The World Bank Group

Energy Strategy Approach Paper

Sustainable Development Network

October 2009

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Abbreviations

CAS	Country Assistance Strategy
CEIF	Investment Framework for Clean Energy and Development
CIF	Climate Investment Funds
CO_2	carbon dioxide
CTF	Clean Technology Fund
EI	extractive industry
EITI	Extractive Industries Transparency Initiative
FFT	Fuel for Thought
FY	fiscal year
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IEA	International Energy Agency
IEG	Independent Evaluation Group
IFC	International Finance Corporation
INFRA	Infrastructure Recovery and Assets Platform
MIGA	Multilateral Investment Guarantee Agency
OECD	Organisation for Economic Co-operation and Development
QAG	Quality Assurance Group
SIAP	Sustainable Infrastructure Action Plan
SREP	Scaling-up Renewable Energy Program for Low-Income Countries
WBG	World Bank Group

World Bank Group Energy Strategy Approach Paper

This approach paper forms the basis for the consultation leading to the preparation of the World Bank Group (WBG) energy sector strategy, which is expected to be presented to the WBG Board of Executive Directors in early 2011. The consultation process, based on the approach paper, will run through May 2010. Comments provided on this paper will guide the preparation of the strategy.

Setting

1. **Energy is critical to economic development and poverty reduction**. Energy service delivery, especially to the poor, contributes to the achievement of the Millennium Development Goals. Without energy, economies cannot grow and poverty cannot be reduced. Energy is an important input to all sectors of the economy, fueling transport to move goods and people and providing electricity to industry, commerce, agriculture, and important social services such as education and health. However, many developing countries face a lack of power supply, which is handicapping business and reducing growth. Hundreds of millions of households continue to rely on traditional use of solid fuels for cooking and heating, lack access to electricity, or both. These households—and especially women and children among them—are exposed to dangerously high levels of harmful smoke and deprived of income-enhancing opportunities.

2. **Inadequate and unreliable electricity supply affects many developing countries**, particularly in Sub-Saharan Africa and South Asia. One consequence is lower enterprise productivity, competitiveness, and employment, and a severe constraint on economic activity and growth. There are large populations without access in the poorer countries of Asia and Latin America, as well as in the rural and peri-urban areas of middle-income countries such as Peru and the Philippines. Energy poverty in Sub-Saharan Africa is particularly acute: on a per capita basis, power generation capacity in the region is about one tenth of the levels found in other low-income regions. Not surprisingly, some 30 African countries have been experiencing frequent outages and load shedding. To balance supply and demand, extend cross-border transmission to enable regional trade, and raise electrification rates by 10 percentage points, Sub-Saharan Africa needs an annual investment of US$40 billion, or 6.4 percent of the region's gross domestic product (GDP). Currently, the region spends only about $11 billion annually, or a quarter of what is required, leaving an annual financing gap of about US$30 billion. There are as many people in South Asia without access to electricity as in Sub-Saharan Africa, most of them in India. Per capita consumption of electricity in South Asia is the lowest after Sub-Saharan Africa. Supply shortages have resulted in many firms generating their own electricity. The government of India earlier set the target of electrifying the entire country by 2012, but the target is unlikely to be met because of delays in new capacity addition—the country installed only half of planned power capacity addition in the three consecutive five-year plans between 1992 and 2007—and transmission bottlenecks. Power shortages affect not only low-income but many middle-income countries, including Egypt, Kazakhstan, Paraguay, and South Africa.

3. **A key challenge facing governments in most developing countries is how to improve the reliability and adequacy of energy supplies while making modern energy services accessible and affordable to all people** (annexes 1–3). Given vast unmet energy demand and the recent experience with energy price volatility, ensuring energy supply at reasonable prices has taken center stage in energy policymaking. Meeting this challenge will require financing—to

increase the supply base and to improve the efficiency of energy delivery and use—on a scale that many developing countries have not been able to mobilize to date. Compounding the problem of lack of supply capacity is energy infrastructure operating well beyond their design life and in urgent need of replacement.

4. **Continuing economic growth—essential for poverty alleviation—and the resulting energy demand will have global consequences**. The world economy is set to grow four-fold by 2050 and, absent transformational changes, both energy demand and energy-related carbon dioxide (CO_2) emissions will more than double (IEA 2008). The poor in developing countries will suffer first and the most from climate change, when they have done the least to cause it and are the least able to deal with it. There is a growing recognition that energy-saving policies and energy with low lifecycle greenhouse gas (GHG) emissions are necessary to meet future energy needs in a sustainable manner (annex 4). These measures, by tackling inefficient and polluting sources of energy, generally also help mitigate the local environmental problems associated with energy use. In addition, rising income will increase pressure on depleting energy resources, raising the cost of energy supplies.

