Education center for general public. The project is a valued model for renewable energy project finance in the Thailand and the region. Ms Phokhakul stressed 4 key factors to assure the success in financing renewable energy: (i) *strong government support ie. policy, adder and feed-in tariff, tax incentive, (ii) sponsor strength ie. financial capability, experience in power generation business and familiarity with local market , (iii) sound project structure eg. bankable PPA, turn key EPC contract, reliable supplier,etc. and (iv) public acceptance*.

- **Mr Lin Wan (Managing Director, Beijing Energy Innovation Ltd, China)** gave an overview on China's recent renewable-energy developments, practices on financing renewable **e**nergy and proposals for cooperation. He explained the power source structure in China in 2011 and the forecast for 2020. He also mentioned three waves of renewable-energy development, driven by fiscal subsidies and other forms of government

support, the attainment of grid parity and urbanization, respectively. In addition, he explained the challenges and opportunities facing the renewable-energy sector in China. He concluded his presentation by describing briefly a cooperation proposal (project pool, project evaluation scheme and cooperation model).

- **Mr Koichiro Oshima (Head of Project Financing Department, Tokyo-Mitsubishi Bank, Japan)** *covered three main topics: renewable energy in Japan generally, wind power projects, and PV projects. Japan plans to increase its share of renewable energy in total energy output from 10.8 per cent in 2011 to 25–35 per cent by 2030. Japan has a feed-in-tariff schemes to support renewables. Furthermore, Mr Oshima prese***n**ted case studies on wind projects in Fukushima (Japan), an offshore wind project in the UK, and the Parque Eolico El Arrayan wind-power project in Chile. In terms of PV projects, Mr Oshima spoke about the major risks for financing, including sponsors, the level of feed-in-tariffs or offtakers, the amount of solar radiation, and the performance of the PV panel. In conclusion, he emphasized several case studies in PV, such as PV projects in Kumamoto (Japan), in Toronto (Canada), and in California (USA).

- **Mr Helmi Priko Nainggolan (Head of Bioenergy Business Monitoring, Ministry of Energy and Mineral Resources, Indonesia)** shared information on Indonesia's energy policy, including energy conservation and diversification. He identified two challenges in the development of new and renewable energy in Indonesia, which are: relatively higher production costs and the lack of a smart financial mechanism and incentive. In addition, Mr Nainggolan described what policies the Government of Indonesia is using to develop new and renewable energy, in particular, in geothermal energy, bioenergy and hydro-electric, solar and wind energy. In summation he noted that *Indonesia has a relatively huge potential for renewable energy, therefore, Indonesia is the right place to invest in renewable energy due to its particularly high growth in demand for energy (both electricity and other forms of energy); The more renewable energy is developed, the more secure the energy supply, and the greater the potential for reducing greenhouse gas emissions; Government will continue to update its regulations to attract foreign investment.*

IV/ Conclusion and Recommendations

In the Workshop's closing remarks, Mrs. Pham Quynh Mai, Deputy Director General, Ministry of Industry and Trade of Viet Nam, congratulated the speakers and participants on a very successful and productive Workshop. She thanked the organizers, co-sponsors and distinguished speakers and participants from

government, academic, business, international finance agencies and international organizations, for sharing their valuable experiences and invaluable insights.

1/ Workshop's speakers, moderators and participants shared their achievements after attending the Workshop, including but not limited to: *(i) Best practices in financing renewable energy, although there is no one-size-fit-all; (ii) Comprehensive financial infrastructure needs (for tapping funds); (iii) The important role of Government and a good regulatory framework in developing suitable, strong, committed, supporting policy, incentives for renewable energy (private sector, renewable energy users); (iv) Well presented renewable energy projects and models, typical for future renewable energy activities; (v) The importance of, and best practices in, cooperating with banks and international finance agencies; (vi) The wide varieties of forms of financing renewable energy.* Participants also said that the Workshop had provided a great networking opportunity and stressed that all parties (i.e., those working on policy, technology, finance) need to involved in renewable-energy projects.

2/ The Workshop concluded with a discussion of possible future activities and continuing work to improve the effectiveness of renewable-energy financing in APEC. First of all, it is is necessary to continue the work of EGNRET experts here (at the Workshop) and for APEC to keep listing and to share up-to-date information on successful renewable-energy projects. An interesting recommendation was to establish a renewable-energy fund in Viet Nam and perhaps even APEC-wide. Some suggested that the Workshop would have benefitted from hearing from a wider range of perspectives. A suggestion to assure the sustainability of the project is to report its outcomes to APEC Ministers at one of their future meetings (e.g., the APEC Ministerial meeting in Bali, Indonesia in October 2013).

3/ Follow-up activities that APEC can consider, include:

- Database sharing resources;
- Set up networking on renewable energy (technical, providers, governments, banks, agencies, etc);
- Developing a mechanism or guidance for financing renewable energy in APEC economies;
- Conducting case studies on good practices and successful models.

4/ Follow-up Workshop(s) should consider the following topics:

- Working sessions with banks and international agencies;

- Awareness on impacts of policies on renewable energy development;
- Removal of fossil fuel subsidies;
- A strong need to continue this activity in the future as energy markets change quickly;
- Sharing experiences and engaging in capacity building for local financial institutions on renewable energy;
- Supporting capacity building to train future workforces (new information on renewable energy for students), or a short course for policy makers in renewable energy (e.g more focused training on finance).

Annex: Workshop Presentations

APEC Committee on Trade and Investment
June 4th, 2013
Hanoi

Renewable Energy Financing – Best practices from a private sector perspective

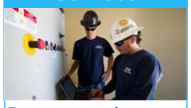
Kristin Paulson, Senior Director
ASEAN Government Affairs & Policy

imagination at work

GE’s Renewable Energy Businesses

imagination at work

GE’s renewable portfolio

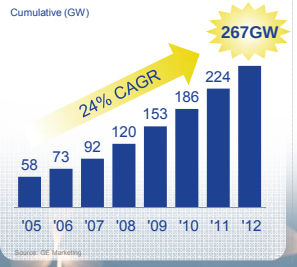
Wind	Solar	Services
		
1.5 MW series **1.7-100** World’s most efficient turbine **2.5 MW series** **2.85-103** World’s largest wind farms **2.5-120** a “brilliant” machine	**Solar power plant** **Integrated solution** for challenging grids **Distributed generation** offering **Power electronics** 1MW Inverter 20,000 running in wind	**Remote operations, O&M** Advanced diagnostics, technical support, & parts management **Performance upgrades** Enhancing installed fleet value **Availability** Best running fleet 98%+

Delivering the lowest cost of energy solutions with the best products and services

Wind going mainstream

Global wind installations

Cumulative (GW)



Source: GE Marketing

Cool wind stats

42% of ‘12 U.S. … largest PG tech installs

60GW in U.S. … **~52** coal plants

8 states **~10%** wind generation

6 countries **10%+** wind generation

Record year for wind in **15** countries

~800TWh … ~4% global penetration

Sources: AWEA YE ‘11 report, GWEC & REN21

GE’s global installed wind fleet

USA
(~15,000 units/~23,000 MW)

Canada
(~1,200 units/~1,800 MW)

Brazil
(~280 units/~450 MW)

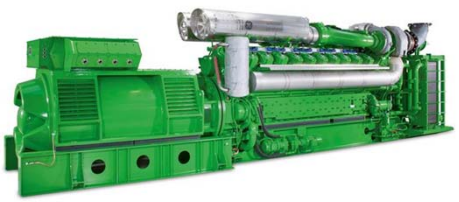
Europe +Turkey – 16 Countries
(~3,500 units/~5,900 MW)

China
(~1,000 units/~1,500 MW)

Japan
(225 units/400 MW)

~21,000 WTGs, ~32GW+ installed … 23 countries

GE Gas Engines



imagination at work

Waste To Power : Cassava processing effluent waste, Sumatra

- 1st successful, fully operational facility in Sumatra
- Utilizing anaerobic digester and bioscrubber
- Technology to produce the biogas
- Intake of 800 tonnes per day cassava root
- 2,500 m3/day waste water
- 100,000 m3 lagoon
- Producing 3 MW power with Jenbacher gas engines
- Save ~ 8,000 liters of diesel fuel per day
- Eligible for carbon credits
- Improved effluent waste treatment

Renewable Energy Is Expected to be a Much Larger Percentage of Total Energy Mix in Future

Reasons to think the projections will be higher than expected:

- global public support for renewable energy
- sharp cost reductions achieved by especially the solar and wind industries
- increasing rates of energy efficiency

Renewable Energy Financing

Barriers to RE Financing

- Awareness barriers to renewable energy financing and risk
- *Political barriers,* associated with regulatory and policy issues and governmental leadership;
- *Analytical barriers,* relating to the quality and availability of information necessary for prudent policy planning
- *Lack of financial and legal frameworks*

Renewable Policy … Global Lessons

No “one size fits all”
variety of workable approaches

- Feed-In Tariffs
- Production Tax Credits
- Green Certificates/RPS

Elements of effective Policy

- Rewards performance
- Supports project viability
- One-Stop-Shop Land Permitting
- Technology-specific (Wind, Solar…)
- Long-term & stable commitment
- Energy/climate strategy link

Multifaceted approach is needed

- Role of ECAs – ECAs reduce risks for developers where gaps exist in private sector financing.
  - long repayment terms make RE projects competitive with conventional energy alternatives
  - co-financing reflects the reality that projects are globally sourced
- Role of Multilateral Institutions – finance pilots and projects in developing countries using new technologies
  - create a track record for such technologies to attract financing from the private sector.
  - can work with ECAs on co-financing opportunities
- Role of Private sector lending institutions – complements ECAs and Multilateral Institutions in financing,
  - enable risk diversification to deeper pool of investors from banks to private sector insurers to infrastructure funds and other capital market players
- Role of Governments – stable renewable policy environment

Policy Drivers

To encourage cleaner, smarter, energy technology, we need four things:

•First, domestic markets that spur investment and job creation.

•Second, stable government policies that include targets and incentives to use new energy technologies and deploy development resources so investors can expect a fair return.

•Third, financing policies that will appropriately allocate risks for developers and all stakeholders including state guarantees in frontier markets.

•Fourth, free and open markets.

Best Practices Examples

imagination at work

Vietnam Wind Energy – Bac Lieu II

Market dynamics

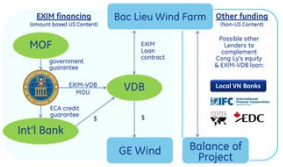
- Theoretical: 500GW *(WB source)*
- Accessible: 100GW
- Economical: 10GW
- Optimal efficiency: 1.8 – 2.3 MW/unit
- 80% private developers
- Feed-in-tariff negotiated by each IPP

Action plan

- Active in maping developer needs and government objectives
- Offer product fit + project financing + project development support:
  - 1.6MW WTG and US EXIM financing via VDB
  - Partnership with consultants & contractors)

Best Practices

- High engagement level by the government
  - availability/approval for land
  - appropriate tariff & tenor
  - state support through VDB
- US EXIM was brought in early
- Enabled dialogue with international banks
- Technical and engineering support to developer new to wind projects
- Closely working with EPC/other suppliers



imagination at work

Mongolia Wind Energy – Salkhit

Market dynamics

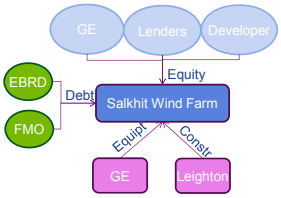
- Mongolia's installed capacity is ~800MW
- Not enough capacity to meet demand
- Imports electricity from Russia during peak periods (capacity of 70MW)
- Electricity demand expected to double in the next 15 years mainly due to mining
- Salkhit 1st IPP and PF wind farm in market

Current Update

- Go live in early Fall 2013
- Project Finance Magazine : Asia Deal of the Year for Renewables
- Using model to further power development in Mongolia with new government

Best Practices

- y investment committed by GE, developer & lenders for development
- EBRD & FMO engaged early on senior debt
- Encompassed transmission upgrades in scope of work to reduce bottleneck
- On site project manager with EPC to ensure smooth operations and issue management
- Closely working with EPC/other suppliers



imagination at work

To succeed we need

Stability and clear national strategy and policies

Incentives for renewable technology and energy Efficiency improvements

Removal of trade and investment barriers

Funding for innovation and capacity building

Empowerment of local and regional governments

imagination at work

APEC Workshop on Best Practices on Financing Renewable Energy

China’s Practices on Financing Renewable Energy

Mr. Lin WAN

Fortuna Hotel, Viet Nam, June 4–5, 2013

Key Points

- Renewable Energy at different stage (Hydro, Wind, PV)
- New Shining Star: PV
- Challenges:
  - PV Industry, from Manufacturing, Construction, Maintenance, etc
  - Environment, Climate Change
  - Business Model & Financing Model
- Expectations:
  - Urban Virtual Power Plant (Distributed) & VLPV
  - International Alliance & Cluster
  - PV IPO in Singapore ,Hong Kong, USA or other stock market

Content

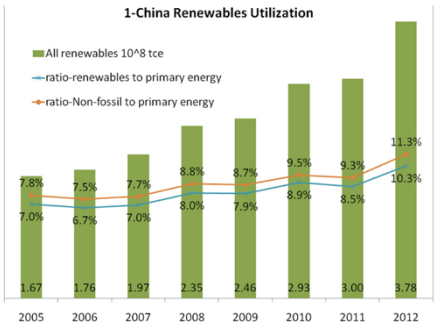
Power Source Structure in China, 2011

2011年电力装机和发电量 Power Source Structure in 2011				
类 型 Type	装机容量（GW） Capacity		发电量（TWh）Generation	
	容 量	比例	发电量	比例
	（GW）	（%）	（TWh）	（%）
煤 电 Coal	765.46	72.5	3897.5	82.54
水 电 Hydro	230.51	21.83	662.6	14.03
核电等 Nuclear etc	15.65	1.48	87.4	1.85
风电 Wind	42	3.98	73.2	1.55
光伏 PV	2.14	0.2	1	0.02
合 计 Total	1055.76	100.00	4721.7	100.0

Power Source Structure in China, 2020

2020年电力装机和发电量 Power Structure by 2020				
类 型 Type	装机容量 Capacity （GW）		发电量 Generation （TWh）	
	容 量	比例	发电量	比例
	（GW）	（%）	（TWh）	（%）
煤 电 Coal	1170	60.47	6100	72.27
水 电 Hydro	360	18.6	1200	14.22
核 电等 Nuclear etc	130	6.71	590	6.99
风电 Wind	180	9.3	360	4.27
太阳能 PV	50.00	2.58	75	0.89
其它 Others	45	2.33	115	1.36
合 计 Total	1935	100	8440	100

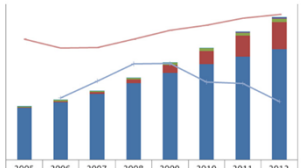
China RE Utilization



（from CNREC website: http://www.cnrec.org.cn/cbw/zh/2013-03-02-370.html ）

China RE Installed Capacity

2-China Renewables installed Capacity 10^7 Watt

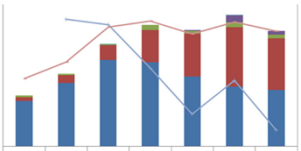


	2005	2006	2007	2008	2009	2010	2011	2012
Geothermal & Ocean	2.5	2.5	2.5	2.81	2.81	2.81	3.02	3.02
Solar on-grid	0	0	0	0	3	26	221.9	328
Biomass	200	250	300	327	460	550	700	800
Wind on-grid	106	207	420	839	1760	2958	4623	6083
Hydropower	11739	13029	14823	17260	19629	21606	23298	24890
Total	12048	13489	15546	18429	21855	25143	28846	32104
growth rate-installed Capacity		12%	15%	19%	19%	15%	15%	11%
ratio of renewables to total installed capacity	23%	22%	22%	23%	25%	26%	27%	28%

（from CNREC website: http://www.cnrec.org.cn/cbw/zh/2013-03-02-370.html ）

China RE Annual Installed Capacity

3-China Renewables Annual Installed Capacity 10^7 Watt

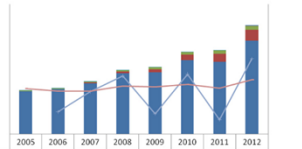


	2006	2007	2008	2009	2010	2011	2012
Geothermal & Ocean	0	0	0.31	0	0	0.21	0
Solar on-grid	0	0	0	0	23	196	106
Biomass	50	50	27	133	90	150	100
Wind on-grid	101	213	419	921	1198	1665	1460
Hydropower	1290	1794	2437	2369	1977	1692	1592
Total	1441	2057	2883	3426	3288	3703	3258
growth rate-Annual Installed Capacity		43%	40%	19%	-4%	13%	-12%
ratio of renewables to total annual installed capacity	14%	22%	39%	42%	36%	41%	37%

（from CNREC website: http://www.cnrec.org.cn/cbw/zh/2013-03-02-370.html ）

China RE Power Generation

4-China Renewables Power Genaration 10^11 Watthour



	2005	2006	2007	2008	2009	2010	2011	2012
Geothermal & Ocean	1	1	1	1	1	1	1	1
Solar on-grid	0	0	0	0	0	1	7	35
Biomass	52	70	97	147	207	248	315	380
Wind on-grid	16	28	57	131	276	494	741	1004
Hydropower	3964	4148	4714	5655	5717	6867	6681	8641
Total	4033	4247	4869	5934	6201	7611	7745	10061
growth rate-Renewables Power Genaration		5.3%	14.7%	21.9%	4.5%	22.7%	1.8%	29.9%
ratio of renewables to total power generation	16.1%	14.9%	14.9%	17.2%	16.8%	18.0%	16.4%	20.2%

（from CNREC website: http://www.cnrec.org.cn/cbw/zh/2013-03-02-370.html ）

First Wave of RE Development

- Pushed by global fiscal subsidy and support
- Leading role: Manufacture, especially PV Module
- Main character and achievement
  - Large Scale
  - Lower Cost
  - Fast Speed

Second Wave of RE

- Pushed by: Grid Parity
- Leading Role: System Solution provider, Developer
- Five Characters
  - Innovation of Application
  - Quality & Risk Management, Evaluation System
  - Insurance: Yield Index & Revenue Insurance
  - Investment: Professional, Long-term Investor
  - Second hand market and Quit Scheme

Third Wave of RE

- Pushed by: urbanization
- 100 Low Carbon Model Town
- Risk of Carbon Tsunami, Global Carbon Taxation could bring the third wave of PV development

Opportunity & Challenge in China

- Opportunity
  - Resources
  - Laboratory
  - Market
- Challenge
  - Technology: Reliability of PV System
  - Economy: Safety, Profitability, Liquidity of PV Investment
  - Social: Mature Industry?

