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The Energy Efficiency Investment Forum: Scaling Up Financing in the Developing World



Energy Sector Management Assistance Program

Energy Sector Management Assistance Program (ESMAP)

Purpose

The Energy Sector Management Assistance Program (ESMAP) is a global technical assistance partnership administered by the World Bank and sponsored by bi-lateral official donors, since 1983. ESMAP's mission is to promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner. Its work applies to low-income, emerging, and transition economies and contributes to the achievement of internationally agreed development goals. ESMAP interventions are knowledge products including free technical assistance, specific studies, advisory services, pilot projects, knowledge generation and dissemination, trainings, workshops and seminars, conferences and round-tables, and publications. ESMAP work is focused on four key thematic programs: energy security, renewable energy, energy-poverty and market efficiency and governance.

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The Energy Efficiency Investment Forum: Scaling Up Financing in the Developing World

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List of Acronyms and Abbreviations

ACORE	American Council on Renewable Energy
ADB	Asian Development Bank
ADEME	French Agency for Environment and Energy Management
AMD	Advanced Micro Devices
APEC	Asia Pacific Economic Cooperation
APEC EE/RE	APEC Energy Efficiency and Renewable Energy Financing Initiative
ASE	Alliance to Save Energy
ASEAN	Association of Southeast Asian Nations
BaU	Business as Usual
BBP	Better Buildings Partnership
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CESA	Clean Energy States Alliance
CFL	Compact Fluorescent Lamp
CIS	Commonwealth of Independent States
CLASP	Collaborative Labeling and Appliance Standards Program
CMI	Carbon Market Initiative
CONAE	Comission Nacional Para El Ahorro de Energia/National Commission for Energy Conservation
CSD	The United Nation's Commission on Sustainable Development
DSM	Demand-Side Management
ELI	Efficient Lighting Initiative
ESCO	Energy Service Company
ESCOs	Energy Service Companies

ESMAP	Energy Sector Management Assistance Program
EU	European Union
Ex-Im Bank	US Export-Import Bank
FEMP	Federal Energy Management Program
FI	Financial Institution
French GEF	Fonds Francais pour l'Environnement Mondial
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GNESD	Global Network on Energy for Sustainable Development
GVEP	Global Village Energy Partnership
HVAC	Heat, Ventilation and Air Conditioning systems
IEA	International Energy Agency
IEEFP	International Energy Efficiency Project Financing Protocol
IFC	International Finance Corporation
IT	Information Technology
JBIC	Japan Bank for International Cooperation
JPoI	Johannesburg Plan of Implementation
KEIDANREN	Japan Federation of Economic Organizations
KEMCO	Korea Energy Management Corporation
kW	Kilowatt
LAC	Latin America and the Caribbean
LDC	Less Developed Country
LEED	Leadership in Energy & Environmental Design
LFIs	Local and Regional Financial Institutions
MEPS	Minimum Energy Performance Standard
M&V	Monitoring and Verification
MW	Megawatt
NGO	Non-Governmental Organization
NRECA	National Renewable Energy Cooperative Association
NREL	National Renewable Energy Laboratory

OECD	Organization for Economic Cooperation and Development
OPIC	Overseas Private Investment Corporation
R&D	Research and Development
REEEP	Renewable Energy and Energy Efficiency Partnership
RFP	Request for Proposal
RPS	Renewable Portfolio Standards
S&L	Standards and Labeling
SCE	Southern California Edison
SMEs	Small and Medium Enterprises
UN	United Nations
UNECE	UN Economic Commission for Europe
UNF	United Nations Foundation
UNEP/SEFI	United Nations Environment Program/Sustainable Energy Financing Initiative
USAID	US Agency for International Development
WSSD	World Summit on Sustainable Development

Executive Summary

Overview

On May 8-9, 2006, the Energy Efficiency Investment Forum was held to discuss options and explore opportunities for improving access to investment capital and financing for energy efficiency in developing countries. The Forum was held in New York City, New York, as a side event to the 14th Meeting of the Commission on Sustainable Development (CSD-14) which had energy for sustainable development as one of its core themes.

The Forum objectives were the following:

- Increase investor awareness of the significant market opportunities for energy efficiency investments in developing countries.
- Enhance corporate understanding of investor issues and options.
- Identify investment players and prospective partners.
- Share successful business and financing model structures for such projects.
- Feature-sound, bankable energy efficiency project opportunities.

Approximately, 130 individuals representing 30 countries participated in the Forum. Attendees included developing country government officials, and representatives from energy utilities, private Energy Service Companies (ESCOs) and equipment manufacturers, local and international banks, bilateral and multilateral donors, Non-Governmental Organizations (NGOs) and international organizations. Forum sponsors included the Renewable Energy and Energy Efficiency Partnership (REEEP), US Agency for International Development (USAID), the US Department of State, the World Bank, ESMAP, the United Nations Environment Program's Sustainable Energy Finance Initiative (UNEP/SEFI) and the EAGA Group.

Over the two-day session, participants were able to present and debate the state of the global energy efficiency market and to explore its relevance in the broader global energy debate. Topics addressed included: energy efficiency issues and opportunities; country experiences in promoting energy efficiency; market-based approaches for utility, building and industry sectors; financing energy efficiency; innovative financial structures; and mobilizing local capital markets. Breakout sessions enabled participants to examine

financing and policy issues in more detail, and dedicated facilities were made available for one-on-one meetings, networking and deal-making. A Forum Communiqué was prepared as input to CSD-14. And commitments were made for scaling up energy efficiency at the local, national, regional and international levels, with progress to be reported at CSD-15 scheduled for April 30 - May 11, 2007, in New York City.

Meeting Highlights

The highlights of the Energy Efficiency Investment Forum are summarized below.

Why Energy Efficiency? Why Now?

Global Energy Demand. The International Energy Agency (IEA) forecasts that under a Business as Usual (BaU) scenario, energy consumption will increase by over 60 percent in the next 25 years. The bulk of this growth will occur in developing countries, led by the G+5 countries such as China and India, and over 85 percent of energy consumption will be sourced from fossil fuels. This will result in a 60 percent growth in Greenhouse Gas (GHG) emissions, with the majority to occur in developing countries.

Related Pressures. In addition to increasing demand, developing and industrialized countries alike are confronting spiraling energy costs, aging infrastructure within their facilities, power reliability and quality issues, shortage of capital funds, and increasing concerns over indoor air, water quality and GHG emissions.

Energy Efficiency: A No Regrets Solution. Energy efficiency is the fastest, cheapest and cleanest solution for stretching the world's energy supplies and enhancing energy security in an environmentally sustainable manner. The cost of saving energy through the particularly large, untapped demand-side energy efficiency potential in developing countries is cheaper than the cost of adding new supply capacities. It is as much an energy resource as any option in the marketplace today, including conventional fuels. In emerging and developing economies where the growth in energy demand is accelerating, energy efficiency has the potential to be an integral part of future energy supply strategies. Improved energy efficiency in buildings, industry and transport could lead to between 17 and 33 percent lower energy use by 2050, according to the IEA.

"Improving end-use efficiency offers the greatest opportunity to address energy security, price and environmental concerns."

G8 Clean Energy and Development Report: Towards an Investment Framework

Defining Energy Efficiency. Energy efficiency includes investments in energy generation, delivery, end-use equipment, facilities, buildings and infrastructure which deliver higher useful energy outputs or services. Examples include lighting, heating, cooling, refrigeration, water pumping and industrial processes.

Benefits of Energy Efficiency. Intelligent use of energy can reduce waste, increase efficiency and diminish costs while providing the same level of service with less consumption. Energy efficiency can reduce infrastructure bottlenecks and future investment requirements, enhance competitiveness by lowering input and operating costs, free up capital for other social and economic development priorities and advance environmental stewardship. Energy efficiency can also contribute to long-term resource planning and management, hedge fuel risks, reduce Operation and Maintenance (O&M) costs, and decrease energy losses due to mismanagement, fraud and theft which is a serious problem in many developing countries. Energy efficiency is conducive to new paradigms in the energy sector to include distributed generation and smart grids.

Major Market Drivers. In today's evolving energy scenario, two key drivers are spurring increased interest in energy efficiency — energy security and the environment.

- From an **energy security** perspective, concerns exist over power shortages and blackouts, escalating oil prices and associated price volatility, petroleum supply uncertainties, China's rapid emergence onto the global energy market and the political and economic instability of several of the oil-producing nations. Energy efficiency can reduce the need for imported fossil fuels and the corresponding foreign exchange drain, diversify supply options, generate energy savings and decrease demand.
- **Environmentally**, mounting evidence over the linkages between fossil fuel use and climate change — as demonstrated in rising tides, rapid melting of the Arctic ice caps, receding glaciers in Greenland, the heating up of the tropics, etc., — are prompting countries to seek cleaner alternatives for meeting their energy needs. Energy efficiency offers a win-win solution for tackling the risks of local pollution and global GHGs. It can also be a major contributor to achieving industrialized country commitments made under the Kyoto Protocol.

Energy Efficiency: The Elusive Bargain

Despite profitable business opportunities for energy efficiency, and the substantial market potential, actual investments in the energy efficiency sector, both by public and private entities, have been slow. Despite over 30 years of energy efficiency measures, the market remains relatively immature and successful experiences are limited, especially in the developed world.

A number of obstacles were put forward to explain the lack of penetration of energy savings as a fundamental element of energy sector development. These included:

- Lack of full economic costing of energy, subsidies and inadequate market signals.
- Perceived risks and relatively high transaction costs.
- Lack of technology availability.
- Poor implementation of energy efficiency projects and programs.
- Lack of awareness of energy efficiency potential and opportunities.
- High debt and equity costs.
- Small ventures and start-ups often lack business/management skills and collateral.

- Relatively weaker institutions.
- Lack of political will and policy commitments.
- Limited attraction by financial institutions due to low transaction sizes and unfavorable risk/return profile; energy savings as a revenue stream entails technical and transaction risks for banks (as these are not a classic asset-based investment like supply-side investments).
- Lack of reliable and commercially viable financing to end-users, developers (including ESCOs), contractors and manufacturers/vendors; the problem is not a lack of available funds but getting access to these funds at local and regional financial institutions.
- The energy efficiency market is diverse and complex; it has a range of end-users, a variety of end-use technologies and a number of market sectors and solutions are often customized and not always replicable.

To date, though multilateral banks, bilateral donors and a number of those in the local private banking sector have promoted energy efficiency as a means of addressing growth in energy demand in developing countries, and improving the commercial viability for their clients, the real support still comes from the public sector. This is likely to continue into the foreseeable future, despite a movement in the global market for privatization and private sector finance, until there is a more effective use of public funds to leverage private resources.

Mitigating the Barriers

While approaches to barrier mitigation vary widely, a number of lessons learned and good practices emerged throughout the Forum presentations and discussions.

Elements of Effective Energy Efficiency Initiatives

Stakeholders. Energy efficiency scale-up requires supportive government policies backed by strong local institutions, a robust private sector, educated consumers and vibrant financial institutions (local, regional and international), all of which contribute to the potential savings from both supply- and demand-side efficiencies. Most importantly, the roles, responsibilities and accountability of each of the key stakeholders need to be clearly defined and understood.

Policies. Political will and commitment are key to the advancement of energy efficiency projects and programs. Policies should be long-term in nature and encourage proper market and pricing signals. Legal and institutional frameworks need to be supportive and remove market distortions favoring conventional sources. Regulatory interventions are required to implement norms and certification programs; monitoring and enforcement is appropriate. Policies must consider both demand and supply aspects, and both mandatory and voluntary measures are working in the market. In many instances, state and local governments can be as important as the national government in putting in place policies and regulations to advance energy efficiency in their locales.

Policy Measures. A range of policy measures are in use to accelerate deployment of energy efficiency, typically targeting a particular sector and end-user group such as the industrial, residential, commercial, utility and transport sector. Examples of the types of policy measures employed are energy efficiency codes, Standards and Labeling (S&L); mandatory energy efficiency targets; financial incentives such as tax incentives, low-interest loans and targeted subsidies (used judiciously, transparently and with a clear exit strategy); bulk procurement programs and competitions; and voluntary agreements, among others. Cross-cutting programs provide information and outreach, support ESCOs, and offer carbon market assistance. Table 1 provides a sample of the energy efficiency policies and programs in operation today.

Market Transformation Programs. Market transformation programs combine many of the policy mechanisms above into a comprehensive package that seeks to favorably influence and drive the energy efficiency market. Market transformation policies attempt to address a set of barriers through a mix of incentives, information, targets and standards.

Financing. Financing is required for energy efficiency assessments and technical assistance, for debt and equity and risk-sharing. Funding sources are varied and include financing from end-users; ESCOs; utilities; local financial institutions; federal, states and municipalities; bilateral and multilateral sources; carbon finance; equity through special purpose vehicles; venture capitalists; institutional investors; and others. Ultimately, local financing sources will be the key to the scale-up of the industry, as these sources understand their clients and markets, operate in local currencies and can access local liquidities. One suggestion was for the development of an International Energy Efficiency Project Financing Protocol (IEEFP) that becomes a blueprint for local financing institutions to finance energy efficiency projects. It was also recognized that public sources (multilateral and bilateral) are still important to leverage these funds. Bundling through financial and market intermediaries has also proven important.

Technical Assistance. Most successful energy efficiency projects have complementary technical assistance components to help ensure achievement of program objectives. Technical assistance support can include marketing, training, information dissemination, market/pipeline development and consumer outreach.

General Policy and Program Design Considerations

Before designing an energy efficiency policy or program, it is important to *understand the value of energy efficiency at the micro level*, including identifying the specific market segments to be addressed, the economics, the commercial viability and the financing needs.

Table 1: Energy Efficiency Policy and Program Summary

<i>Sector</i>	<i>Energy Efficiency Promotion Activity</i>
Industrial	<ul style="list-style-type: none"> • Regulation measures • Tax incentives • Energy efficiency funds and low interest loans • Performance codes, standards, incentives and regulations • Mandatory/compulsory energy efficiency targets • Technical assistance and small business programs • Energy audits for factories • Product labeling, rating, certification and retro-commissioning • Energy conservation management • Recognition programs, technology adaptation and upgrades; and bulk procurements
Residential	<ul style="list-style-type: none"> • Energy manager capacity-building/recognition programs • Product standards, labeling, appliance recycling • Funding/rebate programs • Energy audits/surveys • Regulations and codes for new buildings • Residential lighting incentives and new construction programs • Pro-poor fuel support programs
Commercial	<ul style="list-style-type: none"> • Technology upgrades • Energy audits and management programs • Energy product labeling • Mandatory/compulsory efficiency targets • Recognition/incentive programs • Public procurement programs and Green Buildings
Power Generation and Utilities	<ul style="list-style-type: none"> • Utility obligation programs • Demand-side management (time of use) • Heat rate improvement of power plants • System loss reduction program
Transport	<ul style="list-style-type: none"> • Introduction of more efficient vehicles • Increase production of alternative fuels (e.g., biofuel, ethanol); tax holiday and import duty exemptions for these products • Low-interest loans for conversion of fleet vehicles • Voluntary agreement programs (carless day program, carpooling, park/ride programs) • Mass transit programs; tighter regulations for transport companies and cargo owners • Energy saving measures for traffic systems
Information, Education and Outreach	<ul style="list-style-type: none"> • Energy audit procedures/training • Energy manager guidelines/certification/training • Technology transfer and demonstration programs • Public awareness campaigns, fuel economy guides, conservation programs in schools • Documentation/dissemination of best practices • Survey and monitoring, discount programs and demand bidding programs

Sector	Energy Efficiency Promotion Activity
ESCO Promotion	<ul style="list-style-type: none"> • Tax incentives • Access to low-interest loans • Training/technical assistance • Monitoring and verification protocols • Standard performance contracting
Climate Change	<ul style="list-style-type: none"> • GHG reduction registry center • Emission trading and support for Clean Development Mechanism (CDM) projects Market Transformation • Mix of policies, incentives, information, targets, standards above to mitigate barriers and accelerate energy efficiency adoption

Upfront, holistic market analyses are essential to determine target markets, service providers, financing constraints and skill gaps.

