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The World Bank
Energy Efficiency for Sustainable Development (EEfSD)

Scale Up Strategy and Action Plan

Summary

Energy Efficiency for Sustainable Development is an Action Plan to scale up energy efficiency operations in client countries to support economic growth, energy security, poverty reduction and environmental sustainability. It is structured along four tracks to permit countries to take advantage of energy efficiency opportunities in priority sectors:

- *Track 1- Integrating Energy Efficiency within Economic and Sector Work*
- *Track 2 – Mainstreaming Energy Efficiency in Investment Operations*
- *Track 3 – Improving Internal Operational, Learning and Analytic Capacity*
- *Track 4 – Monitoring, Evaluation, and Outreach*

The energy efficiency interventions in the EEfSD are an integral part of the action plan of the Clean Energy and Development Investment Framework (CEIF). The EEfSD strategy comprises of interventions at three levels: Policy and regulatory, sector and sub-sector and at end-use equipment and appliances. Priority focus is on countries with highest energy intensities, where rapid growth of the energy sector is expected and where total energy use is greatest. These include the G8+5 countries of Brazil, China, India, Mexico and South Africa, as well as smaller countries, including in Africa where economic growth and environmental sustainability is stymied due to inefficient energy sectors.

Implementation of the Action Plan will be guided by the Energy, Transport and Water Department and will require cooperation and collaboration across the Bank Group, in particular the regional operations units. The estimated incremental costs (i.e., beyond the cost of project preparation/supervision) for FY07-09 is estimated at approximately $17 million of which about $11 million in funds have been committed from energy trust funds and Bank budget.

1. Background

The World Bank Group (WBG) has been active in promoting energy efficiency since the early 1990s. Following the publication of the World Bank policy paper on "Energy Efficiency and Conservation in the Developing World",[1] energy efficiency issues were mainstreamed into country policy dialogue and World Bank financial instruments were deployed in support of energy efficiency interventions along the entire energy supply chain.[2] For the past 16 years, the WBG has been engaged in promoting energy efficiency, having financed investments totaling $2.2 billion for over 100 projects in more than 40 countries[3]. The projects span all regions, but with a significant concentration in Europe and Central Asia, and East Asia and Pacific, and in a few sectors, in particular the delivery of district heating and electric power services. In FY2006, the WBG committed $490 million for energy efficiency projects, addressing the full range of end-use and supply-side opportunities and also aiming to remove institutional, regulatory, financial and technical barriers.

1 World Bank, *Energy Efficiency and Conservation in the Developing World: The World Bank's Role* (Washington, DC, 1993)

2 World Bank, *The World Bank Group's Energy Program – Poverty Reduction, Sustainability and Selectivity (Washington, DC, 2001)*

3 *World Bank Group Progress on Renewable Energy and Energy Efficiency - Fiscal Year 2005.* The World Bank Group, the Energy and Mining Sector Board, December 2005.

At the 2004 Bonn International Conference for Renewable Energies, the WBG committed to increase financing for renewable energy and energy efficiency operations by 20 percent a year over the next five years. The WBG's commitment to energy efficiency has been further reinforced through the key role it is playing in leading the global cooperative efforts to reduce GHG emissions through the *Clean Energy Investment Framework.*

2. Objective

The objective of EEfSD is to support scaling up energy efficiency operations support economic growth, energy security, poverty reduction and environmental sustainability.

Energy efficiency reduces the economic costs of supplying energy for economic growth and increases the economic returns to investment ("economic competitiveness"); also, energy efficiency measures are often the lowest cost options available for a country to lessen its vulnerability to disruptions in energy markets ("energy security"). Moreover, by reducing the amount of primary energy resources needed to "deliver" a given amount of modern energy services, energy efficiency helps to mitigate global and local environmental impacts ("environmental sustainability") and facilitates poverty reduction.

3. Energy Efficiency Opportunities

Energy efficiency opportunities exist across the entire chain of modern energy production, distribution and consumption. Disparities in energy intensities between the developing and industrialized countries are observed in both the supply and demand side and across various sectors and sub-sectors.

Table 1 Energy Efficiency Opportunities and Measures in Key Consuming Sectors

Sector	Energy Efficiency Improvement Opportunities
Buildings	Integrated building design and measures such as better insulation, advanced windows, energy efficient lighting, space conditioning, water heating, and refrigeration technologies.
Industry	Industrial processes, Cogeneration, waste heat recovery, pre-heating, efficient drives (motor, pump, compressors).
Cities & Municipalities	District heating systems, combined heat and power, efficient street lighting, efficient water supply, pumping, and sewage removal systems.
Agriculture	Efficient irrigation pumping and efficient water use, such as drip irrigation.
Power Supply	*New thermal power plants:* Combined cycle, supercritical boilers, integrated gasification combined cycle (IGCC), etc. *Existing generation facilities:* Refurbishment and re-powering (including hydro), improved operation and maintenance practices, and better resource utilization (higher plant load factors and availability). *Reduced transmission and distribution losses:* High voltage lines, better insulated conductors, capacitors, efficient and low-loss transformers and improved metering systems and instrumentation.
Transport	Efficient gasoline/diesel engines, urban mass transport systems, modal shifts to inter- and intra-city rail and water transport, improved fleet usage, CNG vehicles.
Households	Lighting, appliance efficiency, improved cook stoves

The supply-side efficiency opportunities include more-efficient power plants, advanced transmission systems, and low-loss gas and electricity distribution networks.[4] Considerable unexploited potential for energy efficiency improvements exists particularly along the delivery and end-use chains across various sectors of major energy-consuming countries. According to another recent analysis by the IEA,[5] improved

