ECONOMIC AND SOCIAL COMISSION FOR WESTERN ASIA (ESCWA)
ECONOMIC COMISSION FOR EUROPE (ECE)

Regional Training Workshop on: "Renewable Energy project development, finance and business planning" - 3-4 May 2016, Rabat, Morocco

Workshop Summary

The Economic and Social Commission for Western Asia (ESCWA), in cooperation with the Energy Investment Company (SIE) in Morocco, organized a training workshop on "Renewable Energy projects development, finance and business planning". The workshop was held on the 3rd and 4th of May 2016, in Rabat, Morocco. The training is part of the activities included in the United Nations Development Account (UN DA) capacity-building project, led by ESCWA in partnership with UN ECE, on "Promoting Renewable Energy Investments for Climate Change Mitigation and Sustainable Development''

The workshop offered an opportunity for regional experts, officials and project developers to receive a technical training in renewable energy project development, business planning and project financing. It also provided participants with an overview of several experiences of financing RE in Morocco, Lebanon and other countries in the Arab region and elsewhere.

The workshop was structured around six sessions. Session 1 introduced the challenges and potential solutions associated with financing RE projects, based on the Moroccan experience and other regional experiences. Session 2 covered the role of financing institutions in promoting RE projects, with case studies provided by a Moroccan bank and a Lebanese bank. Sessions 3 to 6 were dedicated to Part 1 through part 4 of the training course focusing on the RE project development process and financing engineering and business planning. The last session (part 4 of the training course) was dedicated to a group practice involving five groups of participants; with each group performing the analysis of a specific RE project.

Nine project developers, representing the majority of the submitted projects, were invited to the workshop in addition to participants from other ESCWA Member Countries that did not submit proposals. Participants from UN ECE Member Countries were also invited by UN ECE to attend the workshop. A total of thirty-three participants from both UN ESCWA and UN ECE Member Countries attended the workshop in addition to four UN staff, a training facilitator and four speakers.

Opening Session: Overview of the Project & Expected Outcomes from the Workshop

3 May 2016, 09:00 – 09:45

The present UN DA project, on "Promoting Renewable Energy Investments for Climate Change Mitigation and Sustainable Development'', is designed to work closely with RE policy makers, project developers, and other RE stakeholders in the Member Countries, to carry out several capacity building activities related to promoting RE investments. These activities aims at: (a) Developing the skills of the public and private sectors at the national level to identify, develop and implement RE investment projects, (b) Providing assistance to authorities to introduce regulatory and institutional reforms needed to support these investment projects, (c) Enhancing the financing of renewable energy projects in selected countries. Activities also include case studies on the experience of policy reforms, regional trainings, workshops and seminars.

This regional training workshop is one of the main activities of the UN DA project, and focuses on providing capacity building material on financial engineering tools and business planning processes for selected

Renewable Energy (RE) project developers and other relevant stakeholders, in conformity with the UN DA "regional training" topics (Activity A 1.1 in the Project Document).

The workshop was organized in collaboration with the Energy Investment Company (SIE) in Morocco, representing the financial arm of the State for the execution of the Moroccan energy mix by 2020. It operates both in investment and in the development of renewable energy projects and energy efficiency. As part of its tasks, SIE's role is to develop financing solutions to serve the financial needs of national projects, within a rationale of financial leverage. The workshop benefited from this valuable partnership with SIE to cover the Moroccan approach in public financing of RE projects.

Session 1: Financing Renewable Energy Projects – Challenges & Potential Solutions

3 May 2016, 09:45 – 11:45

The first session included three presentations to introduce the challenges and potential solutions associated with financing RE projects, based on the Moroccan experience and other regional experiences.

The first presentation covered the Moroccan financing schemes and mechanisms for financing RE projects based on the SIE' experience. The second presentation covered some schemes for developing and financing RE based on "Enel Green Power"' experience in the Mediterranean and African Regions. The third presentation, based on the experience of the "Renewable Energy Solutions for the Mediterranean (Res4Med)" program, covered the potential of accelerating investments in RE in the MENA and African regions through enhancing public-private partnerships, ,

- *Moroccan financing Schemes and mechanisms for financing RE projects*

  The Energy Investment Company (SIE) in Morocco represents the State financial arm for the execution of the Moroccan energy mix by 2020. It operates both in the investment and in the development of renewable energy projects and energy efficiency. As part of its tasks, SIE's role is to develop financing solutions to serve the financial needs of national projects, within a rationale of financial leverage.

