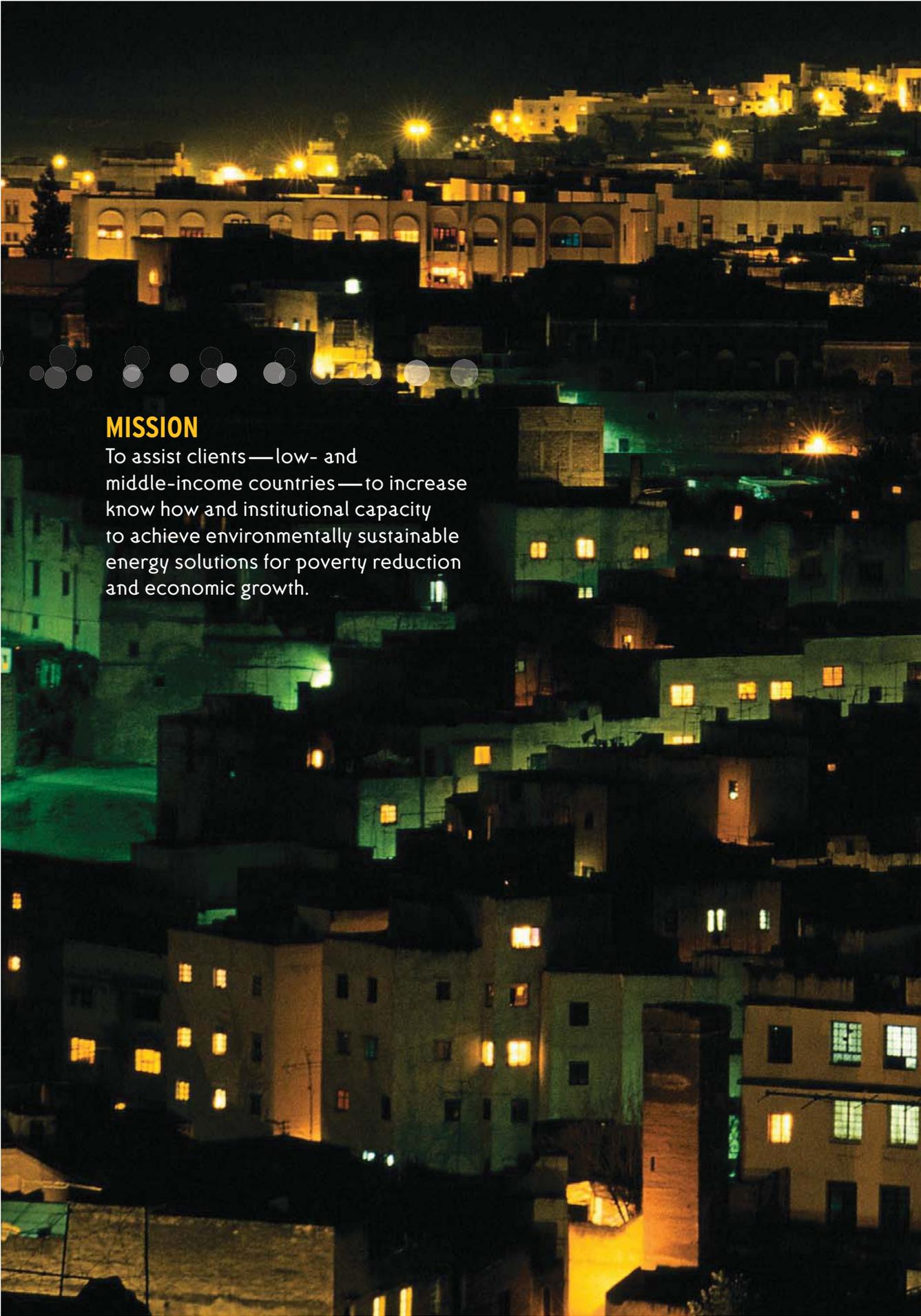


09

Annual Report





MISSION

To assist clients—low- and middle-income countries—to increase know how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth.

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Foreword

Since ESMAP's inception more than 25 years ago, its primary mission has remained steady: to help its client countries increase their know how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. Over the past year, ESMAP has taken significant steps, in line with its new 2008-13 Strategic Business Plan, to extend its engagement with client countries to encompass the nexus of energy security, energy access, and climate change, mirroring the changing landscape of global energy challenges.

The global economic recession continues to take a toll on energy infrastructure financing. High and volatile fossil fuel prices threaten the security of energy supply for low-income countries and pose unprecedented challenges for all client countries. Climate variability is boosting the costs and risks to economic development, especially as energy demand is rising quickly.

ESMAP's challenge is to more proactively assist client countries to acquire fresh ideas and insights on how to reduce the vulnerability of their energy sectors to increasing climate variability, while transitioning to a low carbon development path that can support poverty reduction and economic growth. They need the capacity to provide clean, reliable, and affordable energy services to as many people as

possible—in an efficient and environmentally sustainable manner. They must also harness the broadening range of technologies and solutions to ensure a sustainable energy future.

During fiscal 2009, ESMAP transitioned from a three-year to a five-year business planning cycle, enabling ESMAP management to cultivate more meaningful, longer term strategic partnerships to achieve “win-win-win” energy solutions for poverty reduction and sustainable economic growth. The changes in ESMAP's thinking are also evident in the results-orientation of this report on the first year of the new business plan—on better-informed policymaking, enhanced client capacity, and cutting-edge solutions.

Despite the bleak global economic picture, ESMAP stayed on track by receiving US\$13.9 million from donors (up US\$0.6 million from fiscal 2008) and disbursing US\$14.9 million (up US\$2.5 million from fiscal 2008). In the years ahead, ESMAP looks forward to helping its client countries grapple with new and emerging energy challenges while maintaining the course towards poverty reduction and economic growth.

Jamal Saghir

*Director, Energy Transport and Water
Chair, Energy and Mining Sector Board*

Amarquaye Armar

*Program Manager
Energy Sector Management Assistance Program*



1. ESMAP IN A CHANGING GLOBAL ENVIRONMENT

The global financial crisis, volatile fuel prices, and the emerging climate change agenda have provided additional challenges for ESMAP to carry out its mandate—to help developing countries better manage their energy sectors.

- The global economic and financial crisis is constraining the availability of infrastructure financing from private capital markets. In developing countries, the level of infrastructure financing dropped from US\$200 billion in 2007 to US\$135 billion in 2008 and declined further in 2009.
- Sharp fluctuations in world oil prices—which increased sevenfold between January 2002 and July 2008 and have since declined—contribute to the instability of the global economy and could worsen the current crisis, while natural gas and internationally traded coal prices moved in tandem with oil prices. Price volatility is one of the greatest obstacles to developing alternative energy since large energy price changes affect the relative costs of technologies.
- Climate change adds costs and risks to development, especially in the energy sector. Some regions and ecosystems are more vulnerable than others to increasing weather variability, rising temperatures, and extremes—such as droughts, floods, and heat waves. As temperatures rise, energy demand will increase for space cooling and decline for heating. The consequences vary by energy asset type, but may include financial loss, stress on energy supply, and environmental and social risks.

Moreover, energy demand is rising quickly and is expected to rise 45 percent above its 2006 level by 2030, with China and India leading the charge. Over the

next 20 years, roughly 90 percent of the projected increase in energy consumption will come from developing countries, using 70 percent more energy annually than developed countries. Nevertheless, large parts of the developing world lack adequate access to electricity, especially rural areas where fewer than 25 percent of people have access—despite the known ability of rural electrification to transform lives. The International Energy Agency estimates that by 2030, 1.4 billion people will still be without electricity, while 2.7 million will still rely on traditional biomass fuels—especially in South Asia and Sub-Saharan Africa.

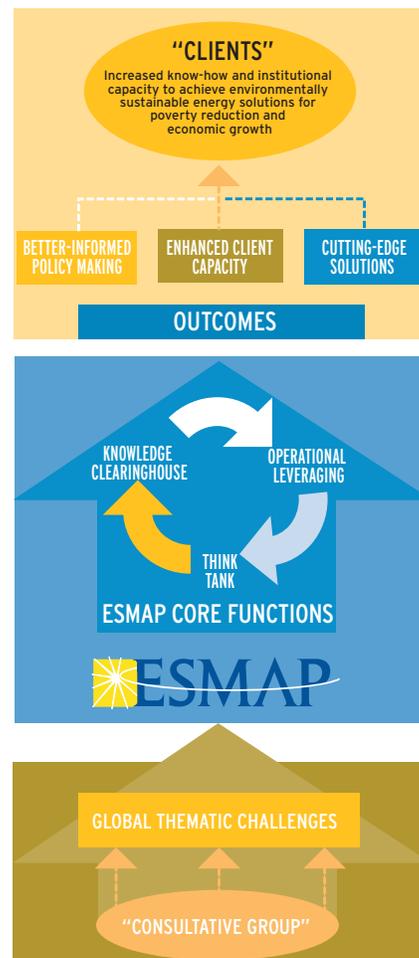
Against this backdrop, during fiscal 2009 ESMAP has been rethinking how it goes about assisting low- and middle-income countries to increase know how and institutional capacity for environmentally sustainable energy solutions for poverty reduction and economic growth. The ESMAP 2008-13 Strategic Business Plan responded by introducing a new focus area on the energy-security and climate-change nexus. By reinforcing ESMAP’s commitment to address energy poverty, the plan includes a heightened focus on social dimensions, especially the needs of low-income urban dwellers and gender equity. Additionally, ESMAP is stepping up its assistance to Sub-Saharan Africa through the Africa Electrification Initiative and partnerships, such as Lighting Africa.

HOW ESMAP WORKS

Established in 1983, ESMAP has a comparative advantage as a client-centered partner that serves the

global energy practice as an honest broker, addressing issues in a balanced way. Its mission is driven by a Results Framework (figure 1.1). Consultative Group (CG) members choose the global thematic challenges—energy security, energy poverty, and climate change—that underpin funding priorities for each ESMAP business plan cycle. These global thematic challenges, in turn, inform the choice of energy practice areas for ESMAP during each business plan cycle.

Figure 1.1 Results Framework



To implement the CG's mandate, ESMAP focuses "upstream" through three core functions: think tank, knowledge clearinghouse, and operational leveraging—all aimed at helping client countries make better informed choices, enhance capacity, and adopt cutting-edge solutions (box 1.1).

To ensure more effective delivery of client outcomes during the current business cycle (2008-13), ESMAP is strengthening its portfolio development in two major ways. First, under the *Portfolio Management Method*, it is better aligning its program implementation arrangements with The World Bank's fiscal year cycle for executing analytical and advisory activities and technical assistance and expanding coverage of the Annual Block Grants across all core programs. Second, it is setting up a comprehensive, programmatic *Monitoring and Evaluation* system to assess the effectiveness of its programs in achieving timely and sustainable outcomes for clients.

Beginning with this fiscal year (July 2008–June 2009), ESMAP has transitioned into a five-year strategic

ESMAP TEAM

The ESMAP Unit is responsible for the day-to-day management of ESMAP, following the strategy laid out in its business plan as approved by the CG and annual work program managed by the Energy, Transport and Water Department (ETWD) of The World Bank Group.

Amarquaye Armar, Program Manager

Marjorie Araya*	Feng Liu
Heather Austin	Vanessa Lopes
Douglas Barnes*	Marie-Gisele Morrisson
Agnes Biribonwa	Alain Ouedraogo
Ranjan Bose	Juliet Pumpuni*
Amadou Camara	John Rogers*
Rogério Carneiro de Miranda	Xiaoyu Shi*
Anne-Marie Coonan*	Sheryl Silverman*
Jonathan Coony	Bipulendu Singh
Istvan Dobozi	Jas Singh
Jane Ebinger	Cindy Suh
Oluwafemi Faleye	Lydia Kruse Tietz
Magnus Gehring	Nyra Wallace
Soren Krohn*	Christopher Walsh*
Marlon Lezama*	

Regional Coordinators

Africa, Tjaarda Storm Van Leeuwen

East Asia, Frederic Asseline

Europe & Central Asia, Peter Johansen

Latin America & Caribbean, Xiaoping Wang

Middle East & North Africa (vacant)

South Asia, Sudeshna Banerjee

* Left ESMAP before end of fiscal 2009

Box 1.1 ESMAP's Core Functions

As a *think tank*, ESMAP sponsors a broad range of analytical and advisory activities aimed at delivering high-quality advice to influence policymaking by its client countries and broaden knowledge horizons about cutting-edge energy solutions for global thematic challenges.

Drawing extensively on knowledge from its think tank function, ESMAP's *knowledge clearinghouse* sponsors knowledge exchange activities and training events to share best practices, tools, and lessons of experience, thus enhancing the client's capacity to plan, manage, and regulate energy sector strategies and programs.

For *operational leveraging*, ESMAP provides client countries with "just-in-time" technical assistance to resolve program design issues and offer additional options, helping achieve results on the ground.

CONSULTATIVE GROUP

ESMAP is governed by a Consultative Group (CG) made up of representatives from contributing donors and chaired by The World Bank Vice President, Sustainable Development Network. The CG meets annually to review the strategic directions of ESMAP, its achievements, and its use of resources and funding requirements.

Katherine Sierra, *Chair*

Jamal Saghir, *Acting Chair, WBG Representative*

Australia

AusAID

Austria

*Austria Ministry of Finance
Austrian Development Agency*

Canada

*Canadian International Development
Agency*

Denmark

Royal Ministry of Foreign Affairs

Finland

Ministry of Foreign Affairs

France

Agence Francaise de Developement

Germany

*Federal Ministry for Economic Coopera-
tion and Development (BMZ)*

Iceland

Ministry of Foreign Affairs

Norway

Royal Ministry of Foreign Affairs

Sweden

*Swedish International Development
Cooperation Agency*

The Netherlands

Ministry of Foreign Affairs

United Kingdom

Department for International Development

Cosponsoring Organization

The World Bank Group

business planning framework, which is underpinned by three-year rolling plans formulated in consultation with the regional energy units (figure 1.2). ESMAP monitors, updates and presents these rolling plans for annual review at CG meetings. During the final two years, an independent consultant, under the oversight of the Technical Advisory Group (TAG), will conduct a comprehensive evaluation of ESMAP results and emerging outcomes for consideration at CG meetings. The goal is to ensure that ESMAP's efforts remain on target and relevant to the global challenges highlighted at CG meetings. The total budget for the ESMAP 2008-13 Strategic Business Plan is estimated at US\$55 million.