Programs should be *flexible* to respond to changing market conditions and implementation realities.

Participating stakeholders must have *proper incentives* to participate in programs and share in rewards commensurate with the risks. Stakeholders can include communities, manufacturers, government agencies, etc. The private sector, in particular, noted the need for accelerating the timeline for operationalizing energy efficiency projects. Businesses need to have certainty that they can put projects in place — from inception to implementation — in reasonable timeframes as time is money.

Programs should seek to *encourage competition* — among service providers, equipment suppliers, banks, etc.

Programs should be *commercially-oriented and demand-driven* by end-users.

Pilot programs should test “scalability” of institutional and financial arrangements, clearly documented for target audiences (e.g., private sector, banks) and then intensively marketed.

Early deals help build organizational confidence and program credibility.

Partnership programs have been effective in promoting energy efficiency, generally on a voluntary basis. Examples include programs between utilities, institutions (e.g., schools/colleges, manufacturers, NGOs), communities, cities and states. Cross-border partnerships are also ongoing (e.g., the Association of South-east Asian Nations — ASEAN, and the Collaborative Labeling and Appliance Standards Program — CLASP) allowing developing countries to learn from industrialized countries and vice versa.

Box 1. Illustrative Energy Efficiency Programs Highlighted in the Forum

- French Agency for Environment and Energy Management (ADEME) Local Authorities and Energy Efficiency Program — France
- Coelba Low Income Energy Efficiency Program — Brazil
- Collaborative Labeling and Appliance Standards Program — Global
- Developing Financial Intermediation Mechanisms for Energy Efficiency (EE) Projects – Brazil, China, India
- EAGA Energy for Poor Program — UK
- Energy Action Plan “Loading Order” — California
- Energy Efficiency Commitment Program — UK
- Efficient Lighting Initiative (ELI) — Global
- Energy Star Program — US
- ESKOM Billion kWh Project — South Africa
- FEMP — US
- LEED Green Building Rating System — Global
- Minimum Energy Performance Standard (MEPS) — Korea
- National Energy Efficiency Campaign — Mexico
- Top Runner Program — Japan

On the issue of *measuring savings*, there were mixed views. Some considered it critical, while others felt it is not possible on a deal-by-deal basis. It was recommended that for these latter types of projects (e.g., utility compact fluorescent light bulb programs, the Hungary retail gas program or stipulated savings transactions) there are Monitoring and Verification (M&V) protocols that can be used to confirm savings. This could be especially useful to capture carbon values.

Key Areas Identified for Intervention

Over the course of the two-day meeting, a number of specific areas were cited for priority consideration.

Utility Sector. Need for long-term policies, resource planning and portfolio management and dedicated investment programs by both the public and private sector. Utilities need to make cost-effective energy efficiency the “first resource in the loading priority” over any supply options, as is the case in California’s Energy Action Plan. Line losses were also cited as a critical problem in many developing countries, due to technical, commercial and/or administrative reasons (e.g., theft). The National Renewable Energy Cooperative Association (NRECA) offered a number of tools for successfully addressing these losses.

Industrial Sector. Priority areas include reducing high consumption sectors such as steel and cement, and improving management technologies to include ESCOs, energy auditing and benchmarking. Energy award/competition programs have also proven effective as was demonstrated in several ASEAN countries.

Building Sector. Investments in energy efficiency S&L programs have proven to be more cost-effective than investments in power production; over 50 countries have S&L programs and this number is growing. Other priority areas include building codes, zero emission buildings, improved materials, control system technologies, and Green Buildings. Moreover, federal energy management programs have proven effective in organizing bulk procurements and competition for energy services, saving taxpayers' dollars, improving air quality and conserving water, stimulating markets for new energy technologies, and demonstrating government leadership in energy efficiency. Several states and municipalities have now implemented programs in their facilities as well. Federal Energy Management Program (FEMP) and Leadership in Energy and Environmental Design (LEED) were cited as model programs in this area.

Transport Sector. Focus areas include improving vehicle efficiencies, public transport, intelligent transport management and city planning.

Low-income programs have been effectively designed and implemented in both industrialized and developing countries. In Brazil, Coelba's slum electrification program has led to reduced debt and losses (theft) from low-income clients, energy savings and reduced carbon dioxide (CO₂) emissions, positive corporate image and displacement of low efficiency equipment. In the United Kingdom (UK), domestic energy efficiency programs have reduced fuel poverty, saved lives, addressed social inequities, improved the environment and built a new industry sector.

Consumer Outreach. Across the board there is a need for consumer outreach to reduce end-use demand and to institutionalize behavioral change such as shifting to Compact Fluorescent Lamps (CFLs).

Capacity-building. Capacity-building efforts are needed to strengthen the skill sets of developing country institutions and individuals in a number of areas. These include establishing energy audit procedures, implementing energy audit training and recommended improvements, developing systems for energy database benchmarking and guidelines, establishing energy management systems, creating certification systems for energy managers/auditors, developing energy management guidelines, and conducting technology transfer/dissemination. ESCO promotion is also a priority in many countries.

Linking Energy Efficiency to Other Sectors. There is a need to build the tools to link energy to the broader economy, as well as to other sectors. Mexico's National Commission for Energy Conservation (CONAE) program was cited as a model in this area.

Program Finance Considerations

Several speakers highlighted that, with liquidity high in many markets, *capital availability is not the issue*. The requirement is for creating the enabling environment to free the flow of capital, particularly in local capital markets.

Overall, the development of financially viable energy savings has remained blocked by the underdeveloped state of delivery mechanisms. To date, these mechanisms have included *ESCOs and Utility Demand-Side Management (DSM)* programs, generally with mixed results and relatively few successes to show, for example the China ESCO Program, Thai DSM Program, Southern California Edison DSM Program (see Box 2). Local commercial banks have emerged as an important source of energy efficiency loan and debt funds, and project bundling, though they often require capacity-building, technical assistance, and risk-sharing support (credit lines, guarantees, revolving funds, etc.) from government, bilateral and multilateral organizations such as the World Bank, the Global Environment Facility (GEF), USAID, etc. Pooled procurements, on behalf of similar end-users, are another source of energy efficiency finance.

Box 2. Getting Real about ESCOs and Utility DSM in Developing Countries

ESCOs and DSM are two common models in delivering energy efficiency projects in developing countries, with over 15 years of operations. However, experience has shown that though ESCOs and DSM programs have a role to play, they are not a panacea.

ESCOs were designed to help consumers reduce energy costs and share the benefits, ideally a win-win scenario. ESCOs were intended to offer a full service, one-size-fits-all business model providing finance, technical and marketing support. In reality, ESCOs faced significant problems: clients skeptical over energy savings, difficulties in executing performance contracts, lack of legal and financial frameworks, diversity of ESCO models, and equity/debt problems. Though ESCOs have been effective in some countries, the overall success rate has been lower than anticipated.

Utility DSM programs seemed attractive as they have a well defined captive consumer, the utility bill can provide the repayment mechanism, reasonable technical capacity exists in the utility and impact evaluations can build on in house metering and data gathering programs. Practice has shown otherwise, with utilities viewing efficiency as a secondary benefit (e.g., load management, reactive power compensation, loss reduction, public relations). Regulatory/policy interventions are necessary to sustain DSM, especially in reforming utilities; utilities are hesitant to undertake a financial intermediation role; DSM groups are marginalized in the utility; and financial skills are lacking.

Successful energy efficiency finance programs *combine access to finance with technical and financial advisory services* to prepare projects and build capacities of local market participants. The “project delivery mechanism” which includes project development, appraisal and financing, needs to be handled at the local level and the individual components need to be well integrated. Effective programs usually involve careful diagnostic work at the beginning, flexibility in design, and arrangements to cover high labor intensities during program development and implementation.

There is a need to *train bankers* to appraise and underwrite loans to ESCOs and energy efficiency projects in ways that rely on and value the energy cost savings as a source of loan repayment; and utilize the project equipment and contract assets as a source of security.

Standardization of financing products is desirable — particularly given the large range of transaction structures, business models, and end-users for energy efficiency projects — but this is not always possible. Customized solutions may be the answer with programs tailored to the *local market conditions and the specific institutional and credit characteristics* of the target energy efficiency market sector. There are, nonetheless, common needs and elements, and certain financial products can have some standardized components (e.g., credit scoring systems, standard documentation, etc) crafted for specific market segments.

Different financing tools are required depending on whether the funds are for new construction or for retrofits of existing plants. New plants and broad restructuring projects (e.g., to revamp entire production processes in industrial enterprises or overhaul urban transportation systems) will typically benefit from *policies and regulations* which will encourage investors to adopt energy efficiency solutions. Existing plants that are employing energy efficiency measures will benefit more directly from *financing of specific energy investments*. Key factors are who is making the investment decisions and how important energy efficiency is in these decisions.

Energy efficiency may not be the prime investment motive for many companies, it may be a secondary benefit. Thus, there is a need to find energy savings in the projects which companies want financed and in the sectors that financial institutions want to pursue. There is *room for a lot more creativity* needed in the financing area, including more effective utilization of CDM and carbon finance in energy efficiency investments.

Rationale for Public Policy and Investment in the Development of Energy Efficiency Finance Markets

A strong rationale exists for public support in the creation of energy efficiency markets, due primarily to the many economic, environmental, health, job creation, enterprise competitiveness and security benefits these technologies offer.

The substantial economic and environmental *potential of energy efficiency cannot be captured by market forces alone*, due to market failures and barriers.

Public subsidies are large and common for all types of energy supply infrastructure; energy efficiency deserves the same consideration.

The public sector is a major energy user and can be a leader for energy efficiency development in a country.

Because the energy efficiency market consists of large numbers of small, dispersed projects, and because it offers enormous public benefits, markets for these technologies need to be *approached programmatically*

to achieve sufficient volume and investment scale. The market organizing and aggregation role is essential and appropriate for development and government agencies to nurture, in concert with commercial actors.

Public funding must be used within commercial structures and processes to contribute to sustainable market development. Methods to use public funding and combine it with commercial finance include: project development support and technical assistance, energy efficiency loan and project investment funds, guarantee programs, strategic procurements, utility-based programs, ESCO development and investment, training and capacity-building for Financial Institutions (FIs).

Funding for government energy efficiency programs can come from a number of sources. These include a System Benefits Charge (SBC) levied on consumers, public funds, tax revenues and production growth, CDM and other environmental programs, bilateral and multilateral sources, etc. Several countries have created dedicated energy efficiency funds (often financed through a SBC); these include national, state and local funding mechanisms. For example, 14 states in the US have established state energy funds to support energy efficiency and renewable projects which are estimated to generate more than US\$4 billion in new investment over the next decade.

Growing International Support for Energy Efficiency

There is growing support for energy efficiency across the international community, as identified below.

The *G8 Gleneagles Memorandum and the resulting Clean Investment Framework* have made energy efficiency a cornerstone of a clean energy path towards climate change mitigation.

The *GEF* has committed over US\$900 million on energy efficiency projects; future energy efficiency activities will focus on market development and transformation to include policy, business models, information, finance and technology development.

At the Bonn International Conference on Renewable Energies in June 2004, the *World Bank* had committed to achieving a target of at least 20 percent average annual growth in energy efficiency and Renewable Energy (RE) for the next five years. Between fiscal years 1990 and 2006, the World Bank Group had financed investments in energy efficiency totaling US\$2.9 billion for over 140 projects.

Regional development banks such as the Asian Development Bank (ADB) have established a US\$1 billion annual lending target for energy efficiency investments under its new Energy Efficiency Initiative; the Inter-American Development Bank (IDB) is also increasing its support for clean energy. Further, regional organizations such as ASEAN have put in place comprehensive, multicountry programs to promote energy efficiency.

Bilateral organizations such as energy ministries, export credit agencies, development assistance agencies, and others have established policies, programs, and “most favored” lending terms for energy efficiency.

Participating countries — industrialized and developing alike — shared a strong commitment to increasing activities in energy efficiency. From Japan, considered the world’s most efficient country today, to China, which has made an astounding promise to reduce per capita energy consumption by 20 percent in the next five years, countries avowed to work more aggressively towards the advancement of energy efficiency, *which can have the most impact and make good business sense.*

Participants expressed their continued support through a formal *Forum Communiqué*, which called for a significant scale-up in energy efficiency, particularly in developing countries where energy demand will see the greatest growth. The Communiqué served as input to the CSD 14/15 process, where decision makers from around the world discussed critical energy issues and the linkages to Millennium Development Goals (MDGs), poverty reduction and sustainable development. The outcomes of this Forum were also referenced in the overall CSD-14 report.

The presentations provided during the Forum have been compiled onto a CD which accompanies this report. Additionally, the presentations and other Forum materials are also available on the forum website at www.eeinvestmentforum.org, and on the REEEP website at www.reeep.org.

1. Introduction

Purpose

The Energy Efficiency Investment Forum was designed to attract investors, financiers, private firms, end-users and development agencies to showcase and expand profitable, energy efficiency business opportunities in the developing world. Objectives of the Forum were to: increase investor awareness of the significant market opportunities for energy efficiency investments in developing countries; enhance corporate understanding of investor issues and options; identify investment players and prospective partners; share successful business and financing model structures for such projects; and feature sound, bankable energy efficiency project opportunities.

Forum Overview

The Energy Efficiency Investment Forum was held from May 8-9, 2006, at the UN Millennium Hotel in New York City, New York. The REEEP was the lead sponsor of the Forum. Co-sponsors included the World Bank, ESMAP, UNEP/SEFI, USAID, US Department of State and the EAGA Group.

The Forum was conducted in association with the 14th Meeting of the CSD-14, which focused on energy for sustainable development, industrial development, climate change and atmospheric/air pollution. The Forum was based on the premise that energy efficiency's potential impact on these issues is larger, at least in the short- and medium-term, than any other energy alternative. Energy efficiency offers win-win opportunities for lowering production costs and risk, and reducing air pollution and climate change simultaneously.

However, affordability remains a challenge for poorer developing countries, and ensuring technology transfer to these countries is often problematic. In addition, many developing nations are highly dependent on foreign energy supplies, and are subject to high costs and availability issues. For economic growth to occur, reliable and affordable energy must be available. Energy efficiency measures are low-risk, and can be implemented quickly and cheaply. For businesses, energy efficiency can make an immediate impact on bottom line costs and improve competitiveness. Energy efficiency solutions have the added benefit of being highly distributed. By reducing loads on stressed supply networks, including at peak load times, energy efficiency improves energy security and reliability. A key barrier to implementation of energy efficiency is access to finance, particularly at the domestic/local level.

The Forum provided a timely and open exchange to raise awareness about market opportunities for energy efficiency investment, debate barriers and solutions, and enhance energy efficiency's contribution in the global energy marketplace.

Forum Outcomes

Forum outcomes included:

- Sharing of experiences of bankers and entrepreneurs on energy efficiency opportunities.
- Improved understanding of the risks/rewards of investing in energy efficiency ventures.
- Enhanced awareness of FI requirements for investment.
- Increased awareness of the conditions for building a profitable energy efficiency portfolio.
- Sharing of successful business models and financial structuring of deals in developing countries which could be replicated.
- Identification of co-investment and risk mitigation instruments from local/international sources.
- Increased exposure to specific efficiency projects and business opportunities for commercial and public sector end-users.

