DRAFT EXECUTIVE BRIEF

Policy Study on Regional Mapping of Options to Promote Private Investments in Alternative Energy Sources for the Poor

Regional Centre in Bangkok

Background

Renewable energy sources have long been viewed as alternatives to fossil fuels and conventional electricity from the grid. However, in spite of its origins in the oil price crises of the 1970s, their development has been slow and sporadic. The share of renewable energy sources (excluding large-scale hydropower) in most countries of the region is less than 2%, due mainly to the sustained spell of low fossil fuel prices for more than a decade until 2002. Revived concerns with energy security offer fresh opportunities for a significant scaling up of renewable energy markets.
Private investment and financing have played an increasing role in renewable energy market development within the region. Several initiatives have demonstrated the potential of private capital to engender self-sustaining markets, especially in rural areas to which the extension of grid electricity and fossil fuels is economically infeasible. However, these initiatives have generally overlooked the poor due to gaps between technology costs and the poor's lack of purchasing power. Numerous policy barriers have also hindered the growth of renewable energy markets. As international oil prices continue to surge, regional governments have been reducing pricing subsidies on conventional energy options which mitigates a central barrier to renewable energy. Parallel developments, such as the Clean Development Mechanism of the Kyoto Protocol, provide added impetus to a private sector-led renewable energy market expansion. At the same time, supporting policies are needed to ensure that such a market expansion is inclusive of the poor and responsive to their needs.

Research Questions

The policy study is intended to answer the following questions:

- How have renewable energy policies, programmes and initiatives evolved within the region over the past two decades? What have been their motivating factors and how have they shifted over time?
- What reasons prompt regional governments and bilateral/multilateral agencies to enhance the role of private investment in renewable energy development? To what extent do they recognize and emphasize the extension of renewable energy services to the poor?
- What new opportunities and constraints are presented by CDM and other Kyoto Protocol adaptation mechanisms?
- What have been the impacts so far of renewable energy on economic sectors, such as agriculture, transport, industry and physical infrastructure; and social sectors like health, education and commerce?
- What have been the impacts of renewable energy on various components of the MDGs?
- Which renewable energy resources and technologies have been the major focus of concentration in private investment? What are the shares of different options in it and do they represent a fair balance between fuels and electricity, on-grid and off-grid technologies, rural and urban consumers, and poor and non-poor consumers?
- Which policies, programmes and initiatives to mobilize private investment in renewable energy have succeeded? In what ways and with what experience/replication potential?

- Which policies, programmes and initiatives to mobilize private investment in renewable energy have failed? In what ways and why?
- To what extent have successful examples of private investment in renewable energy catered for the poor? What lessons could be drawn from them for the future?
- What strategies and policies could best develop private investment in renewable energy markets that also effectively cater for the poor's needs?

Approach, Methodology and Coverage

The study consists of a review of developing country experiences with renewable energy development, an analysis of related policies and market promotional models, and an assessment of the role and impacts of private investment in renewable energy with specific reference to the poor. It has four components:

Global assessment
Review global developments and trends affecting the role of renewable energy, poverty reduction and achievement of the MDGs, with special attention to post-WSSD initiatives that have a special focus on poverty.

Regional assessment

a) examine policy incentives and barriers to renewable energy development at large;
b) review the policy climate for private investment and financing;
c) assess the effectiveness of policies in addressing the energy needs of the poor; and
d) draw lessons from successes and failures.

National assessment **(in Cambodia, Indonesia, Nepal, Philippines and Solomon Islands)**

a) assess the effectiveness of renewable energy policies, programmes and initiatives, with emphasis on the role of private investment and financing;
b) analyze barriers and opportunities to meet the energy needs of the poor through renewable energy options; and
c) consult policy makers, industry, financing institutions and other key stakeholders to understand their differing perceptions and ideas for the future.

Micro level assessment **(case studies in Cambodia, Indonesia, Nepal, Philippines and Solomon Islands)**

a) assess local impacts of private sector-led renewable energy programmes/projects on the poor within the context of the MDGs;
b) analyze technical, economic, institutional, social and cultural factors behind the success or failure of the programmes/projects;
c) integrate findings into national assessments for policy conclusions/recommendations to enhance productivity, incomes and livelihood opportunities of the poor.

Interim Findings

Global renewable energy market trends

- 1970s & 1980s: ODA-funded small-scale demonstration and pilot projects, lacking institutional and commercial viability, and market infrastructure/incentives.
- 1990s: Larger scale initiatives — ethanol in Brazil, biogas in China and India, grid-connected wind power in India and small hydropower in Nepal. Commercialization of some donor programmes and entry of multinationals (BP, Shell) in solar PV.
- Technology shares by investment in 2003: wind power 38%; solar PV 24%; solar water heating 21%; geothermal power and heat, small hydro power and biomass power 17%.
- Overall share of renewable energy only about 2% of world energy use in 2001.

