e7 Network of Expertise for the Global Environment

e7-140

e7/UNEP
Rural Electrification Workshop

Bangkok
February 23-25, 2005

Final Report

prepared by the e7 Secretariat
(as of May 20, 2005)
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1. **INTRODUCTION**

The objectives of e7-140 e7/UNEP Rural Electrification Rural Electrification Workshop included:

- Identify the main challenges of rural electrification, based on a review of project experiences covering all stages of the cycle;
- Review best practices and determine effective approaches by which to address the challenges of rural electrification in the local context;
- Specify roles that e7 members and other stakeholders can play in ensuring that rural electrification projects are consistent with sustainability principles; and
- Improve the ability of rural electrification project developers to develop project proposals that are eligible for e7 funding and/or technical support.

To reach these objectives, the e7 established a task force who developed a program in collaboration with UNEP. Since November 2003, members of the e7 task force held eight conference calls and one meeting in Paris with UNEP. In the course of the workshop preparation the lead company EDF held three further meetings with UNEP representatives.

In order to achieve the above mentioned objectives, the workshop was structured in a sequence of five major topics, which have been identified as crucial for rural electrification projects:

- Public-private partnership (led by UNEP),
- Project Identification (led by HQ),
- Project Development (led by SP),
- Project Implementation (led by EDF),
- Project Integration (led by RWE).

It was agreed that each company representative be in charge and responsible to design his own session within the given topic. They were also encouraged to invite workshop participants to make presentations during their sessions in order to get participants more actively involved and to enrich the workshop with practical experiences gathered in the South-East Asia region.

As a workshop output it was planned to produce recommendations on how to better align rural electrification projects to sustainable development goals, while reducing transaction costs and accelerating the transition from concept to implementation. The recommendations should also include measures for replication of successfully implemented rural electrification projects.

The workshop agenda, which reflects the workshop as it has finally been delivered is given in Appendix 1, a list of participants is attached in Appendix 2.

The workshop proceedings and further workshop documents have been compiled on a CD-ROM, which has been submitted to all workshop attendees.
2. **WORKSHOP**

Mark Radka (UNEP) and Jan Keppler (e7-EDF) welcomed the participants on behalf of UNEP and the e7 as organizers and opened the workshop with brief remarks. They encouraged the participants to take the opportunity to work with and to learn from each other. Then they passed the floor for the opening speech to the Under Secretary of State from the Cambodian General Directorate of Energy, Sat Samy.

Sat Samy (General Directorate of Energy, Cambodia) stressed the need of rural electrification as a driver for rural development and as contribution towards alleviation of rural poverty. He pointed out the benefits of rural electrification such as giving access to communication, improving education and health care systems and as an opportunity for small industries which would subsequently create jobs. He was looking forward to the expertise to be delivered by the e7 experts through this workshop.

2.1 **SESSION 1 – PPP FOR PROMOTION OF RURAL ELECTRIFICATION**

Mark Radka (UNEP, France) made a presentation on issues, prospects and basic rules of public-private partnerships (PPP). He contrasted the gap between potential and actual utilization of renewable energies in Asia. On the other hand he also contrasted willingness versus the ability to pay for electricity based on a case study from Myanmar. He pointed out that PPP can help to address issues such as the shortage of money for rural electrification and the high initial costs related to renewables. He further explained the role of the public body and the private company in PPP, which can often be facilitated by a third party playing a catalytic role. He concluded with some recommendations of rules which should be considered for such partnerships.

Romeo Pacudan (UNEP Risø Center on Energy, Denmark) talked about global experience and lessons learned from PPP. He showed different possible arrangements of public-private partnerships and the roles of both public and private sector. An overview was further given on several projects developed under PPP in Chile, Mozambique, Nepal, Argentina and Sri Lanka and summarized their outcomes. Impacts on livelihood benefits and sustainability were also evaluated and contrasted in a table. He concluded with lessons learned on stakeholder participation, institutional aspects and financing aiming on making rural electrification projects viable.

Ludovic Lacrosse (COGEN III Coordinator, Asian Institute of Technology, Thailand) reported about the EC-ASEAN COGEN Programme, which aimed at the promotion of the use of cogeneration in the Association of Southeast Asian Nations. The three year's programme was completed recently. Mr. Lacrosse summarized its objectives and activities and showcased full scale demonstration projects based on biomass. The second part of his presentation was devoted to the role of the public and private bodies as well as third parties acting as catalysts in the programme. He concluded by highlighting the main challenges and success factors which have been identified.

2.2 **SESSION 2 – RURAL ELECTRIFICATION: PROJECT IDENTIFICATION**

Peter Leonard (e7-HQ) gave an overview of how the e7 and its partners proceed to identify rural electrification projects. The first part focussed on project identification requirements such as matching e7 member companies’ objectives, sustainability criteria and the assessment through pre-
feasibility and feasibility studies. The second part discussed how to assess and identify suitable renewable energy options. In the third part, project identification criteria of some exemplary e7 projects were given.