5. **Meeting the energy needs of developing countries and arresting global warming will require global action and enhanced global cooperation**. Given the emerging scientific evidence on the pace of climate change, the transformation of global energy production and consumption is an imperative. The developed countries, which have largely contributed to the current stock of GHGs, should take the lead and reduce their GHG emissions significantly. Energy consumption and associated GHG emissions per capita in the developing world are fractions of those in high-income countries today. In the long run, however, the International Energy Agency (IEA) forecasts that, if the present policies are continued, energy-related CO_2 emissions in the countries that are not members of the Organisation for Economic Co-operation and Development (OECD)—currently on a par with OECD emissions—will be twice those in OECD countries by 2030. Even if all emissions from developed countries were to cease, a change in the emission trajectory of the developing world would still be needed to stabilize global GHG concentrations at the levels considered manageable by the Intergovernmental Panel on Climate Change. Equity considerations call for significant financial and technology transfers to developing countries in the international effort to curb GHG emissions. IEA estimates that the total incremental cost of mitigating GHG emissions from energy use in non-OECD countries to limit long-term CO_2 concentrations at 550 parts per million (ppm) would average US$85 billion a year during 2010–2030 and US$230 billion for 450 ppm (IEA 2008). Sustainable energy requires concerted efforts over the long term by a wide range of actors in industry, finance, government, and international organizations, but is still being addressed with short-term financing and policy frameworks that are not aligned with the scale of the challenge.

6. **It is against this setting that the World Bank Group is formulating a new energy strategy**. Developing countries need more energy and cleaner energy to overcome poverty and to set them on strong growth paths. At the heart of the debate about the future of global energy is how to expand supplies and access to energy for the world's poor in ways that meet the needs of both the current generation and all future generations. The new energy strategy will address how the WBG can balance competing demands, promote synergies, and address trade-offs.

Recent Developments and Outlook

7. Several recent developments and future trends are shifting the relative importance of the underlying issues in the energy sector in developing countries.

8. **Many developing countries—including virtually all countries with low access—are experiencing electricity shortages or will do so in the coming years**. The costs to the economy of electricity outages are substantial (annex 2). One study estimates that the average costs amount to 2.1 percent of GDP in Sub-Saharan Africa, and that losses for enterprises in forgone sales and damaged equipment are equivalent to 6 percent of turnover for firms in the formal sector on average, and as much as 16 percent of turnover for informal sector enterprises that lack their own backup generation (Eberhard and others 2008).

9. **If current trends continue, fewer than half of Sub-Saharan African countries will reach universal access to electricity even by 2050 and, despite the growing number of connections, the number of people without access will actually increase through 2030**. Sub-Saharan Africa has a disproportionately high percentage of households without electricity. The average access rate is less than half of that in South Asia, the region with the second lowest access rate. Even those with access often experience many hours of power outages, adversely affecting their business, schooling, and other essential activities. Growing power outages for those already connected have added another dimension to the efforts to narrow the effective access gap. The end result is slowing down of the progress toward the Millennium Development Goals. For this population, the highest priority is more energy.

10. **Rapid urbanization across the developing world will affect efforts to increase access**. Rural-urban migration will increase the focus on grid power connection in the coming decades. According to the United Nations, urban population in developing countries will grow by nearly 2 billion between 2000 and 2030 and exceed rural population by 850 million. In fact, rural population will decline in all income categories except in low-income countries (UN-Habitat 2007). While extending access in urban and peri-urban areas is cheaper per connection than in rural areas, meeting increasing demand in rapidly growing low-income and informal urban settlement areas will be a challenge. And despite urbanization, there will still be an estimated 125 million more people in rural areas in 2030 than in 2000, requiring continuing attention to rural electrification.

11. **A clear lesson emerging from the oil price episode of 2004–2008 is the importance of diversifying the energy portfolio, aggressively pursuing measures to improve energy efficiency, and being better prepared for high energy price volatility and possible future shocks**. World oil prices averaged US$29 in 1999–2001 (in 2008 U.S. dollars), against US$97 in 2008. When the current WBG energy strategy was being formulated, soaring energy prices were not among the pressing issues considered. Rising energy prices up to mid-2008 gave an impetus to a number of countries to consider relying more on coal-fired power generation. Governments subsidizing energy prices faced mounting energy subsidy bills. The International Energy Agency (2008) estimates that energy subsidies in the 20 largest non-OECD countries reached US$310 billion in 2007. Energy prices have also become more volatile—2008 was the most volatile year for oil prices. High and volatile energy prices pose a challenge to transitioning households from traditional use of biomass and coal for cooking and heating to modern commercial energy. In the near term, low prices and financial constraints will slow down investment. With economic recovery, spare capacity will start to erode and oil supply could begin to tighten again, taking the

world oil market into a new cycle. Large energy price changes affect relative costs of technologies, and price volatility is one of the greatest obstacles to developing alternative energy.

12. **The duration and depth of the financial crisis will affect future energy supplies as well as energy consumption efficiency**. The global financial crisis is causing a number of project delays and cancellations. Reduced investment makes meeting future demand—once the global economy begins to recover—all the more difficult, constraining growth, this when low-income countries in particular can ill afford further slowing down of measures to reduce energy poverty. In the power sector, as of the first quarter of 2009, investment in renewable energy was falling proportionally more than in other types of generation. On the demand side, businesses and households are spending less on energy-efficient appliances, vehicles, and equipment (IEA 2009). The financial crisis and the resulting fall in demand for energy and in fuel prices, however, provide breathing space for improving sector performance and preparing for future demand growth. Governments can take this opportunity to formulate policies that are resilient to energy price volatility, move away from regressive price subsidies, and take steps to improve the quality of investment in the sector.