- Wind power and solar PV with fastest growth in a few developed countries — Japan, Germany, Spain and US.
- Technology improvements, cost reductions, better market information and climate change awareness primary driving factors for growth.
- Rural development, poverty reduction and local environmental concerns less important.

Renewable energy investment trends

- Rise in investment from USD 6 billion in 1995 to USD 22 billion in 2003; cumulative investment in 1995-2003 USD 110 billion.
- USD 30 billion investment in renewable energy in 2004; additional USD 4–5 billion by solar PV manufacturing industry, and several hundred million dollars by ethanol industry.
- Investment shares in 2004: wind power USD 9.5 billion; solar PV USD 7 billion; small hydro power USD 4.5 billion; solar hot water/heating USD 4 billion; and geothermal and biomass power and heat USD 5 billion.
- Renewable energy investment 20–25% of global power sector investment.
- Multilateral, bilateral and other public financing invest USD 500 million/yr in developing countries; largest sources are KfW USD 180 million, World Bank USD 110 million and GEF USD 100 million; other USD 5-25 million/yr.
- Developing country public investment examples: IREDA (India), Grameen Shakti (Bangladesh) and Development Bank of Uganda.
- Public investment expected to grow further, e.g., doubling by World Bank in next 5 yrs., EU-JREC ‘renewable energy fund of funds’.
- Indirect or associated private investment often equal to or significantly greater than public investment which is usually intended to catalyze former.

Private industry profile

- Worldwide, 60 publicly traded renewable energy companies or renewable energy divisions of major companies with market capitalization >USD 40 million in 2005.
- Solar PV is one of the world’s fastest growing, most profitable industries; USD 5-7 billion of investment planned in 2005.
- Entry of large corporations (GE, Siemens) into wind power market historically dominated by wind-turbine manufacturing companies.
- China and other developing countries emerging solar PV manufacturers; doubling of Chinese production capacity 2004 from 50 MW to 100 MW; 8 cell manufacturers and 14 module manufacturers in India; Sun Power, Philippines planned doubling of cell production capacity to 50 MW.
- Biomass power and heat and small hydro industries more localized and diverse than those for wind and solar PV; investments in former by companies generating biomass waste (timber, paper, sugar mills); investment in latter led by European industry.
- Policies/mechanisms to promote private investment:
  - investment subsidies;
  - tax and duty rebates/exemptions;
  - mandated market shares for renewable energy;
  - independent power producer programmes, especially for small-scale power generation using renewables;
  - special funds for renewable energy financing;
  - new financing modalities/partnerships to cater for different consumer groups; and
  - emerging CDM-based opportunities.

***Regional experiences with private investment in renewable energy for* basic energy services**

- Improved household stove programmes with rural artisans as entrepreneurs (Nepal, India) and private manufacturers in urban areas (China, Sri Lanka, Thailand, Vietnam) with government/NGO technical support.

- Household biogas commercialization programmes through private companies with government/NGO technical support (Bangladesh, Cambodia, China, India, Lao PDR, Nepal, Vietnam).
- Household space heating incorporated in improved stove programmes (China, India, Mongolia, Nepal).
- Electricity services for households through solar PV home modules supplied by private companies under government supported commercialization programmes — fast growth in Bangladesh, China, Lao PDR, Mongolia, Nepal, Sri Lanka, India, Vietnam.
- Electricity services for households through community-managed micro hydro mini grids with government/NGO technical support — fast growth in Nepal, medium growth in Indonesia, slow in Philippines, poor in Solomon Islands.
- Electricity services for community facilities (education and health) and domestic water supply — widespread use of solar PV under government programmes involving private sector.

Regional experiences with private investment in renewable energy for **productive uses**

- No projects/initiatives to provide mechanical power for farm machineries despite potential for biofuels.
- Isolated initiatives for irrigation water pumping — PV (India, Lao PDR), biomass gasifiers pumps (China, India, Sri Lanka).
- Private sector manufacturers of biomass-fired crop dryers (India, Philippines) and solar dryers (Thailand, Viet Nam) trying to compete with petroleum-fueled dryers and traditional drying practices.
- Water mills and small turbines providing mechanical energy for agro-processing (Nepal, China, Lao PDR) and isolated initiatives for gasifiers to run diesel engines (China, India, Sri Lanka).
- No programmes for electrical energy for agro-processing, storage and refrigeration, but most micro-hydro projects designed to provide agro-processing energy also. Isolated gasifier initiatives in China, India and Sri Lanka.
- No major programmes for process heating in SMMEs, but a number of successful gasifier stove/dryer projects China, India and Sri Lanka.
- No major programmes for electrical energy for SMME processing, product storage and refrigeration, but most micro-hydro power (MHP) projects promote off-farm enterprises. Isolated PV projects for SMMEs in Bangladesh, Philippines, Vietnam; and gasifier projects in India and Sri Lanka.
- No programmes for commercialization of biofuels for transport.