To position ESMAP's results and achievements on the developmental radar of both internal and external audiences, ESMAP's communications efforts are now more proactive in sharing knowledge and best practices through a wider variety of media: publications, CD-ROM, websites, newsletters, fact sheets, user-friendly brochures, videos, and events. Over the past fiscal year, the team worked more closely with The World Bank regional energy teams to highlight results achieved through web articles and a quarterly newsletter. Through external partners, ESMAP has also disseminated a wide range of energy-related knowledge products to global audiences at such international events as the International Energy Conference (Vienna), the United Nations Framework Convention on Climate Change (Bonn), Carbon Expo 2009 (Cologne), and the 5th Urban Research Symposium (Marseille). A redesigned ESMAP website will be launched in early 2010 to reflect priorities of the new Strategic Business Plan.

TECHNICAL ADVISORY GROUP

A Technical Advisory Group (TAG) of international experts selected by the CG provides informed, independent opinions to the CG about the purpose, strategic direction, and priorities of ESMAP. The TAG also provides advice and suggestions to the CG on current and emerging global issues in the energy sector likely to impact ESMAP's client countries.

Elizabeth Cecelski
Amitav Rath
Winfried Rijssenbeek

Box 1.2 ESMAP At a Glance

ESMAP is a global, multidonor technical assistance program aimed at promoting environmentally sustainable energy solutions for poverty reduction and economic growth. It is managed by the Energy, Transport and Water Department of The World Bank Group and is governed by a consultative group of donors that meets annually. ESMAP's mandate and products have evolved over time to meet the changing needs of its clients from low-income, emerging, and transition economies. It has operated in more than 100 countries through more than 800 activities since its inception. ESMAP-financed activities are led by World Bank Group staff in partnership with international, national, regional, and local organizations.

In fiscal 2009, ESMAP received US\$13.9 million from its donors-US\$0.6 million more than in fiscal 2008—with about half of the funds coming from the Netherlands and Germany (see Section 5). About 41% of total contributions went into core (global, unrestricted) funding and 54% into thematic funding for various initiatives. Disbursements totaled US\$14.9 million, increasing US\$2.5 million from fiscal 2008. Program expenditures increased by US\$2.7 million, most of it on regional work.

For more information, go to the ESMAP web site: <http://www.esmap.org>.

GLOBAL ENERGY CHALLENGES

ENERGY SECURITY

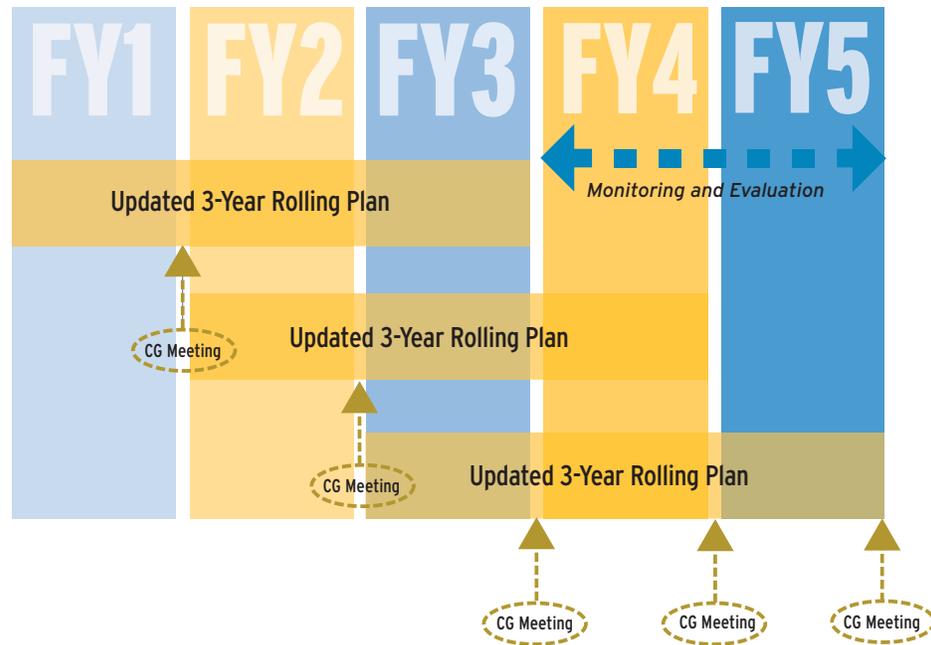
For the first time in 35 years, the world faces sustained increases in fossil fuel prices, resulting in substantial income redistribution. Although prices have eased in recent months as a result of slowing economic growth, they are expected to remain at historically high levels because of perceptions about global supply and demand trends. Countries with large net oil imports relative to income are especially vulnerable to the macroeconomic effects of price shocks.

In some developing countries, higher oil prices may reverse years of progress in reducing poverty. Faced with escalating equipment and service costs and difficulties in securing

reliable and affordable energy supplies for sustainable economic development, many ESMAP client countries are unable to expand energy infrastructure. To increase resilience to supply disruptions, many countries are choosing to restrain demand and pool their resources through regional energy approaches.

Moreover, the recent downturn in global credit markets has created uncertainty about the availability and cost of medium- to long-term financing to meet energy sector investment targets. Some energy projects have suffered withdrawal of potential financiers or an unsustainable increase in funding costs. Others are finding that potential lenders are requiring more stringent project approval thresholds in a credit-constrained environment. Some commercial lenders

Figure 1.2 ESMAP 5-Year Business Plan Cycle



are withdrawing from potential energy project loan syndications because of capital constraints, while others are preserving their capital base to remain sufficiently liquid and meet reserve requirements. In the face of these obstacles, ESMAP client countries may be tempted to ration resources or otherwise postpone essential investments in the energy sector. Their best option to improve energy security, however, lies in greater energy efficiency, diversification of energy sources, and prioritizing the use of low carbon and renewable energy technologies.

POVERTY REDUCTION

The inability of ESMAP client countries to meet their energy sector investment targets will constrain economic growth, employment, and access to essential infrastructure services—not

to mention delay the achievement of the 2015 Millennium Development Goals (MDGs) aimed at raising living standards around the world (box 1.3).

Despite increased international commitment of resources, providing quality energy services is expensive. Few poor people can afford the upfront expenditure to secure access to quality supply. The cost is especially prohibitive in remote and dispersed rural areas, where low-density demand raises service costs and reduces profitability for potential providers. Poor consumers in rapidly growing urban slums and peri-urban areas face similar constraints, despite higher urban distribution efficiencies. Moreover, programs to close the energy access gap often

Box 1.3 Millennium Development Goals



involve cross-sector interventions. In response to these challenges, ESMAP client countries need help to develop robust and collaborative institutional frameworks to plan and implement nationwide strategies to expand access to electricity and also promote and facilitate productive uses of electricity, once it becomes available.

CLIMATE CHANGE

The global community recognizes that deep cuts in global greenhouse gas (GHG) emissions—including along the energy production chain and its end use—are required to hold the increase in global temperature below 2 degrees Celsius. Warmer temperatures, reduced snow cover, and changing hydrology have been observed as a direct result of increased GHG emissions. Some regions and ecosystems are more vulnerable than others to changing climatic conditions, such as droughts, flood, and heat waves; changes that can affect both energy supply and demand.

Energy consumption and emissions have doubled since 1970 and are projected to do so again by 2050. The developing world's contribution is also growing, accounting for more than 50 percent of global GHG emissions today and projected to reach 70 percent by 2050. Efforts taken over the next two to three decades will have a large impact on the ability to stabilize GHG concentrations and limit climate impacts.

Tackling climate change mitigation and adaptation will require actions across multiple sectors—agriculture, energy, forests, industry and transport—as well as changes in individual lifestyle and behavior. It will also take the combined efforts of developed and developing countries, whose populations are likely to be among the worst affected, to achieve this. Although developed nations should carry out the major effort to reduce GHG emissions, developing countries have multiple opportunities to grow in a sustainable manner.

Mitigation and adaptation measures need not constrain further growth. Stabilizing carbon emissions at manageable levels urgently requires multilateral actions that offer policy incentives to remove barriers and build capacity to implement a portfolio of low carbon energy approaches and technologies (mature, pre-commercial, and yet to be developed), including energy efficiency measures. Regions and countries experiencing more frequent and intense extreme weather events, as well as changes in endemic conditions such as persistent drought, will need enhanced hydro-meteorological and technological capacity, risk management strategies, and formulated incentives for adaptation to address energy sector vulnerabilities. Implementing such an approach can help curb emissions growth, support climate-smart development, and address the significant gap in science, technology, and innovation capacity.

PROGRAMS, INITIATIVES, AND PARTNERSHIPS

Fiscal 2009 was the first implementation year for the ESMAP 2008-13 Strategic Business Plan under which ESMAP's assistance to client countries aims to achieve the following three outcomes:

BETTER-INFORMED POLICYMAKING

As ESMAP client countries map out their energy futures, they will rely increasingly on fresh ideas to shift to a low carbon and more energy

efficient development trajectory, while trying to cope with the global credit crunch, volatile energy prices, and climate variability. They will also need to make better informed decisions for themselves, their neighbors, and the global community; and they will have to do this sometimes with little advance notice and great uncertainty, including the political environment.

What is ESMAP's role? ESMAP is assisting countries to carry out vulnerability assessments for their power sectors, completing three such activities in East Asia in fiscal 2009; crafting indicative plans for low carbon growth in emerging economies; stepping up its support of timely energy assessments and strategy work, not only for countries and regional organizations but also for specific energy-consuming sectors, such as transportation; and launching a new program to bring gender equity considerations into energy decisions.

ENHANCED CLIENT CAPACITY

Developing countries setting out to provide more clean, reliable, and affordable energy services in an environmentally sustainable manner to as many people as possible are going to need the institutional capacity to do so. However, this capacity is not met given the reality of the inadequate institutional capacity levels throughout much of the developing world.

How can ESMAP help them? Fiscal 2009 activities have applied “learning by doing” approaches to help build institutional capacity of clients, ranging from developing natural gas services in Vietnam to hydroelectric power systems in Peru and Nepal, expanding electricity markets in Egypt and Turkey, and strengthening the knowledge base of electrification agencies in Bangladesh. The Lighting Africa Initiative is exploring new technical innovations, such as the latest LED, fluorescent, and solar technologies, to offer modern energy services to consumers throughout Sub-Saharan Africa that are clean, efficient, and reliable—and at price points comparable to typical expenditures for kerosene. In China, the focus

is on reducing energy intensity, which means rethinking the relative use of coal and renewable energy resources for electricity production.

CUTTING-EDGE SOLUTIONS

ESMAP was involved in two major initiatives to explore cutting-edge solutions in fiscal 2009: the Renewable Energy Market Transformation Initiative, which supports an expanding role of renewable energy technologies (some more tested than others) in achieving energy supply diversification and the Energy Efficient Cities Initiative, a flexible, cross-cutting, demand-driven program that helps cities identify innovative ways to improve energy efficiency in the delivery of city services.





**COUNTRY ENERGY SECTOR
VULNERABILITY ASSESSMENTS PROGRAM:**

Helping Countries Prepare an
Effective Energy Sector Response

2. BETTER-INFORMED POLICY MAKING

VULNERABILITY ASSESSMENTS

The global financial crisis, highly volatile energy prices, and climate variability have been creating a significantly more turbulent environment for energy sector management worldwide. Developing countries are particularly exposed, but their governments have little room to maneuver because of limited institutional capacities and fiscal resources.

In response to these challenges, ESMAP has launched an initiative to identify existing and emerging vulnerabilities for policymakers and energy practitioners alike. The **Country Energy Sector Vulnerability Assessments Program** focuses on the effects of financial crisis, volatile oil prices, and climate change on the energy sectors of developing and transition economies. The program includes three components:

- *Power sector vulnerability assessments* help countries assess the impact of the global financial crisis on priority investments. The goal is to identify a pipeline of priority power projects; financing gaps and ways to fill them; “green” investments (using hydropower, wind, geothermal, and solar technologies); and at-risk public-private partnership projects and ways to support them.
- *Oil price volatility assessments* help countries assess the effects of oil price increases and heightened price volatility, including their ability to absorb price shocks. The assessments examine policy instruments to cope with price volatility, including hedging security stocks, price-smoothing schemes, taxation, and reducing oil dependence (such as diversification).
- *Climate vulnerability assessments* help countries assess their energy sector vulnerability in the face of climate change, including changing average temperatures and precipitation, increasing variability, and extremes.

Table 2.1 Power Sector Vulnerability Assessments in East Asia (US\$ millions)

	Pre-crisis funding estimate 2009-13	WB estimate based on post-crisis demand 2009-10	Funding secured through end 2008	Funding gap 2009-10
EVN, Vietnam	7,847	3,897	2,553	787
PLN, Indonesia	8,071	4,333	3,047	1,286
PSALMTransco Philippines (NPC debt overhang, Transco costs, stranded costs)	PSALM NPC debt repayment obligation 2009-13	PSALM NPC debt repayment obligation 2009-10	Privatization proceeds through end 2008	Funding gap net of privatization proceeds of \$US 2,190 mln 2009-10
	5,280	3,750	935	1,560
Total	21,198	11,980	6,535	3,633

In fiscal 2009, ESMAP completed the first set of three country power sector vulnerability assessments in East Asia. The assessments reveal approximate funding gaps in Indonesia (US\$1.3 billion for 2009-10), Vietnam (US\$800 million), and the Philippines (US\$1.6 billion; table 2.1).