  Morocco adopted the following four energy strategic orientations: (1) Diversifying the energy mix, by applying reliable and competitive energy technologies, (2) Mobilizing national resources, especially renewable resources, (3) Making energy efficiency (EE) a priority along all economic public and private sectors and (4) aiming towards strategic regional energy integration.

  The existing RE potential amounts to 25000 MW of wind energy and a solar potential of 6.5 KWh/m2/day. In addition to a strong emphasis on energy efficiency programmes. Morocco is planning to reach a total share of power capacity from RE of 52% by 2030. Morocco developed a clear vision to build a new economic and social system based on the principles of sustainable development. This vision is being supported by the implementation of an attractive regulatory framework to develop RE and apply EE measures.

  In this context, SIE is today the main instrument that the State is using to invest in the energy sector and more specifically in renewable energies and energy efficiency, therefore constituting an important element of the national scheme set up to implement the national strategy.

  SEI overlooked the development of dedicated financial instruments, in cooperation and partnership with national banks and international banks and private funds.

  SEI Positions itself as a Co-developer in Renewable Energy and Energy Efficiency projects, a state investor in energy with a priority given to RE & EE, and a Fund raising leverage. SEI's present missions include: Providing support to National programmes, mid voltage sector coverage, mainly through photovoltaic, boost investment in Energy Efficiency in the Country and Industry support in SIE Domain (scope of SIE action). SIE takes into consideration the social and economic returns whenever possible; job creation and people's welfare, as well as the regional integrational aspects of funded projects.

To conclude, comprehensive and Complete Frameworks, that make economic sense, need to be sought in the development of RE policies. These policies need to be implementable and therefore require the development of adequate institutional and legislative frameworks.

- *Enel Green Power development and financing RE experiences in the Mediterranean and African Region*

  The year 2016 is expected to be another record year in RE deployment and in the volume of clean energy investments, after reaching around USD 329 billions in 2015. Additional growth is also expected in association with the commitments made by states at the COP21 in Paris. Moreover, RE markets indicate that there is no coupling between oil prices and the RE market. The RE markets continue to grow, despite the fall in oil prices. PV installations are catching up worldwide thanks to the spectacular cost reduction they have experienced in the last decade: about - 78%. Within the next decade, the levelized cost of electricity (LCOE), from solar PV, will be at parity with that of coal in most markets. It is also expected that an additional 67 GW of solar capacity will be added during 2016 alone. As for electricity generated from Wind, it already has a lower LCOE than that of coal-fired power electricity, in many countries in both Asia Pacific and Europe. It is also expected that the year 2016 would be a record year for wind energy as well, with an additional installed capacity of about 63GW. Also, technological advances are expected that will further reduce costs and improve equipment performances (load factors).

  The challenges associated with financing RE projects can be identified by comparing corporate financing and RE project financing, and identifying the additional risks associated with financing RE.

  Key concepts of RE project financing were presented, including lending structures and type of financing sources. Pros and Cons of Project vs Corporate Financing mechanisms of RE projects were outlined, and it was recommended to resort to a scheme of project financing for RE through a dedicated SPV (Special Purpose Vehicle/Entity) to be created solely for the RE project.

  Regarding the lending structures and type of financing source, both commercial and concessional finance sources are used for RE. Blending financing sources (commercial and concessional) is considered to be the most suitable solution for RE projects given their cost structures. On-lending of concessional funds obtained by governments/government agencies can further reduce financing costs. Finally, RE project developers need to consider key provisions, in terms of commercial and legal terms, to secure bankability of offtake agreements.

  Several projects implemented in Egypt, Morocco and South Africa, by ENEL Green Power, were presented as case studies, with indications regarding the financing sources, mechanisms and structure. The projects included Solar PV and Wind power generation installations. Carefully designed tenders in Morocco allowed for a record-breaking bid tariff ($ 28-30/MWh).