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Possible Risk & Casualty (PV)

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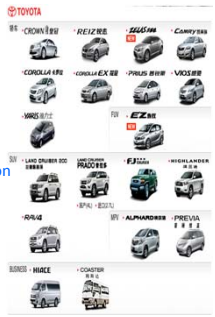
Learn from other Industry

- Who shall we learn from
  - Real Estate
  - Automobile
  - Clean Development Mechanism
- What shall we learn
  - Mature Industry & Mature Market
  - Risk Management, Technology & Innovation
  - Financing, Insurance, Marketing & Service



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2. Practices on Financing RE

- IPO
- Bank Loans
- Sale-Leaseback
- Securitization
- Other solutions

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IPO

- China Longyuan Power Group Corporation Limited(00916.HK)
- Design, development, construction, management and operation of wind farms in China
- Selling of electricity to the local grid companies
- 17.5 Billion HK$ in 2009

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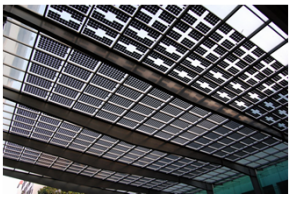
Bank Loans

- Project Financing
- Corporate Financing
- Loan on pledge
- Challenge:
  - Efficient pledge
  - How to evaluate the RE assets



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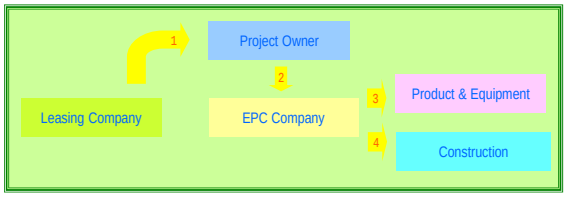
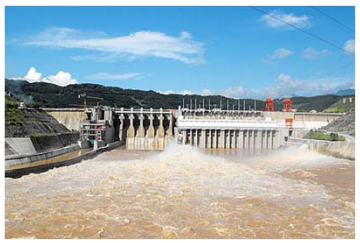
Sale-Leaseback (PV power plant)



- 1: Sale-Leaseback Contract
- 2: Service Contract
- 3: Purchase Contract
- 4: Construction Contract

Securitization

- May 2006
- Lan Cang Jiang Hydro Power Plant
- Shenzhen Stock Exchange
- 2 Billion RMB, on pledge of 38 months electricity revenue



3. Cooperation Proposal

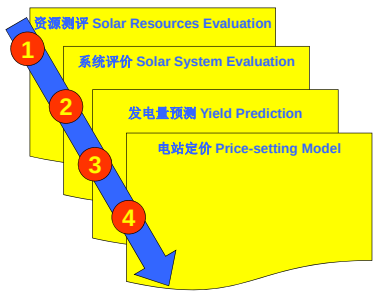
1. Project Pool
2. Project Evaluation Scheme
3. Cooperation Model

3.1 Project Pool

- Renewable Energy Project Pool
- Low Carbon Model Town (LCMT)
- Low Carbon Building
- Low Carbon Transportation

3.2 Project Evaluation Scheme

- KPI package
- Quantification
- Cooperation
- Build-up & Share together



3.3 Cooperation Model

- Real Estate Investment Fund
- Long term, Sustainable, Professional Investment
- Money Pool
- Standard Investment Model

Thank you for your precious time

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- Mr. WAN Lin graduated from Renmin University of China in 1994, majored in Industrial Economics and International Economics.
- He joined China Classification Society, CCS in 1994, having worked as strategy researcher, production inspector, project manager, cooperation department manager, assistant to Chairman of International Association of Classification Society (IACS). He was appointed as the general manager of China Classification Society London branch in 2003.
- In 2005, he acquired the Master degree in MSc Shipping, Trade and Finance at CASS business school, City University, London. He went to the US for Tri-State (New York, New Jersey, Connecticut) Maritime Cluster Research sponsored by the Baltic Exchange scholarship in 2005.
- He joined China General Certification Centre (CGC) as vice president in 2008, in charge of PV, solar thermal business, as well as Strategy & International Cooperation.
- He is CCAA Senior Auditor, member of China’s national PV standard committee and IEC, and main contact window in renewable energy cooperation between China and US, EU, AFRICA, APEC, BRICS, Mainland and Taiwan, as well as Co-Chairman of WG Standard, Testing & Certification in China-US RE cooperation, and steering committee member of PV Quality Assurance Forum.

Public-Private Partnerships: what role for financing renewable energy?

Ronald Steenblik
Trade and Agriculture Directorate, OECD

APEC Workshop on Best Practices on Financing Renewable Energy
Hanoi, Vietnam, 4-5 June 2013

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Context for clean energy in developing & emerging economies

- *Investing in clean-energy infrastructure is an opportunity, particularly for developing countries*
  - Lengthy operational lifetimes of infrastructure
  - Leap-frogging to clean-energy technologies
- *The financing needs of this energy transition are likely to be substantial*
- *Public financing alone will not be enough to meet these investment needs*

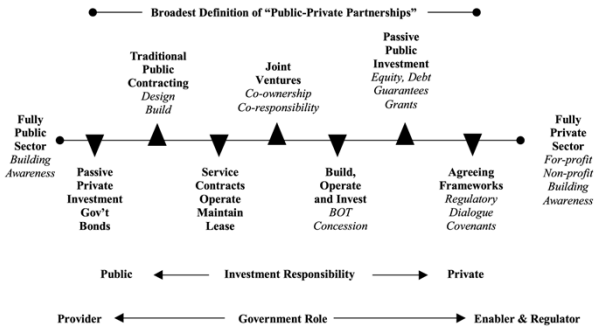
Public-Private Partnerships (PPPs)

"A Public-Private Partnership (PPP) is a contractual agreement between a public agency … and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility."

Source: http://www.ncppp.org/ppp-basics/7-keys/

3

Public-Private Partnerships (PPPs)



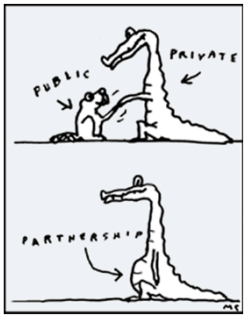
Advantages and criticisms

- PPPs are "advantageous to a cash-strapped government, since the one who will build the necessary infrastructures is the private sector. It helps the government provide basic services to the public, stimulate economic growth while at the same time save costs for the government. The private sector, in turn, benefits from this arrangement since they can derive returns from such investments, generate more jobs and help improve the economic outlook in our country."
- "However, … in order for the private sector to achieve its projected rate of return, it has to charge users, the public, for the use of such service or infrastructure. It takes the nature of double taxation, since the main point of paying taxes is so that the government can provide us services, at most basic, in return. To be charged for using such service is indeed an added burden."

Source: http://lawandict.blogspot.fr/2011/03/public-private-partnerships.html

5

Two opposing views of PPPs



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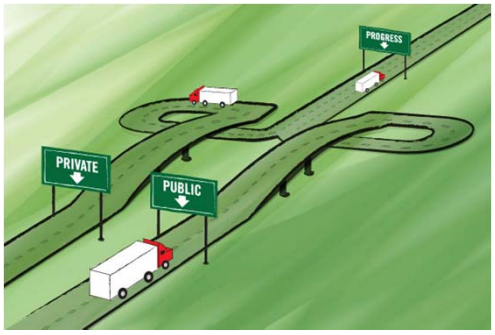
Another view of PPPs



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Best practice (1)

- **1) Establish a well-informed** champions who can play a critical role in minimizing misperceptions about the value to the public of an effectively developed PPP.
- **2) Create a** statutory foundation for the implementation of each partnership. Transparency and a competitive proposal process should be delineated in this statute.
- **3) Create a** dedicated team for PPP projects or programs. This unit should be involved from conceptualization to negotiation, through final monitoring of the execution of the partnership. This unit should develop Requests For Proposals (RFPs) that include performance goals, not design specifications. Consideration of proposals should be based on best value, not lowest prices.
- **4) A PPP** contract should include a detailed description of the responsibilities, risks and benefits of both the public and private partners. Realizing that all contingencies cannot be foreseen, a good contract will include a clearly defined method of dispute resolution.

Source: based on http://www.ncppp.org/ppp-basics/7-keys/

8

Best practice (2)

- **5) Identify a revenue stream sufficient to retire the investment** and provide an acceptable rate of return over the term of the partnership. The income stream can be generated by a variety and combination of sources (fees, tolls, availability payments, shadow tolls, tax increment financing, commercial use of underutilized assets or a wide range of additional options), but must be reasonably assured for the length of the partnership's investment period.
- **6) Ensure there is stakeholder support.** More people will be affected by a partnership than just the public officials and the private sector partner – e.g., affected employees, the portions of the public receiving the service, the press, appropriate labor unions
- **7) Pick your partner carefully:** The "best value" (not always lowest price) in a partnership is critical in maintaining the long-term relationship that is central to a successful partnership. A candidate's experience in the specific area of partnerships being considered is an important factor in identifying the right partner. Equally, the financial capacity of the private partner should be considered in the final selection process.

Source: based on http://www.ncppp.org/ppp-basics/7-keys/

9

POLICY ISSUES TO CONSIDER

- Investment Policy
- Investment Promotion and Facilitation
- Competition Policy
- Financial Market Policy & Trade issues
- Public Governance & Regional co-operation
- Making and implementing the choice between public, private and mixed provision of clean energy

Investment Promotion: Incentives

- Incentives to promote investment in clean-energy power generation, including IPP

In Brazil the use of reverse auctions for wind energy (with 20-year PPAs) resulted in winning bids for which tariff rates were 42% lower than previously established FITs

- Incentives to transmission operators for the extension and improvement of the electricity grid
- Ensuring that policy support is clear, credible and coherent & that policies and regulations are enforced

India's National Solar Mission: poor enforcement of Renewable Purchase Obligations at state level

Competition Policy

- Achieving the structural separation of the power sector
  - *Unbundling*
  - *Enhancing IPPs*
  - *Access to the grid & grid flexibility*
- Levelling the playing field for investment in clean energy infrastructure
- Competition authority

Energy procurement criteria: *the example of South Africa*

South Africa has adapted bidding criteria to focus on technologies that have already been proven, and by requiring previous experience in undertaking similar projects:

Sector	Minimum capacity (MW)	Max capacity (MW)	Experience
Onshore wind	1	140	Developer must have worked on 2 projects of comparable scope and duration (although this is not restricted to the renewable energy sector.
Solar PV	1	75	The inverter type must have been used in two commercial projects for 24 months with 95% technical availability/ The module type must have used in two commercial projects for 12 consecutive months with 95% technical availability.
STEG	1	100	The solar concentration system, heat receiver, heat transfer fluid and handling system, electrical generation system, cooling system and thermal storage system (if applicable) must have been used in 2 commercial projects for at least 24 months or 36 months for a demonstration project.
Biomass	1	10	The fuel handling systems, fuel conversion and prime mover technology must have been operating at a technical availability of 75% for 12 consecutive months
Biogas	1	10	The proposed anaerobic digestion concept must have been in use for at least 24 months and operated at similar scale for the project. Prime mover technology must have been in use for at least 12months with 80% technical availability.
Landfill gas	1	10	Prime mover technology must have been in use for at least 12months with 80% technical availability. Gas booster and flare equipment must have been in use for at least 12 months in 2 different commercial landfill gas projects and have been shown to comply with the South African requirements for safety and environmental performance.
Small hydro	1	10	The proposed turbine and generator manufacturer must have supplied similar equipment in 2 different hydropower projects at a scale greater than 1 MW and operating for a period of at least 24 months.

Public Governance

- Governance & regulation of the electricity market

Mexico’s Energy Regulatory Commission has no independent budget & appointment is done by the President with Ministry of Energy advice.
Brazil’s National Electric Energy Agency ensures its financial autonomy via supervision fees; appointment by the President is subject to validation by Senate.

- Land planning and deployment of the electricity grid
- Co-ordination between different levels of governance
- Regional co-operation

Thank you!

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Financing Renewable Energy in the APEC Region: A Multilateral Perspective

Ronald Steenblik
Trade and Agriculture Directorate, OECD

Christopher R. Kaminker
Osamu Kawanishi
Environment Directorate, OECD

APEC Workshop on Best Practices on Financing Renewable Energy
Hanoi, Vietnam, 4-5 June 2013

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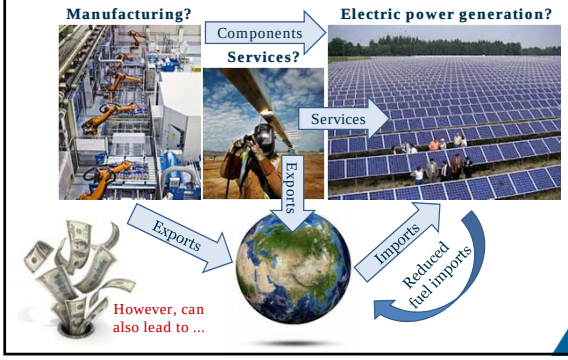
When people refer to “investment in renewable energy”, what do they mean?



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Interests of countries in renewable-energy-based power generation

Environmental benefits **High certainty**	Short-term economic benefits **Some uncertainty**	Longer-term economic benefits **Not certain**
• Improved air quality • Reduced disruption from transport of fuels (esp. coal) • Reduced CO2 emissions	• Increased energy supply • Increase security of energy supply • Reduced import bill for fossil fuels • Employment related to the renewable-energy-based power plants (esp. in services)	• Integrating into the global value chain. • Diversification and increased sophistication of the economy?

3

Questions relevant to investment in RE

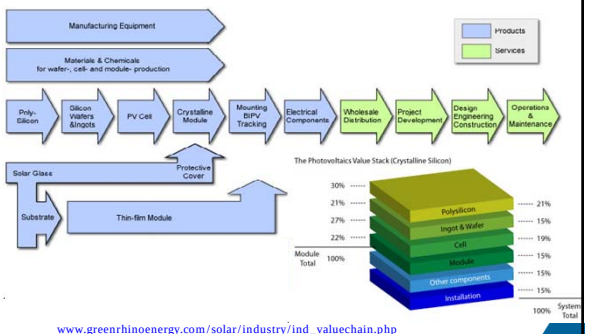
Manufacturing	Services	Power Generation
• **What technologies ?** — Where in the global value chain? — How strong is the foreign competition? • What investor restrictions? — On foreign ownership? — On corporate form (e.g., only JVs)? — Domestic content require-ments? — Other performance reqs?	• **What kind of services?** — Design, construction, maintenance, operation? • What restrictions on movements of persons (Mode 4)? • How strong is the foreign competition?	• **What kind of renewable energy?** • What are local RE resources? • What is the current structure of power generation? • Prices and policy incentives: for energy inputs, in wholesale electricity market, in final market. • What is capacity of the grid to handle variable power supply?

4

Manufacturing

5

The solar PV industry value chain

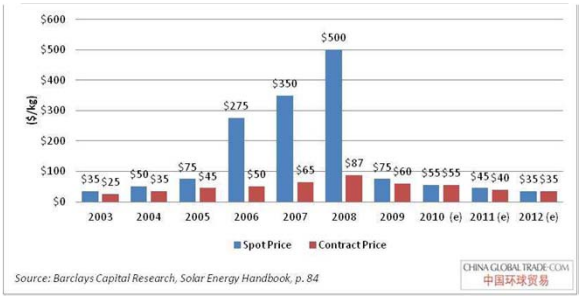


www.greenrhinoenergy.com/solar/industry/ind_valuechain.php

OECD Trade and Agriculture Directorate

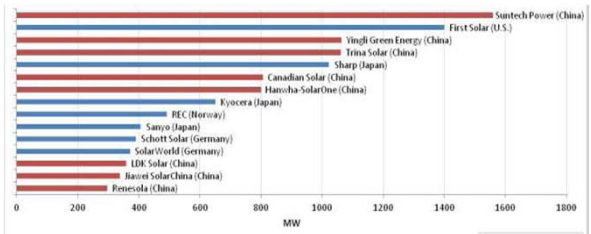
6

Polysilicon spot and contract prices



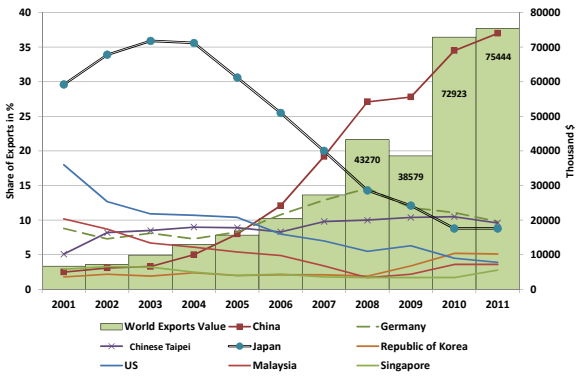
Source: Barclays Capital Research, Solar Energy Handbook, p. 84

Top 15 solar module manufacturers, 2010

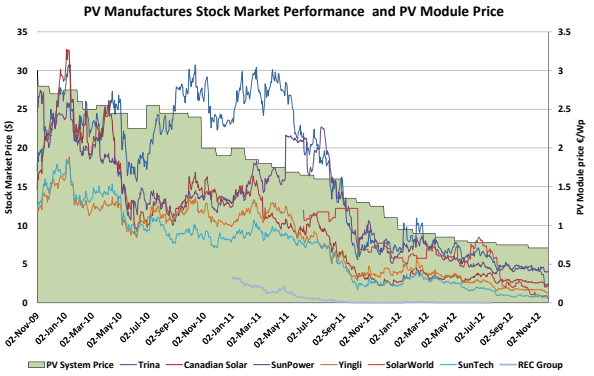


Source: Shyam Mehta, “PV News Annual Data Collection Results: 2010 Cell, Module Production Explodes Past 20 GW,” Greentech Media, 9 May 2011.
*Red bars indicate China-based companies

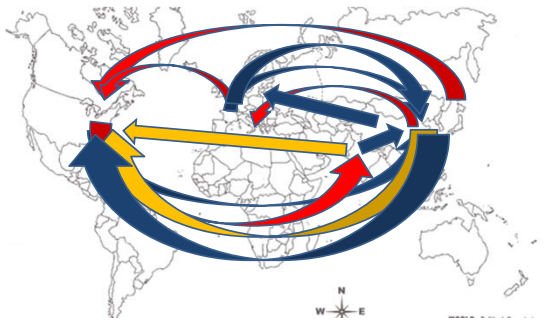
PV exports value and exporter shares of major exporting economies



PV Manufactures Stock Market Performance and PV Module Price

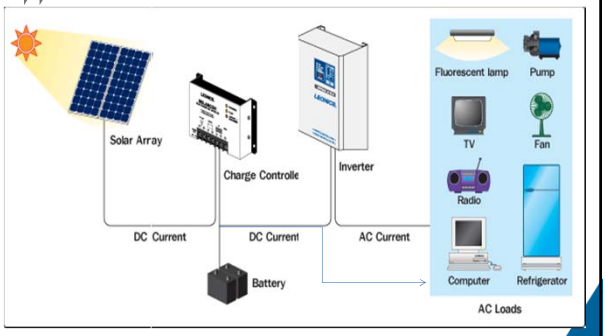


The consequences: “solar trade wars”, Sept 2010 to present



Source: OECD.