Pascale Bonzom (UNDP Consultant, Madagascar) made a presentation on the Growing Sustainable Business (GSB) Initiative for Poverty Reduction and its contribution to identifying rural electrification projects. Its objectives and the contributions of multiple stakeholders as well as the role of UNDP in this initiative were described. Ms. Bonzom also explained the country approach of the initiative and showcased GSB frameworks which have been set up in three African countries. A major part of her presentation was devoted to the Madagascar Lokoho project in the context of the GSB initiative. She encouraged more companies from the private sector to engage in GSB operations.

2.3 SESSION 3 – RURAL ELECTRIFICATION: PROJECT IDENTIFICATION (CASE STUDIES)

The presentation of Karma Tshering (Department of Energy, Bhutan) focussed on energy development, national policy and project identification in Bhutan from the perspective of the Department of Energy. He mentioned that rural electrification through grid-extension is not viable in Bhutan but highlighted the great potential of hydro power in Bhutan, which could play a major role in the future through off-grid micro/mini-hydro power projects. The Department of Energy aims at achieving 100% rural electrification by the year 2020 (currently 30%) by a 20 year's hydro power master plan.

Sat Samy (General Directorate of Energy, Cambodia) made a very extensive presentation on rural electrification based on renewables in Cambodia. Major points were energy sector development policies and strategies. Rural electrification in Cambodia focuses primarily on its hydro power potential; many project sites have already been identified. Dr. Samy delivered a table showing priority hydro power projects which need the participation of the private sector. The potential of other renewable energy sources in Cambodia has also been explored. A master plan of renewable energies aims at achieving 100% rural electrification in Cambodia by 2020. Some few projects have already been implemented and were showcased at the end of the presentation.

Peter Leonard (e7-HQ) concluded the session on project identification with a presentation of e7 case studies on the Chiloé and to the Wiwilí project. The description of each project and the studies which have been produced as well as lessons learned were discussed during the presentation.

2.4 SESSION 4 – RURAL ELECTRIFICATION: PROJECT DEVELOPMENT

Jonathan Curren (e7-SP) opened the sessions on project development with an overview about the concept of the presentations to be given in this context. Two detailed case studies from Nepal and Sri Lanka in session 4 would provide the basis for the working groups to be established in session 5 on the following day. Before he passed the floor to the experts from Nepal and Sri Lanka, he explained the topics of the three working groups:
- Planning and consultation,
- Finance, costing and tariff study,
- Ensuring closure.
Girish Kharel (Project Developer, Nepal) introduced the Nepal case study which was about leasing isolated generation and distribution systems to the private sector. Many of Nepal's public small hydro power systems were losing money, which led to the decision to lease such systems. In addition to providing the Nepal Electricity Authority with a net income, it was assumed that the private sector would provide a better level of service. Mr. Kharel reported that the experience has been positive so far. These privately managed systems proved to be more reliable and led local people to invest more in economic activities. He concluded with recommendations and lessons learned with a particular focus on contractual issues and financing.

Lalith Gunaratne (Project Developer, Sri Lanka) talked about the development in the renewable energies sector in Sri Lanka. Private sector promoters started to emerge with micro-financing concepts for solar PV in the 1980s. Similarly, micro-hydro power concepts have also been developed with strong community involvement aiming at self sufficient and independent operation. About 300 micro-hydro projects are currently being operated on this rural cooperative model. Other renewable energy sources are still in pilot project stage. He pointed out that most of these activities have happened outside the government system through NGOs and the private sector.

2.5 SESSION 5 – RURAL ELECTRIFICATION: PROJECT DEVELOPMENT (WORKING GROUPS)

Jonathan Curren (e7-SP) summarized the earlier presentations of the Nepal and Sri Lanka case studies. Three working groups of approx. 15 participants were formed. Mr. Curren, Mr. Kharel and Mr. Gunaratne were facilitators of the three working groups and led the discussion.

Working Group 1 (planning and consultation) explored the aspects of energy planning, capacity building and institutional arrangements, environmental impact assessment and a possible role the e7 could play. For energy planning, the following needs were identified:
- Integration of macro and micro planning;
- Demarcation of grid extension;
- Effective and informed stakeholders involvement;
- Balance of needs and affordability of the rural community and resources available;
- Integrating the planning with development activities and forecasting;
- Technology mix to have the best socio-economic development in the particular area.

For capacity building and institutional arrangements the following target groups were identified:
- Local communities and grass root level NGOs, private entrepreneurs and local educational institutions;
- Local authorities and national planners;
- Implementers and decision makers;
- Delivery chain.