The outcomes of the Forum were reported at the CSD-14 meeting, held in New York, May 1-12, 2006.

Participants

Forum participants included:

- Private Developers
- Utility Representatives
- ESCOs, Energy Efficiency Equipment and Service Vendors
- FIs
- International Banks
- Bilateral and Multilateral Organizations
- Venture Capital Firms
- Senior Policy Makers
- Equipment Manufacturers
- End-users
- NGOs

2. Energy Efficiency: Key Issues and Opportunities

In the opening session, senior-level speakers addressed the roles and prospects for energy efficiency in the context of the global energy marketplace.

Energy Efficiency: Making a Difference

After languishing for 30 years, energy efficiency gained prominence in the year 2006 and its importance cannot be understated. The Japanese Government has initiated a national effort to combat soaring global energy prices, creating a “low energy” consciousness in the world’s second largest economy. Japan’s “cool biz” campaign was launched last summer by Prime Minister Junichiro Koizumi. In the US, a similar effort was launched by President Bush with a 22 percent increase in the clean energy research budget aimed at reducing the country’s addition to oil. Other OECD (Organization for Economic Cooperation and Development) nations, concerned over energy security, have responded with greater focus on domestic energy sources such as renewables and enhanced energy efficiency. For example, the European Union (EU) published its energy efficiency Green Paper in 2005, which aims to curb current energy consumption by 20 percent in 2020. In China, Premier Wen Jiabao announced his Government would cut its energy intensity — the amount of energy it uses to produce each dollar of national income — by 4 percent this year. According to energy research, China’s enormous economy uses over four times more energy to generate a unit of economic output than the average industrialized country. Other developing countries are following similar steps including Chile, India and parts of Central America.

The significance of energy efficiency emerged strongly on the political agenda when it was highlighted in the G8 Gleneagles Plan of Action. Yet, steps need to be taken to improve energy efficiency across the delivery chain, as only a third of global primary energy consumption is converted to useful energy. And while governments are realizing the importance of this solution, businesses and entrepreneurs are often cautious, lacking information and investors. Financial structures and traditional asset-based lending mechanisms are not well matched to energy efficiency investment needs. CSD 14/15 can be important for highlighting the importance of energy efficiency in meeting global energy needs, and addressing issues and barriers.

The World Bank and Energy Efficiency

Despite the opportunity for energy efficiency across various countries and sectors, very little of the potential has been converted into actual investments. Barriers hindering energy efficiency market development include relatively low energy prices to date, perceived risks, technology availability, weak institutions, lack of awareness and information and lack of skilled resources. Mitigation of these barriers will require policy-based tools, regulatory interventions, financial structuring, institutional support, market-based mechanisms and awareness and capacity-building. The World Bank is committed to increasing its support for energy efficiency, with a target of 20 percent growth per year for RE and energy efficiency established during the 2004 Bonn International Conference on Renewable Energies. Between fiscal years 1990 and 2006, the World Bank Group had financed investments in energy efficiency totaling US\$2.9 billion for over 140 projects. It is also leading the development of the Clean Energy Investment Framework as a follow-up of the 2005 G8 Summit at Gleneagles. Both lending and non-lending projects are ongoing and planned in countries such as Brazil, Bulgaria, Burkina Faso, China, Egypt, Ethiopia, India, Indonesia, Iran, Mexico, Morocco, Rwanda, Tunisia, Vietnam and Uganda. In future efforts to scale up energy efficiency investments, the World Bank will enhance its coordination with GEF, CDM, and the carbon market; mainstream energy efficiency activities in non-energy sectors (urban, rural, transport, water); and draw upon lessons learned from best practices of the World Bank Group and other donors.

Energy Efficiency and its Role in Increasing Energy Access — South Africa

Energy efficiency is instrumental in advancing economic and social development. In Africa, energy efficiency plays a role in helping to address the energy access and electrification challenge, and doing so affordably. Energy efficiency is prevalent through the government's energy efficiency strategy, the National Business Initiative's Energy Efficiency Accord and the DSM Program. For ESKOM, the South African utility and one of the largest in the world, energy efficiency is integrated into decision-making for capacity expansion and is the core of a Billion Kilowatt Hour project. ESKOM has shown that DSM practices can bring costs down, reduce demand and attain a market-driven business environment. Also, partnerships between Government and business can have benefits for all.

The Role of Energy Efficiency in China's Future

China's economy has been expanding at a rapid pace, estimated at an average Gross Domestic Product (GDP) growth rate of 9.4 percent in the last 28 years with concurrent growth of key product outputs such as iron, steel, cement and plate glass. The energy increase has outpaced GDP and China faces an enormous challenge in trying to respond to uncertain and growing energy needs. For example, energy demand could be 3-6.4 billion tce in 2020, depending on the scenario, with domestic peak energy supply estimated at approximately 2.6 billion tce. This is dominated by coal (85-90 percent), which has enormous environmental consequences in terms of air and water pollution. In response, China is reconsidering its economic growth patterns for the future and has made energy efficiency a priority. Energy efficiency has

been designated as one of the two key economic indicators in the country's National Development Plan for the next five years, the other being GDP. Plan targets for 2010 are: (1) per capita GDP to double compared to 2005, and (2) per unit GDP energy consumption to reduce by 20 percent compared to that of 2005. This is an extremely ambitious commitment that China has made to both its people, and the world. Key measures by the Government to achieve the energy efficiency target are to: enforce the country's top 10 energy conservation programs; focus on the top 1,000 enterprises; implement inspection and monitoring of the Energy Conservation Law; and release the results of four key indicators to the public Energy/GDP (E/GDP), reduction rate of E/GDP, E/Added Value of Industry, and Electricity/GDP. Opportunities for energy efficiency investment in China exist in advanced technology in the industrial, building and transport sectors; processing technologies; and management technologies.

Summary

Energy efficiency has finally risen to a high level of importance across the globe, driven by soaring energy prices, climate change concerns and energy security issues. Energy efficiency generates new income of its own, makes industries more competitive, improves consumer welfare and creates business opportunities. With two-third of primary energy lost before it is delivered to consumers, the most sustainable kilowatt hour (kWh) is the one saved, regardless of how it is produced.

Despite the benefits, however, energy efficiency potential remains largely untapped. Factors such as irrational energy prices, perceived risks, technology availability, weak institutions, lack of information and skilled resources have hindered market development. The Gleneagles Clean Investment Framework outlines a strategy and timetable for meeting the global energy challenge, and includes a strong role for energy efficiency. The World Bank is increasing lending for energy efficiency and RE by 20 percent per year. South Africa has ambitious programs underway involving Government and the private sector and is demonstrating how energy efficiency can help Africa meet its access and electrification challenge in an affordable manner. China has made an astounding pledge to reduce per unit GDP energy consumption by 20 percent in 2010 (as compared to 2005). Energy efficiency is one of the two key indicators being tracked and reported in the current Chinese Five Year Development Plan (the other being GDP).

CSD 14/15 has a vital role to play in raising the visibility of energy efficiency as a cost-effective, no regrets solution for meeting energy needs which is available and in the marketplace today. Energy efficiency products and services exist for utility, industry, building and transport sector applications and yield significant cost and demand reduction savings, while improving quality of life and service delivery. The IEA estimates that improved energy efficiency in buildings, industry and transport could lead to between 17 and 33 percent lower energy use by 2050.

3. Country Experiences in Promoting Energy Efficiency

This session presented the experiences of countries around the world that have had active energy efficiency programs in place for a number of years.

ASEAN Country Experiences in Promoting Energy Efficiency

ASEAN was established in 1967 to accelerate economic growth, social progress and cultural development in the region; strengthen the foundation for a prosperous and peaceful community of Southeast Asian nations and to promote regional peace and stability. ASEAN member nations include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. ASEAN is one of the most dynamic economic regions of the world, with energy growth increasing at a rapid rate. It is a heterogeneous mix of economies with greatly varying energy resource endowments and energy development situations. In spite of these differences, the 10 ASEAN countries have common aspirations in achieving the goals of sustainable energy development, particularly utilization. In this light, the ASEAN Regional Plan of Action for Energy Cooperation for 2004-2009, has established energy efficiency and conservation as one of its core program areas with planned areas for collaboration including: continued information sharing and networking, focusing on policy, products, technologies and best practices; expansion of the ASEAN Energy S&L program; enhanced private sector involvement (ASEAN and non-ASEAN); capacity-building on audits, benchmarking, energy management systems, and technology transfer and demonstration; promotion of ESCO businesses; and promotion of energy efficiency in the transport sector. Moreover, each individual ASEAN member nation has put in place policies and programs to enhance energy efficiency improvements, and is participating in collaborative programs in this area.

Activities include:

- Thailand: Speed up industrial sector reform, create tax measures to promote energy efficiency in factories and in the transportation sector, enforce minimum energy performance standards, establish certification programs, promote energy production systems with combined use of energy, create a conducive climate for energy efficiency investment (including dedicated funding) and address the range of stakeholder needs — government, consultants, trade allies, ESCOs, end-users and bankers.

- **The Philippines:** The Philippines National Energy Efficiency and Conservation Program works across a number of sectors. In the residential sector, activities focus on S&L, and information and education. In the industrial and commercial sectors, efforts focus on energy audits, energy management programs, labeling and recognition programs. In the transport sector, activities include a voluntary agreement program (carpooling, car-less day programs, park and ride), fuel economy guides for vehicles, fuel economy seminars, road transport patrol, radio and television ads and fuel economy cartoon tips. For power generation and utilities, activities focus on heat rate improvement, systems loss reduction programs and DSM. In the transport sector, opportunities exist for more efficient vehicles, mass transit systems and increased production of alternative fuels.
- **Indonesia:** Indonesia's programs on energy efficiency date back to 1982 and include a wide range of initiatives. Energy efficiency is a key component of the national energy policy guideline; a national energy conservation strategy has been put in place and a range of activities are under way including campaigns, training and education; partnership programs and long-term agreements are in place as are energy efficiency S&L; DSM as a component; and the ongoing energy manager certification program.
- **Malaysia:** Malaysian energy efficiency activities include the Industrial Energy Efficiency Improvement Program, the Energy Efficiency Programs in Buildings, the Electricity Supply Industry Trust Account Fund, the Labeling Programs for Industrial Motors and Household Appliances and incentive schemes for companies that incur capital expenditures for energy conservation or provide energy conservation services.

Global Perspectives on Energy Efficiency in Developing Countries

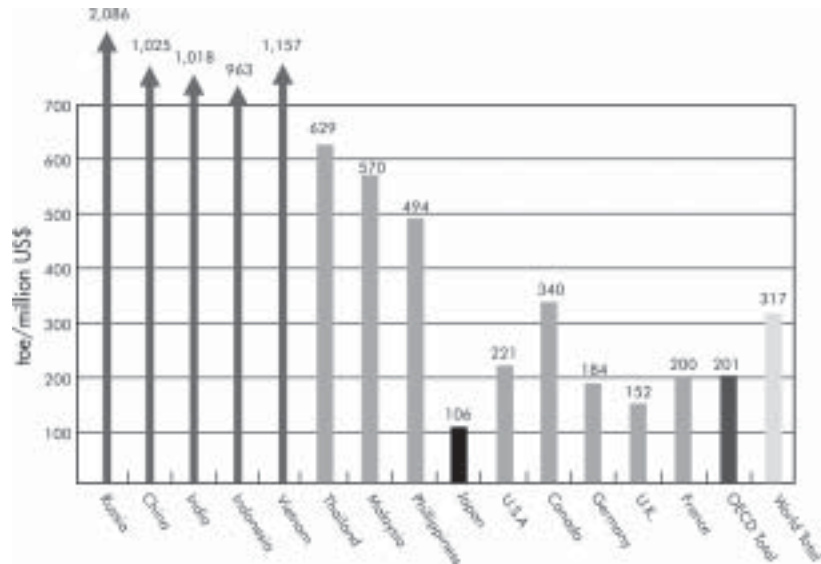
Improving energy efficiency through reduced distribution losses is an important area for developing countries to focus on. Reduced distribution losses through solid engineering and adequate resources are an important offset to CO₂ emissions (particularly in countries dependent on coal). Examples were cited of line losses as high as 43 percent in Asia and 51 percent in a Latin America and the Caribbean (LAC) utility. It was noted that all losses are not the same. Technical losses involve energy lost as heat in conductors and equipment, with typical loss rates of 6-7 percent and often three to five times higher in developing countries.

These losses can be addressed by system analysis tools to detect high-loss feeders (e.g., Geographic Information Systems-GIS), the minimization of Low Voltage lines, higher efficiency distribution transformers and higher primary voltages (e.g., 25 kV) is rural standard in the US, 11 kV in most Less Developed Countries-LDCs). Commercial losses involve energy used but not registered or sold by the utility, with administrative problems, unmetered connections and theft the most likely causes. Commercial losses can be controlled through computerized consumer information systems, universal metering, higher quality meters, improved security of meter installation, prosecution of power theft and training and motivating staff. Applying these approaches in rural cooperatives in Bangladesh has helped to reduce losses, improve efficiency and management, enhance reliability and improve billing and collection rates.

Energy Efficiency Policies and Activities in Japan

Beginning with the first energy crisis of 1973, Japan has been aggressively promoting energy efficiency programs and policies aimed at improving energy management, equipment and process technology Research and Development (R&D). As a result, Japan leads the world in primary energy intensity per GDP (see Figure 3.1).

Figure 3.1. Primary Energy Intensity per GDP



Japan's policies have focused on a combination of regulations, supportive measures and energy conservation management by companies. From a regulatory perspective, the Energy Conservation Law, enacted in 1979, focuses on energy efficiency in the industrial, commercial, residential and transport programs. Supportive measures include preferential low-interest loans; tax incentives (tax deductions, special depreciation); and subsidies for enterprises that introduce high energy efficiency systems into industrial, building, residential and transport systems. Within this framework, sample programs include:

- **Industrial Sector.** The Energy Manager System program whereby energy managers are required by law to recommend energy efficiency improvements in facilities and the Voluntary Environmental Action Plan of KEIDANREN (Japan Federation of Economic Organizations) which involves 35 of the most energy intensive industries that have committed to energy-efficiency goals and are delivering results.
- **Consumer/Transport Sector.** The Top Runner Program sets fuel efficiency target standards for 21 designated machinery and equipment products and has had enormous impacts in reducing electricity consumption in the products targeted (see Figure 3.2). Plans are under way to expand this to other energy-intensive products. Other programs include the Smart Life Program which aims to change behavioral practices of consumers and children; the labeling and ranking catalog for energy efficient appliances; the spread of clean energy cars (hybrid and fuel cell models); and popularization of idling stop cars.

Figure 3.2. Japan - Actual Improvement of Energy Saving in Target Fiscal Year

<i>Equipment</i>	<i>Base Year</i>	<i>Target Year</i>	<i>Initial Expected Energy Saving (%) compared to the Base Year at the Target Year</i>	<i>Actual Improvement Energy Saving (%) compared to the Base Year at the Target Year</i>
Air Conditioners (below 4kW)	FY1997	FY2004	63.0	67.8
TV Sets <Cathode Ray TV>	FY1997	FY2003	16.4	25.7
VCRs	FY1997	FY2003	58.7	73.6
Electric Refrigerators	FY1998	FY2004	30.5	55.2
Electric Freezers	FY1998	FY2004	22.9	29.6
Gasoline Passenger	FY1998	FY2004	22.0	22.0

Domestic Energy Efficiency in the United Kingdom

The UK has 2 million households spending more than 10 percent of their income on energy — the fuel poor. Fuel poverty is thought to contribute to 30,000 excess deaths per year. The UK Government response has been a Winter Fuel Payment subsidy for those aged 60 or more at a cost of approximately US\$4 billion per year. To date, the program has been poorly targeted and has significant wastage. Energy efficiency is regarded as a solution to this problem. By providing a one-time grant to make homes more energy-efficient, the Government saves money, targets those most in need, reduces waste, creates local job opportunities, improves the environment and addresses health and social injustice.