What are the sources of vulnerability in national power sectors? One source is the ownership structure. In Indonesia there is a single buyer model with ownership of generation assets diversified between public and private players, but tariff reforms in late 2003 hurt the “bankability” of electricity projects. Another is the anticipated drop in gross domestic product (GDP) in all three countries in 2009. Further, efforts to fund public power projects must contend with a drying up of traditional sources (e.g., government budgetary transfer, commercial banks, and bond markets); local banks constrained by single-borrower limits; local bond markets being largely illiquid and offering only relatively short maturities; and commercial

banks (mainly foreign ones) lending less. For private power projects the sources of vulnerability range from a shortage of liquidity among foreign banks and limited lending capacity of local banks to currency risk, banks requiring sovereign guarantees, and bilateral agencies capping exposure limits and lowering maturities.

ESMAP is currently supporting power sector vulnerability assessments in 18 countries (figure 2.1) and has piloted a climate vulnerability assessment in Albania.

LOW CARBON GROWTH COUNTRY STUDIES

Further along the development path, emerging economies have a different set of energy issues from low-income countries, and several governments are already taking steps to study alternative scenarios for a shift towards a low carbon growth trajectory. With commercial energy demand projected to grow by 4.3 to 5.1 percent annually, India is integrating low carbon development options into

Figure 2.1 ESMAP Power Sector Vulnerability and Follow-Up Assessments

Completed Assessments	Ongoing Assessments	Follow-up Assessments
Indonesia Philippines Vietnam	Armenia Bangladesh Colombia Egypt India Jamaica Jordan Kyrgyz Republic	Mexico Mongolia Morocco Pakistan Peru Romania Tunisia Ukraine
		Philippines Vietnam Egypt

its growth plans. China intends to scale up to 15 percent renewable energy generation by 2015, South Africa wants to de-carbonize its power sector by 2050, and Mexico is implementing bus rapid transit in multiple cities.

With the help of ESMAP's **Low Carbon Growth Country Studies Program** in 2007-09, the governments of six middle-income-countries—Brazil, China, India, Indonesia, Mexico, and South Africa—initiated studies to assess their development goals and priorities for GHG mitigation. These studies also examined the additional costs and benefits of lower carbon growth and how to finance such measures. Mitigation actions today are expected to reduce future expenditure on adaptation. Moreover, these actions can help attract international concessional funding to cofinance programs with carbon reduction aspects in energy, industry, transport, and natural resource management.

Two years into the program, results are beginning to center on common themes: transportation, financing,

capacity building, land use and forestry planning, renewable energy, energy efficiency, policy implementation, and macroeconomic modeling. Together these studies identify some broad messages (such as the need for renewable energy and energy efficiency support) and some new insights (such as low-cost transport options and untapped cogeneration investments). Highlights include:

- In **Brazil**, measures to improve agricultural productivity and livestock management could slow deforestation, but the potential for mitigation in the energy sector is low because hydropower already constitutes a large share of the energy mix. There are opportunities for ethanol exports.
- In **China**, the study is providing policy support for locally directed areas of research (rather than sector or country assessments) to better understand renewable energy, energy efficiency targets, and low carbon growth consistent with China's targets.
- In **India**, the economy is relatively low carbon, with energy intensity 20 percent below world averages and per capita emissions among

Box 2.1 India's Low Carbon Growth Model

The Government of India worked with the study team to build a Low Carbon Growth (LCG) model that can be used as a planning tool to analyze key sectors and assess the impact of policy choices on greenhouse gas (GHG) emission levels. Using Excel/Visual Basic programs, the bottom-up, engineering model is user-friendly, low-cost, and available for continuous use.

The model considers five major sectors in the economy—electricity transmission, transportation, residential buildings, nonresidential buildings, and industry—which together accounted for 60% of India's GHG emissions in 2004 and more than 400 possible interventions. These sectors are also considered the high growth sectors likely to increase faster than other sectors. The model enables planners to analyze future demand for emission-producing activities, estimate associated costs, and calculate GHG emissions under different development scenarios to 2030. The India LCG model builds energy demand from the bottom up and matches supply with demand. Demand in each sector is assessed from a simulation analysis of such variables as GDP, population, age distribution, household size, income, and location (urban or rural).

The model has been used in India to generate various low carbon scenarios based on India's sector plans, the 11th and subsequent Five-Year Plans, and consultations with sector specialists. The annual growth of commercial energy demand for the nonresidential buildings, industry, and agricultural sectors is assumed to be between 4.3-5.1% based on the projections contained in the 2006 Integrated Energy Policy. Various growth and population projections have also been captured. Going forward, the Government of India can refine the model, change assumptions, and update the data to continually reflect the country's reality. The model will be transferred to the Planning Commission after the study is completed.

Adapted from "India: Strategies for Low Carbon Growth," Preliminary Report, World Bank, June 2009.

- the lowest worldwide. But given the energy deficit and entrenched poverty, India's priority remains to meet energy demand and sustain high growth. Opportunities include curbing transmission losses, closing inefficient coal plants, adopting mandatory energy efficiency standards for household appliances, and rethinking its transport strategy.
- In **Indonesia**, there is a significant opportunity to develop renewable resources—geothermal, hydropower, and biofuels. Fiscal incentives could support a transition to energy efficient equipment, especially for small and medium enterprises (SMEs). Climate change could provide an entry point for changing practices in forestry and land use.
 - In **Mexico**, study results have shed light on prospective low carbon "wedges" and underscored potential energy savings in the industrial sector from cogeneration and

better energy efficiency. An estimated 80 percent of Mexico's industrial cogeneration potential remains unused and could provide 13 percent of new power capacity in a low carbon scenario. There is also untapped mitigation potential in forestry.

- In **South Africa**, the majority of emission cuts lie in the energy sector, particularly industrial energy efficiency and renewable energy.

ESMAP is setting up a partnership with The World Bank Institute and The World Bank's Climate Change for Development Professionals Program to launch a global outreach program to share the knowledge, experiences and lessons generated from the work in these six countries, including for example, India's new model for energy use (box 2.1).

REGIONAL APPROACHES TO ENERGY DEVELOPMENT

Sustainable energy development is often a regional concern. Many countries lack the capacity to meet demand or are not sufficiently endowed with a diversified indigenous energy resource base (including hydropower, wind, geothermal, and biomass) that would help assure security of energy supply. Additionally, fossil fuel prices are expected to remain volatile and at historically high levels for some time to come. Given this context, energy security for many developing countries depends on crafting a regional energy strategy to buttress national ones. Instead of incurring high capital costs to build additional power generating capacity, some countries may find cross-border transmission lines a more prudent option to access electricity from big regional power plants that

benefit from economies of scale to generate power at a lower cost than smaller, national ones.

Regional energy integration requires regional economic cooperation, such as determining the level of participation of each utility and managing cross-border transmission. Cooperation can begin with regional energy assessments and sharing of best practices. Standardizing design can reduce unit costs, permit faster implementation, and lower the costs of spare parts, maintenance, and staff training. While all local projects are different, some strategies may be useful elsewhere.

In fiscal 2009, ESMAP continued to work closely with client countries on regional energy integration assessments, embracing a diverse set of issues:

- For **Sub-Saharan Africa**, a study estimated the impact on petroleum refining operations by switching to cleaner fuel specifications. It explored refinery investment costs, air quality, and human health as effects of high levels of exposure to particulates and other pollutants in the urban environment.
- For the **Persian Gulf**, a study explored the potential for increased electricity and gas trade among Yemen and the six Gulf Cooperation Council countries and also assessed the availability of gas resources for electricity systems.
- For the **Middle East and North Africa**, a study examined the region's energy intensity (the energy consumed to produce a unit of GDP) and explored options to boost energy efficiency. Finding that the region's energy intensity

is 60 percent higher than that of the Organization for Economic Cooperation and Development (OECD) countries and 40 percent above the world average, it proposed an array of instruments to pursue energy efficiency investment and provided a roadmap to develop a regional energy efficiency strategy.

- For **South East Europe**, a study explored ways to realize the potential of natural gas, currently playing a very limited role. It showed the viability of developing a gas market and proposed establishing the Energy Community Gas Ring (EC Ring) to link up to seven Balkan energy markets.

Other studies focused on the West Balkans and Latin America and highlighted the need for harnessing renewable energy resources, promoting cogeneration by industry, and developing better regulatory and commercial frameworks to underpin regional energy initiatives.

Steaming ahead in The Balkans.

Like many cities in the Balkans, Belgrade's inhabitants heat their homes and businesses from a district heating system. Warmth is typically supplied by gas, coal, and oil-powered boiler plants, often 20 to 30 years old. Belgrade's power and gas systems are subject to outages and shortages, but cold snaps cause the greatest problem. Peak heat demand (3,000MW) spikes fossil fuel use, making generation more expensive and straining an already frail infrastructure. Capacity increases are costly and Belgrade remains at the mercy of unpredictable oil and gas prices.

ESMAP is helping search for alternatives for Belgrade and the Balkan region, where ensuring energy provision is increasingly difficult. Many countries are net energy importers, making them vulnerable to volatile fuel costs. And energy demand is rising rapidly while supply is hampered by insufficient investment. Significant capacity additions have been envisioned to meet the growing energy demand, but energy efficiency—a major source that could defer some of the costly supply-side investments—and renewable energy have not yet been considered.

In its *Western Balkans Energy Efficiency Study*, ESMAP examined the potential use of cogeneration, the process of using waste heat from power plants. Although almost nonexistent in the Balkans, cogeneration could be used in more than 60 cities in the region, including Belgrade. According to ESMAP's study, instead of building new boilers, Balkan cities could use the heat already generated by thermal power plants. These plants are plentiful, often within a few kilometers of cities, and give off a tremendous amount of waste heat, an untapped resource for city heating systems. A heat pump could capture the heat from a plant's condenser, increase the water temperature to a desirable level (for example, from 25°C to 70°-80°C), and pipe it into the city system. ESMAP estimates that just one of Belgrade's power plants, Obrenovac A, could generate 690MW in heat.

The study also looked holistically at the existing efficiency of energy consumption in the six Balkan countries—Albania, Bosnia-Herzegovina, Kosovo, Macedonia, Montenegro, and Serbia—and evaluated potential

savings. Demand for energy services in the region will increase by more than 3 percent per year until 2027, while energy consumption will increase by 2 percent per year, creating increased cost. However, if efficiency measures are implemented, average energy savings could be 10 to 15 percent in the same period. To achieve these savings, countries should collect better data, eliminate cross-subsidies, enforce existing legislation, and create an energy efficiency fund.

This is good news for a region with relatively high energy intensity and thus high energy saving potential. On average, a dollar invested in efficiency avoids the need for two dollars in supply-side investment. ESMAP estimates that efficiency measures could reduce use by roughly 7 million tons of oil equivalent per year. At the equivalent of US\$65 per barrel, this could save US\$3.4 billion. Efficiency investments would eliminate the need to build additional power plants and transmission, and distribution facilities, not to mention making the region less beholden to unpredictable imports. The major barriers to realizing this vast potential include cross-subsidies, insufficient energy meters, a high level of nonpayment of energy bills, and a weak institutional framework.

European Union regional integration is an incentive since all six Balkan countries want the economic benefits that come with it, making it prudent to approach efficiency on a regional level. Before this can happen, each country must adhere to stringent regulations: the European Union Energy Directive, Energy Efficiency Directive, and an Action Plan for Energy Efficiency—the latter requiring

policies that can achieve 20 percent energy savings by 2020.

Streamlining supply in Central America. Rapid economic growth in Central America has spurred electricity demand, posing many challenges for central governments. Uncertainty in energy supply, due to heavy reliance on foreign-sourced fuels, and costly energy supply disruptions, caused by poor transmission infrastructure, leave supply and demand in an increasingly tenuous balance. Problems are already occurring. Uncharacteristic spikes in seasonal demand and unreliable supply led to drastic blackouts in Nicaragua in 2006, a situation threatening to replicate itself in Honduras and Panama. Even Costa Rica—the strongest power sector in the region—has suffered blackouts.

To streamline supply, six Central American countries—Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama—have cooperated to build a 1,830km transmission line that will allow them to share generation capacity and create a regional electricity market to support the power needs of their roughly 40 million customers. The transmission line, known as the *Sistema de Interconexion Electrica para America Central* (SIEPAC) project, will allow reliable interconnection capacity of 300MW and has the potential to connect with energy-rich grids in Mexico and Colombia.

Yet the SIEPAC project, expected to be operational in 2010, cannot alone cure what ails the energy sectors of Central America. Transmission lines will

prevent blackouts, but they do little to avoid price shocks. The SIEPAC project is a positive start toward full regional cooperation, but Central America urgently needs a unified regulatory and commercial framework, as well as locally sourced energy. While it lacks oil resources, Central America is rich in potential renewable energy, particularly hydropower, which could be harnessed if project costs were reduced by capturing economies of scale through joint development.

ESMAP is assisting with this regional energy initiative by providing stakeholders with just-in-time guidance on key tasks to leverage a regional programmatic energy study for Central America. This regional study is helping them develop and follow a strategic approach to improve energy security, reduce vulnerability to external price shocks by tapping into the region's renewable potential, and support regional integration by identifying joint development possibilities for power generation projects. The study provides a comprehensive analysis of the regional energy sector and offers advice on three areas: meeting the short-term challenges for avoiding power cuts and ensuring stable supplies, addressing regulatory barriers for regional cooperation, and determining the feasibility of regional renewable power plants.

ENERGY EFFICIENCY AND TRANSPORTATION

For most developing countries, transport is usually the major energy consumer, followed by buildings and industry. As the largest and fastest growing energy-using sector, transport was responsible for 23 percent of world energy-related GHG emissions

in 2004, about 75 percent from road vehicles. The central problem is that developing countries' cities are growing and motorizing very rapidly, even faster than urbanization. The cities house and transport too many people on an insufficient number of poorly maintained roads and rails, and generally lack the money and institutional vigor to fix the problems.

The critical challenge facing the transport sector is ensuring low carbon growth in rapidly urbanizing environments while encouraging development that can lessen a city's dependence on imported fuels and reduce energy costs. This complex problem requires policymakers to make changes on numerous fronts, such as legal and regulatory frameworks, institutional reform, procurement, technology, and collaboration across traditional boundaries.