Regarding environmental impact assessment, following aspects were pointed out:
- Developing a framework;
- Global and local environmental issues;
- Lack of data.

Finally, for a possible role of the e7, suggestions were as follows:
- Support all the above programmes;
- Influencing decision makers;
- Technical support, advice and recommendations;
- Resource assessment;
- Developing a monitoring and evaluation protocol;
- Developing co-operation amongst regional bodies.

Working Group 2 (finance, costing and tariffs) stressed the need to better provide information on how to get access to finance. A brainstorming resulted in the following list:
- Information on access to finance;
- Identify stakeholders: developers, intermediary entrepreneurs, consumers;
- Dependency on technology.

For the tariff issue, following aspects were identified:
- Need for benchmarking what consumers are currently paying for energy (e.g. kerosene);
- Need for a tariff plan which takes into account the increasing ability to pay over the project period;
- Minimum tariff is determined at least by the recovery of O&M cost;
- Reducing the financial risk can reduce the tariff.

This working group also suggested possible roles which the e7 could play:
- Help in planning project economics and costing;
- Make available global experience;
- Support through guidelines, manuals;
- Approaches for surveys about willingness to pay;
- Provide exemplary project details and business plans;
- Provide supply and technology to improve cost recovery over long periods;
- Offering a forum on finance and risk reduction.

Working Group 3 (ensuring closure) identified the need of subsidies for off-grid rural electrification. However, rural electrification through grid extension should not be subsidised but provide electricity at an affordable tariff. Criteria on how to subsidise (government, industry, community) and what to subsidise (generation, transmission, distribution) were discussed. The model of a life-line tariff, which subsidises the first portion of consumption was proposed. It is based on the idea that even the poorest households must be able to afford a basic amount of electricity.

The importance of integration and coordination between stakeholders (rural industry, agriculture, etc.) throughout the planning process and the project development was stressed as well.

Regarding solar PV and micro-hydro as two options of rural electrification, there was a consent that solar PV should be installed anywhere as long as the consumers can pay for it. For the use of micro-hydro, characteristics such as distribution of population, electricity demand/loads were underlined.

It was also proposed to obtain import duty waivers for equipment.

2.6 SESSION 6 – RURAL ELECTRIFICATION: PROJECT IMPLEMENTATION

Jan Keppler (e7-EDF) opened the session on project implementation with a presentation on the need of a lifecycle approach for successful implementation of rural electrification projects. The objective of such approach is to provide a realistic framework for implementing renewable energy projects in developing countries. He emphasized the need to integrate and manage the economic and social context over the whole lifecycle (long term) and concluded by with the recommendation to pay attention to context, size and time.
Somnath Bhattacharjee (Entrepreneur, India) made a presentation on the role of renewable energies in energizing rural India. He stressed the fact the India experiences continued power shortages due to the increasing demand. There is also a discrepancy between the percentage of villages which are electrified (86%) and the households which do actually have access to electricity (only 31%). India plans to achieve 100% electrification of rural villages by 2007 and 100% of households by 2012. From the lessons learned so far he recommended to empower more community and grass root level NGOs as top-down administered planning has not proved to lead to sustainable rural energy interventions.

The presentation of Ibrahim Hafeez Rehman (TERI, India) referred to implementation strategies and models for rural electrification based on renewables. He explained the TERI approach aiming at facilitating rural electrification in the context of sustainable rural development. Suitable project frameworks were presented, a concept for capacity building was introduced, selected projects were showcased and implementation strategies were discussed.

Ashish Kulkarni (TERI, India) made a presentation on modalities for micro-hydro based rural electrification. He pointed out the gap between the cost and the subsidy levels for small hydro power and the lack of promotion. He introduced the entrepreneur model, an approach developed by TERI. The Uttaranchal project, which is based on this model and which had been offered to the e7 in the past year was presented in this context, too.

Sunil Dhingra (TERI, India) focussed on decentralized distributed generation based on biomass gasifier. He stressed that an estimate of 18,000 remote villages cannot be electrified by grid extension and need to be electrified off-grid. He introduced the potential of biomass and the state of the art of TERI's research on the gasification technology. He further showcased some ongoing rural electrification projects based on gasified biomass and presented typical figures of project costs.

2.7 SESSION 7 – RURAL ELECTRIFICATION: PROJECT IMPLEMENTATION (CASE STUDIES)

Takao Shiraishi (e7-KANSAI) made a presentation on the e7 Bhutan micro-hydro power project. The project history, scope of work, construction schedule, project framework and the lessons learned so far from the CDM process (requirements, transaction costs) were highlighted in his presentation.

Tania Urmee (e7 Scholarship Recipient, Asian Institute of Technology, Thailand) contributed to the workshop with a presentation of her actual work at the AIT on the assessment of renewable energy systems for decentralized rural electrification by using the Geographic Information System (GIS). Her methodology was applied for the assessment of the renewable energy potential on two sites in Indonesia and Vietnam.

