



Second Report on UNDP Generic Component
Networking and Outreach Activities
in Jordan-Lebanon-Syria for Energy Access II

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Summary

This report summarizes the networking and outreach activities that took place in the second steering committee meeting of the Regional Action Plan (RAP) and the Stakeholders meeting on Energy Access and Renewable Energy Technologies in Syria Jordan and Lebanon. This RAP partnership was started in the workshop of April 26-30, 2004 by the establishment of the Regional Action Plan (RAP) and the development of its bylaws and the identification of priority areas on which the various partners in the RAP would need to tackle. The first objective of the second steering committee meeting is to agree on the working groups' structure from various partner institutions in each of the priority areas of the regional action plan initiatives. These priority areas are: (I) Regional Data Base, (II) Capacity Enhancement, and (III) Technology Transfer, Adaptation, and Enhancement. Identify joint proposals that have potential success in getting funding and match members of various partner institutions to form working groups to further develop the proposals' concepts and details. The other objectives were to finalize the RAP partnership Bylaws document; to discuss findings on energy efficiency and renewable energy technology status for energy policy recommendations and provide prioritization on the policy items with stakeholders' support. The main objective of the stakeholders' workshop was to further develop and strengthen the regional and in-country role of the Energy Research Group as a knowledge and communication hub and stimulate policy dialogue across stakeholders working on energy and development issues. Several people involved in the formation of policy attended or contributed to the workshop from Jordan, Lebanon, and Syria. In addition we note also the attendance of consultants involved in developing the detailed rules and regulations for the awaited electric power market reform in Lebanon. The meeting started with a brief welcome which was followed with a presentation to introduce the audience to the objectives of GNESD, the centres of excellence that constitute it, and the energy access and renewable energy themes currently being studied by the different working groups. There were several presentations which aimed at introducing to the audience the work done by GNESD in general and by ERG under the Energy Access and Renewable Energy Technologies themes. In this respect a presentation was given on the Energy Access theme its rationale, objectives, scope and lessons learnt. A second presentation on the Renewable Energy Technologies theme discussed the renewable energy scene in Jordan, Lebanon, and Syria, the barriers that are impeding its development, and some of the solutions to remove such barriers. An overview of the activities carried out by UNDP in Lebanon was given. A presentation was also given on the Thermal Standard project being conducted as one of the activities of UNDP in partnership with GEF and the Ministry of Public Works in Lebanon.

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1. Introduction

GNESD (Global Network of Energy for Sustainable Development) has just completed the Energy Access II (EAI) and the Renewable Energy Technologies (RET) themes. The current activities in the EAI theme are focusing on the dissemination of the knowledge and data already generated through data collation and compilation, preparation of journal articles and preparation of papers for the International Conference for Renewable Energies in Bonn, Germany. The RET theme aims to determine the possible contribution of RET to poverty alleviation and to provide policy guidance to overcome barriers. The ERG at the American University of Beirut (AUB) is currently involved in both themes and has already established contacts with the Jordanian University of Science and Technology (JUST) and Damascus University (DU) that helped in collecting data and compiling it in a data base [1] and to address the current status and the potentials of renewable energy applications in selected Middle East countries, i.e., Jordan, Syria, and Lebanon [2].

The ERG at the American University of Beirut (AUB), in partnership with JUST, the Palestine Polytechnic University (PPU), and Birzeit University (BU), has recently started a cooperative project on renewable energy initiatives and technology to enhance energy efficiency and contribute to environmental sustainability in the Middle East. The project has been supported the Citizen Exchange Program of the US Department of State and is carried out with the technical help of US partners from the Northwestern Energy Education Institute (NEEI), the Florida Solar Energy Center (FSEC), and PRD Consulting. The objective is to build training capacity at the Middle East universities and provide them with a strong platform for collaboration at the regional and international level.

A week-long regional collaboration and technical workshop was held at AUB during the week of April 26-30, 2004 and focused on developing a partnership for regional collaboration in energy efficiency and renewable energy technology [3]. The workshop was attended by participants from all partner Middle East institutions and from the following other institutions and individuals: Damascus University, King Fahd University for Petroleum and Minerals, FSEC and NEEI as technical advisors, regional experts from renewable energy research centers in Syria and Saudi Arabia, and one expert from the US Department of Energy, National Renewable Energy Lab. The workshop had a regional and international component through the participation of several international organizations, namely UNDP (United Nations Development Program), ESCWA (Economic and Social Commission for Western Asia), United Nations Environmental Programme (UNEP), and the World Bank. These organizations have ongoing projects on human capacity building in the areas of energy efficiency and renewable energy technologies. The workshop had an Energy Audit component to train participants in energy efficiency/energy auditing of commercial buildings from data collection to evaluation and recommendations for investments and savings. The case study for the workshop was the Bechtel Engineering Building at the American University of Beirut and introduced technology that has application in energy efficient commercial buildings. It trained participants on the “process” of addressing efficiency

improvements in existing buildings with “hands on” experience and participation of the trainees in the use of an interactive demonstration of the e-QUEST software for energy analysis. The workshop demonstrated the savings calculations, cost estimating, economic analysis, and audit reporting.

One of the outcomes of the above mentioned workshop was the establishment of a Regional Collaboration Partnership or Action Plan among the participating institutions to promote energy efficiency and renewable energy technologies for environmental sustainability and economic development. This action plan has established a basic regional framework for generating and disseminating knowledge and is well in line with the overall framework of the GNESD activities. This action plan also goes well with UNDP-GNESD outreach effort for centres in developing countries dedicated to strengthen their capacity aimed at stimulating policy dialogue across regional and national stakeholders working on energy and development issues and effectively conducting knowledge networking and outreach activities.

The UNDP support to ERG/AUB as a GNESD¹ Center of Excellence has further enhanced the exchange of information, promoted experience sharing to get the support and commitment of key decision makers when considering reforms in energy policies to keep the energy access by the poor and alleviation of poverty in focus. The first Steering Committee Meeting was held during the period of September 7-10, 2004 and its agenda and minutes of meeting [4] were provided in an earlier report [5]. Its objective was to develop further the Regional Collaboration Action Plan in the countries of the Region to strengthen their capacity and prepare for policy dialogue workshop across regional and national stakeholders working on energy and development issues. The Steering Committee Meeting in September has recommended a proposal for the Regional Collaboration bylaws among partner institutions. The recommended bylaws will be final, once the various partner institutions sign the commitment statement for in kind support to the partnership initiatives. The member institutions commitment is not a necessary condition at the moment for continuing the collaborative work since it does not involve a financial commitment. Individuals and working groups within institutions will still collaborate under the partnership in an effort to generate their own funds from international grants through available channels within their institutions. *Appendix A* has the recommended bylaws.

The next Steering Committee (SC) and national stakeholders meeting was held on **January 24-25, 2005**. The first day of the meeting was confined to the SC members and representatives from the various partner institutions to report on the proposal development progress done in the priority areas identified [7]. The second day of the meeting was held with invited stakeholders on energy access and renewable energy policy outline for the region. Members of ERG have presented the current work they are doing as partners in GNESD and the national policy stakeholders presented papers on the respective energy policies in their countries. Members from various university partners

¹ Global Network on Energy for Sustainable Development (www.gnesd.org) is a UNEP facilitated knowledge network of developing world centres of excellence and network partners, renowned for their work on energy, development, and environment issues.

were invited along with members from the professional and governmental community interested in energy issues. The list of attendees in the January 25, 2005 workshop is given in *Appendix B*.