Components of a household solar PV system



RE Services

Many services associated with RE-based electricity generation

Wind-turbine erection

Wind-turbine maintenance

Remote (cross-border) monitoring of wind turbines

Many services associated with RE-based electricity generation

Biogas unit construction

Remote (cross-border) monitoring of biogas plant

Laboratory analysis

Cluster of services for GHG mitigation

Environmental services
-e.g. Solid waste management, emissions monitoring and control of pollutants in the air

Business services
-e.g. Legal services, architecture, engineering, management consulting, technical testing and analysis; maintenance and repair of equipment, etc.

Research and Development Services
-e.g. R&D services on natural sciences, social sciences and humanities; Interdisciplinary R&D services

Energy services
-e.g. Services incidental to energy distribution

Services important for renewable energy

Computer and Related Services
-e.g. Data-processing services

Telecommunications
-e.g. Data transmission services

Financial services
-e.g. money broking

Services incidental to agriculture

Services incidental to forestry and logging

Construction and related engineering services
-e.g. Work for building and civil engineering, installation and assembly

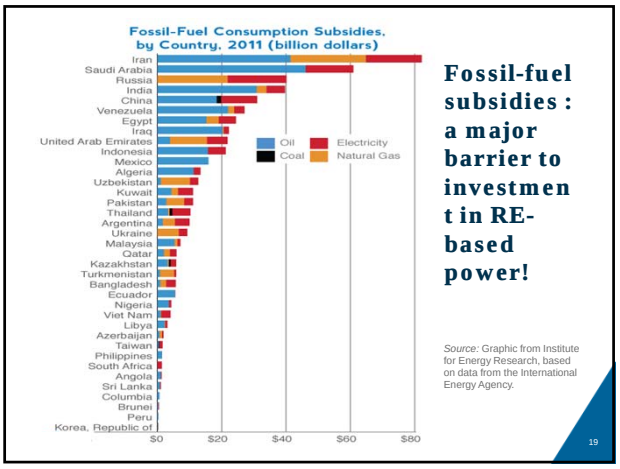
Education services
- e.g. higher technical and vocational education services

Power Generation

Upper limits on share of foreign ownership in renewable power generating projects (%)

Economy	Biomass		Hydro-electric		Solar		Wind	
	GF	M&A	GF	M&A	GF	M&A	GF	M&A
Austria	100	49	100	49	100	49	100	49
Greece	0	0	0	0	0	0	0	0
Costa Rica	50	50	50	50	50	50	50	50
Mexico	0	0	0	0	0	0	0	0
Ethiopia	50	50	50	50	50	50	50	50
Morocco	0	0	0	0	0	0	0	0
Indonesia	95	95	95	95	95	95	95	95
Malaysia	30	30	30	30	30	30	30	30
Philippines	100	100	100	100	40	40	40	40
Thailand	49	49	49	49	49	49	49	49

Source: Gollub et al. (2011), adapted from World Bank (2010).

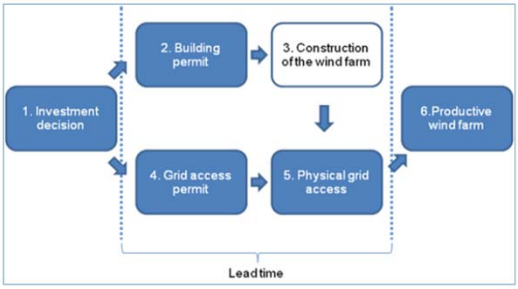


Fossil-fuel subsidies : a major barrier to investmen t in RE-based power!

Source: Graphic from Institute for Energy Research, based on data from the International Energy Agency.

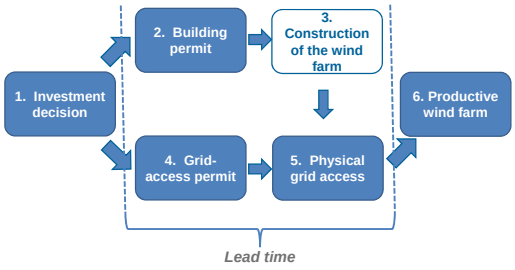
19

Admin delays: a critical factor in RE investments!



20

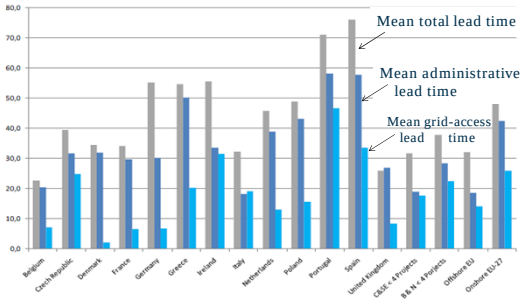
Admin delays: a critical factor in RE investments!



Source: Pierre Tardieu, European Wind Energy Association.

21

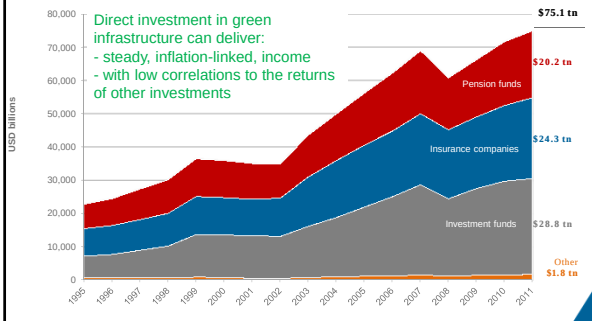
Delays can vary considerably by country



Source: Pierre Tardieu, European Wind Energy Association.

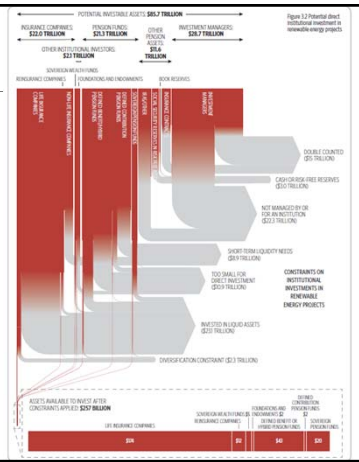
22

Institutional Investors as a source of non-traditional private financing



Source: OECD Global Pensions Statics and Institutional Investors databases

23



Only a small share (~0.3%) of funds from institutional investors could be available after considering various constraints.

Nonethless, 0.3% of $85.7 trillion still means over **$250 billion**.

24

Understanding channels for institutional investor investment in green infrastructure

Understanding the investment value chain

STAGES OF A RENEWABLE ENERGY PROJECT AND INVESTOR APPETITE

Project Development	Pre - Construction	Construction	Operations
Institutional Capital Committed 2004-2013	Institutional Capital Committed 2007-2013		Institutional Capital Committed 2007-2013
€700 Million	€3.0 Billion		€7.5Billion
No. of Active Institutional Investors	No. of Active Institutional Investors		No. of Active Institutional Investors
<10	~20		>30
Types of Institutional Investors	Types of Institutional Investors		Types of Institutional Investors
Private Equity Funds	Private Equity Funds		Renewable Infrastructure Funds
Some Renewable Infrastructure Funds	Renewable Infrastructure Funds		General Infrastructure Funds
	Some General Infrastructure Funds		Insurance Companies
	Few Pensions & Insurance Companies		Pension Funds
			Family Offices

Source: HgCapital (interviews; 2013)

Preliminary findings of what helps attract institutional investments (from OECD case studies)

- **Policy stability** that provides investors with clear and long-term policy frameworks
- **Financial structuring and support** that serves to create steady and predictable cash-flows and mitigate various risks
- **Better governance and education** of institutional investors to enable them to:
  a) understand the different investments channels available across the capital structure and
  b) build the necessary capabilities to manage the risks associated with these investments
- **Enhanced data collection** on green infrastructure investments and their historical performance, and better standardisation of the information collected

27

Summary

- Many places to invest in renewable energy
- First things first: assess local power markets (looking for barriers to remove), international component markets, and policies towards investment
- And then: get prices, and pricing right
- Give investors reason to have confidence
- Don’t forget the important role of renewable-energy-related services
- Avoid domestic-content requirements

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Thank you!

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OECD
BETTER POLICIES FOR BETTER LIVES

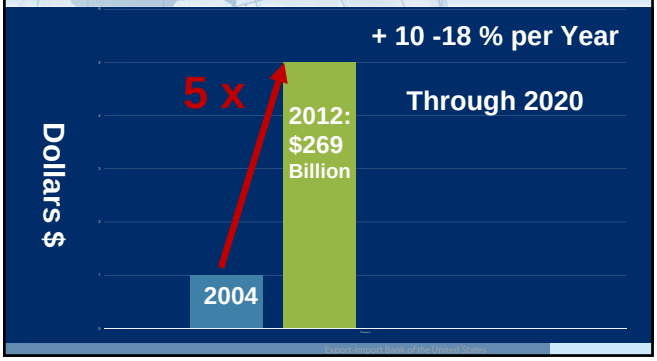
APEC Workshop

Best Practices on Financing Renewable Energy

The Honorable Patricia M. Loui
Member, Ex-Im Bank Board of Directors

June 4, 2013 / Hanoi, Vietnam

Worldwide Investments in Clean Energy



Who We Are

- Official Export Credit Agency (ECA) of the U.S.
- **Mission** – Finance foreign buyers of U.S.-made goods and services
- Since 1934 financed more than $600 billion
- Financed record high $35.8 billion last year

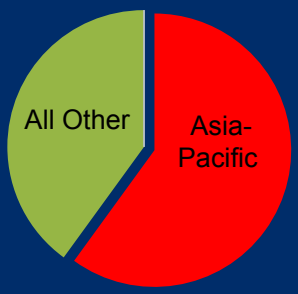
Ex-Im Bank

- Not an International aid agency or ODA provider
- Subsidizes no one
- Self-supporting and market-based
- Finances U.S. exports to creditworthy buyers

A Balanced Approach

- Renewable Energy → Increasing role in share of energy production
- Environmental due diligence is good business
- Time to invest is now with low, fixed rates

Two-thirds of Energy Demand from Asia



APEC Economies Are Adopting Renewables Policy

- Commitment to renewable sources
- Measurable objectives
- Deadlines for action

India: Ex-Im Financed Coal with Renewables Off-Set

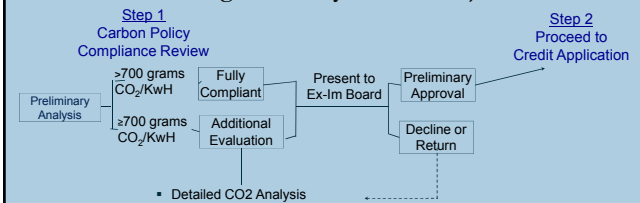
Coal Mining: $900 Million Loan

$5 Billion MOU to develop solar & wind

Ex-Im’s Environmental Due Diligence is Good Business

- Align with Equator Principles
- Disclose CO2 project estimates on website
- Use guidelines for high carbon power plants

Ex-Im’s Guidelines For High Intensity Carbon Projects



- Detailed CO2 Analysis
- Alternatives Analysis
- Best Appropriate Technology
- Low Carbon Growth Strategy
  - Long Term Energy Strategy
  - Sustainable Emissions Levels
  - Commitment to Renewables
  - Energy Efficiency Programs
- Other Mitigants

Now Is Time for Renewables Investment

- Ex-Im financing to date: $1.4 Billion, including 1st geothermal in Philippines & Chinese Taipei
- $5 Billion Available from U.S. – Asia Cooperative Energy Partnership

Current Terms Facilitate Renewables ROI

- Vietnam’s Bac Lieu Wind
- Terms up to 18 years
- Up to 30 percent local cost support
- Capitalization of interest
- Low fixed rates can be locked in now!

Azure Power – India’s First Megawatt-Scale Project

- Add 20,000 MW by 2020
- 15-Year Direct Loan
- Benefits 50,000 people
- Reduces India’s Carbon Emissions up to 5,500 metric tons per year

Landfill Gasification

- Promising and low cost
- Captures methane from urban landfills

CAM ON!

www. exim.gov
James Lewis
Asia Pacific Business Development Director
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Financing Schemes and Trade Opportunities
for supporting renewable energy deployment

Anja von Moltke, UNEP
Head Trade, Policy and Planning Unit

GREEN economy and TRADE

Outline

- Why invest in renewable energy?
- Renewable energy financing: Key concepts and status quo
- UNEP work on renewable energy financing
- Financing renewable energies in Viet Nam
- Conclusion

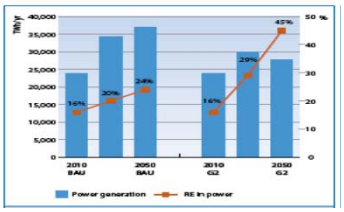
GREEN economy and TRADE

1. Why invest in renewable energy?

GREEN economy and TRADE

The Potential of RE Investment

- UNEP's Green Economy Report (GER, 2011):
  An average annual investment of approximately US$ 327 billion over the next 40 years in power generation could raise the share of renewable energy in global electricity generation to 45 per cent by 2050, compared with 24 per cent under BAU



Benefits: Climate Change

Under the GER (2011) Scenario of RE investment of USD 327 billion , energy-related GHG emissions are approximately 40 % lower in 2050 as compared to BAU

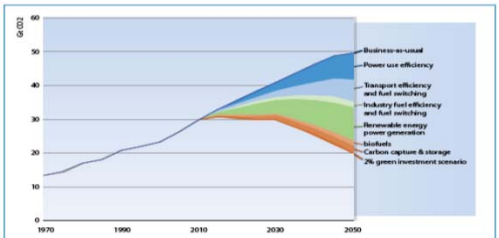


Figure 9: Total energy-related emissions and reductions under G2 by source, relative to BAU

Source: GER, 2011

Benefits: Job Creation, Health

• **create employment:** if around half of total energy investments were directed towards energy efficiency and renewable energy, there would be 20% more jobs by 2050

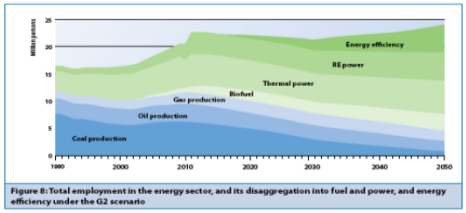


Figure 8: Total employment in the energy sector, and its disaggregation into fuel and power, and energy efficiency under the G2 scenario

Source: GER, 2011

• **mitigate health concerns**: 5% of global deaths and diseases are directly attributed to fossil fuel use

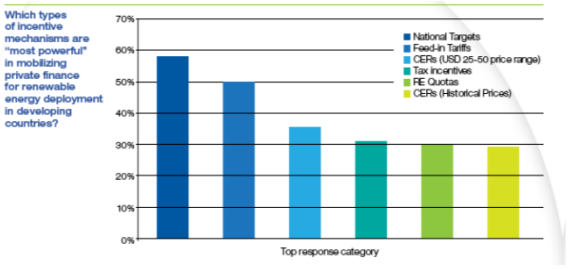
Benefit: Trade Opportunities

- RE investments also help to foster trade opportunities, including by:
  - contributing to electricity grid extension and interconnection
  - diversification of energy portfolios
  - making financial resources available for R&D in RE storage

2. Renewable Energy Financing

GREEN economy and TRADE

Insider Views on Financing Schemes



Source: UNEP FI, 2012

Renewable Energy Financing: Key Concepts

- Three golden rules to mobilizing private finance (UNEP FI, 2012)
  - Create a level playing field for RE (subsidies, carbon tax)
  - Allow for easy market access (e.g. through market liberalization)
  - Mitigate the investment risk (politically, regulatory) – consistent & predictable rules
- For private investors, the risk-return profile is the ultimate determinant of whether to finance or not (UNEP FI, 2012)

Constant Growth in New Investment

Source: BNEF and UNEP SEFI, 2013

State of Renewable Energy Financing Schemes

- Global investment in RE jumped 17 % in 2011, to USD 257 billion
- Small-scale distributed capacity investment increased to USD 76 billion in 2011 (USD 60 bilion in 2010, USD 31 billion in 2009), „fuelled by FIT subsidies“
- Global new investment in particular sources:
  - Solar 147 billion (rose by 52 % in 2011)
  - Wind 84 billion (slipped 12 % in 2011)
- Future projections:
  - Solar PV competitive with coal between 2012 – 2014 (PV prices fell 50 % 2011)
  - On-shore wind: potential for cost below USD 69 per MWh (coal: USD 67 per MWh)
- Global fossil fuel subsidies: USD 300 billion 2007, USD 523 in 2011 (IEA, 2011); six times more than subsidies to renewables
- Phasing out global fossil fuel subsidies by 2020 could (IEA, 2011a)
  - Reduce global primary energy demand by 5 %
  - Reduce energy-related CO2 emissions by 5.8 %

In case not stated otherwise, source: BNEF and UNEP SEFI, 2012

3. UNEP work on Renewable Energy Financing

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UNEP work on Renewable Energy Financing

Goals

- Demonstrate innovative financing mechanisms
- Encourage scaled-up investment in clean technologies
- Overcoming the perceived risks to renewable energy investors

How UNEP supports national clean energy programs

FIRM Project (7 partner countries, led by UNEP Risoe)
- Concrete actions to combine sustainable development and low GHG emissions
- Develop the conceptual basis of low carbon development

Finance for Access to Clean Energy Technologies (FACET) project
- mobilizes financial access (end-user) to clean energy in South East Asia
- helps implementing appropriate financial support mechanisms

Seed Capital Assistance Facility (SCAF)
- helps clean energy entrepreneurs access enterprise development support
- Partnership: Asian Development Bank (ADB), African Development Bank (AfDB)

The UNEP SEF Alliance
- convening body on how to do innovative public finance for clean energy
- joint projects initiated by members, specialised research

Green Economy Advisory Services
- currently working with 30 countries on GE strategies or sectoral studies

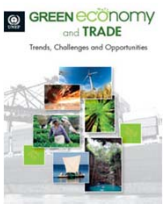
UNEP work on Renewable Energy Financing: Recent Studies

- Feed-in Tariffs as a Policy Instrument for Promoting Renewable Energies and Green Economies in Developing Countries (UNEP, 2012)
  - Policy guide for scaling up renewable energy in developing countries
- Global Trends in Renewable Energy Investment 2012 (BNEF and UNEP SEFI, 2013)
  - Analyses global trends and figures in renewable energy investment
- Financing renewable energy in developing countries (UNEP FI, 2012)
  - A survey on the views, experiences and policy needs of energy financiers in developing countries (focus on Sub-Saharan Africa)