2.8 SESSION 8 – RURAL ELECTRIFICATION: PROJECT INTEGRATION

Claus Dauselt (e7-RWE) opened the session briefly by introducing the following speakers on the panel and by highlighting the importance of post implementation aspects of rural electrification projects.

Katarina Floranza Limpuru (Womintra NGO, Indonesia) made a presentation on community assistance on autonomous and sustainable rural electrification management from the perspective of an NGO representative. She presented three projects the NGO was involved (hybrid, solar home
systems, small hydro). Special attention was given to the involvement of the community and a village electricity management board throughout all phases of the projects.

In her presentation on planning and funding for sustainable rural electrification development, Syamsidar Thamrin (National Development Planning Agency, Indonesia) highlighted the low electrification rate (53%) and the low utilization of local renewable energies in Indonesia. There is also a gap in terms of access to electricity between different provinces in Indonesia. A plan to electrify at least 95% of the villages by 2010 has been developed by the government, which plays a major role in providing investment and micro loan schemes. Private sector participation is part of the government strategy as well as the involvement of the communities.

Yulius Mantaon (Alor District Government, Indonesia) made a presentation on the replication of rural electrification using the community empowerment approach. In Alor District, rural electrification through grid extension is not viable. Solar energy systems were regarded the most suitable option. He stressed the need to use only reliable technologies and to involve the community in the management of the projects. Mr. Mantaon also mentioned that Alor District replicated the e7 Indonesia project concept. The budget for 1200 solar home systems for Alor District had been approved by the government. He concluded his presentation with a long list of benefits resulting from this program.

2.9 SESSION 9– RURAL ELECTRIFICATION: PROJECT INTEGRATION (COUNTRY EXPERIENCE)

Adjat Sudradjat (Agency for the Assessment and Application of Technology, Indonesia) continued with rural electrification based on photovoltaic systems in Indonesia. A governmental program envisioning 1 million houses to be electrified by solar power has resulted in 50 000 installed units so far. There were also hybrid projects combining solar power and diesel. Both for the solar home system as well as the hybrid systems, outcomes and lessons learned were presented. However, the investment came primarily from the government, while the private sector as well as banks are still very reluctant to engage on the program.

Pongsak Harnboonyanon (Provincial Electricity Authority, Thailand) started his presentation with an introduction to the profile of the Provincial Electricity Authority. He further pointed out their role in the rural electrification development in Thailand, resulting in 99% electrification of villages and 96% of households. From the outcomes of this development throughout the past decades, Mr. Harnboonyanon draw conclusions by highlighting benefits, key success factors and constraints which have been identified. He concluded with an overview on the last stage of the Thailand rural electrification program, which will result in nearly 100% of households having access to electricity.

Henry Tarongoy (Department of Energy, Philippines) made a presentation on experience on rural electrification in the Philippines. He contrasted the typical costs of off-grid and on-grid solutions. In some provinces, access to electricity is still lower than 85%, but a four years electrification program aims at electrifying the remaining 3 500 villages without access to electricity. There is a significant participation of IPP in this program and an ongoing support program for household connection.

The presentation given by Debajit Palit (TERI, India) was a case study on the country experience in India, status and lessons learned. He stressed the problem that many villages are already regarded electrified when the inhabited locality has access to electricity, whereas many households of hamlets at a distance of 1-3 km may still remain without electricity. He proposed new criteria to define when a village is to be considered electrified and continued to list some other shortcomings.
in rural electrification and its related barriers, but he also mentioned strengths such as the strong involvement of the private sector, NGOs and cooperative societies. He showcased several projects from which he drew lessons learned and concluded with recommendations from TERI's experience.

Claus Dauselt (e7-RWE) closed the session by making a presentation on lessons learned from planning to operation by using the e7 Indonesia project as a reference. He drew lessons learned throughout the whole project cycle from design to post-implementation phase and reported on the current operation status of the projects. He concluded with a table showing the avoided CO2 emissions, some recommendations resulting from the aforementioned projects and with an evaluation of sustainability aspects.

The central points of discussion during session 8 and 9 were:

- Definition of the terms "non-electrified" and "electrified" rural villages by different presenters;
- Ability and willingness to pay of target groups;
- Planning and targets of governments for rural electrification based on renewable energy technologies;
- Projects financing and how to achieve financial sustainability;
- Discussion of poor results of micro-hydro projects in Indonesia;
- Definition of sustainability;
- Ownership of plants and reliability of on-site management.