To date, a wide array of policies has been tested worldwide to restrain motor vehicle use, manage traffic, and reduce energy use, air pollution, and GHG emissions. ESMAP intends to contribute to this effort by working closely with client countries on fuel efficiency assessments of transport sectors. In fiscal 2009, ESMAP began supporting assessments in several regions, including the Middle East and North Africa, where the transport sector's energy consumption grew 4.5 percent annually from 1990 to 2005, twice the world average and almost as high as Asia's (4.7 percent).

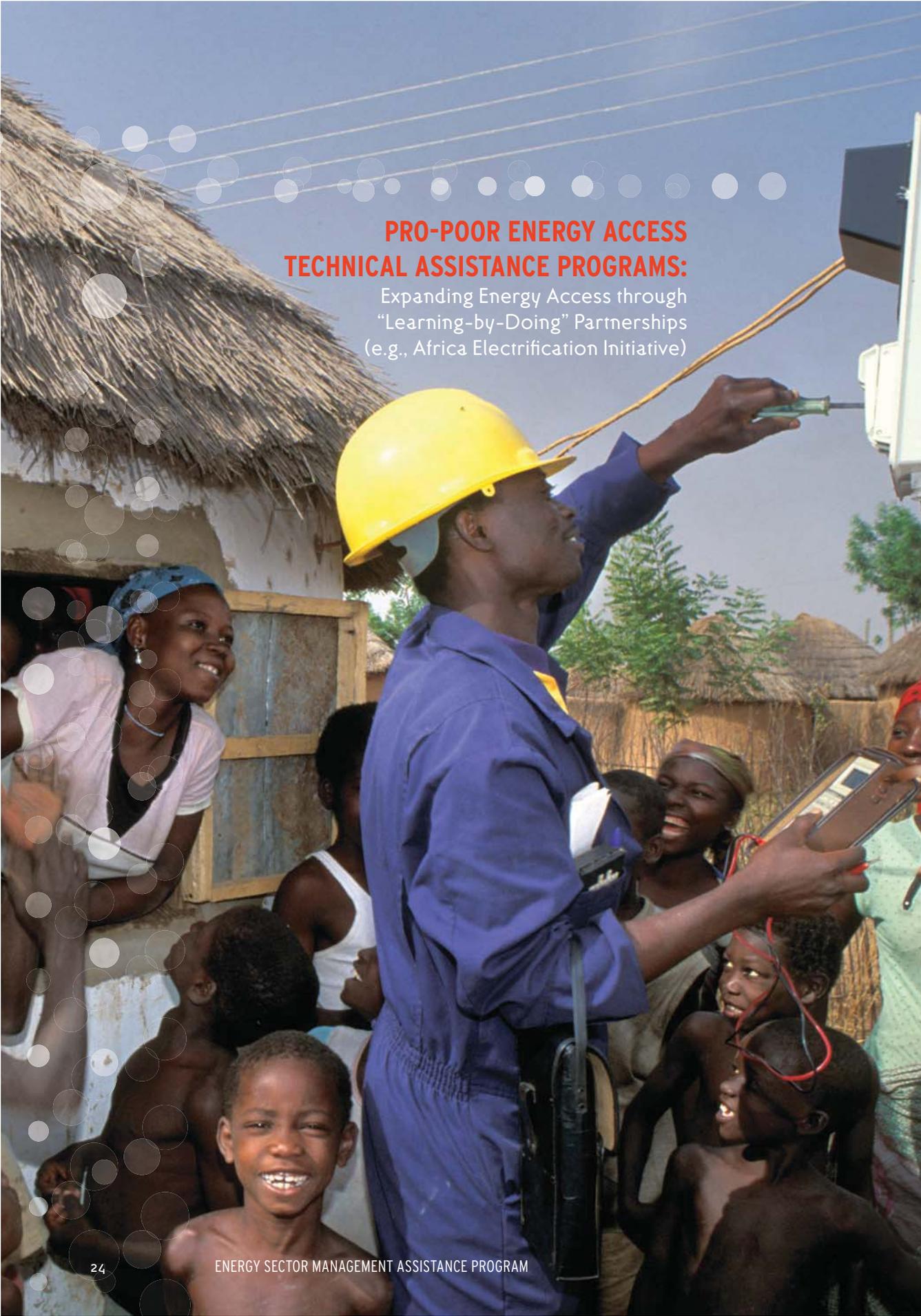
Upgrading the bus fleet in West Bank and Gaza. For the West Bank and Gaza, upgrading the entire aging bus fleet which average 16 years old, is a top priority. It is also an opportunity

to explore cleaner fuel buses that would simultaneously cost less to operate and protect the environment through lower emissions and improved air quality. To better inform decision making, ESMAP supported a detailed evaluation of all possible commercially available clean fuel options in fiscal 2009. Despite initial expectations that compressed natural gas and liquefied petroleum gas (LPG) engines could be a viable option to renew the bus fleet, the study concluded that establishing a EURO 4 standards-based regime would be a better option. It is up to the key stakeholders—including the Ministry of Transport and private bus companies—to determine how best to replace nearly 400 buses to meet EURO 4 standards over the next two to five years.

An innovative bus transportation strategy in Beijing. Beijing's bus system, with more than 20,000 buses,

is the largest of any city in the world. Expanding greatly in recent years in response to a growing, more affluent population that travels more, it still lacks a comprehensive, scientifically developed plan. Meanwhile, personal vehicle ownership has soared, with 1,000 cars added to the roads each day, exacerbating congestion and emissions. Beijing's subway system is continuing to expand to meet this challenge, but the bus system will still carry most public transportation trips even after the planned subway expansion in 2015. ESMAP supported a study to develop a rigorous, multi-criteria assessment of the suitability of each of the more than 50 major public transport corridors in Beijing. Based on the assessment, the Chinese authorities selected the Chaoyang Road Corridor, with more than 200,000 daily bus person trips per day, for a pilot reorganization of bus services to introduce a new type of service, "Rapid Commuting Mode."





**PRO-POOR ENERGY ACCESS
TECHNICAL ASSISTANCE PROGRAMS:**

Expanding Energy Access through
“Learning-by-Doing” Partnerships
(e.g., Africa Electrification Initiative)

3. ENHANCED CLIENT CAPACITY

RETHINKING ENERGY PRICING IN EGYPT

In Egypt, energy prices have long guided energy demand and investment. Retail prices have been kept low as a way of providing social services to households and subsidizing industries to generate employment. But in recent years these low prices have been unable to cover required subsidies and investment in new generation capacity. The government recently decided to raise the natural gas price for industries over a three-year period and requested assistance in preparing a comprehensive energy pricing strategy covering natural gas, fuel, gasoline, liquefied petroleum gas (LPG), and electricity.

In response, ESMAP funded a study to develop an energy pricing strategy that reflects the underlying costs of energy but considers the economic and social impacts of price increases, managing the potential negative effects of subsidy removal on vulnerable customers. The study developed an analytical framework for calculating economic levels of energy prices and for assessing economic, fiscal, social, and poverty impacts of energy price adjustments. It also proposed a plan for adjusting energy prices, accompanied by policies to mitigate the social impact of the adjustments.

Why the big push to reform energy prices? Egypt's current energy subsidy system involves substantial government funds, between 5.4 and 6.7 percent of GDP. Moreover, the government records do not transparently account for all financial subsidies, failing to incorporate the full investment costs required to fund the energy sector's future operations. If energy subsidies were calculated using their full economic costs, the results would be a staggering 14.5 percent of GDP. On top of the budgetary costs, artificially low energy prices misallocate resources, hurt the environment, and encourage excessive energy consumption—Egypt's energy and carbon intensity is two-and-a-half to three times higher than the OECD average.

The common rationale for instituting untargeted energy subsidies through energy pricing is to ensure access to affordable energy services, particularly by lower income households. But the benefits of Egypt's current energy subsidy system are highly regressive, mostly enjoyed by the well-off.

Phasing out subsidies would reduce Egypt's fiscal burden and generate significant government savings that could fund other priorities, including targeted assistance to deserving households. It would also reduce energy consumption, encourage energy saving, make energy use more efficient, and enhance the security of supply. Overall, energy price reform would provide correct pricing signals to producers, consumers, and investors, creating the preconditions for a more competitive economy while curbing environmental pollution.

UNSHACKLING THE POWER MARKET IN TURKEY

Since 2001, Turkey's electricity demand has grown more than 8 percent annually. But with growth come fresh concerns: World Bank studies show that, without serious mitigation measures, Turkey could experience supply shortfalls in the near term.

Turkey has moved swiftly to overhaul the electricity sector to meet growing demand in an efficient and cost-effective manner. The reforms—consistent with the European Union Acquis Communautaire framework—unbundle the sector, restructure state-owned entities, and create an independent market regulator and competitive electricity markets. On the renewable energy side, Turkey plans to develop more than 15,000MW of wind capacity—currently about 400MW—by 2015.



ESMAP is supporting these reforms by helping the government establish the framework and capacity for a competitive electricity market, to be run by the Turkish Electricity Transmission Corporation (TEDAD). In phase one, ESMAP helped design and implement an innovative capacity incentive scheme, plus auction mechanisms, for procuring new generation. It also helped institute capacity in different aspects of market operations, such as using water value and dispatch models, determining system marginal prices based on bids and offers, and managing the settlement system

through workshops, training, twinning arrangements, and toolkits.

In phase two, under way since April 2009, ESMAP is supporting training and capacity building on market management systems and communication systems to enable TEDAD to transition to the final market design. It is hiring external experts to provide TEDAD staff with on-call advice on implementation issues and market and system operations. Also it is helping carry out a needs assessment and conceptual design for a smart grid to integrate substantial amounts of intermittent wind generation.

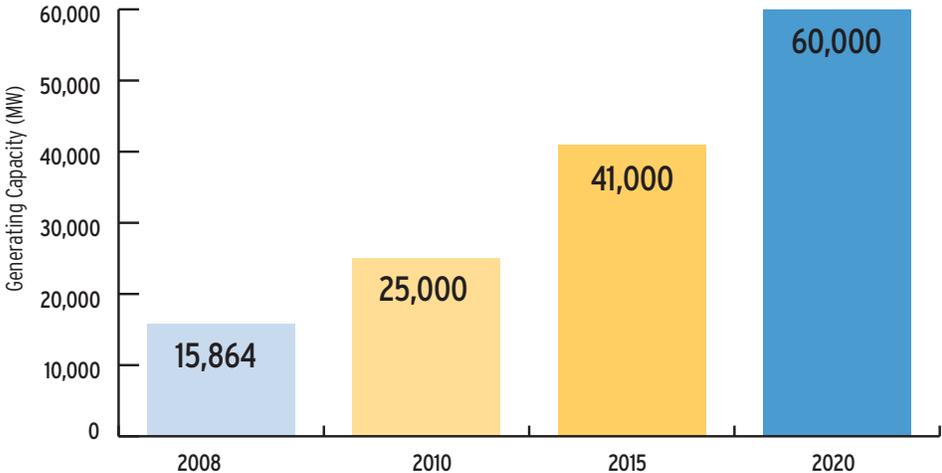
Together, Turkey's reforms should improve the efficiency of the electricity market, stabilize electricity prices, and

mitigate supply unpredictability. The wholesale competitive electricity market has grown rapidly since its 2006 launch, now transacting roughly 18 percent of generated electricity. Cut loose from stringent public control, private investment has increased and should continue to grow. More than 200 private market participants are registered in the market and trading volumes are growing steadily.

HARNESSING INDIGENOUS GAS RESOURCES IN VIETNAM

Fuelled by economic growth above 7 percent for the last several years, energy demand is growing rapidly in Vietnam—15 percent annually. Much of

Figure 3.1 Required Energy Generation Capacity for Vietnam by 2020



this demand is driven by expanding access to electricity (figure 3.1).

Where will this energy come from? The government's 2006-15 Gas Master Plan for Southern Vietnam has identified the country's gas reserves as a key resource for power generation to improve energy access and energy security. Vietnam hopes to meet more than 40 percent of its power needs from gas-fired plants by 2015.

ESMAP first helped the government of Vietnam by reviewing the Gas Master Plan. Noting inadequate consideration of economic and financial planning and market development, the review emphasized the need for a qualitative framework—including sector planning principles, a method for determining optimal utilization, pricing principles for gas, regulatory methodologies, gas market design options, and energy security—as the basis for specific gas sector and policy development decisions.

Second, ESMAP provided follow-up technical support to help the government make the framework a reality, covering sector planning principles (including key trade-offs, such as between energy security and least-cost options), gas market design and sector management, pricing and regulatory

methodologies, and a roadmap for implementing the market design. The Vietnam Petroleum Institute then added these insights to the ongoing Gas Master Plan for Vietnam.

BRINGING LIGHT TO RURAL BANGLADESH

In Bangladesh, energy often delineates the haves and have-nots. Only one-third of households have electricity. Sixty percent of the rest cannot connect to an electricity grid. Then, there are still others who are able to connect to electricity but cannot afford to switch it on.

Inequitable energy access is about more than light. It reinforces and widens income disparities. Low-income populations are worse off without electricity because lighting alternatives often cost more. Switching from kerosene lamps—the most typical alternative—to electric lighting boosts household income by 40 to 45 percent. Farm production is 15 to 20 percent higher with electricity-run irrigation systems. And homes with electricity tend to have more of their younger occupants attending school and studying at night.

There are other opportunity costs as well. Women and young girls are burdened with fuel collection (mainly manure and wood) in 75 percent of households, resorting to leaves and grass when biomass is scarce. Such chores are often at the expense of schooling and employment. Requiring 25 percent less biomass, modern stoves can reduce fuel collection labor and are cheaper and less time consuming to operate.



Some development programs have helped, especially Bangladesh's highly successful rural electrification initiative, now powering roughly 7 million rural households (of 22 million). But progress has been slow—only 3 percent of households gain access each year—and outages and power fluctuations are common. Programs with bilateral and nongovernmental organization (NGO) funding have also improved matters, including a program that installed more than 80,000 solar home systems over three years.