Websites
- http://www.unep.org/energy/
- http://www.unep.org/greeneconomy/

UNEP Trade work: The GE-TOP Report

The GE-TOP report explores the nexus between international trade and the green economy, showing:
- how the transition to a greener economy can create sustainable trade opportunities, economic growth and progress in developing countries
- how the main trade-related challenges can be addressed in order to advance economic and social development in a sustainable way that contributes to poverty eradication and employment
- how national capacity to deal with the challenges of the transition to a green economy can be developed



The GE-TOP Report: RE Trends

- Global market in low-carbon and energy efficient technologies (e.g. RE supply products) is projected to nearly triple to US$ 2.2 trillion by 2020
- Since 1990, annual global growth in solar PV and wind supply capacity averaged 42 / 25 % respectively (oil: 1.3 %)
- Cost of electricity generation from solar PV declined by 31-35 % in 2011, for onshore wind by 9 %

The GE-TOP Report: RE Trade Opportunities

- Exports of renewable energy supply products
- Exports of renewably sourced electricity
- Renewable energy and construction consultancy services
- Key barriers to renewable energy trade: Import tariffs, non-tariff measures

4. Financing solutions for supporting renewable energy deployment in Viet Nam

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The Energy Sector in Viet Nam: Policies

- The Electricity Plan 2004 (into force on July 1, 2005)
  - Initiated market liberalization in the power sector
- Renewable Energy Action Plan 2007
  - Target: increase the share of renewable energy in total commercial primary energy from 3% in 2010 to 5% in 2020 and 11% in 2050
- Decision 21/2009/QD-TTg: Electricity tariff reform
  - Increasing average tariffs, moving towards cost recovery
- National Power Development Master Plan 2011
  - Goal: increase the share of power generated from renewable resources from 3.5% of electricity generation (2010) to 4.5% (2020), to 6% (2030)
- National Renewable Energy Development Plan ("Master Plan VII")
  - Budget assigned to Master Plan VII: USD 48.8 billion (WSJ, 2011)

The Energy Sector in Viet Nam: Subsidies

Viet Nam is capping fossil fuel (coal, petroluem) prices to keep consumer prices low

Figure 9. Estimated consumption subsidies in Viet Nam 2007 - 2010[48]

(Billion USD) Energy source	2007	2008	2009	2010
Oil	0.32	1.09	0	0
Gas	0.09	0.21	0.13	0.23
Coal	0.01	0.01	0.01	0.01
Electricity	1.68	2.25	1.06	2.69
Total	2.1	3.56	1.2	2.93
Total (% GDP in current USD)	2.95	3.94	1.24	2.83

Source: IEA (2011)

Three foremost reasons to phase out fossil fuel subsidies (in Viet Nam)

(a) subsidies are costly: 283 billion (in current USD)

(b) subsidies drive demand (result: low energy efficiency) and GHG emissions

(c) they are comparatively regressive

Financing Solutions: Improving the risk-return profile of renewable energy in Viet Nam

- Energy subsidies: „a readily available source of government funding" (UNEP FI, 2012)
  - Re-channel fossil fuel subsidies (e.g. USD 2.83 billion 2010) to finance RE
  - Cutting fossil fuel subsidies can raise Viet Nam's real GDP by 1 %
- Fiscal reform: a carbon tax can raise Viet Nam's real GDP by an additional 0.5 %
  - Block-tariff pricing schemes for residential users are existing, but insufficient
  - Reform must be gradual / phased; the tax progressive
- Internationally, NAMAs represent an opportunity to finance modern, clean technology
- A ‚level playing field': introduce a feed-in tariff with proper incentive rates
  - A need for prices that allow adequate return on investment

Sources: UNDP, 2012; UNEP FI, 2012; Willenbockel and Hoa, 2011

Supportive UNEP project work in Viet Nam

- The finance for access to clean energy technologies (FACET) project
  - aims to mobilize financial access to clean energy in South East Asia, implementing appropriate financial support mechanisms
- Facilitating Implementation and Readiness for Mitigation (FIRM)
  - Ongoing project in Viet Nam (UNEP & UNEP Risoe)
  - (i) develop a wind power NAMA & a biogas (livestock waste) NAMA
  - (ii) make plans for achieving the target of the RE Action Plan
- Technology Needs Assessment (TNA) Viet Nam
  - TNA's outline appropriate GHG emission mitigation measures
  - Viet Nam finished the TNA activities in June 2012
  - Selected priority technologies for mitigation include wind & biogas

Conclusion

- Targeted renewable energy investment can raise the share of renewable energy in global power generation to 45 % by 2050 (GER, 2011)
- Financing renewable energy yields various co-benefits (e.g. on job creation, GHG emission reductions, global health)
- Investment and incentive tools exist to maximise the risk-return profile of renewable energy investments
- UNEP has various projects that help states transition to clean energy economies
- Renewable energy investment can widely benefit Viet Nam and can be informed by (further) UNEP support

GREEN economy and TRADE

Contacts

Thank you!

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Reference List

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"Lopburi Solar Power Project -THAILAND"
Case Studies: Best Practices in Financing Renewable Energy

Present to APEC Workshop on Best Practices on Financing Renewable Energy, Hanoi

By Sukunya Phokhakul

4 - 5 June 2013

Private and Confidential

Project Overview

Project Name / Capacity	Lopburi Solar Project (LSP) – 73 MW Wang Phloeng Solar Project (WSP) – 11 MW
Type	Grid-connected solar photovoltaic (PV) power plant
Land	240 Hectares private title deed
Location	Lopburi Province, central part of Thailand, approximately 2 hours drive from Bangkok
Off-taker	Electricity Generating Authority of Thailand (EGAT) through SPP scheme (on LSP) Provincial Electricity Authority (PEA) through VSPP scheme (on WSP)
PPA :	5 years with automatic renewal Adder THB8/kWh for 10 years
Technology :	Thin Film Silicon (Japan)
CDM :	LSP: Registered WSP: Validation Process
COD :	LSP: 29 March 2012 WSP: 2 May 2013

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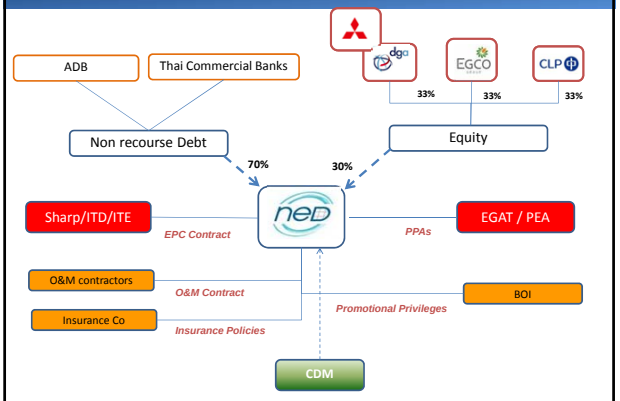
Project Financing Structure



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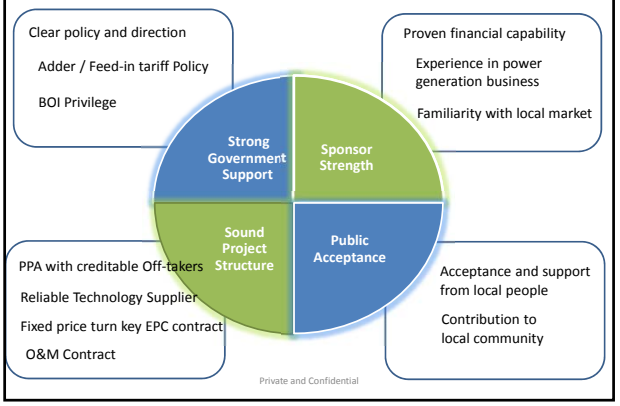
Summary of Financing

Sources of Funding	Project Costs	Approx. USD 250M
	Equity	USD 75M 30 % of Project Costs (Back-Ended)
	Debt	USD 175M 70 % of Project Costs (Non-recourse)
	ADB	*25 % of Project Costs*
	Thai Commercial Banks	*45 % of Project Costs*
	ADB Grant for contingency	USD2M
Tenor	12 years (commercial banks) 18 years (ADB)	

Key Success Factors



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Highlight Features

The largest solar farm in Thailand and SEA

EIA conducted even though not required by law

On site Green Education center for general public

"A Successful Showcase of Thailand Renewable Energy Demonstration"


Thank you for your kind attention
Further Information
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Financial Incentives for Promoting New and Renewable Energy in the U.S.

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APEC Workshop on Best Practices on Financing Renewable Energy
Hanoi, Vietnam
June 4-5, 2013

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The U.S. has a wide range of financial mechanisms that support electric utility specific renewable energy systems at both the federal and state levels

- Federal programs
  - Tax credits
  - Renewable energy credits
- State programs
  - Tax credits
  - Renewable Energy Portfolio Standards (RPS)
  - Net metering/Feed-in tariffs
- Utility/private sector
  - Purchased power contracts

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U.S. Federal Investment Tax Credit Program was extended in 2008 and modified in 2009

- The U.S. Congress passed a 8-year 30% investment tax credit (ITC) for photovoltaics on October 3rd, 2008. The credit was further expanded by *The American Recovery and Reinvestment Act of 2009*, enacted in February 2009.
  - Extends for 8 years the 30-percent tax credit for both residential and commercial solar installations
  - Eliminate the $2,000 monetary cap for residential solar electric installations, creating a true 30-percent tax credit (effective for property placed in service after December 31, 2008)
  - Eliminate the prohibition on utilities from benefiting from the credit
  - Authorize $800 million for clean energy bonds for renewable energy generating facilities, including solar
  - The credits are available for systems put in service prior to December 31, 2016

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Coverage of the Federal investment tax credit (1)

- **Solar.** The credit is equal to 30% of expenditures, with no maximum credit. Eligible solar energy property includes equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat. Hybrid solar lighting systems, which use solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight, are eligible. Passive solar systems and solar pool-heating systems are *not* eligible.
- **Fuel Cells.** The credit is equal to 30% of expenditures, with no maximum credit. However, the credit for fuel cells is capped at $1,500 per 0.5 kilowatt (kW) of capacity. Eligible property includes fuel cells with a minimum capacity of 0.5 kW that have an electricity-only generation efficiency of 30% or higher. (Note that the credit for property placed in service before October 4, 2008, is capped at $500 per 0.5 kW.)
- **Small Wind Turbines.*** The credit is equal to 30% of expenditures, with no maximum credit for small wind turbines placed in service after December 31, 2008. Eligible small wind property includes wind turbines up to 100 kW in capacity. (In general, the maximum credit is $4,000 for eligible property placed in service after October 3, 2008, and before January 1, 2009. *The American Recovery and Reinvestment Act of 2009* removed the $4,000 maximum credit limit for small wind turbines.)

Source: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F

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Coverage of the Federal investment tax credit (2)

- **Geothermal Systems.*** The credit is equal to 10% of expenditures, with no maximum credit limit stated. Eligible geothermal energy property includes geothermal heat pumps and equipment used to produce, distribute or use energy derived from a geothermal deposit.
- **Microturbines.** The credit is equal to 10% of expenditures, with no maximum credit limit stated (explicitly). The credit for microturbines is capped at $200 per kW of capacity. Eligible property includes microturbines up to two megawatts (MW) in capacity that have an electricity-only generation efficiency of 26% or higher.
- **Combined Heat and Power (CHP).*** The credit is equal to 10% of expenditures, with no maximum limit stated. Eligible CHP property generally includes systems up to 50 MW in capacity that exceed 60% energy efficiency, subject to certain limitations and reductions for large systems. The efficiency requirement does not apply to CHP systems that use biomass for at least 90% of the system's energy source, but the credit may be reduced for less-efficient systems. This credit applies to eligible property placed in service after October 3, 2008.

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The U.S. EPA Green Power Partnership Program allows companies to support all forms of green energy

- Organizations can meet EPA purchase requirements using any combination of three different product options
  - Renewable Energy Certificates
  - On-site generation
  - Utility green power products
- Top companies include:
  - Intel Corporation (100% of electricity use) (3.1 Billion Kwh)
  - Microsoft (80%) (1.93 Billion Kwh)
  - Kohl's Department Store (105%) (1.53 Billion Kwh)
  - Whole Foods Market (107%) (0.80 Billion Kwh)
  - City of Austin, Texas (100%) (0.36 Billion Kwh)
  - U.S. EPA (101%) (0.26 Billion Kwh)
  - TD Bank (100%) (0.26 Billion Kwh)

http://www.epa.gov/greenpower/

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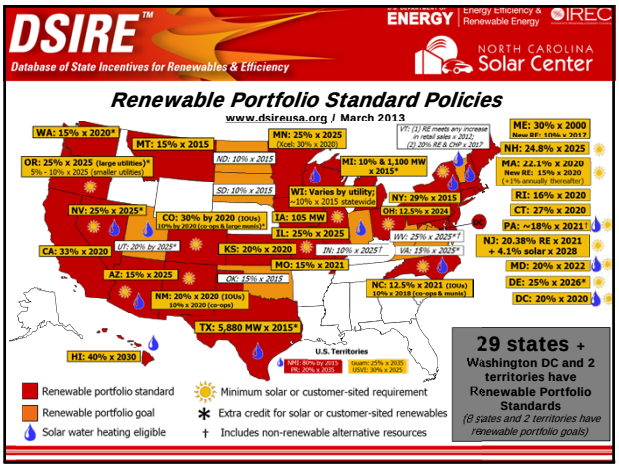
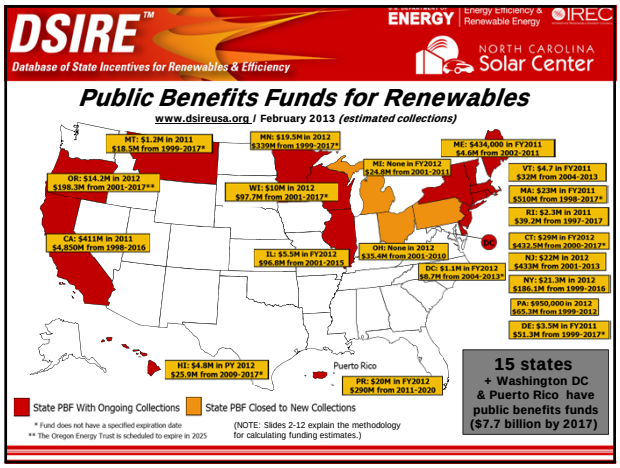
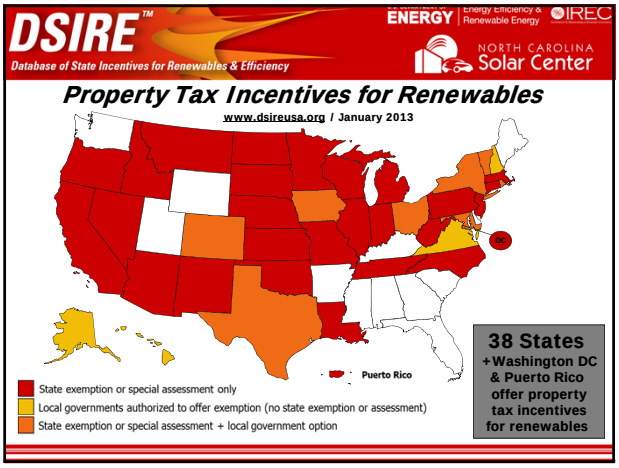
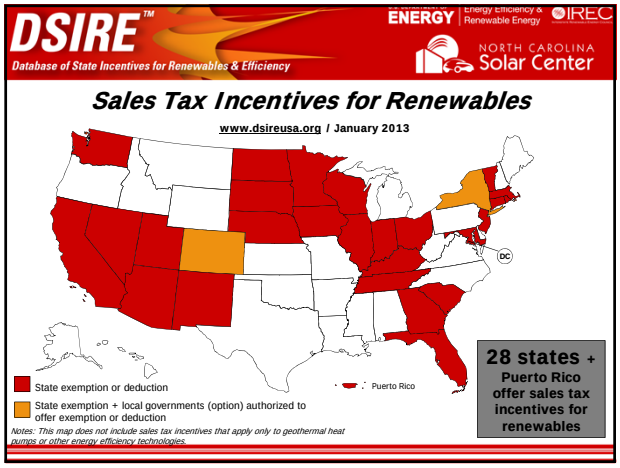
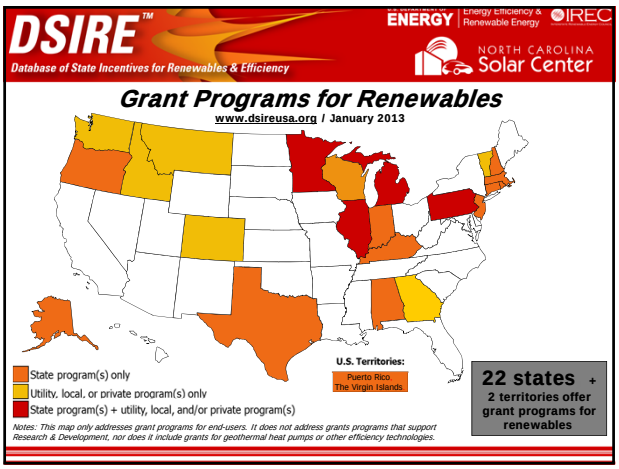
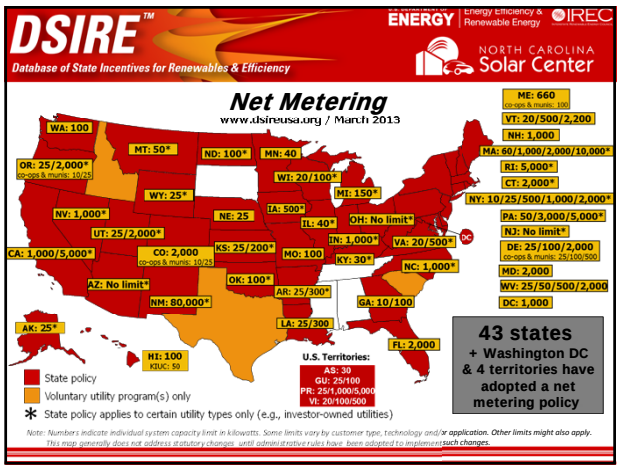

DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Renewable Portfolio Standard Policies
www.dsireusa.org / March 2013
29 states + Washington DC and 2 territories have Renewable Portfolio Standards
(8 states and 2 territories have renewable portfolio goals)
Renewable portfolio standard
Renewable portfolio goal
Solar water heating eligible
Minimum solar or customer-sited requirement
Extra credit for solar or customer-sited renewables
Includes non-renewable alternative resources