2.10 SESSION 10 – SYNERGIZING

For this session, the former program envisioned to form four working groups and to produce recommendations along the main workshop topics (identification, development, implementation and integration of rural electrification projects). However, the e7/UNEP team noticed that there was a need to discuss financial aspects separately and agreed to continue and refine the discussions, which have been initiated by the three working groups on the day before in session 5. Finally, it was decided to assign the following topics to the three working groups:

- Project identification and development (facilitator: Jonathan Curren),
- Financial aspects (facilitator: Peter Leonard),
- Project implementation and closure (facilitator: Jan Keppler).

The main findings of Working Group I (project identification and development) can be summarized as follows: Important aspects of project identification and development have been identified and clustered into the topics "energy planning", "capacity building and institutional arrangements", "environmental impact assessment" and "sustainability". Each aspect has then been evaluated for different renewable energy options such as solar home systems, mini-hydro, biomass and hybrid systems. Many workshop attendees expressed their hope that the e7 could play a more active role in supporting projects in their countries, which led to a list of possible roles the e7 could play, such as financing, influencing decision makers, technical support, sharing best practices, resource assessment, developing monitoring and evaluation protocol, develop co-operation amongst regional bodies, develop and share EIA framework, expert advice on CDM.

Working Group II (financial aspects) identified capital cost, transaction cost and operational costs as the main financial issues. High transaction costs were regarded affecting most the viability of projects. There was agreement that sustainable financing is often the most challenging aspect of rural electrification and that terms and conditions of rural electrification projects are often not suited to commercial loans. Long recovery time and many risks result in commercial banks being very
reluctant. The need to put forth a mechanism to facilitate access to commercial loans was stressed by the participants. Governments could also play a more supportive role in encouraging private enterprises by opening up the rural energy sector and providing subsidies that cover parts of the investment or equipment cost. Combining new imaginative and creative mechanisms ("financial engineering") could also entail developing innovative ways of assuming risk sharing or of assembling guarantor funds. Other possibilities such as rural electrification funds, different taxation of grid electrification as well as IPP agreements were also discussed. Governments were considered the key players and a sound public policy the main factor in rural electrification. There was a consent that public policy should develop appropriate tools to facilitate project financing such as incentives, tax reforms on importation of equipment and the creation of rural electrification funds.

Working Group III (project implementation and closure) discussed project finance/closure, policy integration and areas where an involvement of the e7 would be most helpful. There was a consensus that off-grid rural electrification could not in most circumstances be self-financing. Social groups being unable to pay for electricity access as well as conservatism of rural population were identified as additional obstacles. Rural electrification through micro-hydro was considered the most favourable option with regard to economic dynamic and a self-sustaining cycle of development. The need of integrating rural electrification with other development initiatives (e.g. agricultural policies) and coordinating sound mechanisms on all levels of government was regarded a must. Participants agreed, that decentralization has proven to bring encouraging results. It was also recommended to integrate financing between local financial institutions, national institutions and international donors. Beyond project finance, participants identified several items in the areas of technical assistance and communication of "best practice" in which the e7 could be most helpful in order to accelerate sustainable energy development.

2.11 SESSION 11 – CONCLUSIONS

Mark Radka (UNEP) and Jan Keppler (e7-EDF) thanked participants noting the high level of participation in all sessions. They expressed their appreciation to all panellists for their presentations which enriched the workshop by valuable country experience. They encouraged participants to make use of the network which the workshop helped to established.

3. MAIN OBSERVATIONS AND POINTS OF DISCUSSION

All workshop attendees were very skilled and experienced with rural electrification projects. The representation of participants with institutional backgrounds and those from the practical level proved to be well balanced. This facilitated the active involvement of participants in the workshop, which was excellent.

There existed great hopes for a large and systematic involvement of the e7 in the financing of projects. However, the workshop served also to generate a more realistic appreciation of the capabilities of the e7 and its member companies as well as an understanding that the e7 is itself in a learning phase in which models and modalities of future cooperative activities are being tested. Among the topics proposed were the following:

- Financial support;
- Instruction in financial management of projects and development of bankable business plans;
- Technical support (planning, software, advice, recommendations, experience);
- Assistance in the development of cost-effective systems for billing and revenue-collection, how to prevent power theft and limit losses;
- Resource assessment;
- Developing a monitoring and evaluation protocol;
- Influencing decision makers;
- Developing co-operation amongst regional bodies;
- Developing and sharing EIA framework;
- Providing expert advice on CDM;
- Documenting and sharing on "best practice" or "good governance" in utility management.
**APPENDIX 1 – FINAL WORKSHOP AGENDA**