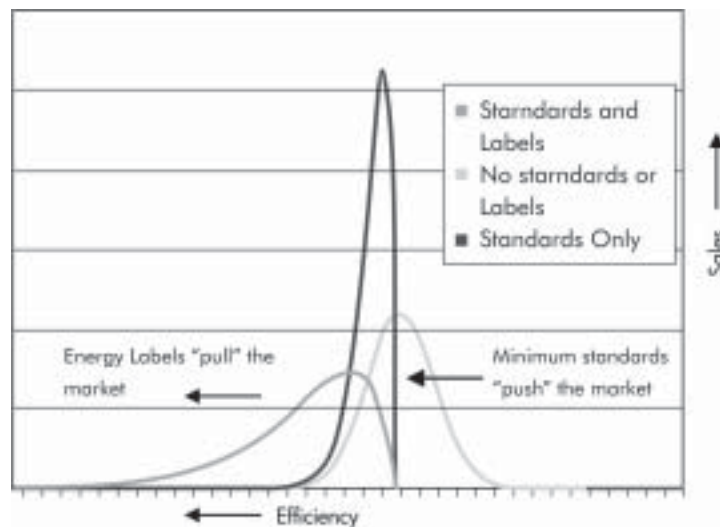
Policy Measures for Energy Efficiency Promotion in Korea

Over the period 1975 to 2004, Korea has experienced an average energy growth rate of 7.5 percent. Korea is dependent on foreign sources for 97 percent of its energy consumption. Further, Korea has a high energy intensity compared to other OECD nations due to a highly intensive yet inefficient industrial structure. Since the 1970s, Korea has been actively trying to reduce its energy intensity through a number of efforts and has learned substantial lessons over the years. First, it is important to build a sustainable system supported by regulations, organizations and funding. Second, high priority should be given to the establishment of long-term national policies. Third, sustainable energy efficiency improvement requires high priority on energy saving, continued funding and support of new and RE resources, integration of climate change and support for R&D.

Promoting Energy S&L in Developing Countries

S&L are dynamic policy measures to raise equipment efficiency. Energy efficiency standards are regulations that prescribe the energy performance of manufactured products, often prohibiting the sale of products which are less energy-efficient than the minimum standard. Energy efficiency labels are informative labels affixed to manufactured products that indicate a product's energy performance and provide consumers with the information necessary to make an informed purchase decision. Energy labels "pull" the market, while minimum standards "push" the market (see Figure 3.3). Currently, over 50 countries with 80 percent of the world's population have S&L. Investments in these measures are more cost-effective than in power production and help to avoid carbon emissions. CLASP has been playing an important role in serving as the primary international entity and resource for exchange of knowledge and experiences, and harmonization of energy efficiency standards and labeling worldwide.

Figure 3.3. Standards and Labelling: Dynamic Policy Measures to Raise Equipment Efficiency



Summary

A number of countries worldwide have extensive experience in the effective promotion and utilization of energy efficiency measures, realizing dramatic benefits for their economies in terms of energy savings, carbon saving, jobs and investment. Lessons learned from countries such as Japan, Korea, ASEAN nations and the UK, that have been active in this field for over two decades, demonstrate the need for a conducive environment for energy efficiency investment. This requires putting in place a favorable regulatory framework bolstered by long-term national policies which aim to minimize primary demand, improve the energy efficiency of facilities and equipment and rationalize energy use.

Energy efficiency market activities need to focus on several stakeholders. The key players of this market are: energy suppliers; energy equipment producers; and energy consumers/users. The activities involve a range of interactions and interventions having both policy and market dimensions, as summarized in Table 3.1.

Table 3.1: Energy Efficiency Policy and Program Summary

Sector	Energy Efficiency Promotion Activity
Industrial	<ul style="list-style-type: none"> • Regulation measures • Tax incentives • Energy efficiency funds and low-interest loans • Performance codes, standards, incentives and regulations • Mandatory/compulsory energy efficiency targets • Technical assistance and small business programs • Energy audits for factories • Product labeling, rating, certification and retro-commissioning • Energy conservation management • Recognition programs, technology adaptation and upgrades; and bulk procurements
Residential	<ul style="list-style-type: none"> • Energy manager capacity-building/recognition programs • Product standards, labeling, appliance recycling • Funding/rebate programs • Energy audits/surveys • Regulations and codes for new buildings • Residential lighting incentives and new construction programs • Pro-poor fuel support programs
Commercial	<ul style="list-style-type: none"> • Technology upgrades • Energy audits and management programs • Energy product labeling • Mandatory/compulsory efficiency targets • Recognition/incentive programs • Public procurement programs and Green Buildings
Power Generation and Utilities	<ul style="list-style-type: none"> • Utility obligation programs • Demand-side management (time of use) • Heat rate improvement of power plants • System loss reduction program
Transport	<ul style="list-style-type: none"> • Introduction of more efficient vehicles • Increase production of alternative fuels (e.g., biofuel, ethanol); tax holiday and import duty exemptions for these products • Low-interest loans for conversion of fleet vehicles • Voluntary agreement programs (carless day program, carpooling, park/ride programs) • Mass transit programs; tighter regulations for transport companies and cargo owners • Energy saving measures for traffic systems
Information, Education, and Outreach	<ul style="list-style-type: none"> • Energy audit procedures/training • Energy manager guidelines/certification/training • Technology transfer and demonstration programs • Public awareness campaigns, fuel economy guides, conservation programs in schools • Documentation/dissemination of best practices • Survey and monitoring, discount programs and demand bidding programs

<i>Sector</i>	<i>Energy Efficiency Promotion Activity</i>
ESCO Promotion	<ul style="list-style-type: none">• Tax incentives• Access to low interest loans• Training/technical assistance• Monitoring and Verification protocols• Standard performance contracting
Climate Change	<ul style="list-style-type: none">• GHG reduction registry center• Emission trading support and support for CDM projects
Market Transformation	<ul style="list-style-type: none">• Mix of policies, incentives, information, targets, standards above to mitigate barriers and accelerate energy efficiency adoption

4. Market-based Approaches to Energy Efficiency

This session involved three parallel sessions which focused on market-based approaches to energy efficiency, including opportunities, barriers and solutions. Three key sectors were emphasized: utilities, buildings and industries. The highlights of the three parallel sessions are provided below.

Utilities Sector

IEA's Review of Energy Efficiency Opportunities in the Utility and Power Sector

From 1978-1998, energy use in IEA-11 countries increased by 20 percent, but without energy efficiency measures, the increase would have been up to 49 percent. Over the period 2003-2030, cumulative global energy investment will be US\$16 trillion with the power sector absorbing the bulk of this (62 percent). Differences in electricity investment in IEA's alternative versus reference scenarios for 2003-2030 demonstrate that additional investments on the demand-side are more than offset by the lower investment on the supply-side. However, problems exist with regard to technologies and policies.

From a *technology* perspective, there are two key issues. First, "load level issues", whereby emissions and waste are generated from too much supply for too high a demand. DSM can reduce the load level, shift from "carbon fat" to "low carbon" systems (e.g., fuel to electricity), allow for strategic growth with complementary energy savings, adapt the system to the environmental requirement and offer values of deferred or avoided investments and lower operating costs. Infrastructure changes occurring in many countries present enormous opportunities for energy efficiency to reduce load levels and to create paradigm shifts toward distributed generation and smart grids. Second, "load shape issues", which are associated with too high peaks, too little reserve capacity and transmission bottlenecks. DSM can change the load shape by better adapting the load to the capacity of the system. Load shape issues entail both price-based demand responses (energy efficiency, time-of-use rates, day-ahead hourly pricing, real-time hourly pricing) and incentive-based demand response (demand bidding/buy-back, emergency programs, interruptible programs, direct load control, etc).

From a policy perspective, it is important to design incentives which are market-based, correctly address the problem and target the particular group(s) that owns the problem. In the case of DSM policy for load level issues, policies should address the least cost delivery of energy services from both demand and supply sides.

DSM policy for load shape should involve development of a regulatory regime which appoints responsibility for resource adequacy, thereby delivering less price volatility, improved system reliability, enhanced system security, improved restoration capacity, less costly network reinforcements, and elastic response. New market-based methods should be global, focus on the long range and consider demand and supply equally. Governments have an important role to set the rules that utilize market-based frameworks.

Mexican Utilities and Energy Efficiency

“The most expensive energy is that which is not available and the cheapest energy is that which we do not need.” This is true at the national level, but is particularly true for utilities which need options to make better use of limited resource. Energy efficiency is good business, and in Mexico there exists the National Campaign for the Intelligent Use of Energy, based on competitiveness and environmental protection. The campaign has three vectors: reducing waste through culture and awareness; increasing efficiency and improving energy intensity through energy-efficient technologies; and grid independence through small-scale RE. A variety of energy efficiency programs and projects are under way in Mexico and innovative financial mechanisms are enabling faster implementation. CONAE has been instrumental in developing tools which can enhance energy efficiency for a major emerging economy. CONAE operates on the premise that sustainability and energy efficiency can attract sustainable investments, and its activities are demonstrating results. From these activities, energy demand in Mexico has been reduced, despite projections for increased demand by the local utilities.

Market-based Approaches to Energy Efficiency: A Utility Sector Case Study — Southern California Edison

Three primary types of DSM are in operation in Southern California Edison (SCE) today — energy conservation which reduces wasteful consumption; energy efficiency which increases energy productivity and demand response; and load management which curtails or shifts load during peak periods. From a utility perspective, energy efficiency helps to provide consumers least-cost reliable energy service, save consumers energy and money, and foster a cleaner and greener environment. In the case of California, policy measures have been put in place to focus on resource acquisition through the state’s Energy Action Plan; and the environment via evolving policies on GHG emissions. The California Energy Action Plan, which sets forth California’s energy policy, has a key provision whereby energy efficiency is the first resource in California’s “loading order” and cost-effective energy efficiency must be used to address energy needs before supply-side options. The plan also mandates that state buildings must reduce energy use by 20 percent by 2005. Through energy efficiency, the investor-owned utilities project will be capable of avoiding three giant (500 megawatt - MW) power plants in the next three years; this program is being extended to municipal utilities as well.

Emerging environmental policies which impact energy efficiency include a procurement incentive framework with cap-and-trade mechanisms and performance standards for generation resources. Expected benefits include an estimated 3.4 million tons of carbon dioxide savings in 2008, equivalent to removing about 650,000 cars from the road. Funding for California’s energy efficiency programs include a legislatively mandated public benefits charge which sets a floor amount for energy efficiency, as well as procurement

funding whereby the government sets goals and amounts in a long-term resource plan, utilities apply for funding based on resource need and the amounts are recovered in rates along with other generation-related expenses.

These energy efficiency programs have yielded total resource savings to ratepayers of more than US\$5.4 billion over the life of the measures. SCE takes a portfolio management approach which: targets key areas of energy use (residential, commercial and industrial) with a range of energy efficiency programs; utilizes competitive solicitations to invite and mainstream innovation; and promotes partnerships at the institutional and local Government levels. SCE also offers consumers more than energy efficiency. Demand response/load management, self-generation incentives, and low-income energy efficiency and rate discounts are also offered. Finally, California is showcasing its energy efficiency model within the US through the National Action Plan for Energy Efficiency, and overseas in the China/US Energy Efficiency Alliance.

COELBA: Brazil Experience

COELBA is responsible for the production and distribution of electric power and related activities in the state of Bahia, in Brazil. It was created in 1960, privatized in 1997, and serves approximately 3.8 million clients, of which 55 percent are low-income (<80 kWh/month). COELBA secures energy efficiency funds primarily from a tariff charge (0.25 percent x net revenue) which yields approximately US\$3 million/year and at least 50 percent of this funding goes for low income populations. These communities are a priority for COELBA as they have difficulty paying for electricity (high defaults and losses); account for the bulk of utility consumption; and have significant potential to achieve energy savings through information and education. However, even when consumption is lowered and efficiency consumption patterns are adopted, lower income families still have trouble paying for energy. In response, COELBA works with target groups to create sustainable pricing plans for electricity — such as adjusting the value of the electric bill to the purchasing power of the consumers — in order to reduce default and electricity losses. This project has included replacing badly maintained refrigerators, rewiring homes and distributing low-energy light bulbs. Results from this work include debt recovery, reduction in electricity loss (through theft), decreased cutting and reconnecting costs and the improvement of COELBA's corporate image. At the national level, projects such as these can help reduce Government subsidies and improve the electrification rate in Brazil.

Buildings Sector

Green Buildings in India: Potential Barriers and Opportunities

Although the functionality and appearance of conventional and Green Buildings may be the same, the difference comes in their approach to resource conservation and human productivity. Green Buildings incorporate efficient water use, energy-efficient and eco-friendly equipment, RE and recycled/recyclable materials and building automation. They also take into account indoor environmental quality. Green Building design can result in energy savings of 50 percent, and water savings of up to 35 percent. Green Buildings have also demonstrated improvements in personnel productivity of up to 10 percent (through day lighting, improved views and CO₂ monitoring), as well as “greened” corporate images.

A building should create delight when you enter, serenity and health when occupied, and regret when departed. A Green Building is a major step in this direction!

Indian Green Building Council

There are several Green Building rating programs operating around the world today, of which LEED is among the best known. LEED has four rating levels: Certified, Silver, Gold and Platinum. The rating system is based on credits that are accumulated based on the incorporation of various building techniques and design. The green transformation presents enormous global opportunities to open markets for green products, specify and use energy efficiency products and create jobs for green specialists (architects, builders, developers, etc.). Though Green Buildings may cost more initially, the operational savings and increased productivity offset the initial costs over time. The challenges faced by the Green Building movement are awareness, upfront cost, the availability of materials, and professionals skilled in Green Building techniques. The Shorabji Godrej Green Business Centre in Hyderabad is the first Platinum-rated green building in India. It presents a model for other buildings in India, where the projected growth of Green Buildings is expected to increase from 10 certified Green Buildings in 2005, to over 1,000 in 2012, with a corresponding industry projection of US\$40 billion/year. Emerging Green Building types include corporate offices, institutions, Information Technology (IT) parks, commercial buildings, convention centers, residences and airports.

Accelerating Municipal Energy Efficiency using a Revolving Fund — the Toronto Experience

At the municipal level, a number of barriers hinder energy efficiency financing. These include: energy costs buried in annual municipal operating budgets which do not provide for energy efficiency investments; fierce competition for municipal capital; and a reluctance to incur debt that will be repaid by uncertain energy savings. To address these issues, Toronto established a revolving fund to incubate and finance projects which reduce GHG emissions and promote market transformation for new technologies. The benefits of a dedicated fund are that it sequesters capital dedicated to energy efficiency investments, provides a special pool that does not compete with other capital needs, enables future energy savings to replenish and grow the fund and quantifies and monetizes energy savings. The revolving fund, established from the energy cost savings that came from a municipal lighting retrofit, was modeled after successful programs in Phoenix, Arizona, Edmonton, Alberta and Woking, UK. The Better Buildings Partnership (BBP) provides no-interest loans to the public sector to undertake energy efficiency measures. Loans reduce the payback period and provide a “Good House Keeping Seal”. BBP is in charge of reviewing applications by interested parties and then conducting feasibility studies; a key criterion is 20 percent cut in CO₂ emissions. If the project is found favorable, money is supplied, and a portion of the savings from the lower energy costs is used to pay back the Fund. Funds such as Toronto’s accelerate energy efficiency financing at the municipal level, remove the money from the hand of politicians, promote transparency, and encourage creativity and flexibility.