13. **A new financing architecture to address climate change mitigation and adaptation is evolving.** The nature and degree of future international agreements on mitigation and the related financing mechanisms to help developing countries pursue a lower-carbon path are currently under discussion. In December 2007, parties to the United Nations Framework Convention on Climate Change adopted the Bali Action Plan for the enhanced implementation of the Convention, according to which developing countries would consider nationally appropriate mitigation actions in "the context of sustainable development, supported and enabled by technology, financing and capacity-building." While a new financing architecture is being developed, it is important for the WBG to help developing countries take maximum advantage of such existing instruments as the Global Environment Facility (GEF), various carbon funds associated with the Clean Development Mechanism and Joint Implementation, the Carbon Partnership Facility for emission purchase agreements beyond 2012, and the Climate Investment Funds (CIF). The largest under the CIF umbrella is the Clean Technology Fund (CTF), which will finance demonstration, deployment, and transfer of low-carbon technologies with a significant potential for long-term GHG emissions savings and that meet country development objectives. Another fund under the CIF umbrella is the Scaling Up Renewable Energy Program for Low Income Countries (SREP), which is in the final stage of design.

14. **In summary, the external environment has changed considerably, with profound implications for the energy sector**. First, the global energy market did not anticipate, nor was it prepared for, the most recent episode of high world fuel prices and price volatility, caused largely by a rapidly shrinking cushion between supply and demand. Indications are that this pattern will likely recur in the coming decade. Second, climate change is increasingly acknowledged to be an integral part of the development agenda, interlinking energy and various other sectors and calling for greater selectivity in investment and technology choice. Third, falling investment in energy—the largest capital-intensive sector—due to the global financial crisis is sharpening the focus on inadequate investment slowing down future economic growth. Increased investment in this sector is seen as a way both to provide short-term relief from the economic downturn and to address long-term development needs. The challenge is to meet the energy requirements of a modern economy and provide access to all people at affordable prices in ways that are sustainable.

World Bank Group Energy Sector Strategy and Performance in Recent Years

15. **The current WBG energy strategy comprises the 1999 environmental strategy for the energy sector, *Fuel for Thought* (WBG 1999, FFT hereafter), and an informal 2001 strategy entitled "The World Bank Group's energy program: poverty alleviation, sustainability, and selectivity"** (WBG 2001, 2001 energy strategy hereafter). The Investment Framework for Clean Energy and Development (CEIF), formulated in 2006, laid out a roadmap for increasing access and mitigating GHG emissions (WBG 2006). More recently, the WBG endorsed two documents that will have a significant impact on the future operations of the energy sector: "Sustainable Infrastructure Action Plan" (SIAP) and "Development and Climate Change: A Strategic Framework for the World Bank Group" (DCCSF) (WBG 2008a and 2008b).

16. ***FFT* laid out six strategic objectives** covering areas managed by both the energy and environment sectors of the WBG. Three were on environmental sustainability of energy production and use, one was on reducing indoor air pollution and pressures on land and forestry, another was on reducing urban air pollution from fuel combustion, and the last was on capacity building for environmental management. *FFT* set a number of targets, many of which were specific to WBG operational activities, to be met starting in FY08 and as late as 2015.

17. ***FFT* stated that, despite its relatively small size and outreach, the WBG aimed to be at the forefront of the drive toward more sustainable use of energy**. The strategy was based on the WBG's assessment that the best way to promote progress on global environment issues is to help our clients tackle issues of national priority—particularly those where the contribution to poverty alleviation and other development objectives is clear-cut and relatively immediate, and to which there is therefore strong local commitment. The strategy also reaffirmed the WBG's continuing support for projects with global benefits where the additional costs required would be fully funded by international sources, such as GEF.

18. **Some specific targets set in *FFT* have been met; notable among the areas with slower progress has been regional energy trade**. The WBG has played an important role in fuel reformulation, particularly in the Africa and the Latin America and the Caribbean regions, and for gasoline lead phaseout worldwide. Global initiatives, technical assistance, and lending projects have been addressing gas flaring, promotion of environmentally sound exploration and production of fossil fuels, and rehabilitation of degraded facilities and areas. Progress in realizing the benefits of cross-border energy trade has been slow, underscoring the difficulties of coordinating energy companies and governments across national boundaries and also reflecting the effects of the WBG's increasing disengagement from the energy sector until 2003 (annex 5). For mitigating the potential impact of energy use on climate change, the WBG was already actively engaged with GEF at the time of *FFT*. A year later, the first carbon finance fund was established, and the number of carbon funds and facilities has since grown to 12 with a business portfolio of US$2 billion.

19. **The 2001 energy strategy defined four lines of business—direct poverty alleviation, macro and fiscal stabilization, governance and private sector development, and environmental sustainability—and set several 10-year targets**. Unlike *FFT*, all targets set by the 2001 energy strategy were high-level, global goals not necessarily linked directly to WBG operations. The targets for increasing access to electricity, reducing CO_2 emissions intensity, and reducing energy intensity have been met. Good progress appears to have been made in setting up sector regulators. However, there has been no progress in reducing the budgetary burden of the

power sector, increasing private sector participation, and having two or more suppliers of electricity, natural gas, or both available for industrial users to choose from. In all cases, there were large regional differences (annex 6). An emerging lesson, consistent with evaluations carried out by the Quality Assurance Group (QAG, an internal unit established to conducts quality assessments of selected operations during their preparation and implementation) and the Independent Evaluation Group (IEG, an independent department that reports directly to the World Bank's Executive Directors evaluating the relevance and impact of WBG support to client countries), is that it was probably premature to set such high targets for sector reform when the underlying institutional capacity was weak.