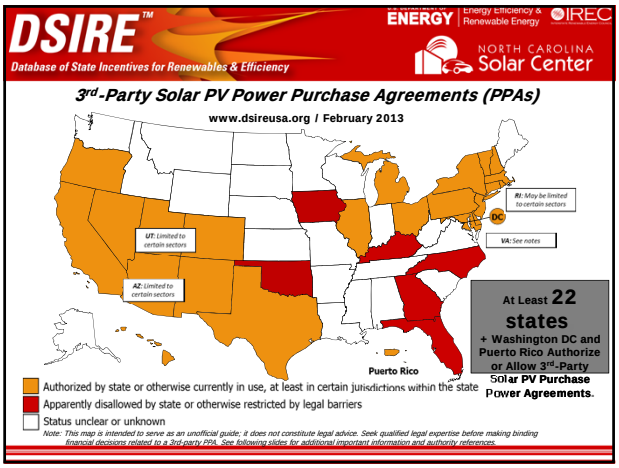

DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Public Benefits Funds for Renewables
www.dsireusa.org / February 2013 (estimated collections)
15 states + Washington DC & Puerto Rico have public benefits funds ($7.7 billion by 2017)
State PBF With Ongoing Collections
State PBF Closed to New Collections
Puerto Rico


DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Property Tax Incentives for Renewables
www.dsireusa.org / January 2013
38 States + Washington DC & Puerto Rico offer property tax incentives for renewables
State exemption or special assessment only
Local governments authorized to offer exemption (no state exemption or assessment)
State exemption or special assessment + local government option
Puerto Rico


DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Sales Tax Incentives for Renewables
www.dsireusa.org / January 2013
28 states + Puerto Rico offer sales tax incentives for renewables
State exemption or deduction
State exemption + local governments (option) authorized to offer exemption or deduction
Puerto Rico


DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Grant Programs for Renewables
www.dsireusa.org / January 2013
22 states + 2 territories offer grant programs for renewables
State program(s) only
Utility, local, or private program(s) only
State program(s) + utility, local, and/or private program(s)
U.S. Territories:
Puerto Rico
The Virgin Islands


DSIRE
Database of State Incentives for Renewables & Efficiency
ENERGY
Energy Efficiency & Renewable Energy
IREC
NORTH CAROLINA Solar Center
Net Metering
www.dsireusa.org / March 2013
43 states + Washington DC & 4 territories have adopted a net metering policy
State policy
Voluntary utility program(s) only
State policy applies to certain utility types only (e.g., investor-owned utilities)
U.S. Territories:



The U.S. is developing a number of innovative business models

- Power Purchase Agreements (PPAs)
- Installation aggregation
- “solar options” on new home construction

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Solar Purchase Power Agreements allow for turn key solar installations

- SunEdison will provide turn key solar PV for selected Wal-Mart stores
- The solar photovoltaic systems will be deployed with the SunEdison Power Purchase Agreement (PPA) model, whereby customers purchase solar electricity, rather than solar equipment
- SunEdison will finance, install, operate and maintain the photovoltaic power plants for Wal-Mart
- Under the PPA model, SunEdison only charges customers for electricity produced at rates equal to, or below the customer’s existing retail prices
- As of 03/2013 Wal-Mart has 150 solar installations in 7 economies producing 71 million Kwh of electricity

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Introduction to the APEC Expert Group on New and Renewable Energy Technologies (EGNRET)

Cary N. Bloyd, Ph.D.
Senior Staff Scientist
Electricity Infrastructure & Buildings Division
Pacific Northwest National Laboratory
Richland, Washington, USA

APEC Workshop on Best Practices on Financing Renewable Energy
Hanoi, Vietnam
June 4-5, 2013

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Presentation Overview

- Introduction to the APEC Energy Working Group (EWG)
- APEC Expert Group on New and Renewable Energy Technologies (EGNRET)
- EGNRET Finance Activties
- EGNRET focus for 2013

There are fourteen working groups that operate under the SOM Steering Committee on Economic and Technical Cooperation (ECOTECH)

- Agricultural Technical Cooperation
- Anti-Corruption and Transparency
- Emergency Preparedness
- Energy Working Group (EWG)
- Health
- Human Resources Development
- Expert Group on Illegal Logging and Associated Trade
- Ocean and Fisheries
- Policy Partnership on Science, Technology and Innovation
- Policy Partnership on Women and the Economy
- Small and Medium Enterprises
- Telecommunications and Information
- Tourism
- Transportation

APEC Energy Working Group (EWG)

- The EWG was launched in 1990
- The EWG seeks to maximize the energy sector's contribution to the region's economic and social well-being, while mitigating the environmental effects of energy supply and use
- Australia was the EWG Lead Shepherd from its inception until 2009. The United States is the current Lead Shepherd
- The Energy Security Initiative (ESI) is the principal mechanism through which the EWG addresses the short and long term energy security challenges in APEC in a sustainable manner
- The APEC Energy Ministers (EMM11) last met in Saint Petersburg, Russia, in June 2012 under the theme of "Energy Security: Challenges and Strategic Choices"

(www.ewg.apec.org)

The Energy Working Group is supported by 8 sub-fora groups

- Expert Group on Clean Fossil Energy (EGCFE) – Chair: USA (www.egcfe.ewg.apec.org)
- Expert Group on Energy Efficiency & Conservation (EGEEC) – Chair: New Zealand (www.egeec.apec.org)
- Expert Group on Energy Data & Analysis (EGEDA) – Chair: Japan (www.ieej.or.jp/egeda/)
- Expert Group on New and Renewable Energy Technologies (EGNRET) – Chair: Chinese Taipei (www.egnret.ewg.apec.org)
- Asia Pacific Research Center (APERC) (www.ieej.or.jp/aperc/)
- APEC Biofuels Task Force- Chair: USA (2005-2012) (www.biofuels.apec.org)
- Energy Trade and Investment Task Force (ETITF) – Chair: Australia (2009-)
- Low Carbon Model Towns Task Force (LCMT)- Chair: Japan (2010-) (http://esci-ksp.org/)

EGNRET Mission

- The APEC Expert Group on New and Renewable Energy Technologies (EGNRET) has been established by - and reports to - the APEC Energy Working Group (EWG)
- The mission of the EGNRET is to facilitate an increase in the use of new and renewable energy technologies in the APEC region
- The activities of the EGNRET will be directed towards meeting the energy challenges identified by APEC Leaders and Energy Ministers

EGNRET's Renewable Energy Activities are Diverse and Complementary

- Lead and work with EWG major initiatives
  - APEC 21st Century Renewable Energy Development Initiative
  - EWG led Energy Security Initiative (2001)
  - Ministerial Level Financing Initiative (2004)
  - Ministerial Level Hydrogen Initiative (2004)
  - Ministerial Level Biofuels Initiative (2006)
  - Ministerial Level APEC Smart Grid Initiative (2010)
  - Ministerial Level Low Carbon Model Town Task Force (2010)
  - Leaders Level Energy Smart Communities Initiative (2010)
- Organize workshops
- Conduct research projects
  - Over 55 have been completed since 1992
  - 11 are being implemented in 2012-2013

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EGNRET On-going Projects

- Prospects for Marine Current Energy Generation in APEC Region (S EWG 23 11A) (Russia)
- Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region (S EWG 19 11A) (Cooperated with EGEE&C) (Thailand)
- Urban Development Smart Grid Roadmap: Christchurch Recovery Project (EWG 08 2012) (with EGEE&C) (New Zealand)
- Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town (EWG 16 2012A) (China)
- The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD (Central Business District), China (EWG 11/2012A) (China)

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EGNRET On-going Projects (Cont'd)

- APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (EWG 18 2012A) (Japan)
- APEC Workshop on Best Practices on Financing Renewable Energy (EWG 21 2012A) (Viet Nam)
- Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems (EWG 22 2012A) (China)
- Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012A) (China)
- Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town (EWG 23/2012A) (China)
- 2013 APEC Workshop on Geothermal Technology (SF EWG 01/2013) (Chinese Taipei)

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EGNRET Finance Related Projects

- Guidebook for Financing New and Renewable Energy Projects (98-RE-03.1) (Japan)
- APEC 21st Century Renewable Energy Development Initiative VIII): Financial Roadmap for the APEC Region (EWG 02/2003) (Australia)
- Development of Renewable and Energy Efficiency (Small Scale Projects) Financing Best Practices and Guidelines for APEC Region Capital Market Development (EWG 08/2005) (USA)

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EWG Clean Energy Finance Related Projects (2)

- APEC 21st Century Renewable Energy Development Initiative (Collaborative V III) Local Banks Training Program for Financing Energy Efficiency and Renewable Energy Projects (EWG 01/2006T)(Mexico)
- APEC 21st Century Renewable Energy Development Initiative (Collaborative V III) Information Sharing on Financing Public Sector Energy Efficiency and Renewable Energy Projects (EWG 04/2006) (USA)
- APEC 21st Century Renewable Energy Development Initiative (Collaborative VIII): Workshop on Recent Advances in Utility Based Financial Mechanisms that Support Renewable Energy and Energy Efficiency (EWG 02/2007) (USA)

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EGNRET Focus for 2013

- EGNRET activities will focus more on smart grid and low carbon towns which are directly related to the Energy Smart Communities Initiative (ESCI) and APEC Smart Grid Initiative.
- EGNRET members are encouraged to conduct research related to reduction of energy intensity in the APEC region.
- EGNRET will strengthen collaboration with other APEC fora, e.g., LCMT Task Force, EGEE&C, Policy Partnership on Science, Technology, and Innovation (PPSTI), and APERC clean energy projects such as the Peer Review on Low Carbon Energy (PRLCE) and Peer Review on Energy Efficiency (PREE).
- Collaborate with the International Renewable Energy Agency (IRENA), and International Copper Association Ltd. (ICA) on promotion of renewable energy in the APEC region.

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APEC Workshop on Best Practices on Financing Renewable Energy – The IFC Perspective

IFC is a Member of the World Bank Group

	IBRD	IDA	IFC	MIGA
	International Bank for Reconstruction and Development	International Development Association	International Finance Corporation	Multilateral Investment and Guarantee Agency
	Est. 1945	Est. 1960	Est. 1956	Est. 1988
Role:	To promote institutional, legal and regulatory reform	To promote institutional, legal and regulatory reform	To promote private sector development	To reduce political investment risk
Clients:	Governments of member countries with per capita income between $1,025 and $6,055.	Governments of poorest countries with per capita income of less than $1,025	Private companies in 179 member countries	Foreign investors in member countries
Products:	Technical assistance Loans Policy Advice	Technical assistance Interest Free Loans Policy Advice	Equity/Quasi-Equity Long-term Loans Risk Management Advisory Services	Political Risk Insurance

Shared Mission: To Promote Economic Development and Reduce Poverty

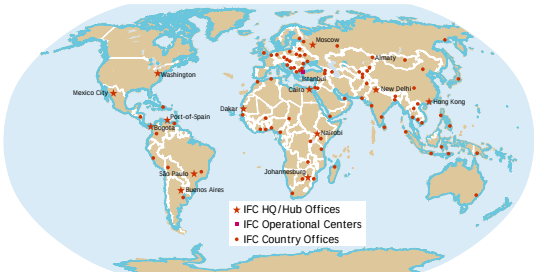
IFC’s business consists of three complementary ‘pillars’ that support its mandate

IFC International Finance Corporation World Bank Group

Investment Services	Advisory Services	IFC Asset Management Company
• Loans and intermediary services • Equity and quasi-equity • Syndications • Structured and securitized products • Risk management products • Trade finance • Sub-national finance • Treasury operations	• Access to finance • Corporate advice • Environmental and social sustainability • Infrastructure advice • Investment climate • Corporate governance	• Wholly owned subsidiary of IFC • Private equity fund manager • Invests third-party capital alongside IFC • Helps IFC fulfill its role and leverage its balance sheet by mobilizing third party capital to increase investments

IFC’s Global Reach

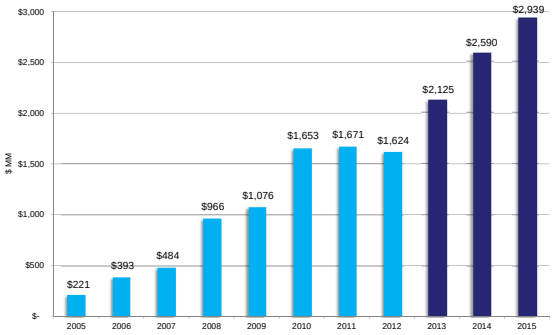
100+ country and regional offices worldwide



IFC Value Add

Long-term Competitive Financing	Regional Knowledge	Country Risk Mitigation	Environmental & Social Risk Management
✓ Equity ✓ Fixed/Floating Rates, Local Currencies ✓ Up to 15 year Loan Maturity ✓ Flexible Amortization Profile ✓ Catalyst for other Investors and Lenders ✓ Equity Participation ✓ Capital Mobilization	✓ Extensive Local Office Network ✓ Local Transaction Experience ✓ World Bank Synergies	✓ Government Relations ✓ Neutral broker Role ✓ Reduced Risk of Expropriation, Breach of Contract, Convertibility ✓ World Bank Synergies ✓ Withholding Tax Benefit	✓ Advice on Environmental and Social Best Practices ✓ Equator Principles Modeled after IFC Standards ✓ Local Consultation and Disclosure

Climate-smart business is a priority for IFC, slated for another boost in growth



IFC invests in Climate Business across its Global Industry groups

Climate Business

Infrastructure & Natural Resources
- Power
- Transmission & Distribution
- Water & Waste
- Telecoms & IT
- Oil & Gas
- Mining
- Transport
- Sub-National Finance

RE Generation
- Hydropower
- Wind
- Solar
- Biomass
- Geothermal

Financial Markets
- Banking
- Sustainability & Climate Fin.
- Private Equity/ Funds
- Housing Finance
- Insurance
- Microfinance
- SME Banking
- Trade Finance
- Securities Markets

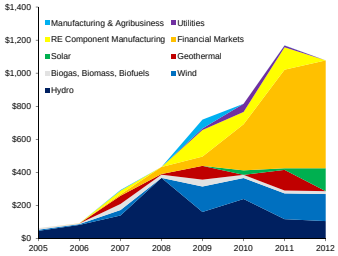
Climate Change Finance
- Mezzanine finance for smaller RE projects
- Guarantees
- Cleantech VC

Manufacturing, Agriculture & Services
- Agribusiness
- Forestry
- Healthcare
- Life Sciences
- Education
- Chemicals
- Manufacturing Industries
- Other Services

Energy Efficiency
- Energy Efficient Machinery and process change
- Green Supply Chains

RE investments are driving IFC’s investment growth

IFC Own Account Renewable Energy Commitments

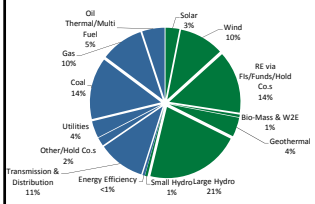


- **RE investments of $1bn in FY12**, including financial intermediaries
- RE investments **increased 3.7x** since 2007
- **Technology diversification:** not just hydro and wind, but also geothermal, solar and biomass
- In-house **technical expertise** and **locally-based** teams allows us to better appraise investments in emerging technologies and markets
- Investments through **financial intermediaries**: support to smaller companies/projects

IFC’s approach is to invest in **technology and scale**, so as to bring down the cost of RE to **grid parity**, to become a widely used source of **power generation** in **emerging markets**.

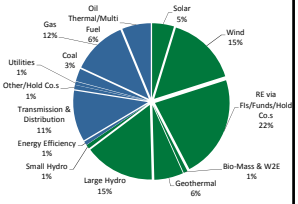
Over Half of IFC’s Global Power Sector Exposure is to RE

PORTFOLIO
US$5.3bn Committed Investments in Power (54% and US$2.9bn to RE)*



US$2.9 bn RE Portfolio (end October 2012):
- includes 105 projects (not including swaps/RIs)
- is 22% of IFC’s US$12.9bn INR portfolio
- is 6% of IFC’s US$46.2bn total committed portfolio

RECENT BUSINESS
US$3.4bn Commitments in Power (FY09-OctFY13) (66% and US$2.3bn to RE)



US$2.3 bn RE New Bus. Commitments (FY09-Oct FY13):
- includes 95 projects (not including swaps/RIs)
- is 26% of IFC’s US$8.6bn INR commitments in the period
- is 7% of IFC’s US$31.0bn total commitments in the period

IFC Has Strong and Differing Role in Supporting Each Renewable Technology

	Hydro	Wind	Biomass	Solar	Geo
Characteristics	• Established and cost competitive technology • Large hydros have long development time • Dams offer base-load • Potential for local E&S issues	• Established technology • Economics site specific • Variable generation • Dependent on suitable regulatory support	• Technology risk varies with fuel type • Long-term access to low cost fuel essential • Opportunities for co-firing and co-generation	• PV still expensive but costs declining quickly • CSP w/ storage offers potential for low cost base load • Potential for grid and distributed generation	• Established and cost competitive baseload technology • High exploration risks and long lead times to develop steam fields
IFC Role & Comp. Adv	• Taking construction risk • Providing long-tenors to match asset life • Innovative bundling for small hydros • Ensuring best practice E&S	• Supporting (i) projects in new markets & new regulations; (ii) supply chain expansion to reduce costs • Structuring to support intermittent generation & merchant risk	• Structuring fuel supply agreements to enable project finance • Understanding technology risk	• Supporting supply chain expansion to reduce costs • Supporting projects in new markets and new regulatory regimes • Coordinating concessionary funding to buy down costs	• Early stage equity and concessionary funding to share exploration risk • Sector expertise and innovative structuring to enable project financing

IFC investments in Wind and Solar

- **Wind Power:**
  - **Zorlu Enerji Rotor (Turkey, 2010):** €55m in LT debt to finance 135MW greenfield wind project using GE 2.5MW turbines
  - **Acciona Eurus (Mexico, 2010):** $71m in senior and mezzanine debt to finance $560m 250 MW wind farm using Acciona 1.5 MW turbines ; CTF concessional loan of $30m
  - **China Windpower Group (China, 2010):** $10m in equity along with $45m “A” loan and $95m in “B” loans to construct a $150m 201MW greenfield wind farm in Gansu using Sinovel 1.5MW turbines
- **Downstream Solar PV:**
  - **Mahindra Solar One (India, 2011):** $5m loan for solar power developer for 5MW project

IFC investments in other Renewables

- **Hydro:**
  - Over 40 hydro investments totaling more than 4,500 MW of capacity
- **Geothermal:**
  - IFC participated in the IPO of a partially privatized vertically integrated geothermal company with subsequent corporate loans in the Philippines
  - **Polaris Energy (Nicaragua, FY11):** $50m in senior and subordinated loans for landmark binary cycle geothermal power plant in San Jacinto
  - **Orzunil (Guatemala, FY07)**: 24MW geothermal power plant

IFC’s Investment in China Wind Power

China

China WindPower

China WindPower

A Loan: $45 million
B Loan: $95 million
Equity: $10 million

Shareholder and Lender
June 2010

Construction of 201 MW wind farm in Gansu province, China.
Developed, owned and operated by China WindPower.
Uses Sinovel SL1500 (1.5 MW) turbines.
Sells energy to the Gansu Power Grid, backed by State Grid.
Part of a 3.8 GW wind base being developed in Guazhou.
Built in 7 months from April 2010 until January 2011.