Partnering with Local Authorities for Better Energy Efficiency in Buildings

In France, the French Agency for Environment and Energy Management (ADEME) helps to achieve the country’s Kyoto target of reducing GHG emissions by 3 percent annually and decreasing energy intensity

by 2 percent annually until 2015. There is also a French memorandum for revitalizing European energy policy with a view towards sustainable development. France's strategy for energy efficiency and RE relies on development of knowledge and innovation through R&D support (positive energy building, efficiency cars, eco technologies), laws and regulations, financial tools (tariffs, tax reduction), and information for stakeholders (local authorities, enterprises, large public, awareness campaigns, etc.). For new buildings, France has set building code requirements and for existing buildings, requirements for retrofits, household tax credits for efficiency improvements, financing and energy performance S&L. Local authorities are also active in transitioning to more efficient cities with activities including urban planning, public transport management, public lighting improvements, grant contracts for energy distribution, enterprise incentives and heritage management. France also supports international cooperation in energy efficiency with countries throughout the Mediterranean, Africa and Asia.

Challenges and Opportunities for Energy Efficiency in Healthcare

Energy efficiency in healthcare is integral to achieving the industry's mission as reduced pollution protects people's health. It is good business as the healthcare industry spends approximately US\$6.5 billion per year in energy costs and is second only to the food service industry in intensity of energy use. Each dollar saved is equivalent to new revenues for hospitals of US\$20, and for medical offices of US\$10.

The healthcare industry presents enormous opportunities for energy efficiency. Many existing health facilities are old, poorly insulated, operate at low energy efficiencies and are in need of structural and equipment upgrades. Regulations dictating temperature, sanitation, filtration and occupancy are rigid, and generally require energy-intensive practices. Investments in high-efficiency chillers, air filtration systems, insulation, Heat, Ventilation and Air Conditioning (HVAC) systems, and lighting practices can be enhanced and energy use reduced. Opportunities also exist for outpatient facilities, as the industry shifts away from new hospital construction. Nonetheless, significant challenges exist for energy efficiency in the healthcare industry. These include the fact that hospitals never close, have constant occupancy rates and require controlled, protected environments which make construction/renovation/upgrades difficult as they can introduce infection control issues and risks. Further, financing for efficiency improvements often competes with demands for new and expensive medical technologies that tend to take management priority. To increase energy efficiency in the healthcare industry, it must be better marketed to healthcare leaders (e.g., energy savings frees up funding for new medical equipment); energy performance should become an organizational objective; energy efficiency "champions" should be identified; and best practices for optimizing energy savings while preserving the patient care environment need to be promoted.

Motivating Efficiency Investments — CO2online

Co2online is an NGO operating out of Berlin, Germany, which provides free, Internet-based advice to homeowners on household energy issues. Co2online offers consumers online energy saving advisors who help homeowners evaluate their household energy consumption, and identify ways to cut costs and CO₂ emissions. Advisors help to evaluate building and appliance efficiency, conduct a cost analysis of current consumption costs and identify the cost benefits of investing in more efficient devices. By teaming up with

partner websites, and gaining credibility through media and word of mouth, this service has proven effective in motivating homeowners to make small investments in residential energy efficiency improvements that are saving time, money and CO₂ emissions for homeowners/tenants, and local jobs and incomes for energy efficiency equipment manufacturers, wholesalers, retailers and service providers.

Industry Sector

International Finance Corporation

The International Finance Corporation (IFC) has been an active player in the area of investments in sustainable energy projects (RE and energy efficiency), which in 2005 exceeded US\$852 million. This is a strong and growing area for IFC and it is open to working with companies and FIs in this area. More details about IFC's programs are provided in Sections 6.7 and 6.8.

Moroccan Agro-industrial Sector

Morocco is a country of over 30 million people. It relies on oil for approximately 65 percent of its energy consumption, and 95 percent of this is imported. The remaining sources of energy consumption are coal (30 percent) and RE (5 percent). The power and industrial sectors account for the bulk of energy demand. Although the need for energy efficiency exists, the country currently has no energy efficiency laws, regulations or incentives. However, a major three-year energy-environment upgrading project — Association IZDIHAR — has been put in place at an industrial park with funding support from GEF and the French GEF (Fonds Francais pour l'Environnement Mondial). After 2.5 years of operation, results include 50 walk through audits, 21 detailed audits, creation of an ESCO, industrial investment of more than US\$350,000 with energy savings per year of US\$365,000 and over 20 industrial units engaging in major investments of over US\$6 million yielding corresponding annual savings of almost US\$4 million. Examples of energy efficiency projects included improvement of compressed air production systems, increased efficiencies in cooling and heating, use of waste heat and use of energy recovery systems in a manufacturing plant. The money saved from these projects went into a "Social and Environmental Fund" which continues to support increased energy efficiency awareness and education, public transportation and industrial waste collection at the site.

Key conclusions from the project in terms of financing energy efficiency were that: projects which were low cost or had short paybacks were generally funded internally through the companies own capital resources; projects with paybacks of two to three years requiring an investment of more than US\$100,000 were financed by traditional bank loans; and "general upgrading" credit lines exist for enterprises though these are not specific to energy efficiency. On this latter point, credit lines could be promoted by a neutral organization and/or engaged by ESCOs. A key challenge encountered in the IZDIHAR Project was the length of time needed to gain access to areas for energy audits due to mistrust and difficulty in mobilizing industrialists. In general, Morocco promises substantial energy savings in the industrial sector (15-20 percent

savings), hotel/tourism (15-25 percent savings) and commercial/administrative buildings sector (10-30 percent).

Solar Industry Development in China

At present, China is going through a solar “Industrial Revolution”. This is based on the principles of energy saving, environmental protection and safe, cheap and convenient energy to help meet the rapidly growing energy needs of China’s 1.3 billion people. At present, China has 76 percent of the global solar thermal market and is able to make large gains in solar power. Solar thermal power (especially for use in water heating) is extremely energy-efficient as it is installed on-site and eliminates energy loss in transmission.

Himin Solar Company has an effective model for scaling up the use of solar power which includes the following steps: increasing public education on the use of solar; continuous technical product innovation to stay at the forefront of the market; advanced manufacturing techniques in the “Henry Ford”-style production model to save time and energy; working with builders and architects to integrate their product into new homes and buildings; and going out into the community to further develop and showcase the opportunities with solar power (e.g., solar fairs, solar museums, solar Photo-voltaic (PV) “sculptures” in city centers which produce energy, etc.). Further, the company tracks government incentives and RE/energy efficiency laws and regulations and educates people on available opportunities.

Information Technology Industry Today: New Responsibilities and New Opportunities

Through the IT industry, the power of technology can be used to better manage resources, especially in regard to energy. Increased technology access and capability allows energy producers to monitor production, transmission and demand, and allows energy users to track their intensity and overall usage patterns. Today in the computing industry, 1.4 kW of power is wasted for every kW of power consumed — yet products exist in the marketplace which can save energy. For example, Advanced Micro Devices (AMD) computing devices, including personal computers, processors, servers, etc., are carefully calibrated to balance between performance and power through advanced heating and cooling technology. In addition, AMD is a founding sponsor of the Green Grid, a global organization which focuses on best practices in data center power management, and works to bring the Internet and technology to underserved populations.

Summary

Utility Sector

Through the year 2030, energy consumption is expected to grow by more than 60 percent, and the power sector will account for the bulk of the demand. Energy efficiency has a key role to play in both the reduction of load levels and the shape of the load curves. Policies and investment by governments, utilities and the private sector can help to deliver results on a market-oriented basis. Utility benefits include reduced

price volatility, enhanced system reliability, improved system security, improved restoration capacity, less costly network reinforcements, distributed generation as an alternative to transmission lines, improved operation and use of RE sources and an elastic response as a complement to competition. Consumer benefits include saving energy and saving money, improved consumer service and enhanced satisfaction. The international community benefits from a cleaner and greener environment. Costs for implementing energy efficiency are borne by the consumer SBC and through public funds, and these investments pay back in terms of energy savings and avoided costs. DSM programs by utilities include conserving resources (conservation), increasing energy productivity (efficiency) and curtailing or shifting load during peak periods (demand response and load management). The state of Bahia in Brazil has demonstrated a model for serving low-income consumer which reduced debts and losses (thefts); postponed investments on distribution systems in slum areas; increased energy savings; reduced CO₂ emissions; achieved positive media exposure; incentivized low-income people to buy more efficient and lower cost equipment; and eliminated the supply of low efficiency equipment in the marketplace.

Building Sector

Residential, commercial and industrial buildings are responsible for approximately 40 percent of energy consumption, including most electricity. End-use efficiency is generally the least-expensive solution for meeting this need and provides the largest non-monetized benefits in terms of health, environment, equity, security and CO₂/global warming reduction benefits. On a least-cost basis, end-use energy efficiency should account for roughly half of the energy investment. Three of the primary end-use efficiency programs are improved appliance efficiency, including S&L; reduced urban heat island, via retooled paint, tiles and paving; and accelerated growth of more energy efficient Green Buildings. Careful design of buildings can improve the energy efficiency of the building operation, as well as reduce the heat island effect in the surrounding environment. The selection of building materials and colors and the design of the building can reduce the effect it has on the surrounding environment. Today, the energy efficiency industry has moved beyond the pilot stage; there are many strong domestic (national, state and local), multilateral, NGO and international programs to build on for the rapid scale-up of end-use efficiency in buildings. Moreover, tools exist to help consumers identify energy savings opportunities which save time and money.

Industry Sector

The industrial sector offers enormous opportunities for energy savings around the world. Presentations by Morocco and China demonstrated opportunities for saving energy in the industrial sector through improved compressed air production systems, enhanced heating and cooling systems, more effective use of waste heat, use of energy cost recovery systems and efficient solar energy. Mechanisms for financing energy efficiency include corporate balance sheets (low cost, short payback measures), traditional banking sector (>US\$100,000 and longer paybacks), dedicated funds and credit lines which may be eligible for efficiency improvements/upgrades. The IT industry can be more effectively deployed to better manage energy resources, on both the supply and demand sides, and to reach a global consumer base including those in developing countries.

5. Energy Efficiency Financing and Mobilizing Local Capital Markets

This session described a range of programs and instruments for financing energy efficiency products and services. In particular, it focused on mechanisms to increase local FI investment in energy efficiency.

US Government Programs to Finance Energy Efficiency

The US Export-Import Bank (Ex-Im Bank), an independent agency of the US Government, finances the export sales of goods and services in the US. Ex-Im supports short-, medium-, and long-term financing to creditworthy international consumers (public and private sector) and working capital guarantees to US exporters. Products include direct loans, guarantees, export credit insurance, working capital guarantees and tied aid funding. There is no minimum or maximum size project. Special initiatives exist for environmental exports (including energy efficiency), small businesses, projects in sub-Saharan Africa, and lending directly to municipalities in certain countries. Overseas Private Investment Corporation (OPIC) is a self-sustaining US Government agency which promotes development that does not adversely affect the US economy or the host country's economy, supports US private investment abroad, does not compete with the private sector and is open in 153 countries worldwide. OPIC offers three main product lines for overseas projects — political risk insurance, loans or guarantees to large projects and Small and Medium Enterprises (SMEs) and investment funds for seed equity.

Energy Efficiency Financing Challenges and Solutions: A Private Sector Perspective

One of the most significant barriers to widespread implementation of clean and proven energy-efficient technologies around the world is the lack of reliable and commercially available financing for end-users, developers (including ESCOs), contractors, manufacturers and vendors. The problem is not a lack of available funds in general but the lack of available funds at the Local and Regional Financial Institution (LFI) levels. This is due to a disconnect with the current “asset-based” practices of these lending institutions. This disconnect stems from the fact that LFIs in international markets typically:

- Are accustomed to providing asset-based lending at 70-80 percent of the market value of assets being financed (or other collateral).

- Do not recognize the cash flow generated by energy efficiency projects as a new asset to be valued in the financing structure (e.g., credit enhancement).
- Are not familiar with the intricacies of financing energy efficiency projects, thus considering these to be high-risk lending.
- Lack the internal capacity to evaluate energy efficiency project risks/benefits or to structure financing in market-acceptable ways.
- Are unwilling to invest the time and resources to develop lending infrastructure due to the relatively small dollar size of the projects.
- Experience market conditions which preclude commercially viable funding for energy efficiency projects (e.g., high interest rates, short repayment terms).

As presently the energy efficiency markets are not developed enough to motivate LFI to invest in a new lending infrastructure, a number of possible solutions were suggested. These included: developing an IEEFP which becomes a blueprint for LFIs to finance energy efficiency projects; and establish an Energy Efficiency Incentives Fund to drive market growth of the energy efficiency industry through financial incentives to end-users and LFIs (the Fund supplements, but does not finance energy efficiency projects), with potential funding sources to include ratepayer fees, emission credit trading funds and bilateral/multilateral development organizations. The benefits of the IEEFP and/or Incentives Fund would be to create a sustainable commercial lending sector for energy efficiency, train local/regional LFI staff on financing energy efficiency projects, eliminate currency devaluation, permit aggregated financing of energy efficiency projects and deliver long-term energy and GHG reductions. Monitoring and Verification (M&V) is also important and protocols exist to assist in this area.

Energy Efficiency Finance Program Business Models and Strategies for Replication

An energy efficiency finance program was defined as systematically delivering energy efficiency project development services and financing to implement multiple projects/transactions in a specific market sector. Given the market characteristics of energy efficiency — large numbers of small, dispersed projects and a wide range of energy use sectors — a programmatic approach is essential to meet the challenges of replication and scale-up. Key components in the design of an energy efficient program are to: organize and aggregate the target market; address institutional and credit characteristics of the target market; and incorporate marketing and project development methods. Also needed are economic energy efficiency projects; engineering, equipment and installation capacities; and a stable macro and legal environment. Energy efficiency finance program categories include: energy efficiency project loan and debt funds, guarantee programs supporting lending by local FIs, utility-based programs, ESCO programs and pooled procurements on behalf of similar end-users.

Today, a substantial body of experience exists with energy efficiency finance programs; it is critical to assess this experience base and lessons learned, define scale-up strategies and share effective methods. Among the key themes resulting from energy efficiency finance programs are the following: the market organizing

and aggregation role is essential; there is a need to combine access to finance with technical and financial advisory services to prepare bankable projects; programs must address markets over the full project cycle (what sells to end-user and meets objectives of all parties); there are a large range of transaction structures and business models; credit structure, financial products, and the marketing plan must address specific circumstances of the target market and meet demand; for FI engagement, creditworthy demand needs to be organized and business tools provided (see Box 3); and there is a strong rationale for public support to develop energy efficiency markets, however, public funding should be used within the commercial structure.