20. **The power sector reform model embraced in the 1990s—unbundling, setting up an independent regulator, and letting the private sector own and operate the supply chain—has had mixed results**. There is a widespread recognition of the need to develop approaches tailored to individual countries' specific circumstances. A 2003 IEG review of the WBG's experience with private participation in the power sector in the 1990s found that good outcomes could be obtained where there was client ownership and a sustained political commitment to private sector development. The results were poor where there were multiple objectives and the World Bank underestimated the complexity and the time required for lasting reforms. IFC and MIGA responded to market demand for new power generation, focused on the single objective of private sector participation, and achieved project-level good outcomes overall. A 2006 review of lessons from reforming power markets in developing countries stressed the need to adapt power market reform to starting conditions and discussed how the different conditions could influence the design of power reform programs (Besant-Jones 2006). Private power sector investment in developing countries increased rapidly to 1997 (flowing mainly to East Asia and Latin America) but then declined sharply until a major recovery in 2007; the current global recession makes private sector financing more difficult to access.

21. **The role of the WBG in extractive industries has received global attention**. Between 2001 and 2003, the WBG conducted a comprehensive assessment of its engagement in extractive industries (EI) in response to questions about whether such engagement is consistent with the WBG's goals of sustainable development and poverty reduction. Oil, gas, and mining provide a significant source of income for dozens of resource-rich countries—many of them poor—making sound resource management and adoption of pro-poor policies critical. The management response to the Extractive Industries Review, approved by the WBG's Board of Executive Directors in 2004, confirmed that the WBG should remain engaged in extractive industries and committed the WBG to be selective in its approach, with a greater focus on the needs of poor people and the rights of those affected by EI investments, a stronger emphasis on governance and transparency, and greater support for mitigating environmental and social risks (WBG 2004). Since 2005, the WBG has reported annually on progress in its implementation. A number of its key recommendations, for example concerning broad community support as a requirement for WBG engagement in EI projects, have been incorporated in WBG policies. IFC has worked with investors in the project it supports to help ensure that communities benefit from projects, such as through support for "linkages" programs that help expand the involvement of local businesses in EI projects. IFC has established CommDev, a facility aimed at working with partners to develop and help implement good practice approaches to communities and EI investments. In the policy arena, the Bank has given significantly more focus to EI governance, including supporting the Extractive Industries Transparency Initiative (EITI)—a coalition of governments, companies, civil society groups, investors and international organizations that requires upstream oil, gas, and

mining *companies* to publish what they pay and *governments* to publish what they receive—and, more recently, covering issues across the EI value chain in EITI++.[1] On the global environmental front, the Global Gas Flaring Reduction Partnership has been supporting national efforts to use currently flared gas by tackling the constraints on gas utilization (annex 7).

22. **WBG lending for energy is rebounding strongly after a decade of decline**. WBG lending for energy declined to an annual average of about US$2.4 billion in FY2000–04 from US$3.7 billion in the preceding five years (annex 8). Lending began to increase after Bank management, at the request of the Board of Executive Directors, launched an Infrastructure Action Plan in 2003 to revitalize the WBG's engagement, and more than tripled by FY09, reaching $8.2 billion.

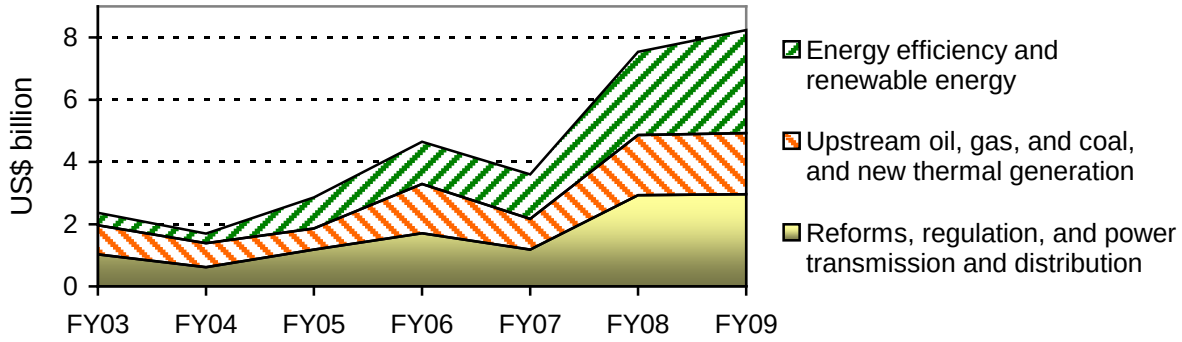
23. **The WBG has further strengthened its efforts on extending access and addressing climate change in recent years**. At the June 2004 Bonn International Conference on Renewable Energies, the WBG made a commitment to scale up energy efficiency and new renewable energy (comprising energy from solar, wind, biomass, and geothermal, as well as hydropower from facilities smaller than 10 megawatts) by 20 percent a year over the average of the commitments in the preceding three years; the WBG met this target with a comfortable margin in the following three years. In July 2005, the World Bank was asked at the annual summit of the Group of Eight nations to facilitate the creation of an investment framework on clean energy and development, and to contribute to fostering a global dialogue around these issues. The WBG formulated an Investment Framework for Clean Energy and Development (CEIF) in 2006 to accelerate private and public sector investments in energy access, mitigation, and adaption. The share of the WBG's energy lending devoted to low-carbon projects increased from 27 percent in FY2003–05 to 40 percent in FY2007–09. Although high-efficient coal-fired thermal plants (super-critical and ultra-supercritical coal where they upgrade plant efficiency relative to the business-as-usual scenario) were included in the definition of low-carbon projects, in practice no coal-fired power projects for new generation capacity have been counted toward low-carbon projects to date. From now on, this category of projects will be omitted from the definition of low-carbon projects. The level of lending for energy efficiency and renewable energy reached US$3.3 billion in FY09 (Figure 1). Figure 2 shows a breakdown of the three categories of operational activities by WBG institution.