2. Steering Meeting Outcomes (January 24, 2005)

The agenda of activities of the Second Steering Committee meeting was as follows:

- Agree on the working groups' structure from various partner institutions in each of the priority areas of the regional action plan initiatives. These priority areas are: (I) Regional Data Base, (II) Capacity Enhancement, and (III) Technology Transfer, Adaptation, and Enhancement.
- Identify joint proposals that have potential success in getting funding and match members of various partner institutions to form working groups to further develop the proposals' concepts and details.
- Discuss findings on energy efficiency and renewable energy technology status for energy policy recommendations and provide prioritization on the policy items with stakeholders' support.
- Finalize the Partnership Bylaws document.
- Prepare the agenda for the meeting that will take place in Kuwait in November 21-23, 2005 during the 3rd International Conference on Energy Research. Members from various universities in the partnership have submitted papers to the conference

2.1 Proposals in Priority Areas

Several mini proposals were received from the various partner institutions and compiled by the Steering Committee. The titles of the proposals are summarized in Tables 1 to 3. Many of the submitted proposals are in search for partner institutions to further develop the proposals to meet the requirements of potential funding agencies. The mini-proposals were discussed at length and the selection will take place from the proposals submitted by the working groups of the partner universities within the three agreed-upon initiatives in April 2004 in the areas of energy efficiency and renewable energy technologies.

Table 1: Initiative I: Regional Data Base

	Proposal Title	Partner University Submitting Proposal	Contact Person or Group Leader
1-	Development of a regional data base for renewable energy sources	JUST – PPU –AUB - KU	Dr. Hani Abu- Qdais hqdais@just.edu.jo
2-	A proposal to develop the following regional data bases: (1) Publications Database; (2) Weather Data Base; (3) Water Resources Data Base; and (4)	Kuwait University	Dr. Walid Chakroun chakroun@kuc01.kuniv.edu.kw

	Proposal Title	Partner University Submitting Proposal	Contact Person or Group Leader
	Electrical Data Base; and to compile all the information in one format accessible to member countries through a website		

Table 2: Initiative II: Capacity Enhancement

	Proposal Title	Partner University Submitting Proposal	Contact Person or Group Leader
1-	Institutional Strengthening and Capacity Building to Become an Important National/Regional Resource to Support Energy Planning at the Decision Maker Level.	JUST	Dr. Mohamad Al-Widyan widyan@just.edu.jo Dr. Fayez Abdulla fabdulla@just.edu.jo
2-	To develop educational courses related to renewable and sustainable energies and to have them on the network and can be used by all institutions.	Kuwait University	Dr. Walid Chakroun chakroun@kuc01.kuniv.edu.kw
3	Innovative Curriculum in Sustainable Energy	Malmö and Lund Universities AUB – JUST – DU – PPU	Submitted to TEMPUS 2005
4	An Operators' Training Simulator Power System Laboratory	AUB	Dr. S. Karaki

Table 3: Initiative III: Technology Transfer/Adaptation/Enhancement

	Proposal Title	Partner University Submitting Proposal	Contact Person or Group Leader
1-	Integration of Solar Ponds in Salinity Mitigation Schemes and Power Generation	JUST	Dr. Ziad Al-Ghazawi gziad@just.edu.jo Dr. Ahmad Harb aharb@aub.edu.lb)
2-	Transferring international Clean Development Mechanism expertise to the region to enhance Sustainable Development projects in biogas-to-energy	JUST	Dr. Ziad Al-Ghazawi gziad@just.edu.jo

	Proposal Title	Partner University Submitting Proposal	Contact Person or Group Leader
3-	Proposal to unify rules and regulations for design of A/C and heating systems and to unify thermal/electrical standards that lead to energy conservation.	Kuwait University	Dr. Walid Chakroun chakroun@kuc01.kuniv.edu.kw
4-	Brine disposal in inland desalination plants	JUST	Dr. Hazim Qeblawi hazim@just.edu.jo
5	Collaborative research and education program on advanced solar based inverter systems	JUST, AUB, and UCF	Prof. Ahmed Harb

2.1.1 Regional Data Base

The Steering Committee members agreed that a concept proposal be submitted for a comprehensive regional data base for water and energy. Two proposals were submitted in that area by JUST and KU for generating a unified reliable data base that can be used by the researchers in the region and in a format that can be integrated with various applications software related to energy analysis, environment, and water resources. The key initiative is to provide the data in an accessible manner from secondary resources and provide primary data collections based on foreseen deficiencies in the secondary data. Members expressed concerns that a project topic on data base may not result in research publications that bring merit to the academic work. However, the availability of the data base facilitates valuable research work for many projects that can get funded and published.

The coordinator for the Data Base Initiative will be Dr. Hani Abou-Qdais who will develop the pre-proposal concept with other group leaders from other universities. Profs. El-Fadel, Chakroun, Al-Khatib, and A. Hamzeh will participate in this effort. The work could further be developed to become a knowledge base. The proposal will be developed within three months (May 1, 2005).

2.1.2 Capacity Enhancement

Dr. Al-Widyan from JUST discussed the proposal titled “Institutional Strengthening and Capacity Building to Become an Important National/Regional Resource to Support Energy Planning at the Decision Maker Level”. The proposal had a wide scope but included a resource assessment component, the establishment of low cost testing facilities for solar systems, and a training

part. The committee proposed that proposal concept be developed further with more focus.

The decision was to develop the proposal on capacity building tools and training to help in energy planning. Members involved are Profs. Al-Widyan, Ghaddar, Al-Khatib, and Hamzeh. Dr. Al-Widyan will contact the members for the completion of the proposal within three months (May 1, 2005). Mr. Mark Thornbloom will be joining this proposal with his expertise in training and certification of solar systems at Florida Solar Energy Center.

In addition, the concept of developing online courses proposed by Dr. Chakroun was discussed. It was agreed that this has a great potential for funding with short courses developed for professionals or regular courses when the content of the courses include relevant regional and local case studied that are not readily available. Dr. Chakroun will develop further this concept with Dr. Ghaddar. Kuwait University offers many short courses to professionals in the areas of energy and facilities that can be further developed for distance learning with input from faculty and support of their institutions.

Prof. Karaki (AUB-ERG) presented a proposal on implementing “An Operators’ Training Simulator Power System Laboratory” the objective of which is to establish a state-of-the-art tool to train students and engineers from utilities in the region on operating the power system in an efficient regime. Prof. Chedid (AUB-ERG), Prof. Chaaban (AUB-ERG), and Prof. Hamzeh (DU) will join the proposal and Prof. Harb (JUST) will be contacted to join so that a regional training facility can be established.

Mr. Markthornbloom from FSEC proposed workshops on solar water heating and photovoltaics (short (3-5 days) modules in practical design with a projected audience of students in ME, EE as well as the engineering technologies; practical installation and maintenance with a projected audience of the trades (plumbers, electricians)), as well as on building science. FSEC might offer its Energy Gauge residential audit course, or NEEI might offer their courses. The training can be done on site or through train-the-trainers option.

2.1.3 Technology Transfer/Enhancements/Adaptations

Dr. Ziad Al-Ghazawi discussed three proposals submitted by JUST on Solar ponds, brine disposal inland and transferring international clean development mechanism to enhance biogas conversion to useful energy. Profs. Dia and Hamzeh from Syria are both interested in solar ponds applications. Prof. Al-Fadel (AUB), Mr. Mark Thornbloom (FSEC) and Ghaddar (AUB) will join in the clean development mechanism for biogas conversion to further collaborate on the proposal development.

The proposal submitted by Dr. Harb (JUST) has already been joined by Dr. Karaki (AUB-ERG) and is submitted for funding jointly with the University of Central Florida to NSF.

Dr. Chakroun (KU) proposal for unifying rules and regulations of A/C and heating systems and to unify thermal/electrical standards that lead to energy conservation will be joined by other interested members from AUB-ERG.

2.2 Energy Related Activities at Partner Universities

The structure of activities related to energy at the various partner universities has been discussed through the presentations of the Steering Committee members.

2.2.1 Activities at JUST

Prof. Fayez Abdullah presented current activities at Jordan University of Science and Technology (JUST) on sustainable energy. The Energy Group was founded with 10 members from various departments and is currently coordinated by Dr. Fayez Abdullah. The Energy Group members at JUST are divided among the working groups in the three initiatives established in the regional action plan ^{Error! Bookmark not defined.}. Table 3 presents the members of the working groups from various partner institutions in each area of the regional action plan initiatives. The biographies of the members are provided in Appendix D. A Center of Energy was founded in June 2004 after the Beirut April Workshop to establish closer relationship between JUST and public and private energy sectors. The center's mandate is to participate in the national and international efforts towards achieving sustainable development by energy utilization and conservation and sustain its natural resources against improper use/overuse and pollution in an integrated manner that takes into consideration economic growth and other factors through education, research and services.