Box 3. Energy Efficiency Finance Business Tools

- Energy Service/Sales Agreements
- Utility DSM Contracts
- Construction/O&M Contracts
- Project Financial Spreadsheets
- Lender Risk Analyses, Due Diligence, Underwriting Guidelines
- Equipment/Master Lease, Vendor Finance, Multi-project Loan Facilities
- Request for Proposals (RFPs) and Procurement Documents
- Credit Enhancement and Guarantee Agreements
- ESCO Business Plans; Equity/Debt Placement Memoranda
- Program Model and Design Documents
- Technical Assistance and Training Program Methods/Materials for FIs and ESCOs
- Energy Efficiency Market Research Guidelines/Methodologies
- Narrative Descriptions, How-to-guides, and Case Studies for Above

Financing Energy Efficiency Investments: the UN Economic Commission for Europe Experience

The UN Economic Commission for Europe (UNECE) has an active program in energy efficiency, with key initiatives including UNECE and Energy Efficiency 21 (EE21), Financing Energy Efficiency Investments for Climate Change Mitigation and an Energy Efficiency Investment Fund. EE21 was launched in 1991 and operates through four, three-year phases. The goal is to enhance East-West trade and cooperation through improved capacities and networking, policy reforms and financing of energy efficiency investments. In 1999, the United Nations Foundation (UNF) and its partners approved a US\$2 million project on energy efficiency for climate change mitigation within the framework of the EE 21 Project. The funding was provided to support market formation activities in economies in transition aimed at improving the investment climate for energy efficiency investments so that these could take place in a market environment on the basis of market criteria. As a result of these efforts, over the period 1999-2005, some US\$60 million of energy efficiency investment projects have been identified and the World Bank and other investors have approved financing for 18 investment projects in Belarus, Bulgaria, Russian Federation and Ukraine for a total of US\$14.9 million. These investments would reduce CO₂ emissions by an estimated 136,000 tons per year. More recently, under the Financing Energy Efficiency Investments for Climate Change Mitigation Project, a dedicated financial facility for energy efficiency and RE is being established in Eastern Europe and Commonwealth of Independent States (CIS) which can serve as a vehicle for the large-scale participation of private sector investors in partnership with public entities. The proposal is to support the development of a

US\$250 million public-private equity fund that will be able to complement other funding schemes and leverage an investment volume of up to US\$2 billion for energy efficiency and RE projects. Fund investors would include public and private banks, insurance companies, local banks in beneficiary countries, large industrial groups and dedicated environmental and green funds. Donor institutions supporting the fund are UNF, UNEP/GEF, and the French GEF.

Public Finance Mechanisms to Increase Investment in Energy Efficiency

Energy efficiency has the potential to mitigate climate change, address local environmental concerns, reduce poverty and increase energy security. The challenge is to provide the right policy frameworks and financial tools which enable energy efficiency to achieve its market potential. Policy makers must create enabling frameworks and finance mechanisms for technology, R&D, commercialization and investment. To reduce risks in project financing and increase capital flows for energy efficiency investment, innovative public sector mechanisms are being employed such as third party finance, debt and loan guarantees. Enabling this process are S&L, awareness campaigns, financial intermediaries and a range of investment/tax incentives. Effective finance mechanisms should fill an existing investment gap, increase private sector involvement and awareness, be phased out over time, leave a long-term private sector financing solution in place and support new markets not distort them.

Asia Pacific Economic Cooperation Energy Efficiency and Renewable Financing Initiative

The 21 Asia Pacific Economic Cooperation (APEC) member economies have recognized the need for action on energy, as demand for the region is expected to increase 60 percent by 2020. Energy efficiency, though much needed, is significantly underdeveloped, with public funds not sufficient to meet energy needs and private funds not getting to qualified projects. For APEC countries, turning energy savings into assets is a priority. The APEC EE/RE seeks to scale up financing by closing gaps between project development and financing. The strategy is to develop public-private partnerships to address the unique risk profiles and investment hurdles of these projects; focus on building local financial/commercial infrastructure to link private capital with project development; and develop new business models and financial products/services to commercialize and build self-sustaining financing. APEC-approved projects include: developing RE and energy efficiency financing best practices and guidelines; developing market capacity to commercialize financing of clean and more efficient energy projects through financial intermediaries and special purpose entities, integrative public-private sector financing and financial guarantee facilities; conducting local banker training programs; and providing information on financing public sector energy efficiency and RE projects. These products will enable increased investment in secure and cleaner energy and provide the financial infrastructure needed to meet APEC regional energy requirements over time.

Summary

There is a justification for public funding of energy efficiency investments, based on their contribution to energy security, environmental benefits and economic and social development. Further, public sector entities are a major energy user and public subsidies are large and common for all types of energy supply infrastructure. However, public policy and investment must be carried out within commercial structures to be effective. Effective finance mechanisms should fill an existing investment gap, increase private sector involvement and awareness, be phased out over time, leave a long-term private sector financing solution in place and support new markets rather than distort them. Efforts should particularly focus on leveraging public funds to increase local and regional financial institutions and turning energy savings into new assets to be valued by the financing structure. Methods to use public funding and combine it with commercial finance have included energy efficiency project development support and technical assistance; energy efficiency loan and project investment funds; guarantee programs; strategic/pooled procurements; utility-based programs; ESCO development and investment; and training and capacity-building for financial institutions. Potential sources of public funding include energy/fuel taxes, surcharges on utility bills SBC, GEF and other multilateral and bilateral agencies, national government support and carbon finance schemes. Several examples of successful models were provided, and opportunities exist for better capturing, synthesizing and reporting of this information through mechanisms such as APEC and the IEEFP.

6. Multi-stakeholder Round-table on Energy Efficiency Financing and Mobilizing Local Capital Markets

This session featured perspectives on financing and mobilization from financial and institutional investors as well as multilateral and bilateral institutions.

Canara Bank — India

India is a huge market for investment in energy efficiency. The energy saving potential in India is estimated at 25,000 MW of power, or roughly 20 percent of installed capacity. Currently, in India, there are resources available for investment from commercial and development banks and venture capital, however this funding is not going to energy efficiency investments for a number of reasons. Commercial banks are accustomed to asset-based financing, shared savings is not a well-received concept, energy efficiency investments are perceived risky, regulatory restrictions exist for clean lending and there is a lack of capacity by loan officers for appraising and documenting deals. Additionally, the enabling environment for energy efficiency is not in place to encourage energy efficiency investments, including a proper legal framework, transparent legal system, equitable treatment under tax laws and fiscal incentives for utilities to conduct energy efficiency. On the delivery side, ESCOs are still in the nascent stage in India. They lack the financial strength and capital to mobilize resources and no viable ESCO model has emerged which is acceptable to lending agencies. SMEs can provide a solution. However, energy efficiency is currently a low priority and they do not see the benefits that these technologies offer. Significant opportunities exist for addressing these issues by strengthening SMEs, creating effective ESCO models, training bankers and putting in place credit enhancement and risk mitigation instruments, utilizing special purpose vehicles for energy efficiency, and putting in place the enabling environment for these investments. Canara Bank, the second largest public bank in India, is an active player in a number of Green products and has helped to develop energy efficiency loan products with the help of the World Bank.

Bankthai Public Company Limited — Thailand

In 2001, Thailand introduced a new national energy policy which promoted the “efficient consumption of energy, while balancing the development of natural resources and environment, with the ultimate goal to reduce the degree of reliance on energy imports.” The government put in place a range of incentives, subsidies, regulations and technical assistance support which has created a supportive climate for energy

efficiency investment. Recognizing that energy expenditure is one of the most significant costs for the country and that energy imports will only increase, Bankthai has been expanding its energy efficiency lending portfolio. In the past five years, Bankthai has supported many energy efficiency projects and trained its executives and officers to understand energy efficiency businesses. Bankthai group is a complete financial service provider consisting of banking services, securities, insurance, consulting and research. It also offers a Revolving Fund Program for energy efficiency projects which begins with interest-free start-up loans, and as the initial loans are repaid, interest rates on new loans increase to current market rates. This allows start-up companies an easier entrance into the market. The Revolving Fund Program is financed with Government funding (through the ENCON Fund), and Bankthai also provides technical assistance. Bankthai has also funded ESCO pilot projects and gained both confidence and credibility in energy efficiency lending through successful investments.

Clean Energy States Alliance — United States

In the United States, the historic transition to clean energy which has been occurring over the last decade has been driven at the state-level through a number of initiatives including creation of Renewable Portfolio Standards (RPS), establishment of dedicated state funds for energy efficiency and RE, enactment of state economic development policies, and creation of ratepayer-funded energy efficiency programs. At present, 20 states have put in place RPSs and 16 states plus the district of Columbia have created RE/energy efficiency funds which will bring nearly US\$4 billion of investment in the next 10 years. Strategic models used by the state funds include:

- The Project Development Model, which provides incentives and grants to directly subsidize project installation (California and New Jersey).
- The Investment Model, which provides loans and equity investment in companies and projects (Connecticut).
- The Industry Development Model, which provides business development grants, marketing support, technical assistance and education to build industry infrastructure (Wisconsin).
- The Research and Development Model used by California and New York.
- A combination of approaches as done in Massachusetts.

The Clean Energy States Alliance (CESA) provides a non-partisan, collaborative network for these states to share experiences, provide information exchange and analysis and conduct joint project development.

Cornell Capital Partners — United States

Cornell Capital Partners is a private investment firm operating out of the US which specializes in structured finance for companies in the small-to mid-cap realm. Working with energy efficiency projects, especially with clients investing in industrial energy upgrades (automotive, manufacturing, etc.) or in new energy technology companies, often requires bundling different investment vehicles. These alternative financing mechanisms can take into account the long-term timeframes and different payback requirements associated with energy efficiency projects yet still offer competitive rates for project developers.

International Finance Corporation — United States

The IFC mission is to promote sustainable private sector investment in developing countries, helping to reduce poverty and improve people’s lives. With this mission, energy efficiency investments are seen as an opportunity lying in wait. They are cost-effective and yield social, environmental and economic benefits. IFC brings a network of investee companies and financial intermediaries, capacity to invest directly in capital projects, market focus and private sector orientation, commitment to innovate and build markets which enable sustainable development, and global leadership and expertise in structuring, risk mitigation and credit.

In the case of energy efficiency, which often tend to be “small transactions” by IFC standards, the IFC works through local FIs to develop sustainable energy lending businesses. Partnering with these local FIs enables IFC to expand its reach, build upon its strengths and mitigate barriers. IFC also challenges these institutions to look beyond energy efficiency as a niche market, and promote energy savings opportunities in all sectors where they are doing business and in all types of projects that companies want financed. Energy efficiency may not be the prime investment motive for many companies, but can be a lucrative benefit. IFC has had successes in building energy efficiency business for partner banks and will continue to evolve its FI support and push the market into more frontier markets such as Russia, China and the Philippines. IFC is also exploring how it can develop latent opportunities for energy efficiency more systematically, form more strategic partnerships and move to scale (e.g., in manufacturing investments, agribusiness investments, etc). Key lessons learned by IFC in energy efficiency are:

- Lack of capital is rarely the problem for energy efficiency.
- Creating institutions and funds which supplant the market can kill the market’s initiative.
- There are many tools/products and approaches for increasing energy efficiency investments by local FIs, the key is to get a good diagnostic of the problem and match the product to the FI need.
- Finally, ESCOs are not a silver bullet for delivering energy services; in many cases they have set back, not advanced, the market. Executing a successful performance contracting business model is very difficult.

United States Agency for International Development — United States

USAID’s rationale for energy efficiency is based on the following: it improves competitiveness by reducing input and operational costs; it reduces infrastructure bottlenecks and future energy sector investment requirements; it enhances energy security by reducing dependence on imported fuels; it frees up capital for other social and economic development priorities; and it reduces local air pollution and GHG emissions. USAID’s energy efficiency work falls into four categories:

- Policy — Development of national energy efficiency strategies and action plans, energy efficiency laws and regulations and regulatory and price reforms.
- Market transformation — S&L, product procurement, buildings, bulk purchasing and utility DSM.
- Financing — ESCO development, bidding, municipal investments and loan guarantees.
- Other — Fuel switching, weatherization, energy audits, training and outreach.

USAID experiences with energy efficiency in developing countries are summarized below:

- Program models need to be customized to local conditions and institutions to ensure greater buy-in and effectiveness.
- Policy without program implementation or implementation without supporting policies, particularly pricing reforms, has had limited effectiveness.
- Programs need to focus less on outputs (audits, market studies) and more on delivery of real energy savings within one to two years to build credibility.
- Participating institutions must have incentives to actively participate (e.g., Government ability to retain energy savings) and share in rewards commensurate with risks borne.
- Programs should be flexible to changing market conditions and implementation realities.
- Subsidies should be used judiciously, transparently and have a clear exit strategy.
- Pilot programs should test the scalability of financial and institutional arrangements, be clearly documented for target audiences (e.g., banks), and marketed.
- The challenges remaining include: utility bias towards energy production/supply; business bias towards production expansion, rather than cost reduction; need for appropriate business models; more testing and sharing of financial structuring options for energy efficiency projects; and need for affordable and appropriate financing.

The World Bank — Three Country Energy Efficiency Project

The World Bank has a wealth of experience in energy efficiency. Currently, it is in the process of documenting lessons learned from recent experience in a three-country energy efficiency project focusing on Brazil, China and India. This project involved a multi-year program for knowledge-sharing between practitioners on energy efficiency financing and was supported by the UN Foundation, UNEP and the World Bank. The final report on the project, to include lessons learned from these three countries and others, as well as a variety of case studies, is in preparation and will be released in the summer of 2006. Preliminary findings can be found at <http://3countryee.org>. Overall, the conclusions show that success requires careful diagnostic work at the beginning of the project, flexibility in design and arrangements to cover high labor intensities during implementation and program development. The World Bank found that the development of financially viable energy savings projects remains blocked by the underdeveloped state of project delivery mechanisms. Developing appropriate delivery mechanisms is an institutional issue which must be addressed as delivery mechanisms serve market development, project identification and financing functions. Well-running project delivery mechanisms must match local institutional environments. The main project delivery options include energy efficiency lending programs through local banks, partial risk loan guarantee programs, direct financial investment, revolving loan programs, ESCOs and utility DSM programs

Japan Bank for International Cooperation — Japan

Japan Bank for International Cooperation (JBIC), owned by the Japanese Government, provides finance through the following tools: export finance, overseas investment loans, untied loans and official development

assistance loans. In addition, JBIC is involved in purchasing carbon credits to help achieve Japan's commitment under the Kyoto Protocol. To do so, JBIC, as an investor (along with other interested Japanese companies), helps fund and provides assistance for energy efficiency and RE projects in developing countries. JBIC has found that an effective approach to reducing GHG emissions is working on both the supply and demand sides to increase energy efficiency. Although companies and investors often focus on supply-side efficiency increases, JBIC found that even if well endowed households in Japan replace 50 percent of lights with energy-saving bulbs it can yield significant savings. For example, a city with a population of 10 million people can save up to US\$450 million annually (after deducting incentive costs) which can be reinvested in further efficiency programs

Asian Development Bank — the Philippines

ADB currently has three major initiatives under way which pertain to energy efficiency: Energy Efficiency Initiative, Carbon Market Initiative and Energy Efficiency in Transport Initiative.

Energy Efficiency Initiative. Asia's current energy development path is unsustainable — both environmentally and economically. Increased CO₂ emissions are causing global warming and high demand is increasing international fuel prices for all countries. ADB is, therefore, placing a high priority on a Clean Energy Initiative to improve energy supply-side and demand-side efficiency and expand RE. Energy efficiency for ADB includes investments in energy generation, delivery, and end-use equipment, facilities, buildings, and infrastructure which deliver higher useful energy outputs or services. This definition covers many diverse and distinct market segments, all targeting the creation of a low-carbon sustainable energy future. The ADB Energy Efficiency Initiative sets an annual lending target of US\$1 billion for projects which are consistent with their policies, priorities and targets; that value pioneering; and provides replicable and scalable investment models. Next steps include working with countries to develop country-level energy efficiency plans and investment pipelines, establishing regional funds for energy efficiency and continuing participation in the G8 Clean Energy Investment Framework.