Regional experiences with renewable energy financing

- Lack of financing remains a key barrier to expanding renewable energy services and investments into grid-connected projects.
- Some dedicated institutions like IREDA (India), RERED (Sri Lanka), IDCOL/REREDP (Bangladesh) have increased investment into renewables substantially. Commercial banks lending emerging in India.
- Microfinancing of renewable energy is uneven (75% of SPV in Bangladesh, 25% in Nepal).
- CDM increasingly used as complementary financing for larger grid-connected projects (wind, biomass, small hydro) – with Asia now in the lead.
- Largest CDM prospects for household energy in cooking technologies, biomass, biofuels, and productive end-uses with substantial emissions; lesser prospects for lighting technologies and telecommunication.
- CDM not effective so far to increase investment into small-scale projects suitable for the poor; biomass substitution projects no longer eligible for CDM financing.

Regional experiences with poverty impacts of renewable energy

- Social benefits from lighting, TV and radio, and some economic benefits from reduced kerosene and candle use.
- Little evidence of income impacts from most renewables, except biogas for cooking and improved biomass stoves that reduce expenditure on fuel wood and create jobs.
- In general, insufficient evidence of large rural development benefits from renewable energy.
- Social benefits, rather than income and economic benefits, have driven markets for renewable energy in rural areas.
- Experience with productive uses of renewable energy limited.

Micro level assessment of poverty and MDGs impacts: case study in Nepal

MDG 1: poverty reduction

- Average kerosene saving (3.2 liters/mth) and dry cell battery saving (2 pairs/mth), equivalent to Rs. 190/mth for SHS users and Rs. 100/mth for MHP users.
- Average fuel wood saving of 140 kg/month for biogas users, equivalent to 12 work days/year and cash expenditure of Rs 150/mth. Time savings mostly associated with women.
- Diesel savings of 35 liters, equivalent to Rs. 1,300 net cash savings, in agro-processing mills.
- Local carpenters providing better furniture and are paid better due to electricity.

MDG 2: education

- Increased study time of 1.2 hrs/day.
- Access to educational information from TV/radio; but negative impacts of TV also as children lose study hours by watching entertainment programmes.
- Better informed teachers; occasional audio-visual teaching.
- No impact on school enrollment rates.

MDG 3: gender equality

- Extra time due to lighting.
- Significant reduction in fuel wood collection time for biogas users.
- Significant reduction in drudgery where agro-processing units installed.
- Increase of women's involvement in community activities and leadership.

MDGs 4 & 5: health and sanitation

- General reduction in health problems claimed, but no association with specific diseases/illnesses.
- People not using biogas or electricity with larger number of diseases/illnesses.
- Reduced indoor air pollution by avoiding/reducing kerosene for lighting.
- Improved maternal health and reduced childbirth mortality.

MDG 6: combating HIV/AIDS, malaria and other diseases

- People believe media facilities have created awareness to combat different diseases, especially HIV/AIDS.

MDG7: environmental sustainability

- Significant reduction in indoor air pollution through use of biogas, solar home systems and micro hydro power.
- Greater forest sustainability due to decrease in fuel wood consumption.

Ongoing Work

- Data from case studies carried out in Cambodia, Indonesia, Philippines and Solomon Islands being analyzed.
- Closer linkages between renewable energy poverty/MDGs being established in global and regional assessments.
- Renewable energy policies and market promotion models being mapped and characterized to identify gaps vis-à-vis enhancing poor's access to modern fuels and electricity.
- Factors underlying imbalances in investment and financing among different renewable energy technologies being reviewed to sharpen focus of future policies for market development.

Timeline and Follow-Up

The study commenced in early November 2005 and will be completed by end of June 2006. Its final outcomes will be reviewed by UNDP, with close attention to the methodologies developed and employed since the issues addressed by the study— crucially, the assessment of impacts on poverty and the MDGs — have insufficient precedents in past studies of energy policies.

Follow-up actions will be determined through internal cross-practice consultations within UNDP and external consultations with national governments and donors. Tentatively, these could consist of a regional policy forum, sub-regional and national policy dialogues, replication of in-depth case studies in other countries, and capacity-building and advocacy in pursuit of medium- to long-term coping strategies.

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