2.2.2 Activities at Kuwait University

Dr. Walid Chakroun presented activities at Kuwait University (KU) related to enhancing environmental sustainability through energy efficiency and renewable energy technology. He also presented actions taken in response to the First Steering Committee Meeting and the partnership among universities. Three groups are formed within each initiative proposed in the regional action plan. The first group will conduct work related to data base activities for weather and solar data, water resources data, and electrical generation/consumption data that allow member countries provide information on energy policies, measures and targets related to renewable and sustainable energies. The second group is concerned with implementing a technical program for Kuwait University for reform and strengthening the energy discipline both at national and regional levels. The target includes establishing a Center of energy and a Center for water resources. Dr. Asad Al-Ibrahim is coordinating the activities for the establishing of the centers with other group members from mechanical, electrical and chemical engineering programs. In addition KU is proposing development of online educational courses related to renewable and sustainable energies that can be shared and attended by participants in the region. The third group is interested in working towards establishing unified rules and regulations for design of air-conditioning and heating systems and unified standards for energy conservation. The American Society for Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) is helping KU establish these standards.

2.2.3 Activities at Damascus University

Dr. Ali Hamzeh presented his views on energy programs and energy planning in Syria. He discussed in particular the natural gas vehicle program and natural gas storage project. He also presented the members who will participate in the various working groups of the regional action plan (see Table3).

2.2.4 Activities at Palestine Polytechnic University

Dr. Imad El-khatib submitted a presentation on energy planning and energy status in the Palestinian Authority. He also provided the names of institutions who are interested and are working on renewable energy: An-Najah National University (Dr. Imad Breik), Bethlehem University (Dr. Hana Hallak); Birzeit University (Dr. Afif Hasan), Islamic University of Gaza (Dr. Hani Najem), and Palestine Polytechnic University (Dr. Imad El-Khatib).

2.2.5 Activities at AUB-ERG

Dr. Ghaddar presented energy related activities at AUB and the issues arising from the minutes of the First Steering Committee meeting (Sept. 8-10, 2004). She then gave a briefing on the current status and continuing activities of the Energy Research Group at AUB on the two projects funded by GNESD on energy access and renewable energy technologies themes and the developed policy outline for the use of renewable energy technologies to improve the quality of living and reduce poverty. More details on the RETs policy outline can be found in the initial assessment report submitted to GNESD [10]. A technical proposal was developed by Ghaddar, Moukalled (AUB) and Chakroun (KU) on displacement ventilation and radiation cooling for an efficient HVAC system. The proposal was submitted on Dec. 15, 2004 to ASHRAE International Funding American Society for Heating Refrigeration and Air conditioning Engineers.

2.3 The Regional Action Plan Partnership Bylaws and Memorandum of Understanding

The Partnership Bylaws document, shown in *Appendix A* was approved. The Partnership Memorandum of Understanding for regional collaboration does not have any financial implications on the involved universities. All participating institutions are in the process of securing their universities official approval to activities of faculty involved in working groups of the partnership.

2.4 Next Steering Committee Meeting and Agenda

The next Steering Committee Meeting that will take place in Kuwait in November 21-23, 2005 during the 3rd International Conference on Energy Research. Members of the Steering Committee and the Assembly from various universities in the partnership have submitted papers to the conference which will provide accommodation to the speakers. Kuwait University will host the meeting that is planned for one afternoon slot. Prof. Chakroun from KU will make the appropriate arrangement for the meeting in coordination with members of the Steering Committee. The agenda of the meeting will include the following:

- a) Follow up on approved proposals
- b) Working group meetings and overhead support to the established activities
- c) Partnership and Universities support
- d) Future funding for the regional collaboration structure, its links with international agencies, and its expansion to include energy industry representatives.
- e) Other business

3. Stakeholders Workshop Outcomes (January 25, 2005)

The main objective of the stakeholders' workshop was to further develop and strengthen the regional and in-country role of the Energy Research Group as a knowledge and communication hub and stimulate policy dialogue across stakeholders working on energy and development issues. This regional collaboration activity was started in the workshop of April 26-30, 2004 [3] by the establishment of the Regional Action Plan (RAP) and the development of its bylaws and the identification of priority areas on which the various partners in the RAP would need to tackle. The list of guests invited to the meeting is given Appendix D. The presence of several people involved in the formation of policy is noted here. Mr. Abdul Raouf Yahia the Syrian national project director of the Energy Planning and Conservation Project presented a paper summarizing the global energy policy of Syria. Mr. Malek Kabariti, the director the National Renewable Energy Centre in Jordan was invited and sent a paper on the Jordan policy on energy access and renewable energy. Mr. Georges Kamar advisor to the minister of energy and water in Lebanon also made a presentation on the current difficulties that the electric power sector is facing in Lebanon and the proposed solutions. In addition we note also the attendance of consultants involved in developing the detailed rules and regulations for the awaited market reform in Lebanon. The meeting started with a brief welcome speech by Prof. Riad Chedid, the ERG coordinator in which he welcomed all participants. This was followed with a presentation by Prof. Chaaban to introduce the audience to the objectives of GNESD, the centres of excellence that constitute it, and the energy access and renewable energy themes currently being studied by the different working groups. There were several presentations which aimed at introducing to the audience the work done by GNESD in general and by ERG under the Energy Access and Renewable Energy Technologies themes. In this respect a presentation was given by Prof. S. Karaki on the Energy Access theme its rationale, objectives, scope and lessons learnt. A second presentation on the Renewable Energy Technologies theme was given by Prof. Chedid in which he discussed the renewable energy scene in Jordan, Lebanon, and Syria, the barriers that are impeding its development, and some of the solutions to remove such barriers. An overview of the activities carried out by UNDP in Lebanon was given in a presentation prepared by Mr. Edgar Chehab and presented by Ms. Mathilda Khoury. Ms. Khoury gave also a presentation on the Thermal Standard project being conducted as one of the activities of UNDP in partnership with GEF and the Ministry of Public Works in Lebanon. In the following section the various presentations and the discussion that ensued are presented with some detail. The full presentations and papers can be found on the ERG website².

² <http://webfea.fea.aub.edu.lb/fea/research/erg/publications.html> .

Table 4: Stakeholders Meeting Agenda

Time	Title/Speaker
Moderator: Dr. Farid Chaaban, ERG	
9:00 a.m. – 9:20 a.m.	Opening speech (Dr. R. Chedid, ERG Coordinator) Briefing on GNESD objectives (Dr. F. Chaaban, ERG)
9:20 a.m. – 9:40 a.m.	Energy Access projects I & II, by Dr. S. Karaki (ERG)
10:00 a.m. – 10:20 a.m.	Jordanian Paper on National Energy Policies (Dr. F. Abdulla, JUST)
10:20 a.m. – 10:40 a.m.	Lebanese paper on National Energy Policies (Mr. G. Kamar, Consultant, Ministry of Energy and Water)
10:40 a.m. – 11:00 a.m.	Discussion
11:00 a.m. – 11:30 a.m.	Coffee Break
Moderator: Dr. Moutasem El-Fadel, ERG	
11:30 a.m. – 10:50 a.m.	Syrian paper on National Energy Policies, Mr. Abdel Raouf Yehia
11:50 a.m. – 12:10 a.m.	Thermal Standards for Buildings, Ms. Matilda Khoury, Project Manager
12:10 a.m. – 12:25 p.m.	Renewable Energy Technologies Project, (Dr. Riad Chedid, ERG)
12:25 p.m. – 1:00 p.m.	Discussion on impact of adaptive energy policies addressing poverty and improvements in quality of life in the region
1:00 p.m. – 2:00 p.m.	Recommendations and approval of proposed national and regional Energy Policies

3.1 The GNESD Presentation

The underlying rationale of establishing the GNESD network was first presented by Prof. F. Chaaban (ERG) who gave a briefing on the key energy challenges that the poor are facing in developing countries. These are the reliance on bio-fuels that harm human health and the environment, the inadequate access to cleaner energy services for productive purposes, and the too low incomes exacerbated by the limited access to appropriate financing schemes to allow the poor to procure cleaner and more sustainable energy services. To address these challenges GNESD was established to increase the capacity of developing country centres of excellence for effective knowledge management of energy for sustainable development issues. GNESD was established to at the Johannesburg Summit in 2002 to work for reaching the Millennium Development. The two themes of Energy Access and Renewable Energy Technologies were then introduced and their rationale presented. The centres of excellence around the world were then briefly introduced.