Carbon Market Initiative (CMI). In the current carbon market, there is a shortage of good projects with carbon content and Kyoto Protocol signatories are well behind in terms of their GHG reduction commitment targets. In consultation with developing country members, ADB identified a number of issues hindering the advancement of carbon projects. These included lack of access to long-term finance, desire for upfront payment for future credits (developers willing to discount price based on inflation and risk), desire for highest prices and best conditions for Certified Emission Reductions (CERs) and need for CDM project preparation support. Accordingly, ADB developed the CMI to address these barriers. CMI is a partnership between carbon investors, sellers and ADB. CMI has three components: the Asia Pacific Carbon Fund, which provides long-term finance and secured credits at discounted prices; the Credit Marketing Service, which assists with credit sales not purchased by the Carbon Fund; and CDM Technical Support, to provide upstream project development assistance including due diligence, carbon credit valuation, documentation preparation for credits, obtaining host country approval and facilitating project validation and registration.

Energy Efficiency in Transport. In 2002, the transport sector used 21 percent of the worldwide total energy consumption. Through the year 2025, the transport sector is projected to account for over 60 percent of the increase in total energy. Emerging Asia, led by China and India, is expected to account for 45 percent of the total world increase in oil use through 2025. ADB is currently conducting a study to understand the issues and develop an action plan at the country and regional levels.

Industry Perspective

Industry representatives expressed optimism about the prospects of energy efficiency overseas in the buildings, industry, utility and transport sectors. It was noted that both industrialized and developing country consumers confront issues of spiraling energy costs, aging infrastructure, power reliability and quality, shortage of capital funds and increasingly, concerns over indoor air quality and water quality. In less developed areas, quality issues are emerging more frequently than cost-effective efficiency issues. A key concern raised was the need to put in place appropriate policy and regulatory frameworks, and to accelerate the timeline for operationalizing energy efficiency projects. Businesses need to have certainty that they can put projects in place — from inception to implementation — in reasonable timeframes as time is money. They cannot afford long drawn-out projects/ procurements and will go where projects can be completed with reasonable certainty.

Summary

A number of lessons learned have emerged in the financing of energy efficiency projects to date:

- Domestic financial institutions have an important role to play in financing energy efficiency projects, yet they face obstacles including unfamiliarity with new technologies, perceived weak credit-worthiness of consumers, collateral issues, insufficient government and policy support, regulatory restrictions and short-term repayment problems.
- Governments (national, state and local) and bilateral and multilateral organizations can support programs to build local FI capacity and reduce risks; financial intermediation programs can include lines of credit, guarantees and revolving funds.
- Other institutional mechanisms for delivering energy efficiency investments are ESCOs and utility DSM programs, each of which has pros and cons.
- Before putting in place energy efficiency financing programs, know about the problem to be addressed and respond with appropriate tools/mechanisms. Do not start with a solution in search of a problem.
- Policies should be linked with program implementation; programs should be flexible to respond to changing market conditions and implementation realities.
- Opportunities to use energy efficiently are everywhere and companies and bankers should pursue these aggressively.
- Subsidies should be used judiciously, transparently and have an exit strategy.
- Participating institutions must have incentives to participate and share in rewards.

Carbon finance will play an increasingly important role in energy efficiency financing as countries seek to meet commitments under the Kyoto Protocol; opportunities exist for programs like the ADB CMI to address financing gaps and boost the carbon market.

7. Breakout Groups

In this session, participants broke out into three smaller breakout groups to allow for more in-depth discussion and problem resolution on advancing energy efficiency in developing countries. Two groups focused on finance, a third on policy and market transformation. The groups were provided a set of questions to serve as guidelines for the discussion.

- What are three to five elements of a successful energy efficiency program?
- What critical gaps remain in your countries which prevent large-scale energy efficiency investment?
- Can you identify three to five policy/financing measures which have been most effective in scaling up the use of energy efficiency?
- Can you provide examples of successful public-private partnerships in advancing the use of energy efficiency?
- What are three to five key issues associated with energy efficiency market transformation?

Moderators were assigned to each of the breakout groups to facilitate discussion and report the findings. The discussions from the breakout groups are presented below.

BREAKOUT SESSIONS 1 and 2:

Financing Energy Efficiency in Developing Countries

- *Understanding financing.* Energy efficiency financing falls into two areas — financing for new capacity and financing for existing projects. Financing solutions will vary by sector, e.g., industry, buildings, transport. These will have different economics, payback, commercial viability and financing needs. There is a need to understand the different financing instruments and different roles they play, e.g., venture capital, private equity, commercial banking, etc.
- *Lessons learned in energy efficiency financing.* Prior projects have yielded some important lessons learned for energy efficiency financing. Market drivers need to be in place. Utilities can be an important vehicle for generating deals, overcoming finance constraints, reducing commercial risk in collection and complementing work with ESCOs. Energy efficiency is a way to improve product quality and consistency. Inter-governmental banks can help create energy efficiency project financing models for smaller local

banks to increase knowledge at the micro-level. Focusing exclusively on project financing may overlook larger technology/sector development opportunities.

- *Role of public policies.* Public policies can have a huge impact in the scale-up of energy efficiency financing. Policy mechanisms will vary, including penalties, standards and incentives, though it was noted that incentives are generally easier to pass than regulations. Standards and benchmarks can have a large impact on the market, but can be difficult to set and regulate. Competitive industries will often work better with voluntary mechanisms. There are good examples in the market of effective energy efficiency policies; Japan, for example, has maintained a constant energy consumption rate for 20 years, even with economic growth.

Renewable energy versus energy efficiency. At present, the RE market is growing at a rapid pace, while energy efficiency is not in a take-off phase. Energy efficiency lacks the “sizzle” that renewable energy currently has. Energy efficiency needs to find its “sizzle”, though valuations for energy efficiency projects may not be as clear or straightforward as with RE projects.

What steps can we take now? A number of steps can be taken now to increase the attractiveness of energy efficiency. Education, marketing, awareness — making energy efficiency part of the culture are — key to increasing demand for efficient products and services. Creating momentum in society, in business and politically can increase coordination among players and make projects happen more quickly. In addition, accounting methods can make a difference in minimizing costs and maximizing revenue in terms of project reporting (accelerated depreciation, early revenue recognition, etc.).

BREAKOUT SESSIONS 3: Policy and Market Transformation

Elements of successful energy efficiency programs. Enforceability, sustainability and profitability are all considered elements required for successful energy efficiency programs — programs which can shift the market and create real demand for energy efficiency. In addition, successful programs should be able to produce verifiable savings (these savings can be money, energy, climate impacts, emissions, etc.); should be replicable; should be enforceable; should have sufficiently allocated roles, responsibilities and accountability; and should capture political value and motivate political will.

Measures to scale-up. In order to scaling-up energy efficiency, measures need to cover as much ground as possible, in as many sectors as possible. Initiatives include: building codes and building labeling; appliance standards and labeling; public sector programs (through government procurement and energy management); demand-side management; specific targets and timetables; incentives and/or penalties (carrots/sticks); education and behavioral change; and increased energy prices which fully account for externalities.

Critical gaps. Critical issues in the area of energy efficiency do not revolve around technology, but around funding, timing issues and clear policy. For example, policies are needed which equate efficiency with supply/production, and these need to be long-term in nature. Efforts should be made to reduce delays in decision-making, enhance the capacity and staffing levels of decision makers, train financial institutions (public and private) in appraising projects for investment and address stakeholder apathy.

Examples of successful public-private partnerships in advancing energy efficiency use. A number of successful public-private partnerships which advanced energy efficiency at the policy/market transformation level were cited. Globally, partnerships mentioned were the Efficient Lighting Initiative (ELI) and CLASP. Country-level programs included the ENERGY STAR Program, the Federal Energy Management Program (FEMP), the Energy Hog Program and the Industries of the Future Program in the US; the Japanese Top Runner Program; and the UK Energy Efficiency Commitment Program.

8. Scaling-up Energy Efficiency in the Developing World

Session 8 highlighted policy initiatives, programs and financing opportunities at the national level — with presentations by senior dignitaries from four countries and the GEF.

United States

“The most affordable watt is the one you save” — energy efficiency is an important component of both the national energy policy and the foreign assistance policy for the United States. The US Government realizes the benefits of “affordability” in terms of economic, societal, environmental, health and national security, noting that potential energy savings for the individual, small business owner, facility manager and multinational corporations are in the 25-50 percent range. The financing challenge is not to create alternative financing mechanisms, but to mainstream energy efficiency projects as part of regular energy investment, and support this through strong policy, educated consumers and technology innovation.

In order to promote energy efficiency domestically, the United States has programs covering a wide range of opportunities — and is accelerating policy and funding for even more support. For example, the ENERGY STAR program (focusing mainly on demand-side management) prevented 35 million metric tons of GHG emissions in 2005, and saved about US\$12 billion on utility bills. This equates to saving about 4 percent of the total 2005 electricity demand. President Bush recently unveiled his Advanced Energy Initiative which proposes a 22 percent increase in funding for clean-energy technology research at the Department of Energy. In addition, the FEMP Program has set a target of 30 percent reduction in energy use in Federal buildings by 2005 (from 1985 figures).

Foreign assistance for energy efficiency finance/technical assistance comes through projects with USAID, the US Department of State, the new Asia Pacific Partnership and the National Renewable Energy Laboratory (NREL). The scope and size of these initiatives vary, but they all work towards increasing the access to and use of sustainable energy. For example, NREL has constructed zero emission buildings in China and worked on village electrification. USAID and the Department of State are members of the Global Village Energy Partnership (GVEP) which works to ensure access to modern energy services through cleaner solutions such as energy efficiency and RE. The US Government is

committed to scaling-up energy efficiency but cannot do all the heavy lifting. This will require new policies, new players and accelerated investment to achieve the societal benefits which energy efficiency has to offer.

Mexico

Mexico promotes intelligent use of energy through waste reduction, efficiency increases and use of domestic RE sources, advocating the same service with less consumption. Activities are supported through the CONAE which operates 11 programs, with the potential reduction of Mexican energy savings estimated at approximately 20 percent. These programs (see Box 4) are in varying stages of implementation. Throughout these activities, energy efficiency project financing seems to be the major barrier to break. Although the projects receive partial Government support, Mexico is looking to the banking sector to increase its investment in energy efficiency and create a new banking culture of future savings financing versus the conservative asset approach.

Box 4. CONAE Energy Efficiency Programs in Mexico

- Standards and Labeling
- Federal Public Buildings
- Municipal and state governments
- State-owned utilities
- Heavy industry
- Small-and medium-size industry
- Cogeneration and distributed generation
- Transportation
- Renewable energy (small-scale)
- Social and residential energy users
- Education

South Africa

Energy efficiency and RE initiatives were first introduced in South Africa in 1998 with the revision of the National Energy White Paper. In 2005, the Government approved an energy efficiency strategy to reduce energy demand by 12 percent. South Africa had its first blackout in Johannesburg in 2005, and Cape Town is also experiencing blackouts in 2006 due to the steadily increasing demand. South Africa has built a new nuclear power plant to begin addressing the energy requirements, but estimates that up to 400 MW can be saved in Cape Town alone with increased efficiency measures. The Government plans to first focus on Federal and district buildings and practices before the rest of South African society — using themselves as an example of good practices (in fact, even Government ministers will employ energy efficiency measures in their homes). To increase efficiency in the industrial sector, the Government will use incentives and voluntary measures such as national energy efficiency awards, information dissemination and training and Government-approved energy management guidelines. Employing these measures, the pulp and paper sector saved US\$6 million in energy costs in 2005. The Government will publicize examples such as this to highlight the cost-saving potential of energy efficiency. In addition, South Africa has recently created a DSM

fund allocated to development and management of ESCOs. The fund has US\$100 million at present to address barriers to entry into the market, especially financing issues. South Africa is also looking into setting industry standards, better regulating the transport sector and forming a national energy efficiency agency.

Egypt

The Government of Egypt has initiated a comprehensive GHG reduction program to decrease carbon dioxide emissions by 2010 — with energy efficiency measures a major component. The target is to reduce energy use by 7-9 percent by 2010. In 2005, Egypt had a 3.7 percent reduction due to a number of measures instituted by the Government as outlined below:

- Worked with power plant facilities to perform energy audits and improve overall efficiency.
- Built cogeneration plants for heating and cooling to reduce industrial energy demand and implemented load shifting measures to reduce transmission losses.
- Worked with power generators and industry to create accepted standards and targets in order to boost the energy efficiency market.
- Conducted energy audits in all Federal buildings to become more efficient.
- Set up energy audit training courses for state and municipal employees.
- Conducted a public awareness campaign on energy use which was broadcast around the country which has proven highly successful.

Global Environment Facility

The GEF, established in 1991, helps developing countries fund projects and programs which protect the global environment. GEF grants support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer and persistent organic pollutants. Energy efficiency is one of the four programmatic areas in climate change (RE, low GHG energy technologies and sustainable transport are the other three). GEF projects are managed by GEF Implementing Agencies which include UNEP, the United Nations Development Programme (UNDP) and the World Bank. To date, the GEF energy efficiency portfolio includes projects worth US\$900 approximately which are in various stages of development and implementation; these have leveraged US\$3 billion of project value. Projects are implemented in project clusters such as energy efficiency for district heating and building, ESCOs and third party finance.

In the *district heating and building cluster*, GEF has funded about US\$200 million in projects throughout Eastern Europe, China and Mongolia. Although the initial focus was on infrastructure, GEF has refocused its attention on issues of ownership, rates, and tariffs as necessary conditions for physical investments. GEF has seen that “softer elements” have been the bigger challenge and is putting its emphasis on institutions, business models, delivery mechanisms and financing. In the *ESCOs and third party finance cluster*, GEF is working in all regions, with about 50 countries having some form of ESCO project. These include street lighting, industrial energy efficiency, commercial sector, buildings and district heating. GEF is supporting a wide range of ESCOs in developing countries, from small, engineering/consulting firms to large multinational

conglomerates. Though ESCOs do have limitations (tend to be smaller firms, limited equity, legal, institutional, tax, financing issues) they can play a useful role in stimulating energy efficiency investments. At present, China maintains the most comprehensive single country portfolio, with GEF contributions of US\$250 million and total project value of US\$1.5 billion. Project examples include energy efficient refrigerators, energy conservation, green lights, heat reform and building and the China Utility Energy Efficiency Program. GEF is also intensifying its efforts to work with the banking sector on energy efficiency financing.

Overall, GEF is evolving its investment strategy. In the GEF tranches 1-3, activities were in pilot phase, a number of technology demonstrations were conducted and there was a “let 100 flowers bloom” approach. GEF 1-3 emphasized barrier removal. GEF 4 will move more towards market development and transformation, to include an emphasis on policy, business models, information, financing and technology. In this new strategy, energy efficiency is an overarching theme across the entire climate change portfolio. GEF 4 strategic objectives under the Energy Efficiency Operational Program include focusing on more efficient buildings and appliances, improving industrial energy efficiency and rehabilitation of large power plants. GEF will also focus more on knowledge management and distilling and disseminating lessons learned and experiences, and expand its network to work more closely with the industry as a whole. GEF’s intent is to more effectively leverage resources to scale up interventions and maximize impact of energy efficiency throughout the developing world.