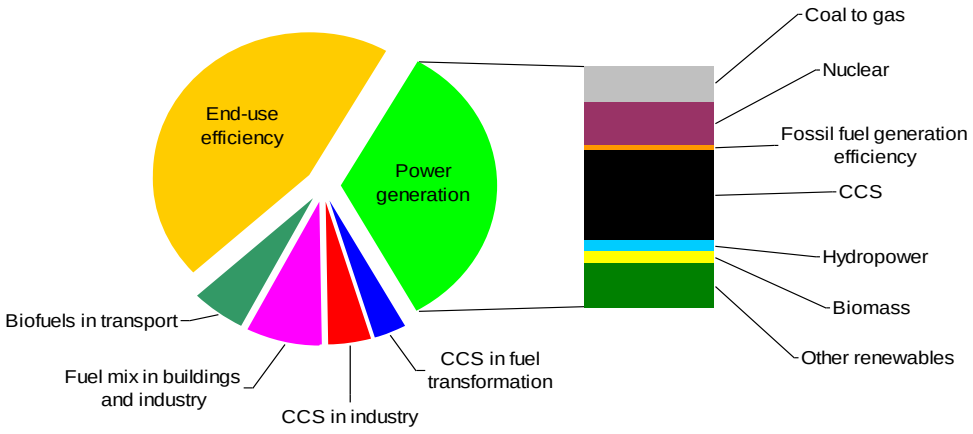
[4] For example, existing coal-fired thermal power stations in China or India on an average use 10-20 percent more fuel per kWh than a comparable plant in the US or Germany.
[5] IEA, 2006. Energy Technology Perspectives, Paris.

energy efficiency in buildings, industry and transport alone could lead to up to 33 percent lower energy use by 2050.

The improvements in production and distribution of energy are significant and have been addressed in the past to some extent, also through WBG projects. The greatest energy efficiency contributions to a low-carbon development path, however, lie in systematic efforts to reduce the energy intensity of specific categories of economic output by way of structural changes, end-use efficiency (technological) improvements, rational energy pricing, and market liberalization. The WBG's future efforts will be focus on all these areas, for helping scale-up the conversion of the end-use or demand-side potential for energy efficiency improvements through market transformation, widespread commercialization and investments; and for continuing to expand traditional, supply-side operations.

Figure 1 illustrates that, among the menu of different existing and emerging energy options, improved end-use efficiency stands out as the most important single contributor to reduced GHG emissions over the next several decades.

Figure 1 GHG Emissions Reductions through 2050, by Consuming Sector
Source: Energy Technology Perspectives, IEA, 2006



4. Operational Priorities for the Energy Efficiency Scale-Up Strategy

The **Energy Efficiency for Sustainable Development (EEfSD) Strategy of the World Bank** aims to scale up the energy efficiency operations on a routine basis and beyond the "business-as-usual" approach, through various lending and non-lending interventions in FY07-09, designed around the following two operational priorities:

(i) **Countries** of focus; and
(ii) Priority **Sectors**

Priority Countries: The energy demand in the developing world is forecast to grow at rates of 5 to 10 percent on an average over the next 20 years. Promoting energy efficiency investments in the major developing countries, including the G8+5 countries (Brazil, China, Mexico, India and South Africa), is a priority for the World Bank because these have not only high energy intensities but are also in the higher

range of magnitudes of energy consumption, as shown in Table 2.[6] The World Bank's energy efficiency scale up strategy is generally focusing on the high energy intensity countries, shown in the table (top row). Similarly, among the countries with smaller energy consumption shares (last column of the table), the priority is rightly focused on the countries with high energy intensities (Ukraine, Serbia, Thailand, etc.) which are relatively more important compared to those like Tunisia, Senegal, etc. (which are medium energy intensity countries). Nevertheless, the table identifies additional countries where energy efficiency interventions should be pursued. Moreover, there remain important, but unexplored opportunities for further efficiency improvements even in countries where efficiency interventions are ongoing or planned.

Table 2 Illustrative Classification of Countries for Targeting Energy Efficiency Scale-Up Support

COUNTRY ENERGY INTENSITY LEVEL (in kgoe/'000$ GDP, year 2005)		**COUNTRY TOTAL ENERGY CONSUMPTION LEVEL (in million toe, year 2005)**			
		VERY HIGH (> 1,000)	**HIGH (500-1000)**	**MEDIUM (100-500)**	**SMALL (Below 100)**
TARGET COUNTRIES	**HIGH (>500)**	China*	Russian Federation, India*	Ghana*, Nigeria*, South Africa, Iran, Indonesia	Ethiopia*, Kenya, Tanzania, Bulgaria, Armenia*, Georgia, Romania, Serbia, Ukraine, Philippines*, Thailand*, Vietnam*, Egypt, Pakistan
	MEDIUM (200-500)	USA (Reference)		Brazil* Mexico*	Honduras, Jordan, Yemen*, Tunisia, Turkey, Senegal, Hungary, Croatia*, Belarus*, Poland, Sri Lanka*, Uruguay*, Argentina, Bangladesh, Morocco*
REFERENCE CASE	**LOW (<200)**		Japan	United Kingdom, France, Germany	Norway, Ireland

Notes:

- Countries that are boxed-in have one or more energy efficiency lending or non-lending projects included in the World Bank FY07-09 pipeline.
- Countries marked with an asterisk * have ongoing IBRD/IDA funded projects with energy efficiency components.
- The average energy intensity of countries in the Reference Case (Lowest Energy Intensity Countries) is about 100 kgoe/'000$ GDP. The countries included in the High and Medium category of Energy Intensive countries are on an average 2-3 times and 5-10 times respectively more energy intensive than the Reference Case average.
- Actual energy intensity and energy consumption data for this table are in Annex III.

Priority Sectors: The priority of the proposed EEfSD scale-up strategy will be:

- **Support to Core Energy Practice**: to maximize, in the short-term, the benefits available from existing best practices and instruments in the core energy practice; and

[6] Large gaps remain between OECD and developing countries in terms of the energy efficiency potential and, as per the IEA, over 65 percent of the GHG reductions though 2030 could come from energy efficiency measures in developing and transition countries.

- **Cross-Sectoral Support**: to speed up the mainstreaming of potential cross-sectoral energy efficiency intervention opportunities.