- *A call for public - private efforts for accelerating investments in renewables in MENA and Africa*

  The presentation started with introducing current and future trends for global RE deployment. World generation capacity projections indicate that by 2040, the added RE capacities will exceed those of all other types of power plants combined. Global electrical generation capacity will grow by 70%, up to 10.600 GW; by 2040. Wind power generation will grow by +150%, reaching 1400 GW and PV power generation will grow by +300% up to 1000 GW. World electricity from RE surpassed gas generation in 2014. It is expected that this trend will continue to expand rapidly, with RE becoming the largest source of electricity supply by early 2030s and accounting for more than 1/3 of the world's electricity supply in 2040. Previsions for the period 2015-2040, indicate that the cumulative investment in the power sector will reach 19.7 trillion USD. RE will account for 62% of global investment in new power plants, coal 14%, gas 10% and oil 1%. Current trends indicate that investment in RE is decoupled from the evolution of oil prices.

In Arab countries, the volume of allocated financial resources (both public and private) for RE till 2030, is about 10 billion Euros in Egypt, 2 billion Euros in Jordan, 10 billion Euros in Morocco and 6 billion Euros in Tunisia. Cost of capital remains an increasingly important component of RE costs. These costs can be reduced by applying sustainable long-term power purchase agreements that provide revenue certainty and facilitate access to debt and equity capital markets. Also by reducing non-economic barriers, reducing grid integration risks, increasing the creditworthiness of off-takers and reducing currency risks.

According to an EY survey results, the main barriers to RE development in the region can be summarized as follows: Government policy framework and regulations (39%), cost of technology (24%), subsidies for fossil-based energy (16%), limited bank experience in RE financing (13%) and other barriers (8%).

The speaker called for a plan of action to support the deployment of RE in the region. The plan is based on three axis: (1) Public-private partnership to implement national programs for achieving renewable energy targets; (2) Policy and regulations reforms to create a business-friendly environment as a pre-requisite for RE deployment; (3) Training and capacity building to contribute to local economic and social development and to create the best conditions for attracting investments.

Finally, a brief outline of the strategy of the Res4Med program in promoting RE in the region was presented, as well as a briefing on the membership in this program.

Session 2: Role of the Financing Institutions in Promoting RE Projects

3 May 2016, 11:45 – 13:15

Session 2 covered the role of financing institutions in promoting RE projects, with case studies provided by a Moroccan bank and a Lebanese bank.

- *Financing RE Projects in the Private Sector in Morocco, the Central Popular Bank (Banque Populaire Centrale) Experience*

  The presentation started by introducing the Central Popular Bank (Banque Populaire Centrale) group, which is a multidimensional banking institution, with over thirty affiliate businesses. The bank's activities in the field of RE are based on a clearly defined strategy around four axis: (1) Building strategic partnerships, (2) offering diversified financing packages, (3) using an approach based on a market segmentation and (4) accompanying the different relevant actors. This strategy is based on a decision made by the bank to fully adhere to the Moroccan national RE strategy and to accompany it with financing products. The bank is also engaged in the reduction of its environmental footprint, and is assessing the environmental and social impacts of the projects it finances.

  The strategic partnership includes related public institutions, such ADEREE, the national EE & RE agency, SIE (the public RE financing company) and MarocPME, the national agency in charge of promoting SMEs, and is a participating bank in the Moroccan Sustainable Energy Financing Facility (MorSEFF) http://www.morseff.com/. Morseff is an 800 million dirhams national credit line facility dedicated to financing energy efficiency and small-scale renewable energy investments of private companies in Morocco. MorSEFF has been developed, with the support of the European Union, by the European Bank for Reconstruction and Development (EBRD) in cooperation with the European Investment Bank, KFW and AFD.

  The segmented approach allows the bank to offer financing packages that are suitable for the size of the client: SMEs, VSEs, etc. The bank offers diversified financing packages that are tailored to the different RE and EE actions and measures.

  The bank also offers accompanying measures to its clients, such as information and awareness raising, technical assistance and advisory services to tailor the financing packages to the client's needs. In terms of commercial offer, the bank waves the service fees on financing packages for all SMEs, and provides reduced interest rates as well.

- *BDL Green incentives - Banque du Liban*

  The presentation covered the Central Bank of Lebanon (Banque du Liban, BDL) Green Incentives programmes. These programmes' objectives are to promote RE and EE, as well as to reduce pollution in the country. The package of incentives include an EIB/AFD credit line of 80 Million Euros for RE & EE, a World Bank credit line of 15 Million USD to promote pollution abatement, in addition to very favourable financing conditions that are passed on to commercial banks, including soft loans (Circ. 236 and Circ. 313). The BDL Green Incentives programmes are implemented by commercial banks under the supervision of the BDL Financing Unit. Furthermore, the financing of RE and EE are realized within the framework of the National Energy Efficiency and Renewable Energy Action (NEEREA). The provided incentives keep the financial costs at no more than 1% for the private sector.