Summary

Governments have a critical role to play in laying out the value and importance of energy efficiency in their countries, and for following through with the legislative and regulatory frameworks central to changing the way to generate, transmit and use energy.

Countries such as the US, Mexico, Egypt and South Africa described their experiences in putting in place policy structures and programs to achieve efficiency benefits, and highlighted their results. Each of these governments is “leading by doing”, with federal energy management programs, and coordinated activities with state and local governments. Efforts also include ambitious energy efficiency programs in the industrial, buildings and transport sectors; S&L; cogeneration; and international collaboration. Both utility DSM and ESCO programs are ongoing in these countries. Future efforts will focus on more effective engagement of the local and international banking sector, educating consumers, putting in place supportive policies and strengthening the role of the private sector in order to realize potential savings of both supply and demand efficiencies.

The GEF has been a major source of funding and leveraging investment in energy efficiency projects throughout the developing world, with funding of over US\$900 million for district heating and building projects, ESCOs and third party finance. With the new GEF 4 funding, the GEF is revising its operational strategy to focus less on technology demonstrations and barrier removal, and more on market development and transformation. Energy efficiency will be a cornerstone of the entire climate change portfolio with a focus on more efficient buildings and appliances, improving industrial energy efficiency and rehabilitation of large power plants. Energy efficiency activities will also focus on documenting and sharing lessons learned, more effective of industry, and leveraging resources.

9. Closing Communiqué

A key outcome of the Forum was a Communiqué prepared with contributions from the participants. The Communiqué served as input to the CSD-14 discussions and to future activities of the Forum participants. The Communiqué is provided below.

Energy Efficiency Investment Forum Communiqué

Background

Over the next 25 years, global energy demand is projected to increase by 60 percent; in the developing world, demand is projected to grow by more than 160 percent. Under current practices, fossil fuel will continue to dominate the global energy mix, with severe environmental and trade consequences. Further, rising fossil fuel prices will result in growing energy security concerns for countries dependent on fossil fuel imports.

In response, countries around the world are seeking cleaner, locally-based energy alternatives. Energy efficiency offers a “win-win” solution in the near term, to reduce demand while continuing to pursue the goals of economic growth, environmental sustainability and poverty reduction. Improving energy efficiency throughout the economy reduces infrastructure bottlenecks and future investment requirements. Enhanced energy efficiency offers opportunities to:

- Lower production costs and risk.
- Free up capital for other social and economic development needs.
- Increase a company’s and country’s competitiveness through more sustainable industrial production.
- Create local job and business opportunities.
- Reduce local air pollution and GHG emissions, simultaneously.
- Improve system reliability and reduce shortages.

Energy efficiency should be considered at par with any other energy resources such as coal, oil and natural gas. Yet, much of the world’s energy efficiency potential, particularly on the demand-side, remains to be converted into investments. Though barriers have existed, a number of factors are coming together to

expand the potential for energy efficiency including liberalized energy markets, increased energy trade, growing environmental awareness, and rising energy costs.

The Energy Efficiency Investment Forum discussed the growing market potential for energy efficiency in the developing world and the challenges confronting energy efficiency technologies and practices. It identified a range of profitable business opportunities and best practice solutions in the utility, industry, buildings and transport sectors. Various stakeholders discussed different technologies and services that could help transform energy efficiency markets, alternative market mechanisms and policy instruments for their effective delivery and implementation, and the potential impact energy efficiency can have on improving the bottom line and enhancing competitiveness. Investors outlined the current trends in energy efficiency finance, the range of financing and investment instruments available and their requirements.

Call for Energy Efficiency Scale-up — The Role for CSD 14/15

The key outcome of the Forum was a call for significant scale-up of energy efficiency investment in the developing world. Recognizing that a kW saved is cheaper, cleaner and more immediate than a kW generated, Forum participants called upon stakeholders to support an aggressive global campaign to increase the use of energy efficient products and practices.

The Commission on Sustainable Development Meetings 14 and 15 (CSD 14/15) come at a critical time as the world is experiencing rising energy prices, increased environmental pollution, and about a third of the world's population without access to modern energy services. CSD 14/15 provides a unique opportunity to review commitments made on energy efficiency at the World Summit on Sustainable Development (WSSD), particularly under the Johannesburg Plan of Implementation (JPol), and outline future programs and plans in this area. These meetings provide a platform for developing and industrialized countries to explore areas for strengthening collaboration and cooperation and for accelerating investments in energy efficiency. Forum participants called upon CSD 14/15 to recognize the critical role that energy efficiency can play in meeting the world's energy needs in an urgent manner and to enhance activities in this area. Most notably:

- Governments to address market barriers hindering the technologies and investment; put in place favorable legal policy and regulatory frameworks; support continued R&D; and conduct educational campaigns.
- Private sector to continue to advance commercially available energy efficiency products and services and to make these available to the developing world on affordable terms
- Utilities to increase the uptake of energy efficiency programs and services and to make the benefits known to consumers.
- Financial community to invest in energy efficiency measures, including addressing financing gaps which exist in the marketplace through innovative financing approaches, long-term financing, credit enhancements, and guarantees. Enhanced use of the CDM and carbon trading should also be explored for energy efficiency projects and services.

- Multilateral and bilateral donors to support policy dialogue; document and disseminate global best practices; and conduct capacity-building, technology diffusion and financial risk-sharing.
- End-users/consumers to adopt cost-effective energy efficiency practices and technologies to enhance competitiveness and reduce energy bills.
- All the above to work together in public-private partnerships which will accelerate energy efficiency, including through existing entities such as the REEEP, the Global Network on Energy for Sustainable Development (GNESD), and the Global Village Energy Partnership (GVEP). In particular, more effective collaboration between governments, the financial community and the donor community to address market gaps, including strengthening financial intermediaries, developing bond markets and building locally-managed financial programs.

Appendix I

Agenda

**The Energy Efficiency Investment Forum:
Scaling-Up Financing in the Developing World
May 8-9, 2006; Millennium UN Plaza Hotel
New York City, New York**

Agenda

May 8, 2006

07:30 Registration

08:30 - 10:00

I Energy Efficiency: Key Issues and Opportunities

Session Chair: Ms. Marianne Osterkorn, International Director, Renewable Energy and Energy Efficiency Partnership (REEEP)

Economic Incentives, Drivers, and Barriers to Advancing Energy Efficiency

- *Mr. Yusupha Crookes, Senior Director for Infrastructure in South Asia, The World Bank*

Energy Efficiency and its Role in Increasing Energy Access

- *Mr. Valli Moosa, Chairman, ESKOM*

Energy Efficiency and the Developing World: What is it and Why is it Important?

- *Ms. Yu Cong, Director for Energy Efficiency, Energy Research Institute, China National Development and Reform Commission (NDRC) and Director of Beijing Energy Efficiency Center (BECON)*

Questions and Answers

10:00 - 10:20 Coffee Break

10:20 – 12:00

II Country Experiences in Promoting Energy Efficiency

Session Chair: Dr. Morgan Bazilian, Department Head — Energy Policy Development, Sustainable Energy Authority of Ireland

ASEAN Country Experience in Energy Efficiency

- *Dr. Weerawat Chantanakome, Executive Director, ASEAN Center for Energy*

Global Perspectives on Energy Efficiency in Developing Countries

- *Mr. Martin Lowery, Executive Vice President, National Rural Electric Cooperative Association*

Energy Efficiency Policies and Activities in Japan

- *Mr. Junichi Noka, General Manager, The Energy Conservation Center*

Energy Efficiency in the United Kingdom

- *Mr. Mitesh Dhanak, Associate Director, Group Strategic Development, EAGA Group*

Policies and Measures for Energy Efficiency Promotion in Korea

- *Mr. Jong-Whan Noh, General Manager Planning and Strategy Division, KEMCO*

Promoting Energy Efficiency Standards in Developing Countries

- *Ms. Christine Egan, Director, Collaborative Labeling and Appliance Standards Program (CLASP)*

Questions and Answers

12:00 – 13:30 Lunch

13:30 – 15:00

III Market-based Approaches to Energy Efficiency-Opportunities, Barriers and Solutions

3 Parallel Sessions

a Utility Sector

Moderator: *Mr. Barry Worthington, Executive Director, US Energy Association*

Overview of Energy Efficiency Opportunities in the Utility and Power Sector

- *Mr. Hans Nilsson, Chairman, IEA DSM Program/Four Fact*

Case Studies

- *Dr. Diego Arjona Argüelles, Executive Secretary, Mexican National Commission for Energy Savings (CONAE)*
- *Mr. Gene Rodrigues, Director of Energy Efficiency, Southern California Edison Company*
- *Mr. Antonio Pinhel, Commercial Superintendent, COELBA*

Questions and Answers

b Buildings Sector

Moderator and overview of Energy Efficiency in the Buildings Sector: *Mr. Greg Kats, Capital E*

Case Studies

- *Green Buildings in India, Mr. S Raghupathy, Senior Advisor, Confederation of Indian Industries-Sohrabji Godrej Green Business Center*
- *EE for Local and Municipal Applications, Mr. Phil Jessup, Executive Director, Toronto Atmospheric Fund*
- *Partnership with Local Authorities for Better Energy Efficiency in Building, Mr. Michel Hamelin, Deputy Director of International Affairs, ADEME*

- Health Impacts of Energy Efficiency in the Building Sector, *Dr. Wayne Thomann, Duke University Medical Center*
- Motivating for efficiency investments, *Mr. Justus von Widekind, CO2online*

Questions and Answers

c. Industry Sector

Moderator: Mr. Michael Ayoub, Senior IO of General Manufacturing and Services and Member of the Primary Metals Team, International Finance Corporation

Overview of Energy Efficiency Opportunities in the Industrial Sector

Case Studies

- Moroccan Agro-industrial Sector, *Mr. Yvan Gravel, Project Director, IED*
- Energy Efficiency and Industry Development, *Mr. Huang Ming, Himin Solar Co Ltd*
- Customer Perspective from AMD, *Mr. George Warren, Government and Education Markets, Advanced Micro Devices*

Questions and Answers

15:00 – 15:30 Coffee Break

15:30 – 16:15

IV Sector Reports on Market-based Approaches to Energy Efficiency
Moderators from Session III report on key issues/themes discussed in their group

- *Mr. Barry Worthington, Utility Sector Moderator*
- *Mr. Greg Kats, Buildings Sector Moderator*
- *Mr. Michael Ayoub, Industry Sector Moderator*

Questions and Answers

16:15 – 18:00

V Energy Efficiency Financing and Mobilizing Local Capital Markets
Session Chair: Ms. Linda Conlin, Member of the Board of Directors, Export-Import Bank of the United States

Challenges and Solutions: A Private Sector Perspective

- *Mr. Thomas K Dreessen, Chief Executive Officer, Energy Performance Services*

Public Finance Mechanisms to Increase Investment in Energy Efficiency

- *Ms. Virginia Sonntag-O'Brien, Director, BASE and Co-Coordinator, UNEP Sustainable Energy Finance Initiative (SEFI)*

Energy Efficiency Finance Program Business Models & Strategies for their Replication

- *Mr. John MacLean, President, Energy Efficiency Finance Corporation*

Investing in Energy Efficiency in Central and Eastern Europe

- *Mr. Frederic Romig, Division for Sustainable Energy, United Nations Economic Commission for Europe (UNECE)*

The Overseas Private Investment Corporation (OPIC) Financing Options

- Ms. Nancy Rivera, Director, Structured Finance, OPIC

Energy Efficiency Financing and Development of Local Commercial Infrastructure: The APEC Experience

- Ms. Larisa Dobriansky, Deputy Assistant Secretary, Office of National Energy Policy, US Department of Energy

**18:00
09:00 – 11:30** **VI Wrap-up
VII Multi-Stakeholder Roundtable on Energy Efficiency Financing and Mobilizing Local Capital Markets
Session Chair: Ms. Kateri Callahan, President, Alliance to Save Energy**

Financial and Institutional Investor Perspectives (10 minutes each)

- Mr. R Prabha, General Manager, Canara Bank
- Ms. Pornpilai Burasai, Vice President, Business Development, Bankthai Public Company Limited
- Mr. Lewis Milford, Executive Director, Clean Energy States Alliance (CESA)
- Mr. Troy Rillo, Managing Director, Cornell Capital Partners
- Energy Service Provider Response: Mr. Victor Pocius, Johnson Controls, Inc.

Question, Answer and Group Discussion

10:00 – 10:30 Coffee Break

Multilateral and Bilateral Institution Perspectives (10 minutes each)

- Mr. Russell Sturm, Principal Projects Officer, Sustainable Energy Team Leader, Environmental Finance Group, International Finance Corporation (IFC)
- Mr. Gordon Weynand, Energy Team Leader, Office of Infrastructure & Engineering, Bureau for Economic Growth, Agriculture & Trade, US Agency for International Development (USAID)
- Mr. Robert Taylor, Lead Energy Specialist, The World Bank
- Mr. Takashi Hongo, Director General and Special Advisor for Kyoto Mechanisms in Tokyo Head Office, Japan Bank for International Cooperation
- Mr. Samuel Tumiwa, Senior Energy Sector Specialist, Regional and Sustainable Development Department, Asian Development Bank
- Energy Service Provider Response: Mr. Bob Dixon, Senior Vice President, Siemens Global ESCO Services

11:30 – 13:00 **VIII Breakout Groups to Enable more In-depth Discussion and Problem Resolution on Advancing Energy Efficiency in Developing Countries
Session Chair: Ms. Judy Siegel, President, Energy and Security Group**

A set of three breakout groups (two for finance, one for policy/market transformation) will be organized to answer the following set of questions.

- Provide 3-5 elements of a successful Energy Efficiency program

- What critical gaps remain in your countries which prevent large-scale Energy Efficiency investment
- Please provide 3-5 policy measures which have been most effective in scaling-up the use of Energy Efficiency
- Provide examples of successful public-private partnerships in advancing the use of Energy Efficiency
- Identify 3-5 key issues associated with Energy Efficiency market transformation (e.g., labels, standards and certification)

Session moderators include:

- *Mr. Ashok Sarkar, Senior Energy Specialist, World Bank*
- *Mr. Jas Singh, Energy Team Planning, Policy and Coordination Advisor, US Agency for International Development*
- *Mr. Griffin Thompson, Senior Energy Advisor, US Department of State*

Rapporteurs will be assigned to each breakout group. Breakout group will be reported out in the next session and will be provided as input at CSD 14 and in the associated CSD 14 matrix

13:00 – 14:30 Lunch

14:30 – 15:30

IX Breakout Group Reports

Session Chair: Ms. Judy Siegel, President, Energy and Security Group

Rapporteurs from each of the prior Breakout Groups report on key issues, findings, and recommendations from their session.

15:30 – 16:00 Coffee Break

16:00 – 18:00

X Scaling-up Energy Efficiency in the Developing World: Dignitary Panel

Ms. Paula Dobriansky, Under Secretary, US Department of State, Session Chair

Country Experiences in Energy Efficiency Applications:

- *Mr. Carlos Dominguez Ahedo, Director General, National Commission for Energy Efficiency*
- *Mr. Andy Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy, US Department of Energy*
- *Global Environment Facility Perspectives on Energy Efficiency — Experience of \$1 Billion in Investments, Mr. Richard Hosier, Team Leader for Climate and Chemicals, the Global Environment Facility*
- *Mr. Kevin Nassiep, Department of Minerals and Energy, South Africa*
- *Mr. Maher Aziz Bedrous, Egyptian Electricity Holding Company*

Questions and Answers

18:00

XI Meeting Wrap-up

18:30 – 20:00

Farewell Reception

Appendix II

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