Globally for the World Bank, the focus will be on the following sub-sectors within the core energy practice and across other sectors.:

(i) Electric power (entire supply chain plus end-use/ demand-side segments);
(ii) Urban/municipal services sectors, including district heating, water supply & sanitation, transportation/transit, and commercial/residential buildings;
(iii) Agriculture
(iv) Transport
(v) Industries (mostly IFC-led interventions)

Across these priority sectors, a regional differentiation of approach will be maintained. For example, efficiency improvements in district heating services will continue to be a major focus of World Bank lending operations in ECA. Power system loss reduction measures may be the key focus in EAP, MNA and SAR. World Bank's future energy efficiency efforts in power sector will place emphasis on introduction of high efficiency technologies (e.g super-critical or ultra-super critical systems) when new power plants are financed; rehabilitating existing generation facilities; and reducing transmission and distribution losses. Also, a pipeline of new lending operations will be developed, incorporating energy efficiency/loss reduction measures, demand management, and enhanced planning and operation of sub-regional power pooling mechanisms as a means to help bridge the energy supply-demand gap in different client countries. World Bank's future efforts on urban sector will also aim to tap into efficiency opportunities in transportation, industry, commercial/public service buildings, including those used for delivery of education and health services.[7]

5. Barriers and Constraints

The promotion of energy efficiency markets face technical, financial, institutional and policy barriers in our client countries as well as institutional and operational constraints within the Bank. Capturing energy savings potential is therefore a challenge. Financially viable investment opportunities are plentiful, but these life-cycle cost-savings measures are technically and logistically diverse, often small in scope, and typically do not compete well with opportunities for using upfront capital for capacity or market expansion. If left unaddressed, high transaction costs, perceptions of uncertain risks and needs for financial intermediation or outsourced technical input mean that much of the potential remains unimplemented.

The classical barriers to energy efficiency scale-up are associated with non-economic pricing of energy and the fact that greater weight is given to upfront (first) costs compared to recurring costs. These projects also could have higher transaction costs due to their smaller size. Furthermore, capital constraints faced by investors lead to more investment in new production capacities rather than energy efficiency, especially if energy costs are a small proportion of production costs.

There is also a generally higher risk perception associated with demand side energy efficiency projects due to the lack of awareness and experience among investors and financiers. As these projects depend on revenues generated through energy savings, the absence of robust systems of measurement, monitoring and

[7] As countries invest in infrastructure across various sectors to support urban development, it is imperative that investments are energy efficient since such infrastructures have long life spans. For example, by 2015 half of China's urban residential and commercial buildings would have been built since 2000 and this stock will remain in use for another 50 to 100 years.

verification of energy savings present a challenge. Finally, in the case of retrofit projects, there is a risk and potential revenue loss associated with taking a plant out of service during renovation.

As energy efficiency investments face various barriers, the expansion of the World Bank energy efficiency portfolio will require actions on multiple fronts:

- Increasing access to energy efficient technologies and strengthening design and engineering capabilities.
- Improving the policy and regulatory environment by adopting economic pricing of energy, and adopting and enforcing energy efficiency codes and norms, appliance energy efficiency standards and labeling systems, mandatory industry energy audits, and utility demand side management (DSM) programs.
- Increasing access to pre-investment and project financing, introducing risk management and credit enhancement instruments, such as guarantees, and encouraging investment decision-making based on lifecycle costs.
- Introducing new business models such as performance contracting and bundling of small projects through Energy Service Companies (ESCOs).
- Building capacity and increasing knowledge among domestic financial sector, industries, municipalities, electric utilities, energy auditors, engineers, architects, builders, and so on.
- Reducing transaction costs by bundling and streamlining approval processes.

An efficient carbon market provides the opportunity to enhance the financial incentives for energy efficiency. The Bank will play a useful role both by catalyzing energy efficiency investments with incentives offered by the carbon market and by implementing projects that demonstrate to the market the financial and commercial viability of these energy efficiency investments. The World Bank has also been actively pursing specialized funds to structure investments that overcome market failures through provision of commercial finance combined with targeted grant funds for capacity building and incentives.

6. Comparative Advantages

The proposed EEfSD concept aims to mainstream a broader, multi-sector set of energy efficiency projects into the World Bank's infrastructure portfolio. The World Bank is well-positioned to meet the challenges of overcoming the constraints to scaling up the energy efficiency portfolio as it can provide:

- Multi-disciplinary teams of experts within the WBG (including IFC, MIGA), organizational structure, strengthened by the newly-established Sustainable Development Network that could facilitate deployment for cross-cutting thematic initiatives.
- Proven tools for energy efficiency (loss reduction, performance benchmarking, etc.) pilot tested by existing Global Partnership Programs (such as ESMAP and ASTAE) in relevant infrastructure sectors.
- Well-structured lending instruments (and a robust "results-oriented framework" to underpin the design, preparation, and appraisal of lending operations) which can accommodate energy efficiency business lines, including in instruments such as, Specific Investment Loans (SIM), Adjustable Program Lending (APL) and Development Policy Lending (DPL).
- Well-tested instruments and frameworks for "policy-dialogue" with client countries, including Country Assistance Strategy (CAS), Poverty Reduction Strategy Papers (PRSPs), Analytical and Advisory Activities (AAA) and Non-lending Technical Assistance (TA).

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7. Energy Efficiency Scale-Up Action Plan

The Energy Efficiency Scale-Up Action Plan will be structured along **four tracks**, which will follow the normal project cycles within the Bank, and specifically draw upon the Bank Group's comparative advantages

and opportunities across client countries and priority sectors (the specific projects and activities are described in Annex I and II):

- **Track 1**- Integrating Energy Efficiency within Economic and Sector Work
- **Track 2** – Mainstreaming Energy Efficiency in Investment Operations
- **Track 3** – Improving Internal Operational, Learning and Analytic Capacity
- **Track 4** – Monitoring, Evaluation, and Outreach

The energy efficiency interventions in the EEfSD are consistent with the overall action plan for the *Clean Energy and Investment Framework* (CEIF) and will follow an "all-encompassing, multi-sector, results-based management approach". The overall EEfSD strategy will comprise of interventions at the following **three different levels**:

- **Policy and Regulatory** level;
- **Sector and Sub-sector** level; and
- **End-use Equipment and Appliances** level.