**Day 1 (February 23, 2005)**

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<th>Workshop Registration</th>
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<tr>
<td>8:00</td>
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<th>Workshop Opening</th>
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<tr>
<td>9:00</td>
<td>Mr. Mark Radka, UNEP Energy Programme Coordinator, France</td>
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<td>9:10</td>
<td>Prof. Jan Keppler, e7 Delegate from Electricité de France, France</td>
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<td>9:20</td>
<td>Dr. Sat Samy, Under Secretary of State, General Directorate of Energy, Cambodia</td>
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<th>Session 1 – Public Private Partnership for Promotion of Rural Electrification</th>
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<tr>
<td>9:30 Public Private Partnerships: Issues, Prospects and Basic Rules</td>
<td>Mr. Mark Radka, UNEP Energy Programme Coordinator, France</td>
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<tr>
<td>9:50 Public Private Partnerships: Global Experience and Lessons Learned</td>
<td>Dr. Romeo Pacudan, UNEP Risø Center on Energy, Climate and Sustainable Development, Denmark</td>
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<td>10:10 Public Private Partnerships: A Case Study – the EC-ASEAN COGEN Programme</td>
<td>Dr. Ludovic Lacrosse, EC-ASEAN COGEN Programme Phase III (COGEN 3)</td>
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<td>10:30 Discussion</td>
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<th>Session 2 – Rural Electrification: Project Identification</th>
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<tr>
<td>11:15 <strong>e7 Rural Electrification Project Identification</strong></td>
<td>Mr. Peter Leonard, e7 Delegate from Hydro Québec, Canada</td>
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<tr>
<td>11:45 Growing Sustainable Business for Poverty Reduction Initiative’s Contribution to Identifying Rural Electrification Projects</td>
<td>Ms. Pascale Bonzom, UNDP Consultant, Madagascar</td>
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<td>12:15 Discussion</td>
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<tr>
<td>14:00 Energy Development, Rural Electrification Policy and Project Identification in Bhutan</td>
<td>Mr. Karma Tshering, Department of Energy, Bhutan</td>
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<td>14:20 Rural Electrification by Renewable Energy in Cambodia</td>
<td>Dr. Sat Samy, General Directorate of Energy, Cambodia</td>
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<tr>
<td>14:40 <strong>e7 Rural Electrification Project Identification Case Studies</strong></td>
<td>Mr. Peter Leonard, e7 Delegate from Hydro Québec, Canada</td>
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<td>15:00 Discussion</td>
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<th>Session 4 – Rural Electrification: Project Development</th>
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<tr>
<td>15:45 Overview and Introduction of Session</td>
<td>Mr. Jonathan Curren, e7 Delegate from Scottish Power, United Kingdom</td>
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<td>16:15 Nepal Case Study – Leasing of RE Systems</td>
<td>Mr. Girish Kharel, Singha Bahini Bidyut, Nepal</td>
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<td>16:35 Case Study – Sri Lanka</td>
<td>Mr. Lalith Gunaratne, LGA Consultants Ltd., Sri Lanka</td>
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<tr>
<td>16:55 Discussion and Preparation for following Day</td>
<td>Mr. Jonathan Curren, e7 Delegate from Scottish Power, United Kingdom</td>
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<td>17:15 End of Workshop Sessions Day 1</td>
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Day 2 (February 24, 2005)

### Session 5 – Rural Electrification: Project Development (Workshops)

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<tr>
<th>Time</th>
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<tr>
<td>8:30</td>
<td><strong>Overview of Session</strong></td>
<td>Mr. Jonathan Curren, e7 Delegate from Scottish Power, United Kingdom</td>
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<td>8:45</td>
<td><strong>Working Group 1 – Planning and Consultation</strong></td>
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<td><strong>Working Group 2 – Finance, Costing and Tariffs</strong></td>
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<td><strong>Working Group 3 – Ensuring Closure</strong></td>
<td>Facilitators: Mr. Jonathan Curren, Mr. Lalith Gunaratne, Mr. Girish Kharel</td>
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<tr>
<td>10:15</td>
<td><strong>Conclusion and Recap of Best Practice</strong></td>
<td>Mr. Jonathan Curren, e7 Delegate from Scottish Power, United Kingdom</td>
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### Session 6 – Rural Electrification: Project Implementation

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter/Details</th>
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<tbody>
<tr>
<td>11:00</td>
<td><strong>Successful Implementation of Rural Electrification Projects: The Need for a Lifecycle Approach</strong></td>
<td>Prof. Jan Horst Keppler, e7 Delegate from Electricité de France, France</td>
</tr>
<tr>
<td>11:15</td>
<td><strong>The Role of Renewable Energy in Energizing Rural India</strong></td>
<td>Mr. Somnath Bhattacharjee, Winrock International, India</td>
</tr>
<tr>
<td>11:30</td>
<td><strong>Implementation Strategies and Models for Rural Electrification using Renewable Energy Technologies</strong></td>
<td>Mr. Ibrahim Hafeezur Rehman, The Energy and Resources Institute (TERI), India</td>
</tr>
<tr>
<td>11:45</td>
<td><strong>Modalities for Micro-Hydro Based Rural Electrification</strong></td>
<td>Mr. Ashish Kulkarni, The Energy and Resources Institute (TERI), India</td>
</tr>
<tr>
<td>12:00</td>
<td><strong>DDG Projects for Rural Electrification based on Biomass Gasifier</strong></td>
<td>Mr. Sunil Dhingra, The Energy and Resources Institute (TERI), India</td>
</tr>
<tr>
<td>12:15</td>
<td><strong>Discussion</strong></td>
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### Session 7 – Rural Electrification: Project Implementation (Case Studies)