24. **A review of IEG and QAG project evaluations and Country Assistance Strategies[2] points to improving overall performance, but with some exceptions and large regional variation**. A review of IEG assessments of IDA and IBRD projects shows that the share of satisfactory projects in energy and mining closing in FY1998 or later increased appreciably until the mid 2000s but declined some in FY2006–08. Weak institutional capacity is a common cause of poor performance, resulting in countries eligible for assistance from the International Development Association (IDA) accounting disproportionately for unsatisfactory projects. QAG

[1] EITI focuses on payments made to governments for producing oil, gas, and minerals (see www.eitransparency.org). EITI++ looks at the entire supply chain, from awarding of licenses and contracts to regulation and monitoring of operations, revenue management and allocation, and implementation of sustainable development policies (Mayorga Alba 2009).

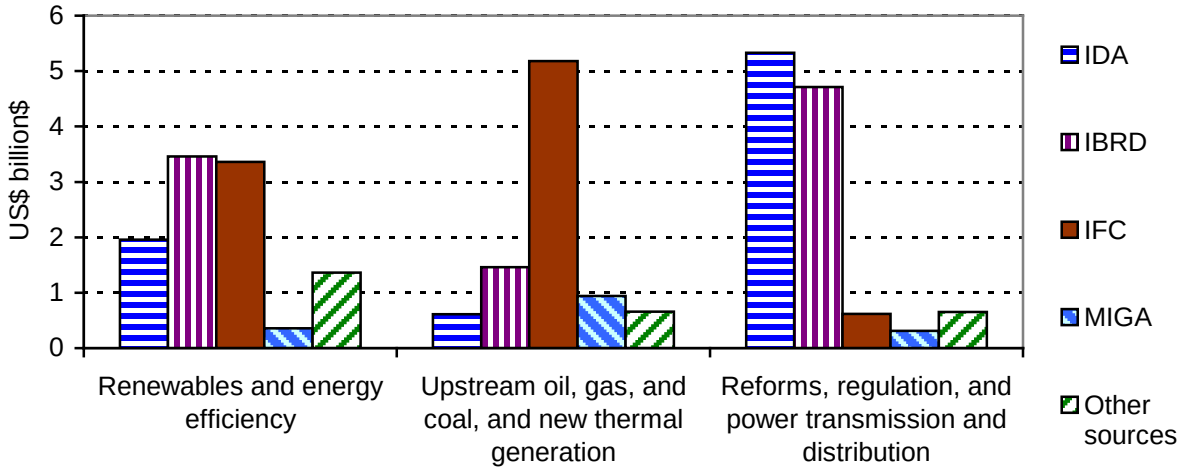
[2] The World Bank prepares a Country Assistance Strategy for active borrowers to set out a selective program of WBG support linked to the country's development strategy and based on the comparative advantages of the WBG in the context of other donors' activities. The Country Assistance Strategy is developed in consultation with country authorities, civil society organizations, development partners, and other stakeholders.

Figure 1 World Bank Group Energy Operations



Source: World Bank Group.

Figure 2 Breakdown of WBG Operations in FY03–09 by Institution



Source: World Bank Group.
Note: Other sources include GEF, IDA and IBRD guarantees, recipient executed financing, special financing, and carbon finance.

reviews of quality at entry and quality of supervision (in contrast to projects that have closed) have shown improvement over time. A review of Inspection Panel cases involving the energy projects point to the need to strengthen consultation with communities affected by proposed energy investments; carry out more careful examination of economic alternatives at the project concept stage that take into account social costs and benefits of different alternatives; and focus more on implementation to ensure compliance with the Bank's main environmental and social safeguard policies, particularly in countries with weak institutional capacity such as those in the Africa region (annex 9). A review of Country Assistance Strategies (CAS) shows that, in FY06–09, energy issues and energy policy were addressed in half of the CAS, and energy policy targets were set in 40 percent. About 70 percent of CAS acknowledged a link between poverty and inadequate supply of energy (annex 8).