IFC’s Role

IFC invested $10 million equity at the holding level (Hong Kong listed CWP) and arranged the US$150 million debt financing. Debt package features included:

- US$55 million senior debt (A Loan) from IFC with 12-year tenor
- US$95 million senior debt syndicated (B Loan) from three commercial banks: Societe Generale, Intesa/San Paolo, and Rabobank, with 10-year tenor

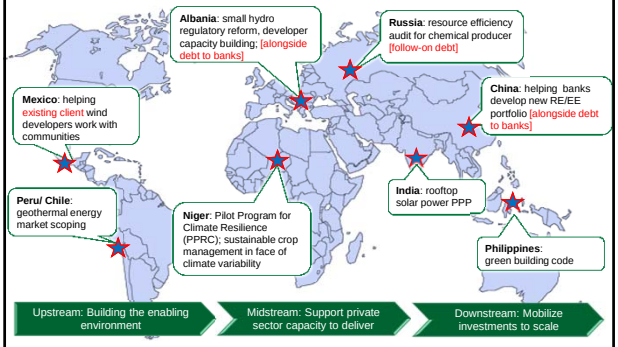
Project/Transaction Highlights

“Asia Renewable Deal of the Year” award 2010 by Project Finance International.
The first wind farm in China to be financed with long-term project finance debt in US dollars from a syndicate of international banks.
First limited-recourse project finance deal in China funded in USD by international banks since 2006.
The Project uses Chinese equipment exclusively.

Developing Markets and Demonstrating Market Viability

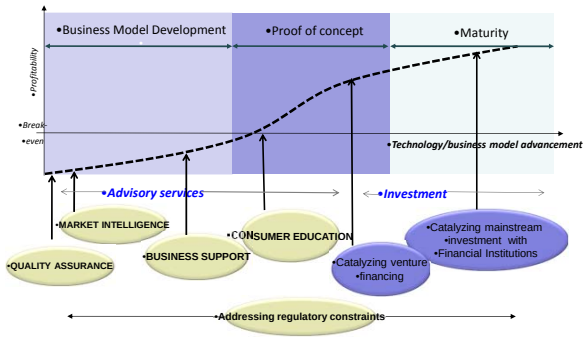
- AS Services work to develop and unlock markets
- Strategic approach to blended finance to build viability of private sector markets

IFC’s advisory services help unlock markets and strengthen climate-smart investments



• Catalyzing market development

• Lighting Africa/Asia operates along the market transformation curve, focusing on specific market support/development activities …



Factors for Successful Private Sector Market Development & Participation

- A renewable resource
- Government Will
  - political push (energy security, energy scarcity, GHG mitigation)
  - Interest/commitment to private sector participation
  - regulatory regime which supports it (including permitting, land, interconnection, etc.)
- Commercial and financial drivers
  - Banking sector interest, understanding
  - PPA’s etc
- Private sector value chain
  - Developers, suppliers, O&M providers, etc.

Thailand Clean Energy: Deepening the market

Objective: Accelerate Private Sector Investments in Solar and Wind Energy

Phase I

- Increase private sector interventions in solar and wind energy in Thailand by reducing roadblocks
- increase renewable energy generation activity in the country.

i) Solar and wind energy development : Increase clarity and ease of implementation of policies/licensing

Phase II

- Increase private sector interventions in solar rooftop projects, by working with the DEDE (Ministry of Energy) to develop policies and structures
- Work with the private sector to develop their business models.

i) Sustainable business models for solar rooftop projects
ii) Island projects

PROJECT DURATION: SEPTEMBER 2012 – JUNE 2015 (3 YEARS)

IFC Sample “Innovations” in Cleantech Area

Applied Solar Technologies (India) is a solar PV based off-grid power solution company that provides off grid solar power currently to telecom towers which often rely on diesel based generation for 50 – 100% of their power requirements. (US$17 million investment)

Husk Power Systems (India) provides off-grid power to rural Indian villages of about 500 households using proprietary technology that cost-effectively generates electricity using a biomass gasifier that creates fuel from rice husks. (US$0.4 million investment)

Azure Power (India) is an independent solar power producer and the first private sector company to implement a megawatt scale grid connected solar photovoltaic power plant in India. (US$10 million quasi-equity investment)

Applied Solar site - Bihar, India

Husk Power plant - Bihar, India

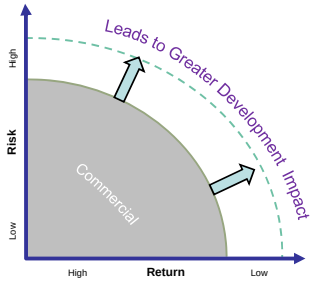
Addressing commercial and financial drivers: IFC’s Principles for deploying Blended Finance

Moves Beyond IFC Additionality	• Only supports transactions where both the client and IFC need a subsidy to complete a transaction
Avoids Market Distortion	• **Minimum concessionality**: Provide minimal subsidy to make project happen and accelerate market transformation
Leads to Sustainability	• **Time-bound:** should not be applied where long term subsidies are required; limited in time (e.g.: 5-8 years); allows for demonstration • Targeted for specific barriers (risk and cost) inhibiting investment • **Link with Advisory Services**: Broaden impact and achieve market transformation
Promotes Transparency	• **Conflicts of interest addressed by:** Blended Finance Committee approves use, structure and terms of concessional donor funds; Blended Finance IOs structure/process and supervise concessional donor funds in a transaction • **Cost effectiveness** to achieve development impact

Subsidy benefits project as a whole, not IFC alone

Purpose of Concessional Funds:

to catalyze investments that would otherwise not happen and which are just beyond commercial viability



Infrastructure

Eléctrico del Valle de México

La Mata - La Ventosa
Mexico

CTF - $15,000,000
IFC - $21,900,000
Sub Debt
2010
Wind/RE Generation

Wind Generation in Mexico: Sub-debt with concessional price

- Concessional financing for development of 67.5MW wind farm in Oaxaca, Mexico
- $21.9M IFC senior loan
- $103M senior loan by other lenders
- $15M CTF concessional subordinated loan:
  - Deferral mechanism with rate step up if deferral activated
  - Concessional pricing to offset some early entrant costs
- Subsidy: 1.4% of project cost

	IFC A Loan	CTF Sub Loan
Amount ($M)	21.9	15.0
Tenor (years)	15 years	
Pricing	10.5%	1.5%

Select Investments in Power in Asia

India TATA POWER CGPL Ultra Mega A Loan: $450 million Lender 2008	India Techno Wind Equity: $5 million Shareholder and Lender 2011	India Powerorid A Loan: $100 million B Loan: $120 million Parallel Loan: $50 million Lender 2012	Philippines Energy Dev Corp II $75 million Lender 2011
India Azure Power Mezzaine (CCD) $7.5 million Equity: $4.5 million Shareholder 2010	Thailand SPC Korat 1 Equity: $1.7 million Shareholder 2010	India Applied Solar A Loan: $10 million Equity: $9 million Shareholder and Lender 2010	China China WindPower A Loan: $45 million B Loan: $95 million Equity: $10 million Shareholder and Lender 2010
Philippines SNAP Loan : $70 million Lender September 2008	Philippines SNAP B A Loan: $74.39 million B Loan : $15 million Lender June 2008	Philippines Masinloc Power P Loan :$177 million Equity : $22.10 million Lender February 2008	Lao Republic Electricite Lao II Loan : $15 million Lender August 2010

Financial Products - From Equity to Debt

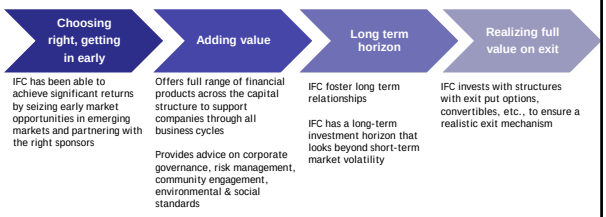
- Corporate and JV
- Typically 5-15% shareholding (not to exceed 20% of total equity)
- Long-term investor, typically 6-8 year holding period
- Not just financial investor, adding to shareholder value
- Infraventures (early equity investments)

- Subordinated loans
- Income participating loans
- Convertibles
- Other hybrid instruments

- Senior Debt (corporate finance, project finance)
- Fixed/floating rates, US$, Euro and local currencies available
- Commercial rates, repayment tailored to project/company needs
- Long maturities: 8-15 years, appropriate grace periods
- Range of security packages suited to project/country
- Mobilization of funds from other lenders and investors, through
- Co-financings, syndications, underwritings and guarantees

IFC’s Approach to Equity Investments

- *IFC own account investments are typically limited to 25% of the total capitalization of the company or the project*
- *IFC equity ownership is typically limited to 20%*
- *IFC does not operate companies*



IFC has been able to achieve significant returns by seizing early market opportunities in emerging markets and partnering with the right sponsors

Offers full range of financial products across the capital structure to support companies through all business cycles

Provides advice on corporate governance, risk management, community engagement, environmental & social standards

IFC foster long term relationships

IFC has a long-term investment horizon that looks beyond short-term market volatility

IFC invests with structures with exit put options, convertibles, etc., to ensure a realistic exit mechanism

What Blended Finance Investments should NOT do

- Be structured as grants or giveaways
- Crowd out IFC or other commercially driven financiers
- Seen to provide additional financial returns for IFC
  - e.g. CAPRI+ pricing for IFC loan along with concessionally priced loan
  - Help IFC compete in price
- Address Integrity Due Diligence or reputational issues
  - Always deployed alongside a new IFC investment
- Mitigate credit issues in existing IFC deals
- Perceived to distort markets
  - Strong emphasis on minimal concessionality
  - Concessional investment cannot exceed IFC’s investment amount

Public – Private Partnerships in Financing Renewable Energy

APEC Workshop on Best Practices on Financing Renewable Energy

June 4 and 5, 2013

Public-Private Partnerships (PPPs) – Why?

- General Aspects of PPPs
  - PPPs consist of contract(s) between public authorities and private sector actor(s) that take advantage of the potential efficiencies each can deliver in terms of managing certain risks.
  - PPPs broaden the scope of the private sectors participation (often limited to construction) to include design, engineering, operations and maintenance, even the provisions of public services.

Why?

- Shortcomings in public sector investments;
- Lays foundations for economic growth;
- Introduces new financing structures, thus transferring management of financing to private sector; and
- Improves quality of services.

Typical Contractual Models are:

- BOOT – (Build-Own-Operate-Transfer); and
- BOT (Build-Operate-Transfer)
  - With a BOOT contract, the “concession grantor” transfers rights of ownership to the “concessionaire” – the private party.
  - With the BOT contract, the right to exploit is granted for a period of time or until some agreed margin is recovered. The private sector makes the investment in capital and expertise. At the time of transfer, the assets (the maker), related IP and know-how to the public sector operator.

2

- Examples of PPP Contracts:
  - Management (Contract)
  - Leasing (Contract)
  - Rehabilitate, Operate and Transfer (ROT) (Concession)
  - Build, Lease and Own (Greenfield)
  - Partial or Full Privatization (Divestment)
- A typical contract provides:
  - Descriptions of the service(s) to be provided;
  - Expected recovery by operator;
  - Tariffs and other financial arrangements;
  - The guarantees going both ways;
  - Contract termination term and damages; and
  - Insurance coverages, among other things

3

Funding

- Project Financing Alternatives
- Traditional Financing
- Capital Markets
- Pension Funds
- Public Initiative Investment Funds
- Private Initiative Investment Funds
- Financial Investments
- The Role of Guarantees
- The Role of Subsidies – Direct and Indirect

4

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5

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An Equity Owner’s Perspective on Successful Renewable Energy Project Financing

June 5th, 2013
Ryota Sakakibara, Head of Southeast Asia IPP Team
Mitsubishi Corporation

Mitsubishi Corporation

1. Introduction of MC’s IPP Business

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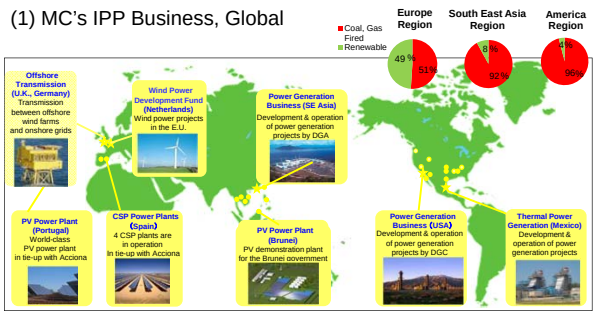
(1) MC’s IPP Business, Global



Diamond Generating Europe, Limited.
・Investment: 2011
・Head office: London
・Shareholders: Mitsubishi Corp.
・Business: To develop, own and operate power plants in Europe region.

Diamond Generating Asia, Ltd. (DGA)
・Investment: 2009
・Head office: Hong Kong
・Shareholder: Mitsubishi Corp.
・Business: To develop, own and operate power plants in South East Asia region.

Diamond Generating Corp.(DGC)
・Investment: 1999
・Head office: Los Angeles, USA
・Shareholder: Mitsubishi Corp.
・Business: To develop, own and operate power plants in America region.

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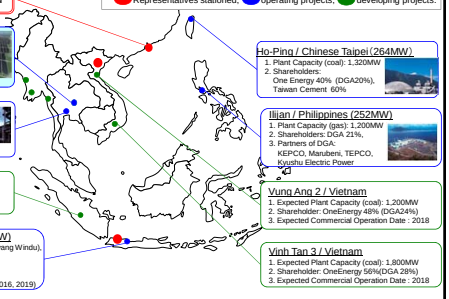
(2) MC’s IPP Business, Southeast Asia

Diamond Generating Asia Ltd

* Net equity capacity of MC is written in the blank.
* Representatives stationed, operating projects, developing projects.



Lopburi / Thailand (21MW)
1. Plant Capacity (solar): 63MW (AC)
2. Shareholders: DGA, CLP, EGCO (33% each)
3. EPC Contractor: Sharp
4. Commercial Operation Date: March 2012

EGCO / Thailand(579MW)
1. Project Capacity: 7,303MW (20 power projects).
2. Shareholders (listed share): EGAT 25%, TEPDIA 24%(DGA 12%)

Sumsel 9&10 / Indonesia
1. Expected Plant Capacity (coal): 1,800MW
2. Shareholders: DGA 33%, EDF 33%, EGCO 24%, DHEnergy 10%

Wayang Windu / Indonesia（46MW）
1. Plant Capacity (geothermal): 230MW(Wayang Windu), 40～80MW(Jailolo)
2. Shareholders: DGA 20%, Prajogo 80%
3. Commercial Operation Date : 2006 (Expected Commercial Operation Date : 2016, 2019)

Ho-Ping / Chinese Taipei (264MW)
1. Plant Capacity (coal): 1,320MW
2. Shareholders: One Energy 40% (DGA20%), Taiwan Cement 60%

Ilijan / Philippines (252MW)
1. Plant Capacity (gas): 1,200MW
2. Shareholders: DGA 21%,
3. Partners of DGA: KEPCO, Marubeni, TEPCO, Kyushu Elecric Power

Vung Ang 2 / Vietnam
1. Expected Plant Capacity (coal): 1,200MW
2. Shareholder: OneEnergy 48% (DGA24%)
3. Expected Commercial Operation Date : 2018

Vinh Tan 3 / Vietnam
1. Expected Plant Capacity (coal): 1,800MW
2. Shareholder: OneEnergy 56%(DGA 28%)
3. Expected Commercial Operation Date : 2018

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2. Key Factors on Investing in Renewable Energy IPP Business

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1. Strong Leadership of the Government	・Clear plan and regulation on renewable energy. Ex: Alternative Energy Development Plan (Thailand), Renewable Energy Act 2011 (Malaysia), Crash Program (Indonesia), Philippine National Renewable Energy Program (Philippine), etc.
2. Long Term Power Purchase Agreement Supported by Feed-in Tariff	・Long term and stable earnings from long term Power Purchase Agreement. ・High rate and long duration Feed-in Tariff.
3. Tax Incentives	・Exemption of Corporate Income Tax. ・Exemption of Import Tax.
4. Transmission Capacity	・Sufficient capacity for renewable energy power plants. ・Expansion of capacity synchronized with the development plan on renewable energy.
5. Efficient Environmental Assess	・Efficient process to assess the impact leads to lower the cost of Environmental Impact Assessment.

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1. Strong Leadership of the Government

Country:	Thailand	Indonesia	Malaysia	Philippines
Plan:	Alternative Energy Development Plan	Crash Program	National Renewable Energy Policy and Action Plan	National Renewable Energy Program
Objective:	To sustainably develop alternative energy as one of the main energy for fossil fuels substitution and oil import replacement.	To accelerate development of power plant using renewable energy, coal, and gas.	To increase renewable energy contribution in the national power generation mix; To facilitate the growth of the renewable energy industry; To ensure reasonable renewable energy generation costs;	To establish the framework for the accelerated development and advancement of renewable energy resources, and the development of a strategic program to increase its utilization.
Duration:	2012-2021	2010-2014	2011-2050	2011-2030
Target Additional Capacity (MW):	9,201MW	10,000MW	11,544MW	15,236MW
Target on Renewable Energy:	Biomass: 3,630MW Biogas: 600MW Hydro: 1,608MW New Energy: 3MW Solar: 2,000MW Waste: 160MW Wind: 1,200MW	Achieve 51% on renewable energy. (geothermal 39%, and hydro 12%)	Biomass: 1,340MW Biogas: 410MW Hydro: 490MW Solar: 8,874MW Waste: 430MW	Biomass: 306MW Hydro: 8,729MW Geothermal: 3,467MW Ocean: 70MW Solar: 285MW Wind: 2,378MW

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2. Long Term Power Purchase Agreement Supported by Feed-in Tariff

(1) Thailand

Installation Capacity of Renewable Source	Adder Rate 2009 (baht / kWh)	Adder Rate 2010 (baht / kWh)	Duration (years)
Biomass&Biogass≦1MW	0.5	0.5	7
Biomass&Biogass＞1MW	0.3	0.3	7
Waste(fertilizer & landfill)	2.5	2.5	7
Waste(thermal process)	3.5	3.5	7
Wind≦1MW	4.5	4.5	10
Wind＞1MW	3.5	3.5	10
50KW＜Small Hydro＜200KW	0.8	0.8	7
Small Hydro＜50KW	1.5	1.5	7
Solar	8	6.5	10

(2) Malaysia

* as of May 17th, 2013

Renewable Source	Tariff Rate (rm / kWh)	Duration (years)	Degression Rate (% / year)
biogas	0.28 - 0.43	16	0.5 - 1.80
biomass	0.27 - 0.47	16	0.5 - 1.80
small hydro	0.23 - 0.24	21	0.0
solar photovoltaic	0.68 - 1.64	21	8.0

(3) Philippines

Renewable Source	Tariff Rate 2012 (peso / kWh)	Duration (years)
Biomass	6.63	20
Hydro	5.90	20
Solar	9.68	20
Wind	8.53	20

(4) Indonesia

Renewable Source	Tariff Rate 2012 (kWh)	Remark
Biogas, Biomass	975rp-1,325rp/kWh	Ministerial Regulation No. 04/2012
Geothermal	10 ¢ -18.5 ¢ /kWh	Ministerial Regulation No. 22/2012
Hydro	656rp-1,000rp/kWh	Ministerial Regulation No. 04/2012
Solar	N/A	N/A
Wind	N/A	N/A

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3. Tax Incentives

Thailand	Indonesia	Malaysia	Philippines
Exemption of corporate income tax for 5 to 8 years;	Reducing of net income amounted to 30% of investment;	Pioneer Status with income tax exemption of 100% of statutory income for 10 years; or	Exemption of income tax for 7 years;
Exemption of import tax for machinery;	Income tax on dividends to foreign taxpayer amounted to 10%;	Investment Tax Allowance of 100% on the qualifying capital expenditure incurred within a period of 5 years.	Corporate tax rate of 10% on its net taxable income (after 7 years exemption of income tax);
Receiving non-tax incentives (permit to bring in experts and to own land).	Exemption of income tax on import for machine and equipment.		Exemption of import tax on renewable energy machinery.