<table>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>14:00</td>
<td><strong>Bhutan Micro-Hydro Power CDM Project</strong></td>
<td>Mr. Takao Shiraishi, e7 Project Leader, The KANSAI Electric Power Co. Inc., Japan</td>
</tr>
<tr>
<td>14:20</td>
<td><strong>Discussion</strong></td>
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<tr>
<td>14:30</td>
<td><strong>Assessing Renewable Energy System for Decentralised Rural Electrification using GIS</strong></td>
<td>Ms. Tania Urmee, e7 Scholarship Recipient, Asian Institute of Technology, Thailand</td>
</tr>
<tr>
<td>14:50</td>
<td><strong>Discussion</strong></td>
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### Session 8 – Rural Electrification: Project Integration

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>15:15</td>
<td><strong>Importance of Post Implementation Aspects</strong></td>
<td>Dr. Claus Dauselt, e7 Delegate from RWE (Germany), Indonesia</td>
</tr>
<tr>
<td>15:20</td>
<td><strong>Community Assistance on Autonomous and Sustainable Rural Electrification Management</strong></td>
<td>Ms. Katarina Floranza Limparu, Womintra Foundation, Indonesia</td>
</tr>
<tr>
<td>15:40</td>
<td><strong>Planning and Funding for Sustainable Rural Electrification Development in Indonesia</strong></td>
<td>Ms. Syamsidar Thamrin, National Planning Board (BAPPENAS), Indonesia</td>
</tr>
<tr>
<td>16:00</td>
<td><strong>Replication of Rural Electrification using Community Empowerment Approach</strong></td>
<td>Drs. Yulius Mantan, Afor District Government, East Nusa Tenggara, Indonesia</td>
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<tr>
<td>16:20</td>
<td><strong>Discussion</strong></td>
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17:30 End of Workshop Sessions Day 2
Day 3 (February 25, 2005)

<table>
<thead>
<tr>
<th>Session 9 – Rural Electrification: Project Integration (Country Experience)</th>
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</table>
| 8:30 **Rural Electrification by using Photovoltaic in Indonesia**  
  *Dr. Adjat Sudradjat, Agency for the Assessment and Application of Technology (BPPT), Indonesia* |
| 8:50 **Rural Electrification: Thailand Experience**  
  *Mr. Pongsak Harnboonyanon, Provincial Electricity Authority, Thailand* |
| 9:10 **Philippine Experience on Rural Electrification**  
  *Mr. Henry C. Tarongoy, Department of Energy, Philippines* |
| 9:30 **Case Study India, Country Experience, Status and Lessons Learnt**  
  *Mr. Debajit Palit, The Energy and Resources Institute (TERI), India* |
| 9:50 **Lessons Learnt From Planning to Operation, Remote Rural Electrification: Project e7-1**  
  *Dr. Claus Dauselt, e7 Delegate from RWE (Germany), Indonesia* |
| 10:10 **Discussion** |
| 10:30 **Coffee Break** |

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<thead>
<tr>
<th>Session 10 – Synergizing</th>
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<tbody>
<tr>
<td>11:00 <strong>Working Group 1 – Rural Electrification: Project Identification and Development</strong></td>
</tr>
<tr>
<td>11:00 <strong>Working Group 2 – Rural Electrification: Financial Aspects</strong></td>
</tr>
</tbody>
</table>
| 11:00 **Working Group 3 – Rural Electrification: Project Implementation and Closure**  
  *Facilitators: Mr. Jonathan Curren, Prof. Jan Horst Keppler, Mr. Peter Leonard* |
| 13:00 **Lunch Break** |

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<thead>
<tr>
<th>Session 11 – Conclusions</th>
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| 14:00 **Presentation of Outcomes – Rural Electrification: Project Identification and Development**  
  *Working Group 1* |
| 14:00 **Presentation of Outcomes – Rural Electrification: Financial Aspects**  
  *Working Group 2* |
| 14:00 **Presentation of Outcomes – Rural Electrification: Project Implementation and Closure**  
  *Working Group 3* |
| 15:30 **End of Workshop** |
APPENDIX 2 – WORKSHOP PARTICIPANTS