3.2 The GNESD Energy Access Theme

The objective of this presentation given by Prof. S. Karaki of the AUB-ERG was to provide the audience attending the workshop the rationale and the essential traits of the energy access study and the variety of solution to the problems of poverty alleviation reported in the various studies carried out by the centres of the GNESD, which summarized in the policy summary report [8] and synthesis report [9]. The key challenge facing the poor is that they do not have access to clean energy services and that their low income is preventing them from access to cleaner and more sustainable energy services.

The basic rationale of the EA study was to answer two fundamental questions: have previous energy reforms addressed the challenge of the poor and did it improve at all their access to cleaner and more sustainable energy services in the developing countries.

The methodology adopted by the centres to perform case studies in their respective regions and provide a perspective of the policies through a policy research based on a data collection activity. The methodology and tools used by the centres to define the energy access and affordability through a series of indicators for data was collated. In the time allowed for the presentation it was only possible to mention and present a sample of these case studies to give the audience a feel of the richness and variety of the case studies performed. The cases of East and West Africa performed by AFREPREN of Nairobi, Kenya and ENDA-TM of Dakar, Senegal, South East Asia performed by AIT in Thailand, and the Middle East by AUB-ERG in Beirut, Lebanon. The characteristics of the various countries and the respective reform actions were then presented. The selection of the case studies to be presented was to provide the regional audience with a variety of cases some of which (e.g. Thailand) parallel the situation in the Middle East and some of which (e.g., Kenya or Uganda) oppose it in terms of characteristics defined by the energy access and affordability indicators.

The main conclusions of the individual studies were then presented and overall lessons learnt were also presented and discussed. Namely the studies showed that the electricity reforms had in general a negative impact on the poor since the main objectives of these reforms were to revitalize the energy sector by creating the right circumstance for the private sector to invest and make the whole operation more profitable. The importance of “ring fencing” or protecting the poor during a reform was delineated and rather than arguing it as a case of subsidy a real positive way to look at it is to justify it as a case of wealth redistribution. In this respect the variety of solutions presented, be they the creation and protection of funds as in Brazil or the setting up of targets and their close monitoring as in the case of South Africa were presented. The importance of sequencing the reforms by first completing of bulk of the electrification of the poor and then going to full extent of a market oriented reform was also delineated. The situation in the Middle East was then put in focus by noting that countries in the regions have high electrification level and that based on some findings in the studies such countries are properly positioned to start a reform of the electric power sector. The leading role of Jordan in a “paced” reform process was noted and the fact that any reform according to the GNESD study findings should have a proper focus on the poor. It was noted that even though Jordan, Lebanon, and Syria have high electrification levels the issue of affordability is still a strong one and can impede any improvement in the access to electricity as the poverty levels in these countries are still relatively high and as such any reform must have a proper focus and involvement of the poor.

3.3 UNDP Presentation

The mission of UNDP is to assist countries in achieving sustainable human development through designing and implementing development programmes for democratic governance, poverty reduction, crisis prevention and recovery, energy and environment, and HIV/AIDS. The energy and environment aims at developing country capacity to manage the environment and natural resources; integrate environmental and energy

dimensions into poverty reduction strategies and national development frameworks; and strengthen the role of communities and of women in promoting sustainable development. Within the *UN Framework Convention on Climate Change* the UNDP has established in Lebanon with partnership from the Lebanese government a climate change enabling activity, an energy centre, energy efficient buildings project, and the assessment of national tariff policy applications. The main objectives of the tariff policy project are firstly to evaluate the effect of energy subsidies on population groups and optimize tariff for poor groups to support socio-economic growth. Secondly, to develop indices relating the impact of the proposed tariff structure on living conditions and national development objectives in energy, rural development, poverty alleviation. Thirdly, issue a set of guidelines and measures for sustainable energy development to be incorporated in the national energy sector and poverty reduction strategy. The institutional strengthening and capacity development projects are the creation of an Enhancement of the Permanent Awareness Unit at the Ministry of Environment (EPAUE), the provision of a Technical Assistance to Reinforce Governance in Environmental Tasks (TARGET) unit, the National Capacity Self-Assessment (NCSA) and the Olive Oil Projects. Under the Small Grants Program the Local Initiative Facility for Urban Environment (LIFE) aims to strengthen the institutional capacity of local actors (NGO's, community based organisations, municipalities), to support small-scale, local projects in urban areas that are based on local-local dialogue among different stakeholders at the community level, and to facilitate policy dialogue based on local initiatives, as well as promotes national capacity building and public awareness raising throughout the country.

3.4 Energy Policy in Jordan

Mr. M. Kabariti the director of National Renewable Energy Centre (NERC), Jordan prepared a paper on energy policy in Jordan. The paper was presented by Dr. Fayez Abdulla of the Jordan University of Science and Technology (JUST). The presentation focused on the main challenges facing the energy sector worldwide as it enters a new millennium through a global demand that is expected to rise phenomenally. Fossil fuels account for more than 85% of world's commercial energy supply and the period of its usage is an era that is highly limited in time and therefore it is critical for governments to view what remains of the fossil fuel era as transition. The earth's remaining fossil fuel reserves can probably provide us with energy for another one to two centuries, but this is an insignificant amount of time in terms of the whole past history of human civilization and (one hopes) of its future. Billion of dollars are being invested into the development, exploration and application of non-renewable energy resources, which soon will be depleted, and worst of all is the growing, irreversible disturbance of the balance of the biosphere that the use of such resources is causing.

Jordan occupies a strategic location in the Middle East, and is an important crossroads for regional energy integration. It is a developing non-oil producing country with basic energy requirements obtained from imported oil. Energy import costs create a financial burden on the national economy as Jordan spends about 10.9% of its GDP on the purchase of energy. The levels of energy and electricity consumption will probably double in 15 years. To face such challenge Jordan must make use of its most important sources of indigenous energy are natural gas, renewable energy and oil shale. Renewable energy (RE) applications in Jordan are still modest and represent less than 2% of the total

energy mix. The RE applications include solar water heaters of more than 300,000 units, solar photovoltaic units of more than 200 kW peak, wind farms of 1.5 MW, hydropower of 5 MW and biogas of 3 MW. Oil shale reserves in Jordan are estimated at 40 billion tons, containing 40 billion barrels of oil. This strategic source of energy could be adequate to cover Jordan's energy requirements for hundreds of years.

The main aims of National Energy Policy are:

- Development of local energy resources; Natural Gas, Oil shale, Solar, Wind, Biogas and Hydro Power.
- Penetration of new energy forms in the final consumption.
- Marketing exploration zones in Jordan.
- Participation of private sector in the energy sector.
- Improvement of efficiency.
- Introduce competition.
- Tariff development so as to reflect the real cost.

Renewable energy will be promoted in the electricity generation sector mainly through private investment, through enhancing the usage of solar heating in households, services and agriculture sectors and utilization of solar water pumping in rural areas. The Ministry of Energy and Mineral Resources (MEMR) is implementing a policy for the penetration of renewable energy in the energy mix to reach about 5% of the total by 2015. In the electric power sector, the enactment of the General Electricity Law made the institutional framework of Jordan the most liberal in the region. The sector was restructured in a way permitting at the first stage the competition in generation preparing the sector to be gradually freed into a full competitive market. The government is implementing a program to privatize the generation and distribution sectors, while the transmission and system operation will remain owned by the government. Jordan policy gives high priority to the development of remote areas and improving the living situations of the people living there. The government of Jordan is leading efforts and plans related to the development of this region. Many authorities have been established under the government umbrella with considerable budget to provide services for inhabitants living in remote areas.