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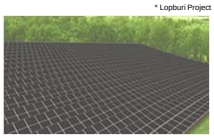
4. Transmission Capacity

Out put of the renewable energy is subjected to natural variability, renewable energy generating electricity has a fluctuating out put.

In order to accept the fluctuation, large capacity of transmission net work is necessary.

* Lopburi Project



* Goshen Ⅱ Wind Farm Project

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5. Efficient Environmental Assess

Thailand	Malaysia	Philippines
Not required	**Not required**	**Required, but short process**

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3. Our Best Practice of Financing Renewable Project in Southeast Asia

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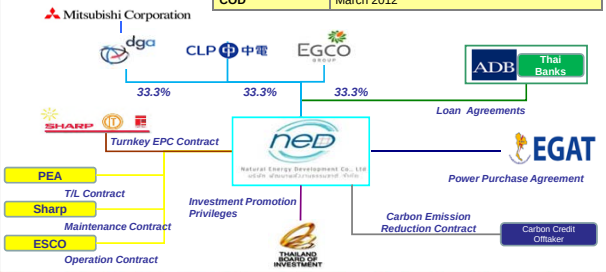
1. NED Project Outline

Project Company	Natural Energy Development Company, Limited
Fuel Type	Solar Photovoltaic (SHARP Thin-Film Tandem)
Project Capacity	63 MW AC (84 MW DC)
Site Location	Lopburi Province (190 ha)
COD	March 2012



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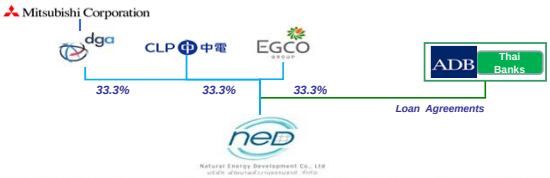
2. NED Project Financing Outline

Project Cost:	8,500 mil baht	Equal to 250 mil USD.
Debt Equity Ratio:	70 : 30	Equal to 175 mil USD, 75 mil USD.
Tenor:	16 years (ADB), 10 years(Thai Banks)	From commercial operation date, fixed interest rate.

Small project cost compared to thermal projects.

Acceptable debt equity ratio.

Power purchase agreement covers debt tenor.



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3. Key Factors

1. Strong Leadership of the Government

Over view of Thailand’s Government strong commitment.

1. Alternative Energy Development Plan: Seeks to bring renewable energy to 20% of final energy consumption by 2020.
2. Long-term Power Development Plan (2010-2030): A forecast of load growth, the additional capacity of power plants to be built.
3. 20-Year Energy Efficiency Development Plan: Aims to reduce energy intensity by 25% in 2030, compared with that in 2005.

Clear plan on renewable energy.

2. Long Term Power Purchase Agreement Supported by Feed-in Tariff

Over view of Power Purchase Agreement and Adder System.

1. Power Purchase Agreement:
   - NED sells contracted capacity of 55 MW to EGAT and PEA for 5 years.
   - PPA will automatically extend on continual basis, maximum of 25 years.
2. Adder System:
   - 8 baht/kWh during the first 10 years.

Long term and stable earnings from Power Purchase Agreement and high rated Feed-in Tariff.

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4. Key Factors

3. Tax Incentives

Over view of tax incentives.

1. Execution on Income Tax for first 8 years.
2. 50% reduction on Income Tax for the next 5 years. (30% income tax for the last 12 years.)

Exemption of Corporate Income Tax.

4. Transmission Capacity

Confirmation of transmission capacity.

1. Off-taker (EGAT) is responsible for connection to the transmission line.
2. Transmission Capacity is confirmed through Grid Impact Study.

Capable for connecting to the transmission line.

5. Efficient Environmental Assess

Over view of Environmental Assess System.

1. Environmental Impact Assess is not necessary for Clean Projects in Thailand.
2. The has submitted Environmental Impact Assess, for Lender and CDM project approval.

Lowered the cost of Environmental Impact Assess.

APEC Workshop on Financing Renewable Energy

Hanoi, 04-05 April 2013

THE PUBLIC SECTOR PERSPECTIVE ON FINANCING RENEWABLE ENERGY IN VIET NAM

By: Nguyen Duc Cuong
Center for Renewable Energy, Institute of Energy

Contents

1. Overview

❖**Population (2012): 88.78 mill. GDP (2012): 136 bill. US$**
❖**Primary energy supply: 64.147 KTOE (2010)**
❖ **Final energy consumption: 50,547 KTOE (2010)**

Still energy exporter

Energy export :
- Crude oil: 7242 mill. USD (2011)
- Coal: 1632 mill. USD (2011)
- Electricity: 1224 GWh (2012)

Energy import :
+ Oil products : 10.67 mill. Tons (2011)
+ Coal: 1.100 mill. tons(2011)
+ Electricity 2676 GWh (2012)

1. Overview

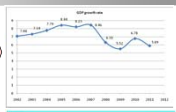
❖**RE plays an important role in total energy supply, especially in households and rural areas:**
- *Biomass: 60% rural Households use biomass to meet thermal need*
- *SHP and other RE : supply about 4.5 billion kWh*
- *Biogas: over 1,000,000 m³ of digestion plants, supplying 65 KTOE/year*
- *Solar heat: 180,000m² of absorption area – saving 36-54 mill.kWh/year*

❖**Development at moderate share in comparison with potential**
- *RE electricity: 3.7% (2012)*
- *Regenerative heat: negligible (high efficient equipment)*
- *Bio-energy: market not available yet*

❖**Vietnam is depending on the world energy price in coming time because:**
- *Large hydropower sources: already developed*
- *Limitation of domestic gas and coal sources*
- *From energy exporting country ⇒ importing one, firstly importing coal for electricity generation*

2. Excellent fundament for RE development

FAST ECONOMIC GROWTH
- Average GDP growth during the past 10 years: *7.2%*
- GDP growth Forecasted for the next 10 years: *~7.0%:*
- Electricity demand increased fastly, driven by economic development, population & income growth



ENERGY AND ELECTRICITY DEMAND
- During past 10 years: *Energy: 10%/year*
  Electricity: 14.5%/year
- Next 20 years: Electricity *increase 6 time*

RENEWABLE ENERGY POLICY
- FIT for wind power: *7.8 UScents/kWh (2011)*
- Avoided cost for small hydro power: issued in 2008
- Existing (2011), shared by renewable electricity *:3.7%;*
- Gov. targets in sharing by renewable electricity: *in 2020: 4.5%; in 2030: 6% (power generation);*

ABUNDANCE RE RESOURCE

Solar energy: 4-5kWh/m² day; Biogas: >100MW
Wind energy: >6200MW (7m/s); Geothermal: 340MW
Biomass: >100,000 ton (>2000MW); Tide, bio-fuels
MSW: >320MW Small Hydro:>7000MW

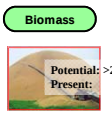
2. Excellent fundament for RE development

RE for Power (on and off grid)

Small Hydro

Potential: > 7.000 MW
Present: >1100 MW

Biomass



Potential: >2500 MW
Present: 150 MW

Biogas

Potential: >100 MW
Present: >0,5 MW

Solar energy

Potential: 4-5kWh/m²
Present: 4 MW
Grid-connected: 0.6MW

Wind energy

Potential: 8% of total national areas (6-7 m/s)
Present: 55 MW
Many projects (F/S): ~3000MW

Geothermal

Potential: 340 MW
Present: 0 MW

M.Solid wastes

Potential: >320 MW
Present: 2,4 MW

Ocean energy

Potential of tidal power: 100-200 MW
Present: 0 MW

2. Excellent fundament for RE development

RE for heat production and use processes

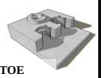
Solar

Potential: >10000 KTOE
Present: 0.86 KTOE

Biogas

Potential: 400 KTOE
Present: 80 KTOE

Biomass



Potential: >20,000 KTOE
Present: 13,513 KTOE

Bio-fuels

Bio-gasoline

- Potential: not identified yet
- Present: 6 bio-fuels under construction with average capacity: 100 millions litters/year/plant

- ✓Wastes from sugar industry
- ✓Cassava, corn
- ✓Cellulose

Bio-diesel

Potential: Not yet identified
Present: 0 mill. litters /year (testing on fish fat)

- Jatropa
- Cooking oil
- Tra/basa fish fat
- Other oily plants

Notes: KTOE: thousand tons of oil equivalent

2. Excellent fundament for RE development

Future of RE in Vietnam

- **National Power Development Plan VII,** 2011-2020, vision to 2030
- Renewable Electricity share : **2020**: 4.5%; **2030**: 6.5%.

Period	2011-2015	2016-2020	2021-2025	2026-2030
Growth rate (%)	14.1	9.9	8.1	7.2

Year	2015	2020	2025	2030
Electric generation (GWh))	194	329	489	695

Period	2011-2015	2016-2020	2021-2025	2026-2030
Capital/annual average (bill.USD)	5.864	7.871	7.870	9.656

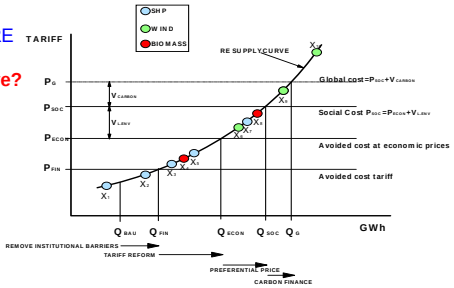
2. Public finance for RE: Current activities

Key perspectives

- Considering development and use of potential RE sources. In first stage focus on deployment of matured technologies with reasonable cost and subsidy levels suitably to conditions of the country.
- Focus on development of RE projects under various forms such as off-grid, on-grid, isolated, community scale, household scale, supplying electricity and heat for processing agricultural products and household cooking etc.
- Drive forward market development.
- Priority for off-grid projects in electrification program in remote mountainous areas. Pay attention on RE development in areas where cost is lower than diesel or expansion of national power grid.
- Promoting, increasing share of RE in national energy balance, including energy production in general and electricity, thermal and fuels in particular.
- Integrating RE development with improving social security, property alleviation.
- Integrating RE development with environmental protection, contributing in energy security and sustainable development.

2. Public finance for RE: Current activities

Cost curve of RE technologies:
Below or above?



- **Defining technologies which need support and support levels:**
  - Economic prices of fossil fuels (coal, oil, gas)
  - Long run margin cost of system (PDP VII)
  - Social-environmental costs (impacts, damages)
  - Price of CO_2

2. Public finance for RE: Current activities

Support policies for investors and users

Summary of incentives and supporting schemes

- Loan interest support: Vietnam Development Bank (VDB)
- Loans and equity rate:
  - Loan, max up to 85%
  - Loan term, max up to 20 years
- Support for power prices (Wind): 1 US cents/kWh from Vietnam Environment Protection Fund (39 bill. VND for one wind project with 30MW).
- Price subsidy for products of CDM projects based on RE (Circular No. 58/2008/TTLT-BTC-BTN&MT:
  - Subsidy/kWh = cost/kWh + reasonable profit /kWh – selling price/kWh –CDM selling price
- Support for solar water heaters: 1 mill. VND/system
- Support for household biogas digesters: about 1 mill. VND/system
- Rural electrification: Rural I, II.

2. Public finance for RE: Current activities

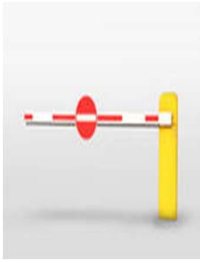
Support policies for investors and users

Summary of incentives and supporting schemes

- Import tax: Exemption for goods which can not yet be produced locally
- Corporation income tax:
  - Tax rate: 10% for duration of 15 years, possible extension to 30 years
  - Tax exemption for first 4 years, 50% tax reduction for next 9 years
- Accelerated depreciation rate
- Power purchasing price: requiring EVN to purchase all of electricity generated from RE resources based on standardized power purchase agreement using:
  - Fixed price for wind power: ~7.8 US cents/kWh (excluding VAT) according to Decision 37/2001/QĐ-TTg.
  - Avoided cost of power generation for other forms of RE: calculated and released annually according to Decision 18/2008/QĐ-BCT
- Land use levy and fee: free
- Environment protection fee: free

3. Key Challenges

1. Economic and financial
2. Policy, regulatory and institutional
3. Technical
4. Awareness/Information



3. Key Challenges

Economic and financial barriers

- ✓ High costs of technology and power purchase price compared to conventional power
- ✓ Subsidies for conventional power
- ✓ Scarcity of financial sources
- ✓ Domestic banks:
  - o Limited capital to provide sufficient finance to RE projects on large scale
  - o Lack of experience of banks on RE sector
- ✓ Limited finance from banks
- ✓ High bank interest rates

3. Key Challenges

Policy, regulatory and institutional barriers

- ✓ No Renewable Energy Law/or Decree which regulates investment
- ✓ First legal framework for wind only: Decision No.37/2011/QĐ-TTg on support mechanism for wind power development
  - o Tariff of 7.8 US cents/KWh: rather low for the specific conditions in Vietnam
  - o Uncertainty concerning the details in the application of this decision
- ✓ No price based support schemes to promote other forms of RE
- ✓ Too low electricity purchasing price for other forms of RE
- ✓ Land use conflict (e.g., many wind projects delayed)
- ✓ Not consistent planning between provincial authorities and government leads to delay of projects

3. Key Challenges

Technical barriers

- ✓ Challenge of small size
- ✓ Access to transmission and distribution
- ✓ Lack of local experts and engineers which consequently creates strong dependence on foreign experts.
- ✓ Lack of domestic production capacities for most RE technologies (import dependence)

3. Key Challenges

Awareness/Information barriers

- ✓ No national planning of RE resources (e.g., wind and solar power planning)
- ✓ Lack of reliable information and data on national RE resource potential
- ✓ Lack of information and awareness about technical know-how and technological development

4. Summaries and conclusions

- Vietnam has a high potential to develop RE projects on various scales.
- Government has an interest in RE development due to rapidly increasing power demand (ensuring of a sustainable socio-economic development).
- Government has recently shown its commitment to promote RE development through several incentives (taxation incentives, feed-in tariff, land use fee, environmental fee etc.), but they are still not strong enough to attract investors.
- Legal framework for RE:
  - ➢ *Government goals for development of RE (PDP VII)*
  - ➢ *National Strategic Program to Respond to Climate Change (2011) and Green Growth Strategy (2012)*
  - ➢ *Renewable Energy/ Wind Power Development Planning on provincial and national level are being developed*
  - ➢ *MoIT's program "Support to the development of RE" is being implemented (biomass, biogas, MSW for grid – connected power generation)*


Thank you
15.07.2013 Page 19

DIRECTORATE GENERAL OF NEW, RENEWABLE ENERGY, AND ENERGY CONSERVATION
MINISTRY OF ENERGY AND MINERAL RESOURCES OF THE REPUBLIC OF INDONESIA

BEST PRACTICE FINANCING RENEWABLE ENERGY IN INDONESIA

Presented by:
Helmi Priko Nainggolan
Head Section for Bioenergy Bussines Monitoring

Presented at :
APEC Workshop on Best Practices on Financing Renewable Energy

Hanoy , June 4-5 2014

OUTLINE

I. INDONESIAN ENERGY POLICY
II. THE DEVELOPMENT OF NEW AND RENEWABLE ENERGY
   A. Geothermal
   B. Bioenergy
   C. Hydro, Solar, and Wind
III. CONCLUSION

I. INDONESIAN ENERGY POLICY

ENERGY POLICY

1. **Energy Conservation** to improve efficiency in energy utilization from up-stream up to down-stream (***Demand Side***) i.e industrial, transportation, household and commercial sector

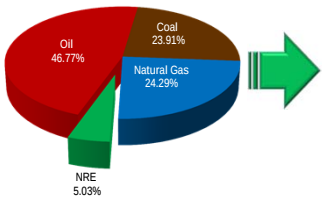
2. **Energy Diversification** to increase new renewable energy share in national energy mix (***Supply Side***). i.e

New Energy
a. Liquefied Coal,
b. Coal Bed Methane,
c. Gasified Coal,
d. Nuclear,
e. Hydrogen,
f. Other Methanes.

Renewable Energy
a. Geothermal,
b. Bioenergy,
c. Hydro,
d. Solar,
e. Wind,
f. Ocean.