  Furthermore, the maturity period of new projects is up to 14 years with up to 4 years of grace period. Whereas, the maturity period for retrofitting existing projects is up to 10 years with up to 2 years of grace period.

  Many projects and programmes were implemented within the NEEREA framework, including a Consumer Solar Water Heaters programme (with the support of 1.5 Million USD grant from the Ministry Of Energy and Water). The programme allowed 7500 applicants to benefit from a grant of USD 200, 0% interest rate and up to 5 years maturity. The NEEREA framework requires that the beneficiary seeks the help of recognized Engineering firms to place their requests at a commercial bank. The Central Bank would oversight the transactions with technical backstopping from the Lebanese Centre for Energy Conservation (LCEC). To date, 325 loans for EE and RE were approved for a total of 350 Million USD. 280 PV projects were financed for a total installed capacity of 21 MWp.

TRAINING SESSIONS

The main objective of the training is to enhance the capacities of stakeholders in the target member countries on the financial analysis of RE projects and the development of business plans that are compliant with the requirements of the banks and donors. The training has targeted over 30 participants, mainly potential RE project holders and national public/private experts from member countries of UN ESCWA and UN ECE.

The training was based on an interactive and participative approach including an alternation of lectures, discussions, exchanges of experiences between the participants and practices of examples and case studies.

The training was organized into four main parts that were distributed over about 1 day and a half.

- ✓ The first part was used to introduce the basic concepts of financial analysis in order to bring the knowledge of the participants to the same starting level before going into further details.
- ✓ The second part focused on the specificities of the financial assessment of RE projects including the different reference costs of RE, project development steps and the main RE business models.
- ✓ The third part covered the financing of RE projects. It identified the main source of financing RE and the way to develop bankable business plans for RE projects that are compliant to bank requirements.
- ✓ The final part was used for practices. Five working groups were formed and each one has developed the financial analysis of one type of RE project based on a financial analysis model provided by the training facilitator.

Session 3: Technical Training – Part 1

3 May 2016, 14:30 – 16:30

The third session of the seminar introduced the topics to be covered in the training sessions and defined the basic concepts used in economic and financial analysis. The session provided an introduction to economic and financial analysis as well as basic elements for RE projects profitability assessment. The session was concluded with some practicing exercises.

Session 4 & 5: Technical Training – Part 2 & 3

4 May 2016, 09:00 – 13:30

The fourth and fifth sessions were dedicated to completing the coverage of the different concepts and tools used in the economic and financial analysis of RE and the different steps to be followed in the preparation of bankable projects. The following topics were presented and discussed during these two sessions:

- ✓ Main business models of RE projects for electricity generation
- ✓ Main steps for RE project development
- ✓ Main financing tools for RE projects
- ✓ How to prepare a bankable business plan for RE projects

Session 6: Technical Training – Part 4

4 May 2016, 14:30 – 16:30

The last part of the training was dedicated to applying the concepts and acquired knowledge to perform the analysis of sample RE projects. The participants were organized into five working groups, each group treating a concrete RE project. A financial analysis model using an Excel sheet was provided to each group. Each financial analysis model was adapted to the type of project being considered. The following four projects were used in this exercise:

(a) Large scale wind farm project

This sample project is a 30 MW wind project connected to the grid.

Hypothetical project characteristics: The project is implemented in a high quality site with a capacity factor of around 3000 hours per year. The business model is based on Feed-in tariff guaranteed for the period of the project (15 years) and object of a Power Purchase Agreement with the Utility. The investment cost of the technology is around 1.5 MUSD/MW and the running cost per year is estimated to be around 2.5% of the total investment amount.

The Feed-in tariff and all the other assumptions should be discussed and defined, by the members of the group, based on the context of their respective countries.

(b) Large scale PV project:

This sample project is a large scale PV power plant project with a capacity of 10 MW connected to the grid.

Hypothetical project characteristics: The project is implemented in a location with high solar radiation levels, and an average PV productivity around 2000 kWh/kW per year. The investment cost is around 1 MUSD/MW with a yearly running cost estimated to be around 2% of the total investment amount. The business model is based on Feed-in tariff guaranteed for the period of the project (20 years) and object of a Power Purchase Agreement with the Utility.