On energy access the per capita consumption of electricity in Jordan doubled from 500 kilowatt hours per year to 1,000 kilowatt hours per year from 1980 to 1985 reflecting the doubling in the number of households supplied with electricity as rural villages were electrified. Electricity penetration in rural areas has reached about 98.8 in year 2002 with more details given in the paper (Appendix B). The implementation of the rural electrification policy was self financed by adding 2 fils per kWh sold in Jordan. Electric generation capacity increased 23 percent in 1986 and 18 percent in 1987 to total 712 MW. Roughly 40 percent of the electric power generated is used by industry, 30 percent is used by private citizens, 13 percent was used by commercial businesses, and the remainder was used by water pumping stations. The Hussein Thermal Power Station at Az Zarqa historically had produced more than 70 percent of the country's electricity, but at the end of 1987, the opening of the Aqabah Thermal Power Station added 650 MW, boosting Jordan's generating capacity to 1500 megawatts. A 400-kilovolt transmission line connected Aqabah and Amman.

The presentation recognized that over two billion people have no access to modern forms of energy to supply basic needs such as cooking, lighting and heating. Instead they rely on dangerous and polluting energy sources that damage human health and the environment. This wasted time in collecting fuel wood could be used for education or more productive income-generating activities. Furthermore, about 2 million premature deaths occur every year from exposure to indoor air pollution caused by burning solid fuels in poorly ventilated spaces. This lack of access to convenient and efficient energy services is a major barrier to achieving meaningful and long-lasting solutions to poverty. Renewable energy technologies using biomass, wind, solar, hydropower and geothermal energy sources can provide energy services for sustainable development based on indigenous sources.

NERC with the cooperation of the Rural Electrification Project has implemented several electrification projects in some remote areas using photovoltaic system. A major issue was the competitiveness of renewable energies vis-à-vis fossil fuel options and thus detailed selection of the adapted sites (where the solar or wind resources are highest and which are close to load centres) have been done based on cost/benefit analysis in order to select the least cost options.

3.5 Energy Policy in Syria

The presentation on Energy policy in Syria was presented by Eng. Mr. Abdul-Raouf Yahia the director of the Energy Planning and Conservation Program. He started with a historical preview of the electricity sector in Syria. In 1994, the Public Establishment was divided into the Public Establishment of Electricity Generation and Transmission, and the Public Establishment of Electricity Distribution. The installed capacity in Syria is currently at 7383 MW and energy production in 2004 has reached 32038 GWh, leading to a per capita consumption of 1743 kWh, with a current electrification level of 99.4%.

The main challenges facing the electricity sector were then described, which are the annual rate of consumption increase, the high subsidy level in electricity prices, and the high losses in the electricity distribution networks. The main reasons for these challenges were recognized as the current tariff structure, the lack of energy efficiency regulation allowing a widespread use of low energy efficiency equipment and appliances. Further, the absence of the private sector in the form of partnership with the public sector was mentioned one of the reasons hindering the development of the energy sector in Syria.

The presentation gave an overview of the total number of un-electrified communities which number 932 representing 13,881 families or a population of 99,764. Most families in these communities use LPG or Kerosene for cooking or lighting, and Diesel fuel for heating. Water supply is provided by tankers from near or relatively far water wells and in some cases there are local water network. Electrical generating sets are widely used in these communities with 2108 diesel sets surveyed.

The recommended policy concerning energy access of these communities is the urgent electrification of all communities located less than 10 km away from the grid. The redeployment of photovoltaic units, currently installed in 2 villages in Dara'a and 4 villages in Aleppo after providing them with electricity from the grid, in communities where it is economically feasible to connect them to the public grid. Plans should be

developed for electrifying communities located more than 10 km away from the public electricity grid by using different sources such as wind mills, photovoltaic, bio-mass or hybrid systems.

One method to address the high rate of increase in consumption was the development and implementation of a demand side management (DSM) program which estimate a capacity saving of about 2500 MW in 2020 and an energy yearly saving of about 4500 GWh. On the supply side, the main policies are to improve the its efficiency by installing combined cycle technologies in all existing gas power plants, rehabilitating old power plants, and by building new power plants either based on combined cycle or steam turbines with minimum of 300 MW unit capacity. This will parallel an improvement of the 400 kV transmission and expansion in of the 20/0.4 kV distribution substations. The supply side will be complemented by the 7-country regional interconnection. the inter-connection between Jordan, Syria and Egypt is now being finalized, whereas the inter-connection between Syria, Lebanon and Turkey is in progress now.

Another alley which is currently being investigated to reduce the dependence on fossil fuel is the introduction of renewable energy in the overall energy balance by construction of wind farms and photovoltaic plants for electricity generation and the expansion in using modern biomass energy. Currently the wind and sunshine atlas of the Master Plan for renewable energies is being finalized.

Building up organizational capacity and improving manpower performance by establishing training centers for power plant operation and maintenance and similar ones for distribution networks.

Policies and regulations regarding energy efficiency & environment are in:

- Establishing energy standards for large energy users and major energy equipment manufacturers and distributors to insure efficient use of energy and the adoption of energy conservation measures through combined heat and power generation and the use of renewable energy.
- Establishing building design standards to be adopted by designers, developers and operators to insure the efficient use of energy renewable energy in new and retrofitted buildings.
- Establish a program of incentives that encompasses the creation of local Energy Service Companies (ESCOs) and the stimulation of energy efficiency measures and renewable energy market in the country.

3.6 Energy Policy in Lebanon

The presentation on current energy policy and difficulties facing the energy sector in Lebanon was given by Mr. Mr. Georges Kamar, Advisor to the Minister of Energy and Water. He started by explaining the financial, technical and managerial difficulties that Electricite du Liban (EDL) is facing today. He explained that the financial difficulties stem from sources chief amons them is the high fuel cost that utility is paying for its fuel as compared to international standards. Further more the non-technical losses, or thefts, are at a high level (28%) compared to 3% in France. Despite this number being high, it has dropped down from around 38% in the mid 1990's and is expected to drop further.

EDL has a high level of debt which is currently at \$2.5 billion and rising. This tight financial situation is having a bearing on the quality of the technical operation in terms of maintenance which is likely to raise the annual deficit of EDL to \$450 millions if it is to be done properly. The financial situation is also having a negative effect on the completion of transmission projects; the 220 kV loop off the national super grid is still awaiting completion as well as the 220/ 400 kV interconnection with Syria. There are also difficulties at the distribution level due to the system being old, under sized with little or no redundancy and weakened further by illegal connections and causing technical losses to be of the order of 15% rather than 7-8% normally expected.

The ministry has plans on the short, medium and long terms to improve as much as possible the situation. A 5-month plan is now in the process to reduce the cost of production by changing the way fuel tenders are prepared to make them more transparent and fit the international standards specifications. Cost of production would also come down as natural gas from Syria becomes available to the Deir Ammar in May 2005 following the completion of the pipe line. The second step in the reduction of cost of production policy would be to have natural gas available through LNG carriers or from a pipe line from Tripoli to Zahrani. The high non technical losses will be reduced by adding extra meters for users and substations to detect fraudulent users and push legal action with the help of the legal and security establishments. The collection in Beirut has reached an all-time high of about 96% and it is expected to shift this experience to other regions in the country. The reliability and quality of service are expected to increase by acquiring new spare parts for generation and by completing the 220 kV grid and 400 kV interconnection with Syria and by improving the customer quality service. The level of funding needed for these activities would be with the help of World Bank and other international institutions and friendly countries in the medium term to finance fuel purchase and long term for a rehabilitation and extension program. On the managerial front the stage is being set for reinforcing the managerial structure at EDL and incorporating it as one entity with new bylaws being regulated by a National Commission. To help in the financing process it is expected to increase the invoiced and collected bills from a current 62 and 54% to 80 and 74% within 5 years with an accompanying reduction in the technical and non-technical losses from current levels of 15 and 28% down to 10% for both. A five-year plan currently in the making aims at revitalizing the electricity sector by a restructuring or reform process that would allow regional trade and private sector participation with tariff policy revision.