In-country data and technical knowledge lag behind recent developments in energy technologies and policies. And government responses are uncoordinated. Rural energy is a complex issue, encompassing a broad and diverse spectrum of resources spanning multiple sectors and ministries.

In collaboration with the Dhaka-based Bangladesh Institute of Development Studies and The World Bank, ESMAP conducted a multiyear study of options to improve the situation. This is the first study to concentrate on Bangladesh's energy systems and their effects on the lives of rural people that presented a pragmatic and inclusive rural energy strategy. The study's broad aim was to identify ways to improve living standards through better and more efficient energy use while creating an environment conducive to growth and poverty reduction.

The major recommendation of the study, released in mid-2009, is to develop long-term institutional capacity. Bangladesh needs better institutional coordination and a critical mass of technology and market develop-

ment, appropriate subsidy and pricing policies, as well as government and donor support.

BOOSTING RENEWABLE ENERGY SUPPLY IN NEPAL

During 2006-07, Nepal's electricity demand increased 8.6 percent to 3,134GW, but the Nepal Energy Authority (NEA) could generate only 3,051GW. Peak electricity demand also rose by 7.5 percent, forcing the NEA to adopt load-shedding measures and rely on imported capacity (although not enough) from India. The following year (2007-08) was worse: low rainfall and maintenance problems limited hydroelectric generation while bureaucratic delays kept new projects on the drawing board.



As a result, only 40 percent of Nepal's households have access to electricity. The disparity in access is stark, with more than 90 percent of the urban population connected but only about 30 percent of the rural. And in recent years even people with electricity have faced daily power outages lasting as long as 16 hours in the winter.

What can be done to quickly remedy the situation? ESMAP is taking a two-pronged approach to help the government respond to these challenges. First, it is conducting a study to identify and assess opportunities to improve efficiency and service quality, reduce peak capacity deficits, and reduce power supply costs through implementation of demand-side management measures. One early idea from the study is to create a compact fluorescent lamp distribution program—quick to implement and reducing daily peak demand between 2.2 and 3.7MW. A pilot demonstration project is now under way. ESMAP hopes that such pilots will improve the NEA's ability to predict demand-side fluctuations and thus help reduce costs through fewer energy shortfalls, targeted investments in new power plants, and imports from India.

Second, ESMAP is helping Nepal find ways to boost its hydroelectric capacity. Nepal possesses some 43,000MW of economically feasible hydropower potential but has developed only 1.3 percent—with no significant generation projects commissioned since 2002. A study will identify hydropower development barriers and assess which barriers are amendable to mitigation (as opposed to absolute barriers, such as geographic constraints).

MOBILIZING LOCAL EXPERTISE FOR ELECTRIFICATION IN AFRICA

Of the 1.7 billion people lacking electricity globally, more than 500 million live in Sub-Saharan Africa—nearly half the continent's population. In many places swelling cities are overburdening already moribund power infrastructures. In rural areas, only 2 percent of the population has access to electricity and connecting to national grids is prohibitively expensive. Households compensate with rudimentary fuel-based lighting methods, often at high costs that can consume 10 to 30 percent of their income. Fuel-based lighting (most often kerosene) is inefficient, second rate, highly pollutant, and dangerous. The International Energy Agency predicts that by 2030, 1.4 billion people globally will still lack access to electricity for basic necessities, with the problem most acute in Africa.

Since September 2007, The World Bank Group—led by the International Finance Corporation (IFC)—has been spearheading **Lighting Africa**, a multifaceted initiative cosponsored by ESMAP that aims to provide up to 250 million people in Africa by 2030 with modern lighting services that are not dependent on fossil fuels (box 3.1).

In fiscal 2009, ESMAP launched the complementary **Africa Electrification Initiative (AEI)**, a capacity building program that intends to create a living body of practical knowledge, sustained by a network of local practitioners in Sub-Saharan Africa—at electrification agencies and funds, government

ministries, regulatory bodies, and state, community, or privately owned utilities. The initiative pools their individual and collective expertise in designing and implementing electrification programs, both grid-tied and off-grid, and also provides comprehensive assistance to enable governments in the region—Ethiopia, Kenya, and Rwanda were covered during 2009—to use new planning tools, such as geo-referenced, least-cost expansion plans to develop sector-wide strategies to mobilize financing to invest in electrification access programs. Consistent with The World Bank’s Sector Wide Approach (SWAp) for improving developmental effectiveness, the emphasis is to focus on the big picture—not just the power sector.

Guided by the African Forum of Energy Ministers advisory committee, ESMAP and its partners organized the first AEI

Box 3.1 Lighting Africa

This initiative is being implemented by the Global Environment Facility, the Energy Sector Management Assistance Program, Good Energies Inc., The United Kingdom, Luxemburg, The Netherlands, Norway, The Public-Private Infrastructure Advisory Facility, The Renewable Energy and Energy Efficiency Partnership, and the Asia Sustainable and Alternative Energy Program.

For more information, visit www.lightingafrica.org.

workshop in Maputo, Mozambique, in June 2009, for more than 170 practitioners from 42 countries to share practical information about ground-level implementation issues in both urban and rural communities.





**RENEWABLE ENERGY MARKET
TRANSFORMATION INITIATIVE:**

Scaling Up Deployment of Grid-Connected
Renewable Energy Technologies
for Power Supply Diversification

4. CUTTING-EDGE SOLUTIONS

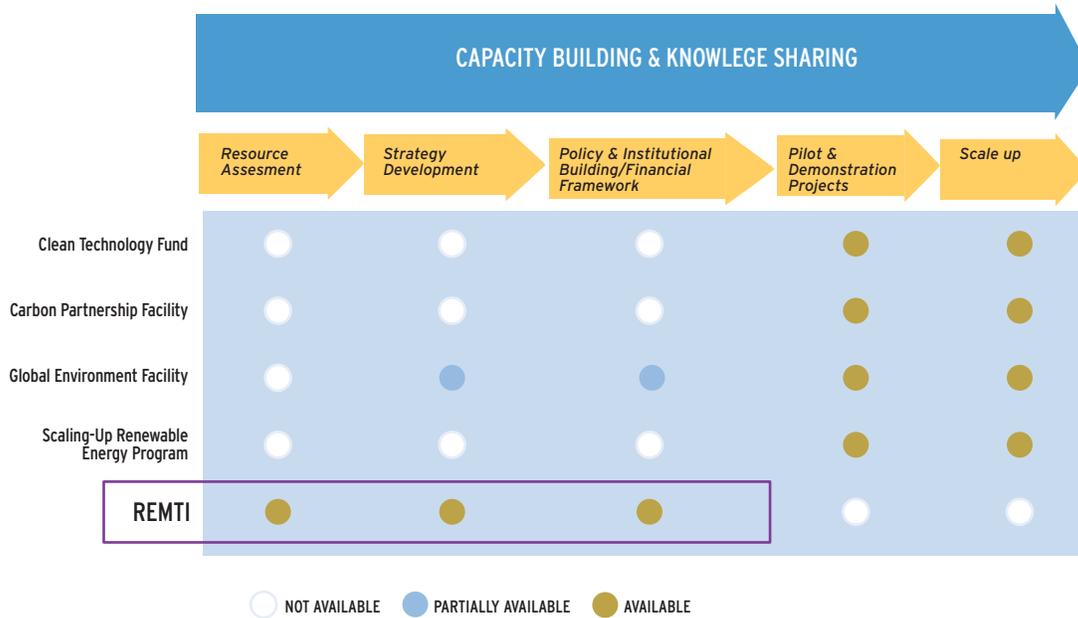
RENEWABLE ENERGY MARKET TRANSFORMATION INITIATIVE

As developing countries search for ways to adopt clean energy technologies, one of their biggest hurdles is limited institutional capacity. In 2009 ESMAP launched the **Renewable Energy Market Transformation Initiative (REMTI)**, a multiyear initiative to help countries build their institutional capacity to develop, plan, and implement strategies to quickly deploy select renewable energy technologies—chiefly solar, geothermal, wind, and small hydroelectric power. ESMAP hopes to achieve “win-win-win” solutions to interlinked challenges: enhanced energy security through diversified supply, greater energy access, and a transition to low carbon paths.

REMTI will treat each energy technology differently, depending on its stage of maturity. For example, technologies for harnessing small hydroelectric power, onshore wind, and geothermal resources are relatively mature, with no major technical obstacles or operating challenges, reliable operating histories when deployed at scale, and prices closer to conventional fossil fuel-based energy options. So pricing gaps can be addressed, at least partly, through existing financial support mechanisms, such as carbon finance. In contrast, technologies for harnessing solar resources, such as concentrating solar power (CSP) systems, have known technical obstacles, limited operating history or challenges, and prices well above alternative conventional options.

REMTI fills a gap in renewable energy deployment in developing countries. It concentrates on preparatory work needed in the early stages of project development and provides technical assistance, knowledge sharing, and capacity-building support to help countries gain access to financing (figure 4.1.)

Figure 4.1 Renewable Energy Deployment in Developing Countries



It complements and leverages several existing and developing multilateral initiatives, facilities, and funds within The World Bank Group and related international financial institutions, including the Clean Technology Fund, Global Environment Facility, Carbon Partnership Facility, and Scaling-Up Renewable Energy Program. These facilities and funds do not ignore early stages of project development but do not make them the main focus of their activities and funding as REMTI does.

REMTI focuses on four areas of engagement:

- *Country renewable energy market transformation strategies* that support the role of renewable energy technologies in achieving broader client goals of enhanced energy security, access, and supply diversification, as well as climate change mitigation.

- *Renewable energy technology deployment roadmaps* to scale up investment by private/public developers in grid-connected power generation facilities using renewable energy resources.
- *Renewable energy market development support mechanisms* to help reduce the associated financing risks of private/public developers of grid-connected power generation facilities using renewable energy resources.
- *Knowledge exchange* to share ESMAP lessons and foster capacity building with clients using knowledge products generated from country renewable energy market transformation strategies and technology development roadmaps—modeling toolkits, best practices, “how to” guidance, and interactive training.

TRANSFORMING COUNTRY-SPECIFIC MARKETS

During 2009, REMTI supported market transformation activities in China and India.

Dispatching renewable energy systems in China. China has set ambitious targets to improve energy efficiency, scale up use of renewable energy, and use less coal and release fewer emissions to generate power. To achieve these energy improvements, the Government of China in 2007 issued the principles to implement new efficient generation dispatch practices (the Fossil Fuel Saving and Emission Reduction Dispatch) and instructed the piloting of these principles in five selected provincial grids—Guangdong, Guizhou, Henan, Jiangsu, and Sichuan. But the complete implementation of those pilots has been delayed, mainly due to potentially adverse short-term financial impacts. For China, a change in dispatch practices will markedly reduce emissions and make a major contribution to addressing climate change because coal-fired power generation is the dominant share of its total installed power capacity and—under business-as-usual scenarios—would double by 2020.

To help China reduce energy intensity—the government's target is a 20 percent cut by 2010—REMTI is assisting the Chinese authorities to identify key barriers to transitioning to efficient dispatch, propose a strategy to address those barriers, and recommend more efficient and transparent dispatch and pricing policies. REMTI's methodology includes helping to quantify coal savings and the financial impact of efficient generation by simulating, over three years, two ways to dispatch coal power in the provinces of Shandong

and Fujian. REMTI's recommendations will align with the Chinese government's goals to improve operational efficiency in the dispatch of thermal power generation to maximize coal (and oil) savings and reduce emissions, reduce energy intensity in electricity supply by prioritizing the dispatch of renewable energy and large hydroelectric power, ensure system reliability, achieve sustainable power sector development, and promote market reform. Preliminary findings show that realizing international best practices could decrease coal consumption by around 10 grams of coal equivalent per kilowatt-hour in each provincial grid, and therefore reduce CO₂ emissions by about 7 million tons per year in the two provinces.

India's investment climate for renewable energy. Facing significant power shortages in the foreseeable future, India is looking for additional resources, including renewable energy, to help meet its significant power deficit and diversify its energy generation portfolio mix (coal-fired plants contribute about 80 percent of total generation). Renewable energy-based power generation capacity exceeded 7,200MW in March 2006 (6 percent of India's installed power capacity), and the government hopes to boost this share to 10 percent by 2012. But for that to happen, the private investment climate needs an overhaul (box 4.1).

DEPLOYING ADVANCED TECHNOLOGIES

To date, REMTI is supporting the development of roadmaps in half a dozen country and regional activities, with others in the works, covering wind, geothermal, small hydroelectric, and CSP.

Box 4.1 Helping India Cut the Red Tape

India hopes to convince investors to invest heavily in renewable energy, but bureaucracy, burdensome regulations, and a changing regulatory framework for renewable energy have discouraged them. Although the Electricity Act of 2003 provided a framework for introducing wholesale competition and open access, the new market structure and rules remain unclear and inconsistent.

Since 2007, The World Bank has been working with the Indian government, to study the investment climate for renewable energy. Assessing the availability of renewable resources and technologies and the economic and financial costs of alternative generation options, the study provided options and recommendations on a policy framework for facilitating investments in renewable energy projects—with the goal of achieving the government's target of 10% renewable energy by 2012.

Under REMTI, the scope of collaboration with the Ministry of New and Renewable Energy, state governments, regulators, and other stakeholders is being extended to cover India's recently announced strategic initiative to install 20,000MW of CSP systems by 2020.

Solar power in MNA. Solar energy represents an enormous resource in many of the Middle East and North African (MNA) countries. Over the next six to eight years, the region plans a 1GW-level deployment of CSP systems from 8 to 10 commercial-scale power plants in multiple countries—representing 10 percent of the planned global capacity. REMTI provided technical assistance to assess the potential of the local industry's role in MNA countries where the CSP scale-up is to be implemented, including local manufacturing of components.