The details of each track of the **Energy Efficiency Scale-Up Action Plan** are further described below.

Track 1- <u>Integrating Energy Efficiency within Economic and Sector Work</u>

The overall impetus for more effective mainstreaming and expanding energy efficiency activities in the World Bank operations will start through integrating energy efficiency as a key theme within the macroeconomic and sector work, development and poverty reduction dialogues and country assistance strategies, that is through Country Assistance Strategies (CASs), Poverty Reduction Strategy Papers (PRSPs), and country level dialogues related to policy development and regulatory frameworks.

The integration of energy efficiency will be done through engagement at the country macro-economic level and therefore will include support in the area of both core energy sector measures and cross-sectoral opportunities. The multi-sector approach and interlinked dialogue is crucial to the Energy Efficiency Scale-Up Strategy, as it will allow for identification of entry points where energy efficiency can contribute to the broadest economic management goals (e.g. GDP growth, fiscal balances, balance of payments, industrial competitiveness) for each country. As with any development dialogue, the process will be continuous and cyclical, incorporating results of earlier plans and project results and careful tracking of key indicators. Specific actions for implementing a strategy focused on scaling-up cross-sectoral energy efficiency interventions will include a systematic combination of non-lending and lending instruments, including macro-economic policy dialogue, AAA, and non-lending TA.

Specifically, the action plan along this track will include the following interventions:

- **Policy Dialog:**
  - Pursue high-level dialogue (sector manager, country director level) on priorities for cross-sector linkages and how to effect them (through CAS, PRSP, programmatic lending)
  - Upstream review mechanisms to ensure that countries with large energy efficiency potential are targeted for energy efficiency policy dialogue. Integrate energy efficiency into short, medium and long term investment programming strategies of client countries and selectively apply World Bank's policy-based and investment lending instruments;
- **Economic and Sector Work:**
  - Enable cross-sectoral project identification and preparation through a suite of resources and activities (especially in high-growth consuming sectors such as transport, water, urban, and oil/gas/mining/chemicals) including energy efficiency specialist secondments to non-energy sectors, ongoing outreach program to non-energy sector TTLs, new product offerings that incentivize inclusion of clean energy technology into lending schemes.

- Apply the most appropriate mix of the Bank's guarantee instruments to mitigate country-specific risks that may undermine private sector participation in the delivery of proposed energy efficiency programs and projects.

- **AAA on Thematic and Cross-Cutting Areas**:
  - Leverage AAA and country economic and sector work to sharpen understanding of country-specific energy efficiency opportunities, barriers and assistance needs and support linked project development;
  - As a part of its advisory work, develop regulatory frameworks, policies and standards (standards and labeling for appliances, building energy codes, life cycle cost based procurement, etc.) for energy efficiency in client countries
- **Institutional Support:**
  - Leverage non-lending technical assistance of World Bank-administered trust funded programs to help client countries to develop robust institutional arrangements that can sustain long-term commitments to plan and implement energy efficiency improvement programs.

Mainstreaming Energy Efficiency into Country Low Carbon Strategies: In FY07, the World Bank had already started preparing energy efficiency policies and interventions in G8+5 and other countries (such as Serbia, Uruguay, etc.) to support low-carbon economic development path, along with the basic sector work to identify opportunities and assistance needs. This policy dialogue is at the macroeconomic level, and the development objectives consider the appropriate role of energy efficiency and other clean energy technologies within the overall country assistance strategy for low carbon economic growth.

Track 2 – <u>Mainstreaming Energy Efficiency in Investment Operations</u>

The activities under Track 1 will lead to the identification of specific investment opportunities which will be designed and developed under this track (Track 2). In the area of investments related to core energy practice, successful "business-as-usual" energy efficiency interventions are currently focused on supply-side and key consuming sub-sectors. The emphasis of the investment operations in this track will be to systematically integrate energy efficiency operations within the core energy practice by replicating the "business-as-usual" and proven energy sector project designs and instruments. In addition, a comprehensive, cross-sectoral approach will be adopted to mainstream energy efficiency opportunities in non-core energy sectors by building upon either existing best practice models adapted from the core energy practice to these other sectors or develop new approaches. These non-core sectors include: Transport; Urban (households, buildings, urban transport); Water; Social (including education, health); Agriculture/rural. While the core energy practice operations will have a firm investment portfolio in FY07-09 (see Annex II), the non-core cross sectoral energy efficiency investments will be a longer-term effort, to create new operational practices and intervention designs suitable to pursue key cross-sectoral energy efficiency opportunities necessary for low-carbon economic development.[8]

Some of the specific interventions under this track will include:

- **Scale-up the existing and promising projects:** The focus will be on energy efficiency sub-sectors with proven designs and high replication potential and develop toolkits such as for district heating, efficient lighting[9], loss reduction for national/sub-regional power generation, power transmission & distribution systems financial intermediation[10], etc. In addition, activities for other promising energy

[8] In the cross-sectoral areas also, there is already a growing number of non-energy projects in the World Bank portfolio with one or more energy efficiency components (for example, the Third Tamil Nadu Urban Development Project, Sustainable Transport and Air Quality for Santiago Project).

[9] By drawing upon the experience with the applications of energy efficient lighting programs under IFC's Efficient Lighting Initiative (ELI) for compact fluorescent lamps, and Bank's recent projects in Uganda, Rwanda, Ethiopia, Timor-Leste, etc.

[10] By drawing upon IFC investments and technical assistance in the area of innovative energy-efficiency-focused financial product offerings to local commercial banks and leasing companies.

technology options and/or systems with high potential for energy savings within the core and other sectors (such as efficient electric motor systems, efficient distribution transformers) will be initiated.