25. **IEG has conducted several reviews of energy sector operations in the past decade**. All of them have urged strengthening monitoring and evaluation. There have also been a number of assessments of country-specific energy operations. "New Renewable Energy: A Review of the World Bank's Assistance" in 2006 assessed the World Bank's new renewable energy projects

against three of the four lines of business in the 2001 energy strategy (all except macro and fiscal stabilization). The review found that Bank's new renewable energy program was well anchored in the three lines of business, and recommended that the Bank focus in particular on its catalytic role for private sector development, staying flexible and innovative by applying lessons learned to improve the design of projects, and more widely disseminating good practices.

26. In 2008, IEG issued two evaluation reports. "Climate Change and the World Bank Group—Phase 1: An Evaluation of World Bank Win-Win Energy Policy Reforms"—on removing energy subsidies and promoting end-use energy efficiency—found that the volume and policy orientation of World Bank efficiency lending had been modest. IEG recommended greater coordination of efforts to remove energy subsidies and improve end-use efficiency, and improving data collection for benchmarking, monitoring, and assessment. "The Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits" found that, although evidence remained weak for many of the claimed benefits of rural electrification, the benefits appeared to be above the average long-run supply cost, suggesting that cost-recovery tariff levels could be achievable.

27. **The 2008 Sustainable Infrastructure Action Plan encapsulated the guiding principles of the WBG's energy sector engagement over the years in what it called the triple bottom line**. Contextualizing for infrastructure the WBG's pursuit of economic growth, equity, and environmental sustainability, SIAP seeks (1) *economic and financial viability* in the infrastructure sector to better equip it to contribute to economic growth; (2) *social inclusion* whereby infrastructure goods and services are provided to the poor, remote communities, women, and other historically disadvantaged groups; and (3) local and global *environmental sustainability*. Building upon SIAP and as part of the WBG's response to the financial crisis, the Infrastructure Recovery and Assets Platform (INFRA) was developed in early 2009 to maintain long-term infrastructure investment programs. INFRA will provide counter-cyclical financing of infrastructure over three years and protect existing assets and priority projects. An important component of INFRA is the **Energy for the Poor Initiative**, which aims to expand energy access, help the poor adjust to energy price shocks, and reduce their vulnerability to volatile energy prices. In addition, IFC's Infrastructure Crisis Facility has raised €1.6 billion for co-financing to date.

28. **The WBG in 2008 adopted DCCSF after extensive internal and external consultation**, committing the energy sector to increase financing of new renewable energy and energy efficiency by an average of 30 percent a year, and the share of low-carbon projects is projected to reach 50 percent by FY2011. These efforts will be supported by a growing carbon finance business and the Clean Technology Fund—Egypt, Mexico, and Turkey have recently asked for CTF support for their sector-wide low-carbon investments—and SREP. If new financing instruments such as the Carbon Partnership Facility grow substantially, the WBG's role in financing sustainable energy programs will likely increase correspondingly.

Objectives and Approach

29. **The proposed energy strategy will articulate a way forward to help developing countries achieve the twin objectives of**

- **improving access and reliability of energy supply;**

- **facilitating the shift to a more environmentally sustainable energy development path.**

The twin objectives distill central aspects of *FFT* and the 2001 strategy (annex 10). Achieving universal access remains an unfinished agenda, particularly in Sub-Saharan Africa. The WBG will strive to help provide modern energy services to the world's poor, which in turn could contribute to the achievement of some Millennium Development Goals (annex 10). It is worth noting that extending access to modern energy services is not simply a matter of providing the supply infrastructure. Improving the reliability of electricity supply is equally important in virtually all countries for enhancing household welfare as well as for efficient business operations. For petroleum products, improving supply reliability is relevant for many fewer countries. The second objective responds to the need—driven by resource as well as local and global environmental constraints—to transform the global energy market. For the WBG's client countries, this will be facilitated by new and additional international financing to meet incremental costs, non-financial risks, and institutional and technical capacity needs.

30. **Where there are synergies between the twin objectives, they will be pursued aggressively**. Many policies to improve the energy sector performance can enhance supply reliability, reduce risks from supply disruptions, and increase access, while simultaneously facilitating moves toward a low-carbon economy. ***The WBG will give greater attention to decreasing consumption—through end-use energy efficiency improvement and energy conservation—and increasing supply efficiency***. These steps are not only equivalent to adding more capacity, but can also lower end-user prices—thereby enhancing affordability—and contribute to environmental sustainability. Institutional and capacity strengthening, enhancing regulation, and targeting price subsidies will help achieve and sustain significant energy efficiency gains and make effective use of new technologies as well as new carbon financing mechanisms. The same essential elements for strengthening the energy sector performance are needed to put developing economies on an environmentally sustainable and climate-resilient path. In selecting projects, priority will be given to those that contribute to both objectives.