Small hydropower in Peru. Peru is asking what role hydroelectric power as a clean, renewable, and abundant local energy source, should play in

its plans to build 1,500MW of power generation capacity to meet demand over the next five years. Still providing 72 percent of Peru's electricity, hydroelectric power has been giving ground to natural gas in the past 20 years (down from 90 percent). Despite potential shortfalls in power generating capacity, Peru's investment in hydroelectric power has been limited, with only one large project now under construction. To boost investment, REMTI is assisting the government to simplify the permitting system for small hydroelectric projects (up to 10MW) and also to develop an appropriate operational framework to encourage investment—a centralized auction scheme instead of the current decentralized system.

Wind in Egypt. Already growing more than 6.5 percent annually during the past 10 years, peak electricity demand in Egypt is expected to rise to 20GW by 2010 and grow at 6 to 7 percent annually during the coming decade. To reduce the country's overwhelming reliance on natural gas for power, the government's energy strategy seeks to promote energy efficiency and develop renewable resources. Wind power is one way to increase capacity—ideally contributing 12 percent of generated electricity by 2020. REMTI assisted the government to develop a framework for large-scale wind energy development, leading to a transformative switch from donor-funded concessional financing of wind power to a privately led, sustainable, and commercially based program.

ENERGY EFFICIENT CITIES INITIATIVE

In 2008 more people lived in cities than rural areas for the first time, and the urban share of the world's population could reach 60 percent by 2030 if the current rate of urbanization holds. Most urban growth is expected in developing regions, already accounting for nearly 75 percent of the world's urban population.

This demographic shift will strain existing urban infrastructure, substantially boost demand for municipal services, and create new demands on land. And if cities are to promote growth and provide municipal

services, they will need to use—and supply—significantly more energy. The International Energy Agency projects that city energy use will increase from 67 percent to 73 percent of all energy use between 2006 and 2030, and urban GHG emissions, from 70 percent to 76 percent of global emissions. The urban built environment will triple, from about 200,000km² in 2000 to more than 600,000km² by 2030.

How can cities cope with this growing energy demand? The best hope lies in greater energy efficiency, helping cities reduce operating costs, free resources for improved services, enhance competitiveness, create local jobs, and reduce the environmental footprint.

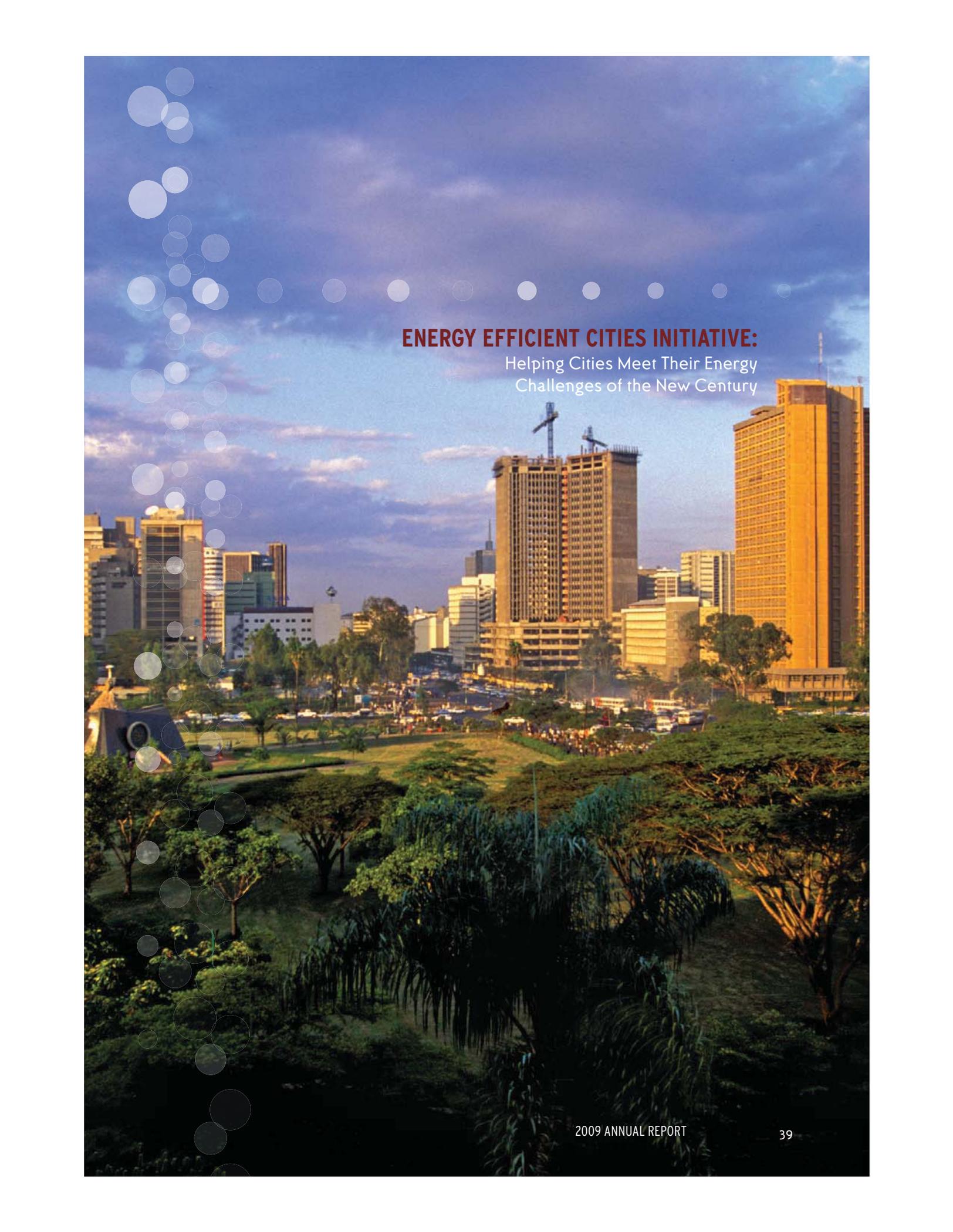
PRACTITIONER'S ROUNDTABLE

City managers and mayors, especially in developing countries, typically prioritize expanding access to basic services such as energy. But achieving results on the ground has been elusive, given constrained budgets and limited technical expertise. In October 2008, ESMAP invited representatives from a dozen cities and several partner organizations to discuss past and ongoing energy efficiency initiatives and draw lessons on scaling up energy efficiency improvements. Responding to the feedback from the roundtable discussion and after consultations with staff of The World Bank's urban practice, ESMAP designed and launched the **Energy Efficient Cities Initiative (EECI)**.

LAUNCHING EECl

EECl has two goals. First, to help countries build institutional capacity at the city level to explore and deploy innovative, energy efficient solutions for the delivery of basic urban services. Second, help countries reduce the costs and environmental impacts of related energy use. The initiative is a flexible, cross-cutting, demand-driven, and comprehensive five-year program to provide city managers and planners with upstream, operational, and evaluation support while disseminating tools, experiences, and results. Within the first year of its launch, EECl has successfully contributed to the design of two energy efficiency components of proposed World Bank urban development operations in China and

efforts are underway in the West Bank, Ukraine, Armenia, Mexico, and South Africa. Fiscal 2009 also saw the completion of two key EECl knowledge products: *Public Procurement of Energy Efficiency Services: Lessons from International Experience* and the energy chapter of *East Asia's Eco2: Ecological Cities as Economic Cities Program*. EECl also sponsored and participated in several global forums, including The World Bank's Energy Week 2009 (Washington, DC), the Energy Efficiency Global Forum (Paris), the Senior Policy Seminar on Climate Change, Housing and Liveable Cities in Asia and Africa (Singapore), and the 5th Urban Research Symposium: Cities and Climate Change: Responding to an Urgent Agenda (Marseilles).



ENERGY EFFICIENT CITIES INITIATIVE:

Helping Cities Meet Their Energy
Challenges of the New Century

5. FINANCIAL REVIEW

CONTRIBUTIONS RECEIVED

ESMAP received US\$13.9 million from its donors in fiscal 2009, US\$0.6 million more than in fiscal 2008. Table 5.1 and figure 5.1 show actual receipts by individual donors for fiscal years 2007-09.

Table 5.1 ESMAP Receipts, Fiscal 2009 (US\$ thousands)

Country				Currently under Agreement	Total Receipts		Of which Core	
	2007	2008	2009	2010	07-09	%	07-09	%
Australia	-	2,682	-		2,682	6.0%	2,682	11.8%
Austria (ADA; MoF)	-	658	588		1,247	2.8%	1,247	5.5%
Canada	-		396		396	0.9%	-	0.0%
Denmark	-	1,962	1,762		3,724	8.4%	-	0.0%
Finland	-	-	-		-	0.0%	-	0.0%
France	860	1,052	885		2,798	6.3%	2,798	12.3%
Germany	1,771	2,805	4,801	2,214	9,377	21.1%	-	0.0%
Iceland	300	200	300		800	1.8%	800	3.5%
Netherlands	9,780	-	3,193		12,974	29.2%	12,974	57.2%
Norway	750	750	750	750	2,250	5.1%	1,125	5.0%
Sweden	-	1,589	-		1,589	3.6%	95	0.4%
United Kingdom	3,061	1,180	964	206	5,205	11.7%	948	4.2%
World Bank	678	450	280	344	1,409	3.2%		0.0%
GRAND TOTAL	17,200	13,329	13,920	3,514	44,449	100%	22,668	100.0%

Note: Not included in this table are: United Kingdom contributions to the Clean Energy Investment Framework (CEIF) to the Environment Unit of US\$ 3.36 million (actual fiscal 2009); and The Netherlands contributions to the CEIF to the Environment Unit of US\$ 3.1 million (actual fiscal 2009) and Africa (AFREA Program) of US\$ 17.5 million (actual fiscal 2009).

CORE (UNRESTRICTED) AND THEMATIC FUNDING

Core contributions totaled US\$5.7 million in fiscal 2009, 41 percent of total contributions. Austria, Canada, France, Iceland, the Netherlands, and Norway contributed to unrestricted funding (table 5.2). The United Kingdom provided thematic funding for the Clean Energy Investment Framework (CEIF). Thematic funding was also provided by Denmark (Renewable Energy) and Germany (Renewable Energy/Energy Efficiency and Energy Access). Norway provided unrestricted funding, as well as targeted funding for Africa. The World Bank also provided support to the administrative budget.

DISBURSEMENTS

Disbursements in fiscal 2009 totaled US\$14.9 million, increasing US\$2.5 million from fiscal 2008 (table 5.3). Program expenditure increased by US\$2.7 million, most of it in the regional units. Program management and administration decreased temporarily because of several vacancies now filled.

Figure 5.1 Receipts by Source

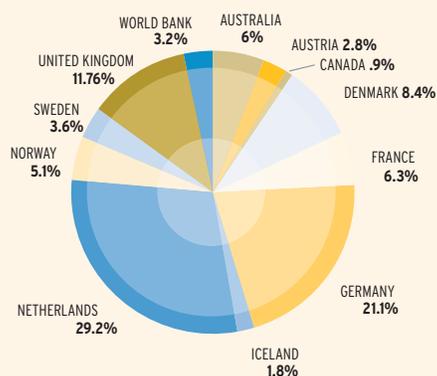


Table 5.2 Receipts by Type of Funding, Fiscal 2009

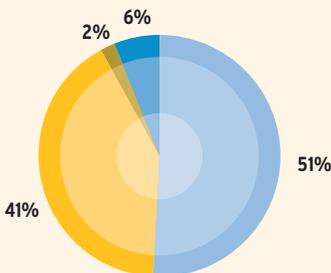
Type of Funding	Amount (US\$ millions)
Core (global unrestricted) (Austria, Canada, France, Iceland, Netherlands, Norway)	5.74
Thematic (Renewable Energy/Energy Efficiency and Energy Access, CEIF) (Denmark, Germany, United Kingdom)	7.53
Regional (AFR) (Norway)	0.38
World Bank	0.28
TOTAL	13.92

Table 5.3 ESMAP Disbursements and Sources of Funding, Fiscal 2007-09 (US\$ thousands)

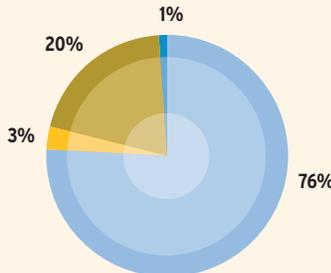
	FY07		FY08		FY09	
Regional Work Program	\$6,524.08	61.1%	\$8,042.30	%	\$10,547.08	70.7%
Africa	\$819.85		\$2,003.16		\$1,628.40	
East Asia	\$1,472.70		\$938.34		\$1,408.00	
Europe & Central Asia	\$486.27		\$1,184.40		\$780.38	
Latin America & Caribbean	\$1,692.28		\$1,282.83		\$2,793.76	
Middle East & North Africa	\$868.83		\$1,119.99		\$1,718.66	
South Asia	\$463.95		\$733.47		\$1,183.13	
Non-Regional VPUs	\$720.20		\$780.10		\$1,034.75	
ETWES own-managed	\$3,058.69	28.6%	\$2,707.86	21.8%	\$2,882.92	19.3%
Program management and administration	\$1,099.07	10.3%	\$1,667.31	13.4%	\$1,495.84	10.0%
TOTAL	\$10,681.84	100.0%	\$12,417.47	100.0%	\$14,925.84	100.0%
Funded by donors	\$9,707.66	11.7%	\$11,617.07		\$14,213.89	
Funded from World Bank budget	\$678.18	3.2%	\$450.40		\$283.45	
Funded from fee income	\$296.00	3.2%	\$350.00		\$428.50	

Figure 5.2 Relative Disbursement by Program, Fiscal 2009

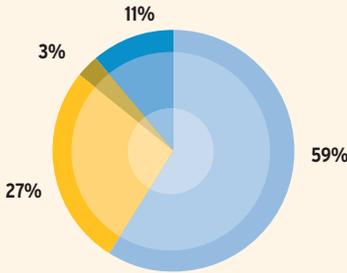
Completed Activities



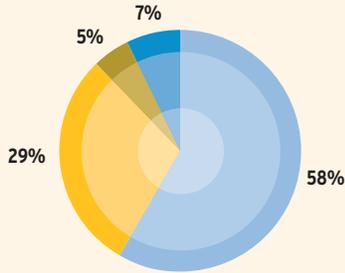
New Activities



Ongoing Activities



Total Disbursements



- Energy Assessments and Strategy Programs (EASP)
- Energy Efficient Cities Initiative (EECI)
- Pro-Poor Energy Access TA Program (PEA - TAP), excluding AFREA
- Renewable Energy Market Transformation Initiative (REMTI)