3.7 Thermal Standard for Buildings in Lebanon

An presentation of the ongoing Project “Thermal Standard for Buildings” carried out with support from UNDP under GEF in partnership with the Ministry of Public Works was presented by Ms. Mathilda Khoury. She first gave an overview of the issues that need to be addressed prior to the integration of the Thermal Standard in the Lebanese Building Law. The adoption of Thermal Standards for buildings is essential to curb the increased energy demand in the building sector. Nonetheless, this essential policy has to follow a phased approach in order to take into consideration the realities and possibilities of the Lebanese construction industry. The current phase which started in 2002 involves development of technical documents and the information dissemination and capacity

building. The next phase from 2005 to 2010 will be a period of voluntary application and adaptation prior to its expected implementation in 2010.

The Thermal Standard for Buildings aims at improving the thermal performance of building envelopes in order to improve indoor thermal comfort of building occupants and to reduce the energy consumed for space heating and cooling. The Thermal Standard covers the various Lebanese Climatic Zones and addresses new residential and non-residential buildings. The first phase of the project entails the development of the thermal standards, technical and design guides, and a legal study. The development of these technical documents involved a climate zoning of the country and a subsequent energy assessment using the Visual DOE software tool to simulate the space heating and cooling energy requirements for two base-case buildings in the 5 climatic zones (10cases) and 34 building envelop alternatives. The Impact of the proposed Standard on the national economy and the environment has also been analysed.

In the second phase, the process of voluntary application will be complemented by energy audits, lab-testing and labeling of locally manufactured building materials. In addition certification mechanisms and financial incentives will be established. In a third phase starting in 2010 the thermal standard / Energy code will be integrated in the Lebanese Building Law and made compulsory.

3.8 GNESD Renewable Energy Technologies Theme

Prof. Chedid of the ERG then gave a presentation of the renewable energy technologies in Jordan, Lebanon, and Syria which started with an overview of the socio economic data for the three countries summarized in Table 2 below. Solar radiation levels and wind speeds were then presented for the countries, which showed an excellent potential for using solar energy (4-8 kWh/ m²-day) and a fair one for wind energy (5 – 11 m/s). The urbanization levels in Jordan and Lebanon are higher than 80% while in Syria it is 52%. The three countries have high electrification levels (> 98%). Poverty and social indicators in Lebanon, Syria, and Jordan were then presented; poverty in these countries ranges between 20 and 30 percent based on a household income between \$10-12/day.

Table 2: Socio-economic Data for Jordan, Lebanon, and Syria

2002 records	Jordan	Syria	Lebanon
Population (million people)	5.239	17.13	3.596
Gross Domestic Product GDP (billion US\$)	9.295	21.871	19.3
Energy Consumption per Capita (boe/y)	7.1	6.4	11.9
Electricity Consumption per Capita (MWh)	1.3	1.1	2.6
Electricity Consumption per GDP (kWh/ US\$)	0.745	0.933	0.535

Solar energy has two primary applications *thermal* and *photovoltaic*. Solar thermal energy is by far the larger contributor to solar energy usage in the form of domestic solar water heaters (DSWH) which have been demonstrated with different penetration levels, types, capacities and fields of applications. In Syria and Jordan, the installed DSWH are estimated to be around 20000, and 200000 units, respectively. The prospects of PV

applications in Jordan and Syrian are promising particularly for remote areas which can effectively contribute to poverty alleviation and improve the quality of life for women and children. PV systems were demonstrated on a small scale and used for a total capacity of about 150 kW used to provide electricity for small remote villages, water pumping and desalination for Bedouin communities, and signaling systems in remote areas.

Producing electricity from the wind energy has been successfully demonstrated in Jordan and Syria with costs range of \$700-1000 /kW and 4-6 cents/kWh. In Syria, more than 60% of system can be locally manufactured, creating new jobs and contributing for poverty alleviation. In Jordan, more than 12 wind turbines were implemented for a total of 1.62 MW, tested and evaluated primarily for electricity generation producing 3.25 GWh per year mainly at Hofa. The Ministry of Energy and Mineral Resources (MEMR) has issued the call for proposals for the development of a 75-90 MW wind IPP project. In Syria, A 150 kW grid connected wind turbine was set up in 1994 in Qunetra producing 300 MWh/year. There are also stand-alone wind systems installed in Syria for battery charging, water pumping and defrost (750 W to 50 kW) which are locally manufactured (since 1990) by private company (SAC) located at Adra, near Damascus. The total capacity production by the company is 600 kW. The degrees of maturity and penetration of this technology in Syria and Jordan are both high, while it is not mature in Lebanon.

In Jordan, the biomass activities were limited to the construction of an experimental biogas digester in 1992 with a capacity of 16 cubic meters per day. A techno-economic feasibility study for electric power generation from municipal solid waste was carried out in cooperation with the UNDP and GEF. Jordan has adopted a special program for Bio-energy. The outcome of this program resulted in implementing the first biogas project in Jordan and in the region with a capacity of about (1) MW of electricity. This project is owned, operated and maintained by the Jordan Biogas Company (JBCO), and is going to be expanded up to 5 MW by the year 2005. In Syria, only theoretical assessment coupled with minor demonstration pilot projects have been carried out so far, although the potential for generating energy from biomass is great. In Lebanon, agricultural waste that is typically burned has some limited applications that have been identified by non-governmental organizations (NGOs). These schemes were mainly financed by the United Stated Agency for International Development (USAID) within the framework of community development projects have been established and have operated efficiently.

In Jordan, the institutions working in solar energy include the National Energy Research Center (NERC), the Ministry of Energy and Mineral Resources (MEMR), Renewable Energy Department, The Royal Scientific Society (RSS), Renewable Energy Research Center (RERC), and the private industry. NERC is responsible for RE development and field promotion of RE electricity generation with emphasis on wind generation, RERC/RSS performs R&D activities, demonstration projects, testing and certification, and support local industries through the development of components and system designs. In Syria, Renewable Energy Office (REO) of the Ministry of Electricity coordinates plans and identifies implementation priorities, the Scientific Studies and Research Center (SSRC) develops analytical simulation models for RE systems and equipment standards for DSWH and windmills, and the Syrian Arab Organization for Standardization and Measurement coordinate RE activities develops specification standards for RE

equipment. In Lebanon, the Ministry of Energy and Water (MEW) plans studies on RE contribution to energy and coordinates efforts in RE field, the National Council for Scientific Research (NCSR) Coordinates renewable energy activities, conducts research and development (R&D) in the field of renewable energy, and develops renewable energy equipment testing facilities, and non-governmental organizations perform promotion and awareness-rising activities, development activities related to the installation of renewable systems, especially biogas systems for rural households.

Although the three countries are rich in renewable energy resources, these are still not properly exploited with little attraction of potential developers. The two main barriers for the quick development of the renewable energy technologies in Lebanon, Syria and Jordan are mainly the high prices of the equipment on the local market, and the relatively low cost of the electricity. There are no dedicated financing schemes or special incentives provided for RETs initiatives. This barrier is especially important due to the high capital investment costs needed of some interventions that require the installation of specialized equipment. Some solutions may start with governments promoting necessary regulations, tariff structures, low tax considerations, low custom duties on RETs and other incentives to encourage RET utilization. These should be practiced in a way to make the activities of local manufacturers of these technologies more profitable. In addition, pilot RET should be sponsored to introduce RET operations and promote its uses to operators and consumers. RET technology transfer should be encouraged to develop the local manufacturing know how, which exists albeit in some limited form, primarily in Syria. Entrepreneurial policies must be developed by the governments with cooperation with local financial institutions, research institutions, private sector, and NGOs.