31. **To achieve the twin objectives, two strategic supporting pillars—considered essential for a reliable, efficient, and sustainable energy sector—are proposed** (Figure 3):

(1) Improving the operational and financial performance of the energy sector

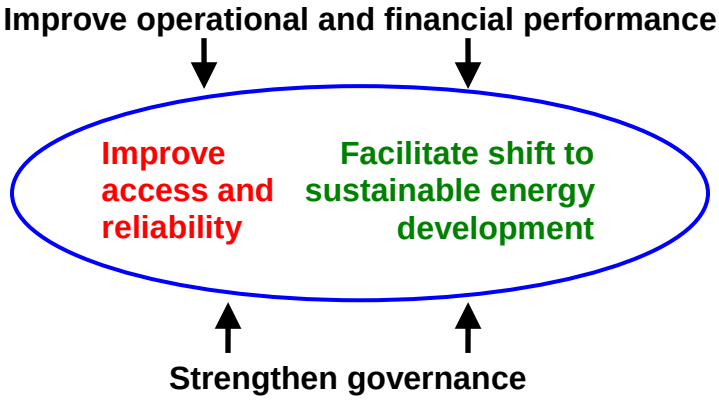
(2) Strengthening governance to improve the contribution of energy to equitable economic development.

Having efficient and financially sound energy companies is a pre-requisite. Poor management of power utilities results in inefficient operation and large technical and non-technical losses, which reduce their ability to finance new investments.[3] Pricing energy below cost exacerbates financial difficulties for all companies, public and private. Strengthening governance is important for ensuring that energy contribute to equitable economic development. Governance is important at every level in the sector: government, state agencies, enterprises, and consumers. Given that public utilities are expected to dominate the power sector in many countries in the coming years, improving corporate governance and strengthening their overall performance is particularly important. For many large hydrocarbon exporters, improving governance in the sector can help

[3] For a more detailed discussion on technical and non-technical losses including successful cases of loss reduction in recent years in developing countries, see the background paper, "Reducing Technical and Non-Technical Losses in the Power Sector," posted on the WBG Energy Strategy website (Antmann 2009).

spur economic growth that is both inclusive and sustainable. An energy market that has due regard for the rule of law is likely to be efficient and help create an enabling environment that can attract and retain private financing.

Figure 3 Framework for the Energy Strategy

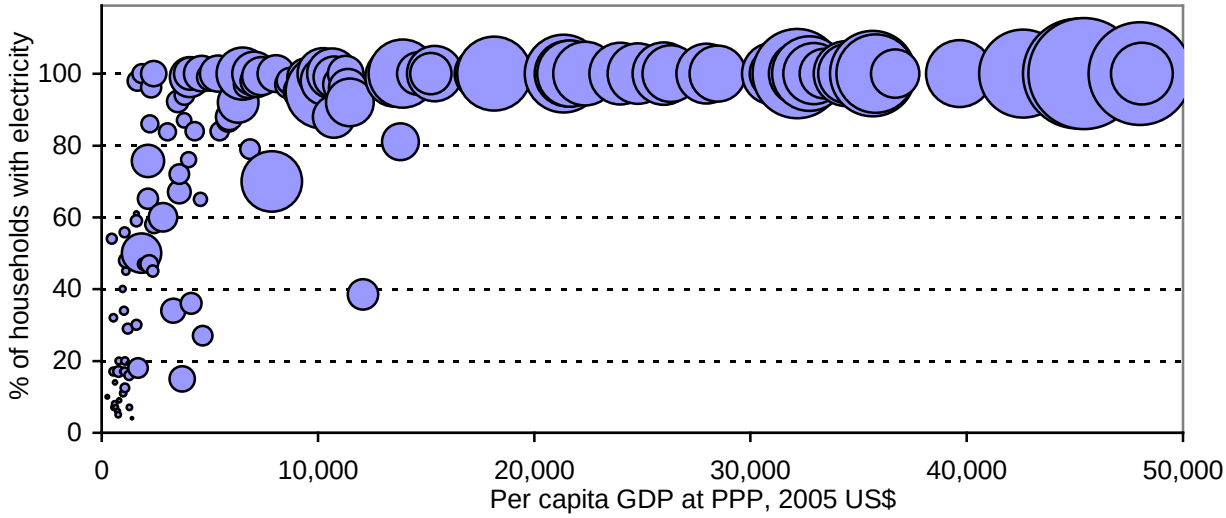


32. **The WBG will maintain its engagement in certain areas across all regions and income categories**. The WBG will continue to support multiple objectives of policy and institutional reforms, including creating an enabling environment for private sector participation and investment. Public-private partnerships will be actively pursued. The WBG's comparative advantage in supporting cross-border energy trade and regional integration by facilitating South-to-South cooperation will remain important for meeting demand and improving reliability of supply, particularly for regional power pools such as those in Sub-Saharan Africa. The WBG will increase investment in hydropower projects, with a focus on integrated water resources management which takes into account different users of water and multiple objectives in managing and regulating water. The WBG will continue to finance transmission and distribution, and in addition will consider thermal generation in accordance with the guidelines set forth in DCCSF—which stated that the WBG will give priority to interventions with direct GHG reduction benefits such as (a) thermal power plant rehabilitation, (b) increasing the efficiency of new thermal power plants, (c) early retirement of inefficient plants and replacement with state-of-the-art facilities, and (d) gas flaring reduction (gas could be used for power generation)—as well as the specific agreed criteria with respect to coal (see Box 1 on page 16). Requests for emergency generation will be considered on merit. The WBG will also selectively support energy development projects in extractive industries where these will contribute to the sustainable development of communities and countries. In this respect, the WBG will continue to be guided by the Management Response to the Extractive Industries Review.[4]

[4] The Management Response summarizes the future engagement of the WBG as follows: "Our future investments in extractive industries will be selective, with greater focus on the needs of poor people, and a stronger emphasis on good governance and on promoting environmentally and socially sustainable development. When requested, we will also continue to advise and help governments create appropriate policy and regulatory frameworks for the sustainable development of their countries' resources. In addition, we will take major steps to increase our own support, as well as to encourage and advocate for more global support, for economically viable renewable energy and other clean fuels. Our goal is clear: to help developing countries provide their people with access to clean, affordable, and sustainable sources of energy and to ensure that extractive industries contribute to economic growth, sustainable development and poverty reduction."