The Feed-in tariff and all the other assumptions should be discussed and defined, by the members of the group, based on the context of their respective countries.

(c) - Net metering PV Project

This sample project is a medium size facility of 300 kW PV installed on the roof of a mall paying a high electricity bill. The owner wanted to reduce the bill by investing in PV, based on a pure net metering model without selling any surplus of electricity to the grid.

Other hypothetical project characteristics: The PV productivity for this site is considered to be around 1900 kWh/kW. The investment cost is around 1200 USD/kW with a yearly running cost estimated to be around 3% of the total investment amount.

The tariff for the electricity to be displaced (replaced) and the other assumptions should be defined and discussed by the group, based on the context of their respective countries.

(d) Self-generation PV project with wheeling

This sample project is a 5 MW PV project to be built by an industrial company as self-generation, in order to replace part of its own electricity consumption. The PV farm is to be built in a location that is far away from the electrical consumption location. Therefore a wheeling approach is required.

The electricity is produced by the PV farm, then injected into the transmission grid. The amount of electricity injected into the grid is deducted on a monthly basis from the electrical consumption of the company. In case, that the injected amount of electricity exceeds the consumption of the month, the excess electricity is sold to the Utility using a predefined price. In addition, the company has to pay to the Utility a wheeling fee for the use of the transmission grid.

Other hypothetical project characteristics: The PV productivity for this site is considered to be around 1700 kWh/kW. The investment cost is around 1.1 MUSD/MW with a yearly running cost estimated to be around 2.5% of the total investment amount.

The other assumptions, including the tariff for the electricity to be displaced (replaced), the wheeling fees, the tariff of the electricity sold to the utility, the profitability requirements of the company, and other conditions should be defined and discussed by the group, based on the context of their respective countries.

(e) Biomass project

This sample project is a biomass power plant project with a capacity of 7 MW connected to the grid.

Hypothetical project characteristics: The project is implemented in a location with a capacity factor of around 75% (6570 hrs) and the estimated losses are7%. The specific consumption of biomass is 210 toe per GWh . The business model is based on Feed-in tariff guaranteed for the period of the project (30 years) and object of a Power Purchase Agreement with the Utility. The investment cost of the technology is around 0.9 MUSD/MW and the running cost per year is estimated to be around 5% of the total investment amount.

The Feed-in tariff and all the other assumptions, including the cost of biomass (USD/toe) should be discussed and defined, by the members of the group, based on the context of their respective countries.

TRAINING MATERIAL

The material communicated during the training sessions covered the following themes:

(a) Basic economic and financial concepts

- Life Cycle Cost Feasibility Analysis
- Project Profitability Analysis
- Capital Expenditure and Operation Expenditures (CAPEX & OPEX)
- Cash flows
- Inflation
- Discounting and discounting rate
- Weighted Average Cost of Capital
- Depreciation of assets
- Interest rate

(b) Profitability indicators

- Net present Value
- Simple Payback Period
- Discounted Payback Period
- Internal Rate of Return of the project

- Internal Rate of Return of the equity
- Capital Enrichment ratio
- Levelized Cost of Electricity (LCOE)
- Sensitivity analysis

(c) Typology of risks and their mitigation

- Standard project risks
- Typical RE risks / RE technologies
- Risk management

(d) Exercise:

- Calculation of the main profitability indicators of wind farm project of 30 MW.
- Home work

(e) Basic elements for RE projects profitability assessment

- Main technologies
- Reference technologies capital costs
- Reference of operation expenditures
- Main factors affecting the RE projects

(f) Main business models of RE projects

- Feed in Tariff
- Auction system
- Net metering
- Self-generation

(g) Main steps for RE project development

- Project development and implementation process
- Project identification
- Assessing of potential sites
- Project development
- Project Financing
- Project Implementation
- Project Operation
- Decommissioning

(h) Potential sources of financing

- Corporate lending
- Project finance
- Senior debt
- Mezzanine debt
- Refinancing
- Green Climate Fund
- Revolving funds
- Leasing

(i) How to prepare a business plan?

- Summary of the business plan
- Description of the developer profile
- RE market analysis in the country
- Project description
- Financing plan
- Financial and economic analysis
- Risk management
- Environmental and other benefits

(j) Criteria and requirements of financial institutions

- Project documentations required by the financial institutions
- What the financial institution want to examine?