- Rapidly **replicate and scale-up successful, private sector-led energy efficiency market development**. This would be done by enhancing cooperation between World Bank, IFC and MIGA through a systematic and comprehensive approach and coordination for energy efficiency projects at the country level. While there is substantial room for growing the dedicated core energy sector efficiency improvement projects, IFC is actively exploring a more ambitious approach to identify and promote opportunities to improve energy efficiency throughout its investment portfolio.[11] Some of these experiences will help in developing a deliberate approach to increase energy efficiency interventions across sectors.
- **Analyze and assess energy efficiency opportunities in Urban, Agriculture and Transport sectors** and provide support to these sectors to prepare SILs and SIMs for cross-sectoral opportunities, such as fuel efficiency improvement for urban transportation systems; Energy loss reduction for municipal water supply and sanitation operations; Energy loss reduction for irrigation water supply operations; SWAps for energy efficiency for municipalities.
- **Revise procurement regulations** for equipment under Bank-funded projects to reflect energy efficiency opportunities across sectors.

Track 3 – **<u>Improving Internal Operational, Learning and Analytic Capacity</u>**

This track of the Energy Efficiency Scale-Up Action Plan will be used for providing broad-based analytical and operational support to facilitate and strengthen the interventions in Track 2.[12] Specific interventions under this track include:

- **Develop New Finance Instruments:**
  - In coordination with internal partners such as Carbon Finance and GEF, create new blended lending products based on GEF and CDM and other financing vehicles that provide incentives to borrow for energy efficiency.
- **Capacity Strengthening:**
  - Establish SWAT teams (including consultants on quick response) to support work along specific business lines (efficient lighting, district heating, etc.) and for providing "just-in-time" support, facilitate cross-sector work and project development, as necessary;
  - Improve staff capacity and knowledge across sectors to undertake energy efficiency projects/ investments more effectively. Establish new capacity building programs with support from entities like WBI and ESMAP, to help instititionalize upstream energy efficiency work in countries that have not yet received energy efficiency assistance.
  - Use the *Energy Efficiency Thematic Group*[13] to build capacity by promoting cross-cutting exchanges on best practices and tools for scaling up energy efficiency.

[11] An IFC exercise to identify recent investments with significant energy efficiency improvements found a much greater number and volume of such investments than anticipated - many times the value of donor projects - confirming the potential to leverage much greater impact on developing country markets through a more deliberate approach. IFC's new Environmental and Social Performance Standards call for all IFC investments to review possible opportunities for Resource Conservation and Energy Efficiency: "The client will avoid or minimize the release of pollutants, or, when avoidance or minimization are not feasible, will reduce the release of pollutants through application of resource conservation and energy efficiency measures consistent with the principles of cleaner production."

[12] The World Bank will significantly expand cooperation with other international institutions (such as the IEA, REEEP) and MDBs (such as EBRD, AsDB) with expertise and similar experiences, to develop a wide-ranging program of improving operational, learning and analytic capacity for scaling up energy efficiency operations across sectors and geographical regions.

[13] The Energy Efficiency Thematic Working Group is a formal network of Bank staff from regional operations and also from IFC who are interested, currently processing and/or pursuing new projects in the area of energy efficiency. The objective of the Group is to enhance energy efficiency practice within the Bank Group by helping exchange ideas, knowledge and experience.

- **Develop Tools:**
  - Develop energy efficiency best practice guidelines and toolkit for specific sectors and sub-sectors identified under Track 2 (such as district heating, industries, energy efficient lighting, etc.) which could be replicated, saving preparation time and costs.

Track 4 – **<u>Monitoring, Evaluation, and Outreach</u>**
The actions under Track 1 through 3 will be monitored and evaluated in terms of developmental outcomes, results frameworks and procurement plans for the entire portfolio of World Bank's infrastructure investment lending operations and development policy loans/credits. The initial focus will be operations in the energy, transportation, urban, agriculture and water resources management sectors. One of the primary aim of the evaluation will be to ascertain emerging "good practice" and/or "lessons learned" for the scaling up approaches. The findings would inform expected replication and expansion of such cross-support activities.

Based on IFC's experience of developing a **new sustainable energy tracking system** as a performance metric to be integrated into key IFC management systems, including its development indicators and IFC's departmental performance scorecard, the energy efficiency portfolio tracking within the Bank will be improved to truly reflect the energy efficiency components of projects across all sectors. To support these systems, IFC is also looking to build capacity to flag opportunities upstream in the project development cycle to ensure that opportunities for enhanced sustainable energy investment and advisory are systematically realized and this philosophy may also be applicable for Bank operations.

The specific thematic interventions along this track include**:**

- **Improved system of screening, tracking, monitoring and evaluation** of energy efficiency investments and energy efficiency components in investments in other sectors.
- **Monitoring program implementation progress** of the World Bank interventions and measure results, impacts and outcomes for client countries.
- **Synthesize the results** of the regular mid-term and completion reviews of projects performance of energy efficiency projects or energy efficiency components of other projects during the FY07-FY09 period.
- **Introduce outreach and support efforts across sectors**, particularly Urban, Agriculture, Water and Transport sectors to improve staff capacities and knowledge to undertake energy efficiency projects.
- **Have regular interactions (including joint workshops and seminars) with other MDBs and international organizations** involved in the area of energy efficiency scale up.

Building Strategic Partnerships to Promote Energy Efficiency: In addition to the efforts aimed at strengthening existing internal partnerships (such as within the WBG with IFC, GEF, Carbon Finance, Carbon Finance Assist, ESMAP, ASTAE and the Global Gas Flaring Reduction Partnership), the World Bank will strengthen external partnerships, as has also been highlighted as a key area under the Clean Investment Framework. The World Bank has been in past and will continue to collaborate with the other MDBs (EIB, EBRD, AsDB, AfDB, IADB, etc), and other international organizations (like the IEA, UNDP, UNIDO, IAEA, etc.). During FY07-09, the World Bank will further intensify cooperation with partners like the IEA which have already started in FY06 to provide non-lending TA and analytical advice to developing countries. Some of the key activities identified include, *inter alia*:

- **Global** Framework for Energy Efficiency Performance Indicators - developing and applying a framework of energy efficiency indicators in G+5 countries for enabling systematic formulation of energy efficiency policies, tracking of policy impacts and evaluation and monitoring of energy efficiency policies and investments. (*ESMAP/IEA/IADB*)
- Collaboration on Innovative Energy Efficiency Delivery Mechanisms in Brazil, China and India (*ESMAP/UNEP*)

- Collaboration on CDM-Energy Efficiency Network to promote development of CDM Methodologies for EE (*ESMAP/ENV (Carbon Financ)./UNDP/IEA*)
- Introduction of Global Energy Efficient Motor Drives Initiative – standard for electric motors (proposed ETWEN collaboration with Japan).
- Introduction of Global Efficient Electricity Distribution Transformers Initiative– standard for electric motors (proposed ETWEN collaboration with Japan).
- Collaboration on the UN-CSD Database of Energy Efficiency Best Practices (*ESMAP/UNDESA/USAID*)

8. Leveraging ESMAP and Other Resources for Energy Efficiency

The World Bank has used grant funding, available through the GEF and trust-funded programs like ESMAP and ASTAE, in the past to focus on country level analytical and advisory assistance and those related to planning, policy advice, and capacity building energy efficiency development related to global public goods such as energy efficiency. These grant funds have been used to overcome barriers and improving the environment for energy efficiency investments by actions on multiple fronts which have helped to leverage World Bank investments extensively in the past. Dissemination of knowledge and best practices have been extensively facilitated through such support. The expansion and diversification of the World Bank's energy efficiency portfolio beyond the business-as-usual approach will require significant infusions of resources and new operational practices in both the short- and medium-term. During FY07-09, the World Bank will further strengthen the existing ESMAP strategic partnerships with countries like Germany and France, which have energy efficiency as one of the key priorities. Similar strategic partnerships with Japan and other interested development partners to promote energy efficiency for energy security will be initiated.

Energy Efficiency Facility in ESMAP: Depending upon the evolution of the Energy Efficiency Scale-Up Strategy, a dedicated trust -funded Energy Efficiency "window" or Energy Efficiency Facility within ESMAP may be established to support the implementation of Energy Efficiency Scale-Up Action Plan to support implementation of the Energy Efficiency Action Plan. This may involve replenishment of existing trust funded "windows" within ESMAP (for example, with Germany, Japan, etc.). Such approach would also minimize administrative overheads, leverage existing partnership arrangements and procedures being adhered to by the World Bank and ESMAP donors.

9. Organizational Setup within the Bank

The Energy Efficiency Scale-Up Strategy will be administratively structured as a multi-year, cross-cutting thematic activity within the Bank's Sustainable Development Network (SDN). The Sector Manager for Energy in the Energy, Transport and Water Resources Department (ETWDR), supported by an EE Advisory Panel (ETW Advisors for Energy, Urban Transport, Water Supply and Sanitation, Irrigation and Energy) will oversee the strategy and the implementation of its associated Action Plan.

Energy Efficiency Scale-Up Team: A dedicated team of professionals led by an experienced specialist in ETW will lead the implementation of the Energy Efficiency Scale-Up Action Plan. The team will be strengthened in FY07 by adding a senior energy efficiency specialist (likely to be seconded by the Government of Japan) and recruiting a full-time research assistant (ETC/STC) for energy efficiency work. This multi-disciplinary, dedicated team will also be supported by sector specialists drawn from the SDN Anchor Units and/or SDN-managed Global Partnership Programs who will be assigned task management responsibilities to implement specific sectoral/ thematic activities under the Action Plan. In addition, each of the regions will appoint an energy efficiency coordinator who will be on the Energy Efficiency Scale-Up team.[14]

[14] This model has been working well in ESMAP operations in FY07, wherein each region has an officially-appointed ESMAP coordinator with 20% of his/her time dedicated to ESMAP work.

The Energy Efficiency Scale-Up Team will be designated and assigned day-to-day responsibilities to coordinate with regional operational units for implementation of the Action Plan. The cross-sectoral linkages will also be facilitated through organized venues such as the Energy Efficiency Thematic Group and through global projects to better understand and uncover new opportunities in key consuming sectors, and assessment of specific opportunities to mainstream energy efficiency within transport, urban, and agriculture projects. Among other tasks, this team will also be responsible for screening and tracking of energy efficiency potential and components in all projects proposed by the energy sector and other sectors.

10. Funding and Implementation Plan

The indicative set of activities in line with the Energy Efficiency Scale-Up Action Plan in the World Bank described above is illustrated in the Annex I and II. As shown in Annex I, many non-lending activities, mostly funded by ESMAP, are either in the pipeline or are planned across regions and sectors. In addition, there are firm plans for lending activities for the FY07-09 time period as shown in Annex II.

Table 3 Summary of FY07-09 Funding and Implementation Plan (details are provided in Annex I and II)

Track	Key Tasks	Funding Sources	FY07-09 Estimated Budget ('000$)	
			Committed	Planned
1	Integrating Energy Efficiency within Economic and Sector Work	BB, ESMAP, ASTAE	2,030	1,000
2	Energy Efficiency Lending Project Preparation and Assistance	BB, GEF, Trust Funds	*	*
3	Operational and Analytical Support to Regions	Trust Funds – primarily ESMAP, and bilateral funds	8,895	2,255
4	Monitoring, Evaluation, and Outreach	BB, EWTEN, Trust Funds (ESMAP, ASTAE, CF)	--	1,700
Other	Strengthening Organizational/Institutional Structure	ESMAP, EWTEN/ BB	--	1,850
	TOTAL		**10,925**	**6,805**
Note: * The project preparation support will be provided through BB, GEF and Trust Funds. Many of the projects in the FY07-09 lending pipeline (see Annex II) are blended projects, with energy efficiency being one of several components.				

As it is clear from the table above and details in annexes, the expansion and diversification of the World Bank's energy efficiency portfolio will be facilitated through early efforts in FY07 and FY08 for various TA, AAA and knowledge products **beyond the business-as-usual approach. It will require significant infusions of resources and new operational practices in both the short- and medium-term from ESMAP and other trust fund sources.** Discussions about many of these planned efforts are already in advanced stage, including some in collaboration with the Bank's external partners.