**e7 and UNEP team**

1. Jonathan Curren (e7-SP), United Kingdom (*SP*)  
2. Claus Dauselt (e7-RWE), Indonesia (*RWE*)  
3. Jan Keppler (e7-EDF), France (*EDF*)  
4. Peter Leonard (e7-HQ), Canada (*HQ*)  
5. Uwe Mades (e7 Secretariat), Canada  
6. Mark Radka (UNEP), France (*UNEP*)  
7. Peter Repinski (UNEP Regional Office for Asia and the Pacific), Thailand

**Participants sponsored by the e7**

**Bhutan:**  
8. Thinley Dorji, National Environment Commission  
9. Tenpa Gurme, Bhutan Power Corporation Ltd.  
10. Karma Tshering, Department of Energy, Planning and Coordination Division (*HQ*)

**Cambodia:**  
11. Chulasa Praing, Electricité du Cambodge  

**India:**  
13. Somnath Bhattacharjee, Winrock International India (*EDF*)  
14. Sunil Dhingra, The Energy and Resources Institute (TERI) (*EDF*)  
15. Ashish Kulkarni, The Energy and Resources Institute (TERI) (*EDF*)  
16. Debajit Palit, The Energy and Resources Institute (TERI) (*RWE*)  
17. Ibrahim Hafeezur Rehman, The Energy and Resources Institute (TERI) (*EDF*)

**Indonesia:**  
18. Katarina Floranza Limparu, Womintra NGO (*RWE*)  
19. Yulius Mantaon, Rural Community Empowerment Board (*RWE*)  
20. Adjat Sudradjat, Agency for Assessment and Application of Technology (BPPT) (*RWE*)  
21. Syamsidar Thamrin, National Development Planning Agency (BAPPENAS) (*RWE*)

**Laos:**  
22. Bouathep Malaykham, Ministry of Industry and Handicraft, Rural Electrification Division  
23. Kévin Mozas, Fondem NGO (Fondation Energies pour le Monde)  

**Madagascar:**  
25. Pascale Bonzom, Global Compact/GSB Initiative, Political Strategies Unit (*HQ*)

**Nepal:**  
26. Sridhar Devkota, entec GTZ, Small Hydro Power Promotion Project  
27. Bir Bahadur Ghale, Nepal Micro-Hydro Entrepreneur's Federation  
28. Girish Kharel, Annapurna Power (P) Ltd. (*SI*)  
29. Mahendra Lal Shrestha, Nepal Electricity Authority, Small Hydro and Rural Electrification Department
Philippines:
30. Rene B. Barruela, NPC-Small Power Utilities Group
32. Roderick N. Padua, National Electrification Administration
33. Henry C. Tarongoy, Department of Energy (* RWE)

Sri Lanka:
34. Asoka Abeygunawardana, Sri Lanka Energy Forum
35. Lalith Gunaratne, Sage Training (* SP)
36. Guru Badalge Wimalaratne, National Engineering Research & Development Centre (NERDC)

Thailand:
37. Tania Urmee, e7 Scholarship Recipient, Asian Institute of Technology (* EDF)

Further participants

Denmark:
38. Romeo Pacudan, UNEP Risø Centre Energy, Climate and Sustainable Development (* UNEP)

India:
39. B. K. Das, National Thermal Power Corporation Ltd. (NTPC)
40. Barun K. De, National Thermal Power Corporation Ltd. (NTPC)

Japan:
41. Takao Shiraishi, The Kansai Electric Power Company Co., Inc. (* EDF)

Philippines:
42. Teruhisa Oi, Asian Development Bank, Energy Division, East and Central Asia Department

Thailand:
43. Pongsak Harnboonyanon, Provincial Electricity Authority (* RWE)
44. Conrado S. Heruela, Food and Agriculture Organization of the United Nations
45. Nipon Ketjoy, School of Renewable Energy Technology (SERT)
46. Tetsuo Kondo, UNDP Regional Centre in Bangkok Asia and the Pacific Region
47. Ludovic Lacrosse, Asian Institute of Technology, EC-ASEAN COGEN Programme (* UNEP)
48. Hongpeng Liu, UN Economic and Social Commission for Asia and the Pacific (ESCAP)
49. Sommai Phon-Amnuaisuk, International Institute for Energy Conservation (IIEC)
50. Kamal Rijal, UNDP Regional Centre in Bangkok Asia and the Pacific Region
51. Ram M. Shrestha, School of Environment, Resources and Development, AIT
52. Manuel L. Soriano, UNDP-GEF Regional Coordination Unit Asia and the Pacific
53. Prapita Thanarak, School of Renewable Energy Technology (SERT)
54. Rajan Velumail, UNDP Regional Centre in Bangkok Asia and the Pacific Region

(* EDF) = made a presentation in session of EDF
(* HQ) = made a presentation in session of HQ
(* RWE) = made a presentation in session of RWE
(* SP) = made a presentation in session of SP
(* UNEP) = made a presentation in session of UNEP