ANNEX 1 Proceedings From CG Meeting

CONSULTATIVE GROUP MEETING FOR ENERGY TRUST FUNDED PROGRAMS
FRIDAY, 3 APRIL 2009, WASHINGTON, DC

Draft Minutes

The Consultative Group (CG) meeting for the Energy Trust-Funded Programs (ETFPs), managed by the World Bank Group, was held in Washington, DC, on 3 April 2009. The meeting was chaired by Mr. J. Saghir, Director for World Bank's Energy, Transport and Water Department and Chair of the World Bank Group Energy and Mining Sector Board. It was attended by CG members, ESMAP Program Manager, ESMAP staff and other guests and invitees. The 2009 CG meeting comprised of five sessions: the opening session, Program Manager's report on ESMAP, Technical Advisory Group (TAG) report to CG, regional perspectives, and a closed door session. The CG meeting immediately followed the World Bank Group's Energy Week from 30 March to 2 April 2009. The following represents a summary of the meeting's proceedings:

Chair remarks. The CG Chair used his welcome remarks to highlight ESMAP's role in advancing sustainable access to energy across the world. Towards this, he invited H.E.A. Butare, the Minister of State for Infrastructure in Rwanda, to present his views on ESMAP's role in helping Rwanda meet its energy challenges. Mr. Butare was extremely complimentary about the support provided by ESMAP in preparing a roadmap and prospectus for Rwanda's energy sector. According to Mr. Butare, Rwanda's donors have responded very well to the roadmap and prospectus and have agreed to fully finance the plan. Making reference to the Minister's presentation on Rwanda, Mr. Saghir noted that this was one of many instances in which ESMAP had provided critical upstream project support to client countries for improving energy access and had facilitated investments by governments and other donors. Mr. Saghir then highlighted five recent activities and

publications prepared by ESMAP – *People and Power: Electricity Sector Reforms and the Poor in Europe and Central Asia*; *Financing Energy Efficiency: Lessons Learnt from Brazil, China, India and Beyond*; *Urban Household Energy Transition*; *China: Development of National Heat Pricing and Billing*; and *Accelerating Clean Energy Technology* – that had pushed the envelope with regards to thinking on energy issues.

Program Manager's presentation. ESMAP Program Manager, A. Armar, presented ESMAP's progress report for FY2009, covering the closing out of the 2005-2007 Business Plan, overview of the strategic Business Plan 2008-2013, ESMAP FY2009 program delivery progress and ESMAP budget and financial update. Mr. Armar informed the meeting that the CY2007-FY2009 Annual Report had been used to close out the ESMAP 2005-2007 Business Plan. In this regard, Mr. Armar shared information about the portfolio clean up undertaken at the end of the last Business Plan and ongoing retrospective review of the 2005-2007 Business Plan. Mr. Armar outlined the framework of the new Business Plan and shared the steps that were being taken to make it operational through greater use of strategic partnerships and the adoption of a new monitoring and evaluation framework. Mr. Armar said that the 2008-2013 Strategic Business Plan would be implemented as three-year rolling plans and would adopt a two-track approach – one for operational leveraging and the other for think tank and knowledge clearinghouse activities. Highlighting the fact that ESMAP had so far received commitments equal to about half of the Business Plan funding requirements, Mr. Armar sought CG guidance on the appropriate funding scenario for the FY2011-13 phase of the Business Plan.

CG members praised the approach taken by the new ESMAP management in the preparation of the Business Plan. The annual report

was also commended for being insightful and for accurately depicting ESMAP's activity over CY2007-FY2008. CG members endorsed the decision to balance ESMAP's past focus on operational leveraging with more think tank and knowledge clearinghouse activities. There was also praise for ESMAP's decision to engage with energy experts outside The World Bank through activities such as the Global Energy Assessment and virtual panels. There was consensus on the overall objective and aim of the monitoring and evaluation (M&E) framework proposed by ESMAP. In this regard, CG members agreed on the need to design the system in a way that does not reduce ESMAP's flexibility to respond to emerging challenges. With the new monitoring and evaluation framework proposed by ESMAP allowing donors to track outputs and outcomes in different areas, there was agreement regarding the need to allocate more core funds to ESMAP. Discussions were also held regarding preparation of The World Bank's energy strategy and ESMAP's role in it. Some CG members expressed the need for a mid-year seminar in Europe to discuss emerging issues in the energy sector.

TAG assessments of ETFPs to CG. Mr. Amitav Rath, TAG moderator, led the discussion on the 2008 review of the ETFPs and presented the TAG report to the CG. The presentation commended the direction adopted by the ESMAP Program Manager and the 2008-2013 Business Plan and praised ESMAP for having responded to a majority of issues raised by TAG in its reports. The TAG positively reviewed the completion of the CY2007-FY2008 Annual Report, the proposed monitoring and evaluation system, and ESMAP's proposals for country energy assessments, virtual panels, Energy Efficiency Cities Initiative, and biomass. Issues highlighted included the relative decline in number of ESMAP activities in renewable energy, shortage of staffing in biomass and renewable energy, the need to transition to more advanced media for dissemination of ESMAP products, the ability of regional units to absorb block grants, and the need for continued work on SMEs once the Department for International Development (DFID)- supported SME program comes to a close. Noting the large increase in the size of the Africa program, the presentation expressed reservations regarding the ability of TAG to, in its current

form, effectively cover the program. In addition, the presentation shared TAG plans for undertaking field visits in Uganda, Rwanda, and Mozambique in May- June 2009. Overall, the presentation advised the CG to approve the annual report and business plan, to expand core funding support to the Business Plan, to clarify trade off between energy access and renewable energy and to draw lessons for Asia Sustainable and Alternative Energy Program (ASTAE) in the establishment of Africa Renewable Energy Access Program (AFREA).

CG members expressed appreciation for the thorough and comprehensive report prepared by TAG. Clarifying the relative priority of climate change and energy access, CG members stressed the need to not see these two thematic concerns as being mutually contradictory and involving trade-offs. They instead urged ESMAP to pursue increased energy access for the poor while at the same time taking into account climate change concerns. Responding to TAG's concern regarding the drop in renewable energy activities, Mr. Saghir, the CG chair, clarified that what was in fact taking place was a transition phase brought on by retirement of staff and movement from upstream work on renewable energy to more downstream work. Finally, discussions were also held on the need to revisit TAG's terms of reference in light of the growth in workload and the impending departure of some current TAG members.

Asia Sustainable and Alternative Energy Program (ASTAE) status report. Mr. Frederic Asseline, Senior Energy Specialist, Energy and Transport Unit, East Asia and Pacific Region, presented the implementation report on ASTAE. The presentation illustrated ASTAE's achievements in 2008, particularly activities undertaken for improving energy access, increasing the integration of renewable energy and promoting energy efficiency. In light of ASTAE's proposed scale up of renewable energy generation activities over 2009-2012, Mr. Asseline highlighted establishment of a multi-donor trust fund, improvement of ASTAE's M&E system, the need for more staff as areas for further discussions with CG. CG members responded positively to the presentation and commended the work done by ASTAE in 2008.

Presentation on credit crisis vulnerability assessments. Mr. Ranjit Lamech, Sector Manager, Energy Unit, Europe and Central Asia Region, presented the findings of the credit crisis vulnerability assessments undertaken with ESMAP support in Indonesia, Vietnam, and Philippines. The presentation highlighted the sharply reduced availability of both domestic and international funding for power projects in these countries and the delays faced by many power projects. Mr. Lamech informed the meeting that ESMAP-supported vulnerability assessments, which would guide World Bank's response to the credit crisis, would also be undertaken in other regions and countries impacted by the credit crisis.

Presentations on energy and climate change. Ms. Jane Ebinger, Senior Energy Specialist, ESMAP, briefed the meeting about ESMAP's ongoing work in climate change. Ms. Ebinger shared information on ESMAP-supported, demand-driven, and country-tailored low carbon assessments in Brazil, China, India, Mexico, and South Africa and said that the outputs of these assessments would be disseminated in partnership with the World Bank Institute. Ms. Ebinger also described a pilot program initiated by ESMAP in two countries to assess climate change vulnerability, adaptation options and their costs, and about ESMAP's plan to prepare a toolkit for broader dissemination based on these two case studies. Dr. Roberto Schaeffer, from Federal University of Rio de Janeiro, Brazil, used his presentation to highlight the expected impacts of climate change on renewable energy. Taking the case of Brazil, which relies heavily on renewable energy, Dr. Schaeffer informed the meeting that the projected changes in climate would adversely affect hydropower generation and biofuel production while increasing the potential of wind energy. At the same time,

according to Dr. Schaeffer, an increase in demand for electricity could be expected due to higher temperatures. Both presentations were very well received by the CG members. Some members stressed the need to replicate the study undertaken by Dr. Schaeffer in low-income countries.

Presentation on the Africa Renewable Energy Access (AFREA) program. Mr. Tjaarda P. Storm Van Leeuwen, Adviser, Africa Unit, presented an implementation update on the ESMAP-CEIF - AFREA program. Mr. Van Leeuwen informed the meeting that the AFREA program will prioritize regional scale-up of generation capacity, improvement in the effectiveness and governance of utilities, and expansion in access through sector-wide engagement and that a new organizational structure and staff had been put in place for this purpose. He acknowledged the important role played by ESMAP in laying the foundation for access scale-up effort and underlined the need for its continued support to consolidate the progress achieved so far. Following the presentation, discussions were held on various aspects of ESMAP support to Africa. It was noted that there was a need to use AFREA to disseminate the findings of ESMAP studies on hydropower development and for starting investment projects. ESMAP's role in promoting regionalization of the power sector through activities on Africa Power Pool Development was also highlighted.

Closed Door Session. The closed door session attended by Chair and Principals of Consultative Group discussed issues relating to ESMAP's governance, monitoring and evaluation, Technical Advisory Group, funding pledges, and ESMAP Business Plan 2008-13.

ANNEX 2 Completed, New, Ongoing, and Activities, Fiscal 2009

COMPLETED ACTIVITIES

Activity	Task Manager	Initiative/ Program	Country/ Region
ENERGY ASSESSMENTS AND STRATEGY PROGRAMS			
Sub-Saharan Africa Generation and Transmission Projects	Robert Schlotterer	REISP	AFR
Modern Biofuels Assessment	Boris Enrique Utria	EASP	Mozambique
Sustainable Coal Sector Development	Jianping Zhao	EASP	China
Municipal Heating Reform and Regulation (Phase 1)	Gailius J. Draugelis	EASP	China
Generation Pricing, Trading, and Dispatch	Ranjit J. Lamech	EASP	China
Survey and Knowledge Sharing of Provincial Activities and Programs on Energy Conservation	Bob Taylor	EASP	China
Energy Efficiency Financing	Leiping Wang	EASP	China
Urban Transport Climate Change Strategy	Shomik Raj Mehndiratta	LCGSP	China
Regional Energy and Sustainable Development	Joel J. Maweni	REISP	EAP
Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements	Arturo S. Rivera	CESVAP	Indonesia, Philippines, Vietnam
Mitigation Sector Reform and Tariff Adjustment	Tumentsogt Tsevegmid	EASP	Mongolia
Urban Heat Pricing and Regulation	Gailius J. Draugelis	EASP	Mongolia
South Eastern Europe Gasification Study	Franz Gerner	REISP	ECA
Thermal Power Plant Rehabilitation: Assessment of Needs, Cost, and Benefits	Dejan R. Ostojic	EASP	Ukraine
Affordable Gas-Fired District Heating in Eastern Europe	Peter Johansen	EASP	Ukraine
Energy Efficiency Needs and Toolkit Assessment	Ashok Sarkar	EASP	Global
Strategy to Design Power Projects Under Stress	Jonathan d'Entremont Coony	EASP	Global
Global Energy Assessment Background Energy Papers	Amarquaye Armar	EASP	Global
Risk Assessment Methods in Power Systems Planning	Soren Krohn	EASP	Global
Accelerating Clean Energy Technology (Phase 2)	Jonathan d'Entremont Coony	EASP	Global
Sub-Saharan Africa Refinery Study	Paulo De Sa	REISP	AFR
Accelerating Clean Energy Technology (Phase 1)	Jonathan d'Entremont Coony	EASP	Global
Energy Efficiency Strategic Appraisal	Todd M. Johnson	EASP	Brazil
Benchmarking Analysis of Electricity Distribution Companies	Luis Alberto Andres	REISP	LCR
Low Carbon Growth Country Study (Medec)	Todd M. Johnson	LCGSP	Mexico
Design of Load Management Program and Time of Use Tariffs	Anna M. Bjerde	EASP	Egypt
Energy Pricing Strategy	Vladislav Vucetic	EASP	Egypt
Regional Energy Efficiency Study	Alexander Kremer	REISP	MNA
Structuring New Energy Agency	Pierre Audinet	EASP	Morocco
Energy Management Policy Review	Silvia Pariente-David	EASP	Tunisia
Best Practice in Energy Efficiency Improvement in Coal-Fired Generation	Sunil Khosla, Mikul Kumar	EASP	India
Private Sector Grid-Connected Renewable Power: Review of 10 Years of Experience	Mudassar Imran	REISP	SAR
Regional Power Trade	Raghuveer Y. Sharma	REISP	SAR
PRO-POOR ENERGY ACCESS TA PROGRAM			
Energy Access Scale-Up in Africa: Action Plan Implementation	Kyran O'Sullivan	PEA-TAP	AFR
Identification and Testing of Inputs for Enhanced Electricity Access Package	Mohua Mukherjee	PEA-TAP	AFR