4. Summary of Discussion and Recommendations

The general points brought up in the discussion included the following:

- Increase public awareness on energy conservation and the usefulness of renewable energy in reducing the cost of energy utilization to the consumer in a manner similar to the Jordanian program of installing domestic solar water heaters. This should be accompanied by plans to secure funds to finance the investment plan in energy efficiency and improve the management structure and effectiveness of electric utilities.
- Standardization and labeling should be a priority for all common equipment and devices that use electricity on national and regional levels. The regional market is flooded with inefficient appliances. Government should provide or encourage the setting up of testing and certification facilities to remove barriers for the use of efficient energy products and to warn the consumer.
- The electricity tariff in Lebanon is the highest in the region and needs restructuring to help low income access to electricity while encouraging conservation. The focus in Lebanon has been directed since 2002 to energy planning and conservation and the reduction of theft with help from security forces.

- Attention to the poor is being given in the policy development and legislation. Study of electricity Tariff's will take into consideration the effect of electricity tariff on the poor and their quality of life. A current project financed by the UNDP is studying the tariff structure in Lebanon and considering its impact on the poor. However, the poor and the average population will benefit if performance and energy efficiency measures are implemented to reduce the production cost in the first place.
- The issue of water access is very important and should be dealt with along with energy in some integrated planning approach. Water resources in the region are getting scarce and energy will be needed in large quantities to desalinate water and improve its quality, while on the other hand water has an energy value in terms of its potential to produce hydro-electricity.
- Most supply of hydro power in Lebanon is in the winter and early spring seasons. So it may help in the overall energy balance but contributes to a lesser extent in the reduction of the summer peak as it has to be managed with agricultural needs in perspective. The possibility of photovoltaic for street lighting was discussed for remote areas but this does not significantly changes the overall energy balance in any of three countries.
- Rural electrification is not needed as the grid in Lebanon extends to most of the country with an electrification level of about 99%. However, we need large scale renewable energy (i.e. wind) for grid connection to cover up supply shortages. And we also need to have large scale solar hot water systems to reduce use of valuable energy on domestic uses.
- A word of caution is in order to differentiate between high electrification levels and energy access especially to the poor following a probable reform in the electricity sector in Lebanon. According to a study by Dr. A. Nehmeh [10] referred to in the Energy Access Paper [1] the percent of people living on \$3.3/day is 18% so the question of affordability of electric energy by these people should be kept in focus. This especially important in light of the present economic situation that is likely to keep a high pressure especially on the poor.
- Based on results of the Energy Access Study, and given the high electrification levels in Jordan, Lebanon and Syria, the electric energy sectors in the region seem ripe for a reform and it is noted that Jordan has taken the lead in this. The reforms will attract much needed funds to address the difficulties and problems mentioned in the Lebanese paper and the high investment needed to implement the Syrian plans. However, such reform must take place with a constant concern or focus to insure that the poor at least are not negatively affected from the access point of view.
- In order to attract the private sector to energy production and distribution, there should be laws and regulations to create incentives for this sector to invest and contribute in the region. Laws in both Syria and Lebanon are not supportive to make it feasible. Regulations are to be in place to attract investment in the energy industry.

- There has to be a strategy that includes conservation and renewable energy use in the region. The Jordanian model can be studied and used as a successful case study. Energy conservation is considered as a new energy source due to its potential in energy savings in Jordan. The extensive conservation programs implemented have led to a direct saving in energy estimated at about 80 thousand tons of oil equivalent per year. One of the primary functions of the conservation program is to inform the public about energy savings by collecting and disseminating information about energy conservation. Activities include holding seminars, advertising, preparing and distributing publications on energy conservation. A second major activity of the Jordan National Energy Research Center is that of conducting energy audits and providing technical advice based on on-site inspections. The advice has encompassed using thermal insulation, designing passive-solar heated buildings, installation solar water heaters and using more efficient electrical equipment
- Much can be learned from the Jordan experience in the privatization of the electric energy generation sector as demonstrated by the Jordanian paper and the effect of the reforms on the energy bill of the low income people. All policies are at the bottle neck at funding. Signing Koyoto Protocol will provide funding mechanisms to Lebanon and Syria. Jordan is already using this fund for energy savings.

5. Concluding Remarks

The establishment of the Regional Action Plan of the Middle East has brought together several national centres and experts and started a dialogue that has exemplified itself through several workshops organized with help from the US Citizens Exchange Program and GNESD. Three areas for proposal development have been identified and deadlines for developing these proposals has been set (April 30, 2005). Stakeholders on national energy policies have been engaged in this dialogue process to have the issues of energy access and its relationship to poverty alleviation better appreciated and understood. The role of renewable energy technologies in helping in the overall energy balance is also under focus. The energy access and profile paper [1] and a paper based on renewable energy initial assessment report [2] on Jordan, Lebanon, and Syria will both be presented in the Third International Conference on Energy Research and Development (ICERD) that will take place in November 2005 in Kuwait. The presentations provided in this are being further developed to put more focus on the issue of poverty alleviation and energy access to the poor. The final versions of these papers should be available by mid March as part of the final report on this outreach activity. The activities that have been carried out by members of the AUB-ERG and other members mainly from JUST, DU are being put in website format that can be accessed on the web as and will be printed on a limited edition of 50 CDs to be distributed for various parties at conferences and other occasions of interest.

6. References

- [1] S. Karaki, F. Chaaban, R. Chedid, T. Mezher, A. Hamzeh, A. Harb, F. Abdulla, and A. R. Yahia, "Electric Energy Access in Jordan, Lebanon and Syria", *The*

Third International Conference on Energy for Research and Development, Kuwait, November 2005, Accepted.

- [2] R. Chedid, N. Ghaddar, F. Chaaban, M. Fadel, T. Mezher, and F. Moukalled “A Sub-Regional Outlook of Renewable Energy Potential: The Case of Jordan, Syria and Lebanon”, *Renewable Energy Conference*, Bonn, June 2004.
- [3] N. Ghaddar, “Beirut regional Collaboration Workshop on Energy Efficiency and Renewable Energy Technology”, Activity Report on Enhancing Environmental Sustainability through Energy Efficiency and Renewable Energy Technology, Project No. S-ECAPE-02-GR-130 (MA), Citizen Exchange Program, US Department of State, May 2004.
- [4] N. Ghaddar, “First Steering Committee Meeting Minutes”, Activity Report on Enhancing Environmental Sustainability through Energy Efficiency and Renewable Energy Technology, Project No. S-ECAPE-02-GR-130 (MA), Citizen Exchange Program, US Department of State, September 2004.
- [5] S. Karaki, F. Chaaban, R. Chedid, T. Mezher: “Networking and Outreach Activities in Jordan-Lebanon-Syria for Energy Access II”, ERG First Report on UNDP Generic Component, December 2004.
- [6] N. Ghaddar, “Florida Solar Energy Center Training Program”, Activity Report on Enhancing Environmental Sustainability through Energy Efficiency and Renewable Energy Technology, Project No. S-ECAPE-02-GR-130 (MA), Citizen Exchange Program, US Department of State, August 2003.
- [7] N. Ghaddar, “Second Regional Action Plan Steering Committee Meeting and Stakeholders Meeting”, Activity Report on Enhancing Environmental Sustainability through Energy Efficiency and Renewable Energy Technology, Project No. S-ECAPE-02-GR-130 (MA), Citizen Exchange Program, US Department of State, February 2005.
- [8] GNESD Secretariat, “Energy Access Theme Results: Summary for Policy Makers”, www.GNESD.org, April 2004.
- [9] Karakezi S. and Sihag A.R. (Eds.), “Energy Access Theme Results: Synthesis/Compilation Results”, www.GNESD.org, April 2004.
- [10] N. Ghaddar, T. Mezher, M. Fadel, R. Chedid, and F. Moukalled: “Initial assessment report on renewable energies and selected case studies of Jordan, Syria, and Lebanon”, “Renewable Energy Technology”, Working Group, Global Network on Energy for Sustainable Development, in preparation.
- [11] Nehmeh, A. “Lebanon: Poverty and Wealth Disparities”, *Social Watch Report 2001*, No. 5, pp. 126-29.

Appendix A

Regional Action Plan on Sustainable Energy Development

Structure and Bylaws

1. Introduction

This document describes the structure and mechanism for implementation of the Regional Action Plan on Energy, a new initiative whose aim is to promote collaboration on energy efficiency and renewable energy alternatives in education and research, and for sharing of knowledge about energy issues among partner institutions.