11. Reporting

The progress on Energy Efficiency Scale-Up Action Plan will be reported by the Energy Efficiency Scale-Up Team on a fiscal year basis to the Director, Energy Transport and Water; the Energy & Mining Sector Board; and the SDN Vice Presidency. In addition, the progress will be reported through other channels such as the Annual Progress Reports on Renewable Energy and Energy Efficiency as a follow up of the WBG's Bonn commitments, and the regular CEIF progress reports.

Annex I
World Bank Energy Efficiency Scale-Up Action Plan (FY07-09)
Funding and Implementation Program for Non-Lending Activities

Activity	Type	Status	Funding Source	Budget (000$) FY07-09	Responsible Unit (Bank)	
					Lead	Support
Track 1- Integrating Energy Efficiency within Economic and Sector Work (including policy dialog and development of regulatory framework)						
India Low Carbon Growth Study (includes EE Component)	AAA	Firm	ESMAP, BB, Others	800	SAR	EWTEN, EWTES
Thailand Sustainable Energy Policies Project (includes EE Component)	AAA	Firm	ASTAE	200	EAP	ETWES
Ukraine: Thermal Power Plant Rehabilitation: Assessment of Needs, Costs and Benefits	TA	Firm	ESMAP, BB	150	ECA	EWTEN
Brazil Climate Change Country Study (includes Energy Efficiency component)	AAA	Firm	ESMAP, BB	330	LAC	
Brazil: Programmatic Approach in Support of the Energy Sector in Brazil: Securing Adequate Energy Sources	AAA	Firm	ESMAP, BB	195	LAC	
Mexico Climate Change Country Study (includes Energy Efficiency policy and regulatory component)	AAA	Firm	ESMAP, BB	355	LAC	
Other Countries – To be programmed	AAA	Planned	ESAMP, BB	1,000	Region	EWTEN, EWTES
Track 2 – Mainstreaming Energy Efficiency in Investment Operations						
Project Preparation for Investment Projects focusing fully or partially on energy efficiency - See Details in Annex II	Loan	See Annex II	BB	See Annex II	All regions	EWTEN, EWTES support
Track 3 – Improving Internal Operational, Learning and Analytic Capacity						
Energy Efficiency Institutional Best Practices (Global)	KP	Firm	ESMAP	100	ETWES	-
Energy Efficiency Sectoral Indicators (G+5 Countries)	AAA	Firm	ESMAP, IEA, IADB	1,200	ETWES	LAC, EAP, SAR
Scaling Up Demand Side Energy Efficiency Improvements through Opportunities under Programmatic CDM (Global)	KP	Firm	ESMAP, SDN BB	20	ETWES	ENVCF
Energy Efficiency Legislative and Policy Best Practices (Global)	KP	Planned	ESMAP, CFC, ICA	200	ETWES	--
Preparation of Toolkit for Specific Energy Efficiency Business Lines (Lighting, District Heating, Funds/ Financial Intermediation, etc.)	KP	Planned	ESMAP, IEA, REEEP	300	ETWES	
Assessment of Energy Efficient Motor Drives and Systems and Toolkit (Global)	AAA	Planned	ESMAP, Japan, IEA	400	ETWES	
Assessment of Efficient Electricity Distribution Transformers Potential and Toolkit (Global)	AAA	Planned	ESMAP, Japan, IEA	400	ETWES	

Innovative Energy Efficiency Financial Mechanisms – Follow Up Tasks	KP	Planned	ESMAP, UNEP	100	ETWES	EAP, ENV
Energy Use and Potential for Efficiency/Conservation and Carbon Finance in Urban Areas of Developing Countries	AAA	Planned	ESMAP, BB	455	TUDUR	ETWES, ETWEN
Transport Energy Efficiency Potential Assessment	AAA	Planned	ESMAP, BB	400	ETWTR	ETWES, ETWEN
Lighting Africa Project (Uganda, Tanzania, Zambia, Senegal, Ethiopia, Burkina Faso) (EE Component: LED-Lighting Systems)	TA	Firm	ESMAP, GEF, SIDA, Norwegian, Others	5,260	ETWEN	ETWES, AFTEG, IFC
China Heat Industry Reform	TA	Planned	ESMAP, ASTAE	TBD	EAP	
India: Coal Fired Plant Rehabilitation - Best Practice in Rehabilitation, Operations and Maintenance Improvements	TA	Firm	ESMAP, BB	500	SAR	ETWEN
India: Coal Fired Generation Rehabilitation Project - Investment Planning and Regulatory Studies	KP	Firm	ESMAP, BB	300	SAR	
China Clean and Efficient Coal Fired Power Generation	TA					
China Energy Efficiency Financing Project	TA	Firm	ESMAP, ASTAE	200	EAP	
Ukraine – District Heating Policies and Reforms		Firm	ESMAP, BB	185	ECA	
Mexico: Commercial bank Financing for Energy Efficiency	AAA	Planned	ESMAP, BB	TBD	LAC	
Brazil: Energy Efficiency Guarantee Facility at BNDES to support ESCOs	AAA	Firm	ESMAP, BB		LAC	
Brazil: Power Plant Rehabilitation in Private and Public Sector (including Hydro Power Plants)	TA	Planned	BB	TBD	LAC	
Egypt: Time of Use Pricing Study	KP	Firm	ESMAP, BB	200	MNA	
Egypt: Load Management Program Development	KP	Firm	ESMAP, BB	240	MNA	
Morocco: Structuring the New Energy Efficiency Agency	AAA	Firm	ESMAP, BB	210	MNA	
Tunisia: Development of an Enabling Environment for Scaling-up EE Investments	TA	Firm	ESMAP, BB	480	MNA	
Mauritius – Demand Side Management Project	TA	Planned	BB	TBD	AFTEG	EWTES
Track 4 – Monitoring, Evaluation and Outreach						
CDM-Energy Efficiency Network (Global)	KP	Planned	ESMAP, ENV (CF), IEA, UNDP	150	ENV	ETWES
UN-CSD Database of Energy Efficiency Best Practices (Global)	KP	Planned	ESMAP, USAID/W, UN-DESA	50	ETWES	
Developing a new Tracking and Screening System for EE Projects in the Bank	TA	Planned	ESMAP	200	ETWES	IFC
Energy Efficiency Global Forum (International Conference)	KP	Planned	ESMAP	50	ETWES	
Energy Efficiency Outreach and support efforts across sectors (Urban, Agriculture, Water and Transport sector).			ESMAP, ASTAE, BB	1,000		
Central Asia Regional and Economic Cooperation (CAREC) Level Workshop on Energy Efficiency	KP	Planned	BB	100	ECA	EWTES
Energy Efficiency Workshop (with Japan)	KP	Planned	ESMAP	150	EWTEN	EWTES
Other Supporting Tasks						