Capacity Building Among Small-Scale Off-Grid Energy Suppliers	Koffi Ekouevi	ESMED-TAP	Burkina Faso
Capacity Building Among Small-Scale Off-Grid Energy Suppliers	Astrid Manroth	ESMED-TAP	Cameroon
Scaling Up Small & Medium Enterprise Participation in Rural Electrification	Dana Rysankova	ESMED-TAP	Guinea
Integrating Small & Medium Enterprises Rural Energy Initiatives	Dana Rysankova	ESMED-TAP	Tanzania
Strengthening Small- & Medium-Scale Off-Grid Energy Enterprises	Abdolreza B. Rezaian	ESMED-TAP	Zambia
Decentralized Energy Services for IDA Countries	Jie Tang	ESMED-TAP	Cambodia
Small & Medium Enterprises in Decentralized Energy Service	Jie Tang	ESMED-TAP	Laos
Rural Energy Project	Arturo S. Rivera	PEA-TAP	Mongolia
Decentralized Energy Services for IDA Countries	Amarquaye Armar	ESMED-TAP	Global
Gender and Energy	Rogério Carneiro de Miranda	GEDS-TAP	Global
Solar Lantern Testing and Certification Project	R. Anil Cabraal	PEA-TAP	Global
Economics of Connecting the Poor to Natural Gas	Franz Gerner	PEA-TAP	Global
Strengthening Small-Scale Off-Grid Energy Suppliers	Susan Bogach	ESMED-TAP	Bolivia
Woodfuel Strategy: Promotion of Efficient Cooking Stoves	Karen Bazex	ESMED-TAP	Haiti
Technical Assistance to Improve Small-Scale Energy Supply	Xiaoping Wang	ESMED-TAP	Nicaragua
Small & Medium Enterprises for Energy Services Delivery	Susan Bogach	ESMED-TAP	Peru
The Poverty Impact of Rural Electrification: Evidence From Bangladesh	Elahi, Raihan	PEA-TAP	Bangladesh
ENERGY EFFICIENCY CITIES INITIATIVE			
Energy Efficient Cities Practitioners Workshop	Jas Singh	EECI	Global
RENEWABLE ENERGY MARKET TRANSFORMATION INITIATIVE			
Pre-Investment in Scale-Up Energy	Leiping Wang	REMTI	China
Grid-Connected Renewable Energy Policy Reform	Soren Krohn	REMTI	Global
Alternative Energy and Bioenergy	Todd M. Johnson	REMTI	Columbia
Small Hydropower	Susan Bogach	REMTI	Peru
Commercial Wind Development Framework	Anna M. Bjerde	REMTI	Egypt

NEW ACTIVITIES

Activity	Task Manager	Initiative/ Program	Country/ Region
ENERGY ASSESSMENTS AND STRATEGY PROGRAMS			
Support for the Development of a National Energy Efficiency Program	Lucia Spinelli	EASP	Chile
Energy Intensity Strategy	Carter J. Brandon	EASP	China
Heat Regulation (Phase 2)	Gailius J. Draugelis	EASP	China
Revisiting Policy Options for the Market Structure in the Power Sector	Maria Vagliasindi	EASP	Global
Development of an Operational Toolkit for Energy Efficient Lighting Program Design and Implementation	Ashok Sarkar	EASP	Global
Global Energy Assessment: Capacity Building	Istvan Dobozi	EASP	Global
Smart Metering	Istvan Dobozi	EASP	Hungary
Environmental Issues in the Power Sector: Consequences of Coal-Based Generation	Mudassar Imran	EASP	India
District Heating Restructuring	Gary Stuggins	EASP	Moldova
Public-Private Partnership Options for Electricity Generation	Franz Gerner	EASP	Montenegro
Energy Supply Strategy	Silvia Pariente-David	EASP	Morocco
Natural Gas Study	David Reinstein	EASP	Peru
Capacity Building for Electricity Market Operations	Sameer Shukla	EASP	Turkey
Gas Sector Development Framework	Sanjoy Ranjan	EASP	Vietnam
Institutional Framework for Energy Efficiency Program Implementation	Chandrasekar Govindarajalu	EASP	Yemen

Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements	Rome Chavapricha	CESVAP	Egypt and Jordan
Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements	Alan Townsend	CESVAP	Bangladesh
Study on the Impacts of the Financial Crisis on the Energy Sector	Edon Vrenezi	CESVAP	Armenia, Romania, Kyrgyz Republic, Ukraine
Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements	Silvia Pariente-David	CESVAP	Tunisia, Morocco
Regional Low Carbon Transport Strategy	Michel Bellier	REISP	Tunisia
Programmatic Energy Study	Juan Cayo	REISP	LCR
Policy and Capacity Building Support for Greater Mekong Subregion Power Trade	Beatriz Arizu de Jablonski	REISP	EAP
Regional Electricity Security	Ariel Yepez-Garcia	REISP	LCR
Maghreb Countries Energy Market Study	Silvia Pariente-David	REISP	MNA
Assessment of Energy Integration in the Mashreq Countries	Husam Mohamed Beides	REISP	MNA
South Eastern Europe Wholesale Market Opening	Kari J. Nyman	REISP	South Eastern Europe, Balkans
West Africa Power Pool Broadband Program Assessment	Mavis A. Ampah	REISP	AFR
PRO-POOR ENERGY ACCESS TA PROGRAM			
Review of Strategies for Sustainable Production of Commercial Fuelwood	Rogério Carneiro de Miranda	PEA-TAP	Global
Economic Benefits of Electricity Supply	Pierre Audinet	PEA-TAP	Global
ENERGY EFFICIENCY CITIES INITIATIVE			
Ningbo "Energy Efficient" Township	Shenhua Wang	EECI	China
Energy Efficiency Project Development in Urban Investments	Feng Liu	EECI	China, Ukraine, West Bank
Programmatic Approach to Building Energy Efficiency Codes	Feng Liu	EECI	Global
Analytical Framework for Energy Efficient Cities	Ranjan Bose	EECI	Global
Energy Efficiency in Sub-Saharan African Water Utilities	Feng Liu	EECI	Zambia
RENEWABLE ENERGY MARKET TRANSFORMATION INITIATIVE			
Capacity Building in Renewable Energy for Implementing Agencies in Latin America & the Caribbean	Karen Bazex	REMTI	LCR
Regional Concentrating Solar Power Initiative	Chandrasekar Govindarajalu	REMTI	MNA

ONGOING ACTIVITIES

Title	Task Manager	Initiative/Program	Country/Region
ENERGY ASSESSMENTS AND STRATEGY PROGRAMS			
Utility Performance Benchmarking	Prasad V.S.N. Tallapragada	REISP	AFR
Institutional Framework Development and Capacity Building	Fanny Kathinka Missfeldt-Ringius	EASP	Guinea-Bissau
Regulating Electricity Exports and Imports in the Southern Africa Development Community	Wendy E. Hughes	REISP	AFR
Southern Africa Power Market: Indicative Generation & Transmission Expansion Study	Samuel A. O'Brien-Kumi	REISP	AFR
Sub-Saharan Africa Downstream Petroleum Efficiency Study	Masami Kojimi	REISP	AFR
Sub-Saharan African Electric Utility Capacity Assistance Project	Prasad V.S.N. Tallapragada	REISP	AFR
Biomass Cogeneration Development Project	Ximing Peng	EASP	China
Technical Assistance for GEF Vietnam Demand-Side Management and Energy Efficiency Program	Ky Hong Tran	EASP	Vietnam
South Eastern Europe Regional Energy Efficiency and Renewables Assessments	Peter Johansen	REISP	South Eastern Europe, Balkans

Supporting Electricity Market Operations	Sameer Shukla	EASP	Turkey
Needs Assessment of Hydropower Infrastructure Rehabilitation	Daryl Fields	EASP	Global
Regional Power Sector Integration Potential	Jonathan d'Entremont Coony	REISP	Global
Low Carbon Growth Country Study	Christophe de Gouvello	LCGSP	Brazil
Natural Gas Study	David Reinstein	EASP	Peru
Assessment of Climate Impact on Peru's Hydrology: Development of a Methodology	Walter Vergara	EASP	Peru
Strategic Overview of Energy Procurement and Best Practices in Energy Auctions	Luiz T.A. Maurer	REISP	LCR
Programmatic Energy Study	Juan Cayo	EASP	LCR
Energy Savings Opportunities in Large Buildings	Sunil Kumar Khosla	EASP	Afghanistan
Energy Sector Master Plan	Pierre Audinet	EASP	Djibouti
Electricity Pricing and Power Sector Reform	Vladislav Vucetic	EASP	Iran
Energy Financing and Institutional Framework	Vladislav Vucetic	EASP	Jordan
Transport and Climate Change	Jean-Charles Crochet	EASP	Morocco
Energy Supply Strategy	Silvia Pariente-David	REISP	Morocco
Electricity Sector Strategy	Husam Mohamed Beides	EASP	Syria
Support to Develop Strategy for the Government's Public Transport Subsector	Ibrahim Khalil Dajani	EASP	West Bank, Gaza
Exploring Potential Electricity Trade and Interconnection	Waleed Alsuraih	REISP	Yemen, Djibouti, Gulf Coast Council Countries
Regulatory and Planning Requirements for Rehabilitation of Coal-Fired Generation	Mustafa Zakir Hussain	EASP	India
Organization Transformation and Public-Private Partnerships in MSETCL	Kwawu Mensan Gaba	EASP	India
Low Carbon Growth Country Study	Kwawu Mensan Gaba	LCGSP	India
Assessing Social Impacts of Rural Energy	Sudeshna Ghosh Banerjee	EASP	Nepal
Nepal Energy Authority Energy Efficiency Study	Jeremy Levin	EASP	Nepal
Support for the Development of a Large-Scale Energy Efficient Lighting Program	Raquveer Sharma	EASP	Pakistan
PRO-POOR ENERGY ACCESS TA PROGRAM			
Lighting Africa	Dana Rysankova	PEA-TAP	AFR
Improving the Impacts of Oil, Gas, and Mining Development on Women and Youth	Adriana Eftimie	PEA-TAP	Global
Impact Assessment of National Rural Electrification Programs	Shahidur Khandkar	PEA-TAP	Global
Implementation of Action Plan for Africa Energy Access Scale-Up Program	Kyran O'Sullivan	PEA-TAP	AFR
Africa Electrification Initiative: SWAP Investment and Policy Prospectuses	Kyran O'Sullivan	PEA-TAP	Rawanda, Kenya
Identification and Testing of Inputs for Enhanced Electricity Access	Mohua Mukherjee	PEA-TAP	AFR
Introducing Energy Efficient and Cleaner Technologies and Practices in the Brick-Making Sector	Maria Sarraf	PEA-TAP	Bangladesh
ENERGY EFFICIENCY CITIES INITIATIVE			
Public Procurement of Energy Efficiency Services	Jas Singh	EECI	Global
RENEWABLE ENERGY MARKET TRANSFORMATION INITIATIVE			
Renewable Energy Development	Arturo S. Rivera	REMTI	Philippines
Regulation of Renewable Energy	Peter Johansen	REMTI	Bulgaria
Establishing a Regulatory Framework for Renewable Energy Sources	Peter Johansen	REMTI	Slovakia
Policy Options for Renewable Energy Sources	Walter Vergara	REMTI	Columbia
Overcoming Barriers to Hydropower Investment	Susan Bogach	REMTI	Peru
Promotion of Renewable Energy	Vladislav Vucetic	REMTI	Iran
Renewable Energy Investment Climate Assessment	Gevorg Sargsyan	REMTI	India
Removing Barriers to Hydropower Development	Michael Haney	REMTI	Nepal

Annex 3 Publications, Fiscal 2009

Pub. No.	Country/Region	Title	Author/Contact	Date
SPECIAL REPORTS*				
006/09	Bangladesh	Restoring Balance: Bangladesh's Rural Energy Realities (ENERGY POVERTY THEME)	Barnes/Asaduzzaman/Khandker	Mar-09
FORMAL REPORTS*				
338/09	Mexico	Innovative Financial Mechanism to Implement Energy Efficiency Projects in Mexico	Feinstein	Jun-09
TECHNICAL REPORTS*				
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ABBREVIATIONS & ACRONYMS

AEI	Africa Electrification Initiative	IFC	International Finance Corporation
AFR	Africa Region (The World Bank)	km	kilometer
AFREA	Africa Renewable Energy Access Program	km²	square kilometer
ASTAE	Asia Sustainable and Alternative Energy Program	LCG	low carbon growth
BMZ	Federal Ministry for Economic Cooperation and Development	LCR	Latin America and Caribbean Region (The World Bank)
CEIF	Clean Energy Investment Framework	LED	light emitting diodes
CG	Consultative Group	LCGSP	Low Carbon Growth Studies Program
CSP	concentrated solar power	LPG	liquefied petroleum gas
DFID	Department for International Development	M&E	monitoring and evaluation
EAP	East Asia and Pacific Region (The World Bank)	MDG	Millennium Development Goals
EASP	Energy Assessment and Strategies Program	MNA	Middle East and North Africa Region (The World Bank)
ECA	Europe and Central Asia Region (The World Bank)	MW	megawatts
EC-RING	Energy Community Gas Ring	NEA	Nepal Energy Authority
EECI	Energy Efficient Cities Initiative	NGO	nongovernmental organization
ESMED	Energy Small and Medium Enterprise Development Strategies	OECD	Economic Cooperation and Development
ETFP	Energy trust funded Programs	PEA	Pro-poor Energy Access
ETWD	Energy, Transport and Water Department	REISP	Regional Energy Integration Strategies Program
ETWES	Energy, Transportation and Water Department, ESMAP	REMTI	Renewable Energy Market Transformation Initiative
GDP	gross domestic product	SAR	South Asia Region (The World Bank)
GEDS	Gender and Energy Development Strategies	SIEPAC	Sistema de Interconexion Electrica para America Central
GEF	Global Environment Facility	SME	small and medium enterprise
GHG	greenhouse gas	SWAp	sector wide approach
GW	gigawatts	TAG	Technical Advisory Group
IDA	International Development Association	TAP	technical assistance program
		TEĐAD	Turkish Electricity Transmission Corporation
		VPU	Vice President Unit
		WBG	World Bank Group

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