2. Regional Action Plan

The Regional Action Plan for Regional Sustainable Energy Development (RAPSED) was developed and finalized during the course of the Regional Collaboration Workshop on Energy Efficiency and Renewable Energy Technology that was held in Beirut in April 2004. The partner institutions and universities have adopted then the following mission statement:

“Enhance collaboration among universities and other stakeholders to promote energy efficiency and appropriate renewable energy technologies for environmental sustainability and economic development.”

The institutional arrangement to carry out the mission involved the selection of a lead university to serve as a focal point in each country to coordinate activities among national universities and institutions. A Steering Committee having one representative from each country was formed and shall be chaired on a rotational basis. It will coordinate activities with international institutions and national focal points. So far the institutions involved are:

American University of Beirut
Jordan University of Science and Technology
Palestinian Polytechnic University
Damascus University
King Fahd University of Petroleum and Minerals
National Energy Education Institute
Notre Dame University
Lebanese American University
Kuwait University

The Steering Committee will also have a member representing the technical US/International advisors

**Florida Solar Energy Center, University of Central Florida
Northwest Energy Education Institute (NEEI), Eugene, Oregon.
PRD Consulting, Pleasanton, California**

The Steering Committee links the knowledge, the experience and the skills available amongst its partners, and through its activities benefits decision-makers in the public and private sectors.

The partner Institutions share information on policy mechanisms and solutions that strengthens institutional capacity in the provision of environmentally sound energy solutions. The partnership structure promotes information exchange, learning, analysis and study, policy support, capacity building, and advocacy among and within national and regional institutions.

3. Regional Collaboration Partnership Structure

The partnership among Universities in the Middle East consists of member institutions from each partner country, the Regional Steering Committee (who meet in an annual Partner Assembly), Working Groups (can be formed from members of institutions from different countries or same country), National Partner Assembly and the National Focal Point institution. The institutional setup is depicted in Fig. 1, while the functions and responsibilities are described below.

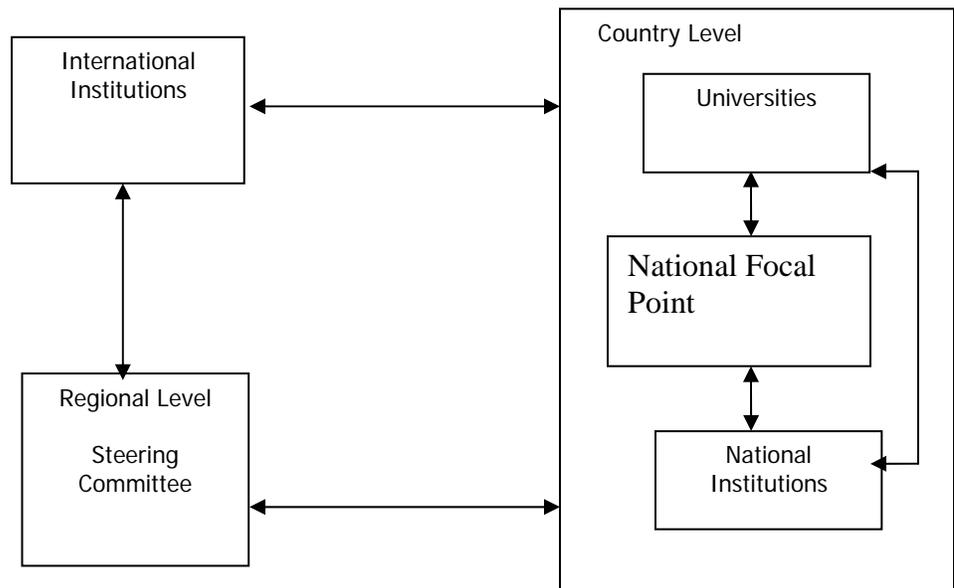


Figure 1: Institutional Setup

4. Partner Institutions (Members)

Partner institutions (or Members) are the focus of the knowledge generation activities. It is desirable that the member institutions have

- A demonstrated expertise in energy research, education, and or services.
- A willingness to extend collaborations to the sub-regional, and regional/international level, and
- A contribution to this partnership by providing in-kind goods support.

Institutions in countries of the region meeting the same criteria are eligible for membership. A statement of Commitment (or Memorandum of Understanding) is proposed to be signed by members of the partnership as given in Annex I.

5. Working Groups

The partner responsibility to energy activities are structured around selected thematic issues that were initially defined as the priority areas agreed upon by the assembly formed at Beirut Regional Collaboration Workshop in April 2004. Future updates on new initiatives may be proposed by any partner institution, but must be endorsed by the Steering Committee and approved by the general assembly. Working Groups are formed from amongst those Members interested and able to contribute to developing knowledge about a particular thematic issue. Working Group members collaborate on information exchange, analytical studies, policy support, and capacity building. Working Groups are composed of all partner Members or a sub-group of Members depending on the scope of the theme and the interest of Members. Activities conducted through Working Groups include the following:

- Conduct analytical and experimental studies within the identified themes, focusing on regional experiences, analysis and development of case studies, comparative policy analysis, and related areas of knowledge generation.
- Develop the identified initiatives through such activities as raising funds through joint grants among universities.
- Submit reports on activities conducted under the partnership to the Steering Committee.
- Presents other initiatives that are of interest to the national/regional Partners during the assembly meeting.

6. National Focal Point and National Partners Assembly

The partner institution that has a representative in the Steering Committee would represent member institutions in its own country and is named as the National Focal Point. A local assembly meeting is held annually for all members and stakeholders from the institutions in the country who qualify as partners. The National Partners Assembly will have the following duties:

- Propose plans on energy initiative areas and work program within the country
- Nominate representatives for the Steering Committee to the regional level
- Provide general input regarding the priorities and direction of the national energy activities

7. Partners General Assembly

Representatives of all partner institution from the region form the Partners General Assembly. All faculty and experts from the working groups are members of the general assembly. The General Partners Assembly will have the following duties:

- Approve strategic plans on energy initiative areas and work program
- Approve the nominations by the national assemblies of the representatives for the Steering Committee.
- Provide general guidance regarding the priorities and direction of the regional energy activities.

The Partners General Assembly meets every other year or at such other intervals as are deemed appropriate by the Assembly.

8. Regional Steering Committee

The Steering Committee provides management guidance and oversight for Network activities between meetings of the Partner Assembly. It consists of representatives from member institutions, and international advisors. The Steering Committee is chaired by one of the member countries on rotational basis.

The Steering Committee will have the following duties:

- Prepare the rolling two year strategic plan and work programme for discussion and approval at the Partner General Assembly.
- Invite institutions meeting the membership criteria to become Members of the initiative.
- Develop indicators for measuring the performance and success of the action plan,
- Endorse themes and establishes Working Groups.
- Identify funds under the broad directives of the Partner Assembly.
- Disseminate information among partners.
- Coordinate and structures activities including the assembly meetings.

Annex I

Regional Collaboration Partnership

*Statement of Commitment
(Or Memorandum of Understanding)*

Mission of the Partnership

“Enhance collaboration among universities and other stakeholders to promote energy efficiency and appropriate renewable energy technologies for environmental sustainability and economic development.”

Partner Commitments

We the undersigned commit to working as a Partner for Regional Collaboration on Energy Efficiency and Renewable Energy Technology to promote greater understanding and application of approaches that expand the provision of environmentally sound energy services. Specifically, by signing this Statement, we hereby undertake the following commitments:

1. Through the Partnership work to create a more effective framework for energy initiatives as defined by the Partners General Assembly.
2. Support partnership activities in the areas of collaborative research, exchange of knowledge, capacity building, and advocacy with other Partners from the Middle East, and International Advisors.

By signing this Statement we accept these commitments and confirm that are able and willing to contribute substantively to the goals of the Regional Collaboration Partnership with no direct financing obligations.

Date Name of Organization Name and title of signatory

Appendix B

List of Participants: January 25, 2005

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