Setting Up Energy Efficiency Scale-Up Team in EWD (including hiring an STC/ETC and secondment from Government of Japan)	Support	Planned	ESMAP, BB, Japan	900	EWTEN	EWTES
Setting Up SWAT Team for Specific Business Lines Power Station Rehabilitation, Lighting, District Heating, etc.) through Energy Efficiency facility in ESMAP	Support	Planned	ESMAP, BB, ASTAE, ENV/CF	500	EWTEN	All regions, other Anchors, ENV
Develop Guidelines and Toolkit for Specific Business Lines (Lighting, District Heating, etc.)	Support	Planned	ESMAP, BB	300	EWTES	EWTEN, all regions
Strengthen the Role and Activities of Energy Efficiency Thematic Group (already established in 2006)	Support	Firm	ESMAP	150	EWTES	All regions, EWTEN

Annex II

World Bank Energy Efficiency Scale Up Action Plan (FY07-09)
Lending Projects in the Pipeline
(Corresponds to Track 2 – Mainstreaming Energy Efficiency in Investment Operations)

Activity	Type	Status	Funding Source	Estimated Budget (million$)			Responsible Unit in the Bank	
				FY07	FY08	FY09	Lead	Support
India Programmatic Framework Fund (includes EE Component)	Grant/Loan	Planned	GEF				SAR	ENV, EWTES (cross-support)
China (Liaoning) Heating Efficiency Improvement Project	Loan	Planned	IBRD	--	200		EAP	
Serbia Energy Efficiency Supplemental Financing	Loan	Firm	IBRD-IDA	28			ECA	ETWES
China Energy Efficiency Financing Project	Loan	Firm	IBRD/ GEF	--	213.5	--	EAP	ETWES
China –Rehabilitation of Small Power Plants	Loan	Firm	GEF		19.7		EAP	
India; Improving Agricultural Pumpsets in AP, MP and TN	Loan	Planned	IBRD		XX		SAR	
India Coal Fired Power Generation Rehabilitation Project	Loan	Firm	IBRD/GEF	--	190		SAR	ETWEN
India: Punjab High Voltage Distribution System	Loan	Firm	IBRD/CF					
Pakistan Electricity Distribution and Transmission Improvement Project	Loan	Firm	IBRD	200	--		ECA	
Ukraine Power Transmission Project	Loan	Firm	IBRD	150	--		ECA	
Ukraine Kiev District Heating – Additional Financing Project	Loan	Firm	IBRD	40	--		ECA	
Vietnam – Hanoi Urban Transport Project	Loan	Firm	IDA/ GEF	141.6	--		EAP	
Mexico – 2nd Medium Cities Urban Transport Project	Loan	Firm	IBRD	--	100	--	LAC	
China Xi'an Urban Transport Project	Loan	Firm	IBRD	--	150	---	EAP	
Kenya Water and Sanitation Service Improvement Project	Loan	Firm	IDA	--	120	--	AFR	
Tanzania Water Sector Support Project	Loan	Firm	IDA, AfDB, US-MCA, Netherlands, Germany, Others	150	--	--	AFR	
Pakistan Sindh Water Sector Improvement Project	Loan	Firm	IDA	140	--	--	SAR	
Pakistan – Punjab On-Farm Water Management Project	Loan	Firm	IDA	--	--	83 (FY10)	SAR	

Note: Many of the projects in the FY07-09 lending pipeline shown above are blended projects, with energy efficiency being only one of several components.

Annex III
Illustrative Table Showing Energy Intensity Comparisons

Category	Country	Energy Intensity (kgoe/000$)	Energy Consumption, 2005 (million toe)
Energy Intensity – VERY HIGH	Ethiopia	2,616	21
	Ukraine	**2,032**	**132**
	Tanzania	1,604	17
	Nigeria	**1,387**	**100**
	Russian Federation	**1,094**	**636**
	Kenya	1,028	17
Energy Intensity - HIGH	**Vietnam**	**989**	**45**
	Ghana	975	9
	Iran	**843**	**138**
	India	**812**	**561**
	Bulgaria	807	19
	Pakistan	**739**	**71**
	China	**734**	**1,418**
	Egypt	**677**	**53**
	Serbia	672	16
	Indonesia	**636**	**164**
	Thailand	**554**	**90**
	South Africa	**553**	**118**
	Romania	532	39
	Georgia	517	3
	Philippines	**506**	**43**
	Honduras	494	4
	Jordan	482	6
Energy Intensity - MODERATE	Yemen	458	6
	Senegal	419	3
	Sri Lanka	406	8
	Argentina	**395**	**60**
	Bangladesh	391	22
	Poland	**387**	**94**
	Brazil	**324**	**196**
	Tunisia	294	8
	Turkey	**264**	**80**
	Hungary	261	26
	Mexico	**240**	**162**
	Morocco	225	11
	Uruguay	190	3
Developed Countries	USA	203	2,382
	France	133	273
	Germany	127	347
	Japan	112	518
	UK	110	233
	Norway	94	23
	Ireland	85	15

Source: The Little Green Data Book, The World Bank, 2006.