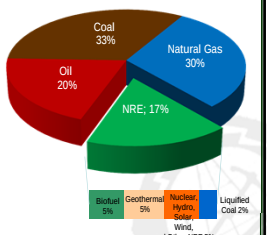
II. NATIONAL PRIMARY ENERGY MIX TARGET

CURRENT CONDITION 2011



ENERGY ELASTICITY= 1,65
NON FOSSIL ENERGY SHARE≈ 5%

2025 TARGET PRESIDENTIAL REGULATION NO. 5/2006



ENERGY ELASTICITY LESS THAN 1 IN 2025
OPTIMIZING NEW RENEWABLE ENERGY SOURCES

THE DEVELOPMENT OF NEW AND RENEWABLE IN INDONESIA

- The objective:
  - To secure the security of energy supply in sustainable way;
  - To reducing the greenhouse gases emission.
- The opportunity:
  - Huge potential of renewable energy that locally available;
  - High growth demand of energy.
- The challenges:
  - Relatively higher production cost;
  - Lack of the smart financial mechanism and incentive

ENERGY PRODUCTION AND POTENTIAL

NO	NEW RENEWABLE ENERGY	RESOURCES	INSTALLED CAPACITY (IC)	RATIO OF IC/RESOURCES (%)
1	2	3	4	5 = 4/3
1	Hydro	75,000 MW	6,848.46 MW	9.13%
2	Geothermal	29,164 MW	1,341 MW	4.6 %
3	Biomass	49,810 MW	1,644.1 MW	3.3%
4	Solar	4.80 kWh/m²/day	27.23 MW	-
5	Wind	3 – 6 m/s	1.4 MW	-
6	Ocean	49 GW ***)	0.01 MW ****)	0%
7	Uranium	3,000 MW *)	30 MW **)	0%

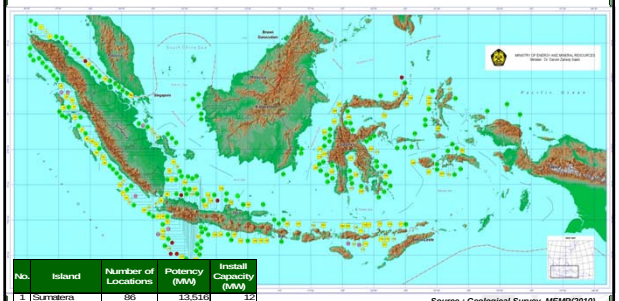
*) Only in Kalan – West Borneo
**) As a center of research, non-energy
***) Source: National Energy Council
****) BPPT's Prototype

NO	FOSSIL ENERGY	RESOURCES	PROVEN RESERVES (PR)	RATIO OF PR/RESOURCES (%)	PRODUCTION (PROD)	RATIO OF PR/PROD (YEAR)
1	2	3	4	5 = 4/3	6	7 = 4/6
1	Oil (billion barel)	7,408.24	3,741.33	0.505	0.314	12
2	Gas (TSCF)	150.70	103.35	0.685	2.98	35
3	Coal (billion ton)	161.3	28.17	17	0.317	89
4	Coal Bed Methane (TSCF)	453.3	-	-	-	-
5	Shale Gas *(TSCF)*	574	-	-	-	-

III. THE DEVELOPMENT OF NEW AND RENEWABLE ENERGY

A. Geothermal

GEOTHERMAL POTENTIAL MAP



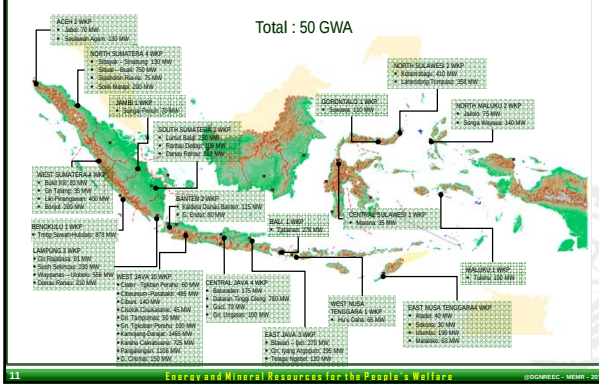
No.	Island	Number of Locations	Potency (MW)	Install Capacity (MW)
1	Sumatera	86	13,516	12
2	Jawa	71	10,092	1,117
3	Bali	6	296	
4	Nusa Tenggara	22	1,471	
5	Kalimantan	8	115	
6	Sulawesi	55	2,519	60
7	Maluku	26	954	
8	Papua	3	75	
	Total	276	29,038	1,189

Source : Geological Survey, MEMR(2010)

Note:
Preliminary Survey
Detail Survey
Ready to Developad
Already Developed

DISTRIBUTION OF GEOTHERMAL WORKING AREA (GWA)

Total : 50 GWA



GOVERNMENT POLICIES TO SCALE UP GEOTHERMAL DEVELOPMENT IN INDONESIA

The Government of Indonesia (GoI) intends to accelerate and speed up the development of geothermal. In order to do so, the government intends to enhance the investment climate for both existing developers as well as new entrants to the geothermal sector in Indonesia.

1. Law No. 27/2003 on Geothermal and Government Regulations No. 59/2007 on Geothermal Business Activities jo Government Regulations No. 70/2010 are the basis of geothermal development Indonesia
2. Presidential Regulation No. 04/2010 jo Ministerial Regulation No. 01/2012 as revised of Ministerial Regulation No. 15/2010 (2nd Stage of 10,000 MW Crash Program) in order to speed up the development of geothermal power.
3. Pricing Policy
   - Ministrial Regulation of MEMR No. 02/2011 on geothermal price structure. The MR gives certainty on electricity price from geothermal power plant:
     - Electricity price as the result of a GWA tender, is represent as purchase price by PT PLN in the Power Purchase Agreement, which is final and non negotiable
     - Ceiling price for geothermal energy: US$ 9.7 cents/kWh
     - If the price exceeds US$ 9.7 cents/kWh, negotiations between Parties are needed.

GOVERNMENT POLICIES TO SCALE UP GEOTHERMAL DEVELOPMENT IN INDONESIA (cont'd)

3. Pricing Policy (cont'd)
   - Fiscal incentives for geothermal development (based on Government Regulation No. 62/2008 jo No. 1/2007; MR of MoF No. 177/PMK.011/2007; and MR of MoF No. 22/PMK.011/2011) :
     - 30% of corporate income tax;
     - 10% of added-value tax paid by the GoI;
     - Custom duties exemption for geothermal developer;
     - 25% per year depreciation for 8 years with double declining balance method; and
     - Investment tax credit 5% per year for 6 years.
   - Currently the mechanism of Feed in Tariff for each GWA is being developed by the GoI in order to make geothermal business more attractive to investors.
4. Access to Potential Geothermal Resources for Investors
   - The Government offers a Preliminary Survey Assignment to third party (investor) which provides "first right refusal".
   - The GoI establishes new GWAs and widely open opportunities for investors to participate in the geothermal business through GWAs tendering mechanism

GOVERNMENT POLICIES TO SCALE UP GEOTHERMAL DEVELOPMENT IN INDONESIA (cont'd)

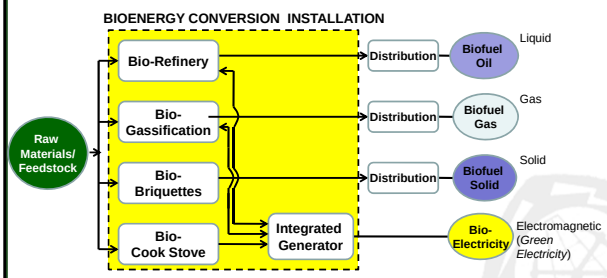
5. In order to accelerate the tender process of new GWAs, the policies which regulate bidding process are being revised in order to make the tender more simple, transparent and bankable.
6. Coordinating with all relevant parties to accelerate and simplify the permit process.
7. Related to Forestry Issues, currently MEMR and Ministry of Forest have signed the MoU regarding the acceleration of geothermal utilization permit within production forest, protected forest, and conservation forest.
8. The government has issued a Presidential Decree that guarantees support for investment in Geothermal Infrastructure Project (PR No. 13/2010 jo PR No.67/2005 and PR 78/2010) and Ministrial of Finance Regulation No. 139/2011 (PMK No. 139/2011) which guarantee the business feasibility of PT PLN for developing electricity from renewable energy, coal, and gas through cooperation with Independent Power Producers.

GEOTHERMAL BUSINESS OPPORTUNITY IN INDONESIA

- Indonesia has geothermal potential approximately 28,000 MW. Currently installed capacity is 1226 MW. Government targeted 9500 MW installed until 2025.
- Government of Indonesia is actively tendering out geothermal new concenssion area in Indonesia. More than 15 new concession area with about 1200 MW has been awarded by Government under new geothermal law.
- Aside from that, there are current geothermal projects are at the stage of development which will need capable and reliable drilling contracts, EPC contractors, manufacturer and supplier for the work related.

A. Bioenergy

BIOENERGY SUPPLY AND UTILIZATION SYSTEM



(1) Bioenergy products consist of:
1. Bio Fuel (Green Fuels)
2. Bio-Electricity (Green Electricity)

(2) Biofuels in point 1.1. consist of:
1. Liquid Biofuel / Green Gasoline
2. Gas Biofuel, or Gas Plant / Green Gas
3. Solid Biofuel, or Bio-Briquette

POTENTIAL OF BIOENERGY

BIOFUELS

- There are huge potential resources for biofuels from Palm Oil, Jatropha Curcas, Nyamplung, Molasses (Sugar Cane), Cassava, Sorghum and Algae.

BIOGAS

- Potential raw material biogas in Indonesia is mainly derived from cattle waste, industrian waste, municipal solid waste, and other organic materials.
- Indonesia has livestock as producers of raw material biogas in significant numbers include 13 million dairy cows and beef cattle, and approximately 15.6 million goats.
- This potential is equal with 1 million unit of biogas digester.

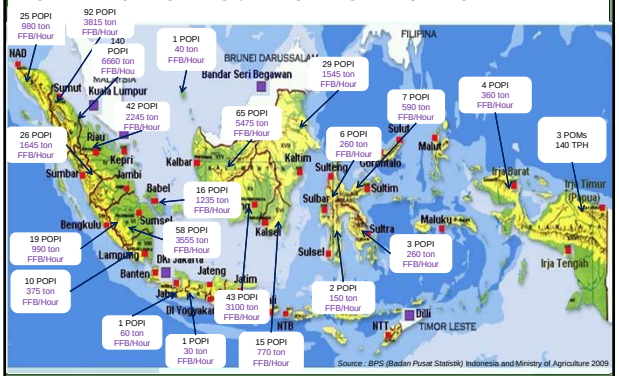
BIOSOLID/BIOMASS: WASTE TO ENERGY

- High potential of biomass waste from agricultural waste and municipal solid waste.

IMPLEMENTATION OF BIOENERGY PROGRAM IN INDONESIA

1. PROGRAM DEVELOPMENT OF BIOFUEL AS FOSSIL FUEL SUBSTITUTION
   - There are 23 biodisel produser and 7 bioethanol producer that have commercial business license to operate in Indonesia.
   - Installed capacity of biodiesel is 4.8 million KL/year and installed capacity of bioethanol is 365.000 KL/year.
   - Utilization of biofuel at transportation sector (with mix by 7,5% at PSO Fuel and 2% at Non PSO Fuel), industry sector (specifically on coal and mineral mining industries), and electricity generation.
2. PROGRAM DEVELOPMENT OF BIOGAS FOR HOUSEHOLD
   - Implemented by government budget through self sufficient energy village program, by private investment, and semi commercial basis through Indonesia Domestic Biogas Programme. This programme implemented by HIVOS, as NGO from Netherlands and funded by Netherlands Governtment. Status until April the total biogas digester that have been built is 4,963 unit from total target is 8,000 unit at the end of 2012.
3. PROGRAM DEVELOPMENT OF BIOENERGY BASED POWER PLANT
   - The existing capacity of biomass, biogas and municipal solid waste power plant that connected on national grid (PT. PLN) by Februari 2012 is 61 MW.

POTENTIAL OF BIOENERGY/PALM OIL WASTE BASED POWER PLANT



POLICY AND REGULATION RELATED TO BIOENERGY BASED POWER PLANT

1. LAW NO. 30 YEAR 2007 concerning on Energy.
2. LAW NO. 30 YEAR 2009 concerning on Electricity
3. PRESIDENTIAL REGULATION NO. 5 YEAR 2006 concerning on National Energy Policy.
4. MINISTRY OF ENERGY AND MINERAL RESOURCES REGULATION NO. 32 YEAR 2008 CONCERNING ON PROVISION, UTILIZATION, AND PROCEDURES OF COMMERCE OF BIOFUEL AS OTHER FUEL (BIOFUELS MANDATORY).
   - Mandatory utilization of biofuel in transportation, industry, and electricity generation sector.
5. MINISTRY OF FINANCE REGULATION NO. 21/PMK.011/2010 concerning on Tax and Custom Facilities for Renewable Energy Utilization.
6. MINISTRY OF FINANCE REGULATION NO. 130/PMK.011/2011 concerning on Provision of Exemption Facilities or Reduction of Income Tax.
7. MINISTRY OF ENERGY AND MINERAL RESOURCES REGULATION NO. 4 YEAR 2012 concerning on Electricity Price Purchased by PT. PLN from Small Scale and Medium Scale Renewable Energy Electricity Generation or Excess Power.

BIOFUEL USAGE MANDATORY

Ministry of Energy and Mineral Resources Regulation Number 32 Year 2008

BIOETHANOL (Minimum)

Sector	2008	2009	2010	2015	2020	2025
Transportation, PSO	3% (Existing)	1%	3%	5%	10%	15%
Transportation, Non PSO	5% (Existing)	5%	7%	10%	12%	15%
Industry		5%	7%	10%	12%	15%

BIODIESEL (Minimum)

Sector	2008	2009	2010	2015	2020	2025
Transportation, PSO	1% (Existing)	1%	2.5%	5%	10%	20%
Transportation, Non PSO		1%	3%	7%	10%	20%
Industry	2.5%	2.5%	5%	10%	15%	20%
Electricity	0.1%	0.25%	1%	10%	15%	20%

MINISTRY OF FINANCE REGULATION NUMBER 21/PMK.011/2010

Regulation of tax and customs facility for renewable energy resources utilization activities

FINANCIAL INSTRUMENTS SUPPORT

Income Tax	Value Added Tax	Import Duty	Tax Borne by Government
• Reduced net income for 30% of total investment • accelerated depreciation • Imposition of Income Tax on dividend p aid to Foreign Taxable at 10% • compensation for losses in certain circumstances	Exemptions of VAT for Taxable Goods, machinery and equipment for RE utilization (not included spare parts)	Exemptions for Import Duty of ❑ Goods and Machinery for development and capital investment ❑ Capital Goods Imports for construction and development of electricity industry	Regulated in State Annual Budget Law and its implementing regulations

MINISTRY OF FINANCE REGULATION NUMBER 130/PMK.011/2011

Concerning on Provision of Exemption Facilities or Reduction of Income Tax

CORPORATE TAXPAYERS

can get facilities:

EXEMPTION OR REDUCTION OF CORPORATE INCOME TAX

EXEMPTION OF CORPORATE INCOME TAX

5 - 10 tax year

After the end of Corporate Income Tax exemption facility

REDUCTION OF CORPORATE INCOME TAX

50% of Income Tax Payable for 2 tax yearh

Minister of Finance may provide facilities Corporate Income Tax exemption or reduction for a period EXCEED predetermined period of time

? The facility can be utilized if:
1. Had executed the entire capital investment
2. Has been produced commercially

PIONEER INDUSTRIES

- **Having a new investment plan min. IDR 1 trillion**
- **Placing funds in the Indonesian banking min 10% from the total capital investment plan**
- **Existed as ENTITY INDONESIA**

- Industry of Basic Metals Manufacutre
- Industry of Oil Refining and / or Basic Organic Chemicals sourced from Oil and Natural Gas
- Industry of Machinery
- **INDUSTRY OF RENEWABLE RESOURCES FIELD**
- Industry of Communications Equipment

PIONEER INDUSTRIES

MINISTRY OF ENERGY AND MINERAL RESOURCES NUMBER 4 YEAR 2012

Concerning On Electricity Price Purchased by PT. PLN from Small Scale and Medium Scale Renewable Energy Electricity Generation or Excess Power

No.	Energy	Capacity	Electricity Tariff	Note
Medium Voltage				
1.	Biomassa	until 10 MW	Rp. 975,- / kWh X F	
2.	Biogas	until 10 MW	Rp. 975,- / kWh X F	Non Municipal Solid Waste
3.	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1050,- / kWh	*Zero waste *)*
4.	Municipal Solid Waste (MSW)	until 10 MW	Rp. 850,- / kWh	*Landfill *)*
Low Voltage				
1	Biomassa	until 10 MW	Rp. 1.325,- / kWh X F	
2	Biogas	until 10 MW	Rp. 1.325,- / kWh X F	Non Municipal Solid Waste
3	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1.398,- / kWh	*Zero waste *)*
4	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1.198,- / kWh	*Landfill *)*

- **F as an incentive factor based on the region where the power plant installed, as follows:**
  - **Jawa, Bali, and Sumatera region : F = 1**
  - **Kalimantan, Sulawesi , NTB and NTT region : F = 1,2**
  - **Maluku and Papua region : F = 1,3**

Note : **) Based on Act No. 18 Year 2008 concerning to Waste Management.*

C. Hydro, Solar, and Wind

MAP OF POTENTIAL MIKROHYDRO-POWER

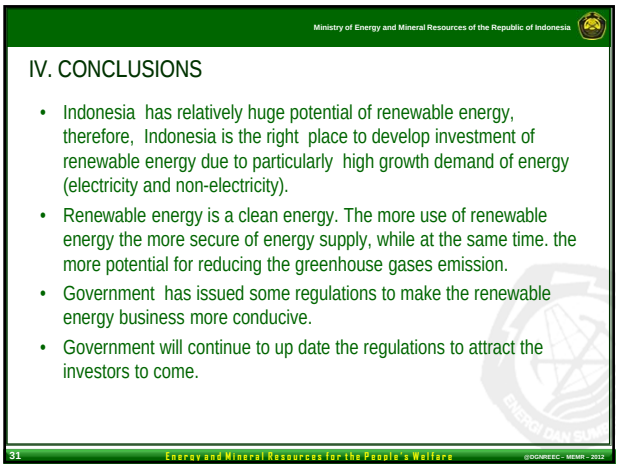
MAP OF EXISTING MIKROHYDRO-POWER

Utilization of Microhydropower potential in Indonesia has been developed in different regions

MEASUREMENT OF WIND POTENTIAL MAP

PROGRAM OF SOLAR ENERGY, WIND AND OCEAN ENERGY

1. RURAL ELECTRICITY:
   to increase rural community accessibility to electricity;
2. URBAN ELECTRICITY:
   targeting middle and high class household, real estate, office and commercial buildings, hotel and resort, industry to install/use particularly solar PV;
3. ELECTRICITY FOR FRONTIER ISLAND:
   targeting community in the island located along the country border line


Ministry of Energy and Mineral Resources of the Republic of Indonesia
IV. CONCLUSIONS
• Indonesia has relatively huge potential of renewable energy, therefore, Indonesia is the right place to develop investment of renewable energy due to particularly high growth demand of energy (electricity and non-electricity).
• Renewable energy is a clean energy. The more use of renewable energy the more secure of energy supply, while at the same time. the more potential for reducing the greenhouse gases emission.
• Government has issued some regulations to make the renewable energy business more conducive.
• Government will continue to up date the regulations to attract the investors to come.
31
Energy and Mineral Resources for the People's Welfare
@DGNREEC – MEMR – 2012


Thank You
Go Green Indonesia !
green energy, future energy
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DIRECTORATE GENERAL OF NEW, RENEWABLE ENERGY, AND ENERGY CONSERVATION
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Energy and Mineral Resources for the People's Welfare