33. **The Strategy will recognize that different country circumstances require tailored approaches**. The strategy will elaborate upon varying approaches appropriate for the specific country circumstances, ranging from low-income countries with very low access to middle-income countries with universal access to modern energy services. Figures 4 and 5 plot income against the share of households with access to electricity and hours of power outages, respectively. There is a continuum of circumstances, with low income, low access, and low reliability at one end of the spectrum and high income, universal access, and high reliability at the other. Although middle-income countries tend to have high access and high supply reliability, a number of them face narrowing supply margins and some have suffered from serious power shortages. Low-income countries are more likely to have low access and poor supply reliability, although some have near-universal access, high reliability of power supply, or both. Estimated losses of GDP due to outages can be large—as high as 6 percent in Malawi according to one study (Eberhard and others 2008). Figure 4 also includes developed countries (on the extreme right) and shows the relative magnitudes of energy-related CO_2 emissions per capita. Countries with the lowest access rates have very low per capita emissions; in fact, some are hardly visible in the figure because their emissions are so small. It is worth noting that, according to World Bank estimates, if all households without access were to be connected to electricity, their additional consumption would amount to less than 2 percent of total world electricity consumption, or less than 1 percent of global energy-related CO_2 emissions.

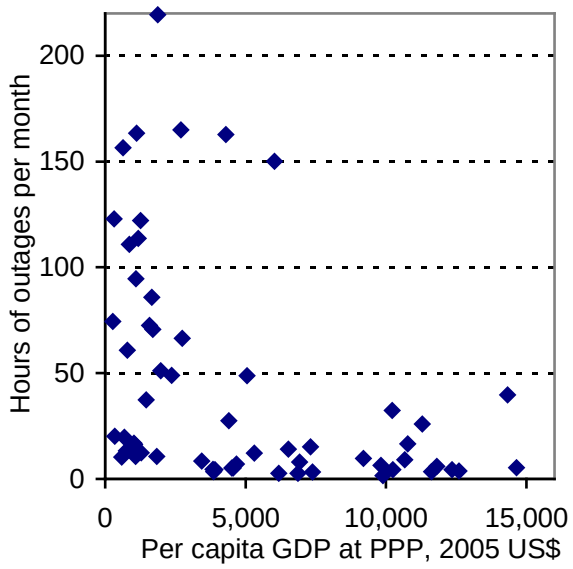
Figure 4 Access to Electricity and CO_2 Emissions



Sources: Various household expenditure surveys, government statistics, World Bank 2008a.
PPP ≡ purchasing power parity
Notes: Data point sizes are proportional to energy-related CO_2 emissions per capita. Developing countries for which access data and GPD data at PPP are available, and developed countries of varying sizes and income levels are shown.

34. **In low-income countries as well as post-conflict and fragile states and poor areas of middle-income countries with low energy access rates, the WBG will seek to simultaneously address the need to improve reliability to the served and the lack of access of the unserved**. Globally, those who lack access to electricity or rely on traditional use of solid fuels (coal and biomass) for cooking and heating number billions. The electrification rate of 30 percent in Sub-Saharan Africa is the lowest in the world, followed by South Asia at 60–65 percent. One-third of

Figure 5 Hours of Electricity Outages



Sources: World Bank 2008a and 2009a.

total installed capacity in India is captive generation—electricity generated typically by firms for their own use. Even with so much captive generation, grid-based power shortages during peak hours averaged 17 percent in the first half of 2009. Because household power use contributes to peak consumption, such a large peak shortage makes it all the more difficult to extend access. To cope with widespread outages in Sub-Sahara Africa, a number of countries have had to contract short term leases for emergency generation in the form of containerized mobile diesel units costing as much as U$0.35 per kilowatt-hour, with lease payment absorbing more than 1 percent of GDP in many cases. Similar circumstances elsewhere have meant that the world's poor all too often pay more per unit of basic energy service, either because the energy provided is expensive, or they lack access and the substitutes—such as kerosene for lighting—are even more costly. Expanding supply capacity, improving supply reliability, and increasing access will be critically important. Increasing supply efficiency *and* passing efficiency gains to consumers improve affordability and are important under all circumstances, but particularly in low-income countries where any step that can lower end-user prices can help increase access to modern energy services. And without access to such energy services, the poor will miss out on the most basic economic opportunities and improved standards of living. For this reason, access to reliable modern energy services will remain the first priority. Where possible, the WBG will proactively seek opportunities to make low-carbon alternatives affordable, including obtaining financing from SREP.

35. **The WBG will strengthen its partnerships with middle-income countries by helping to address a variety of local and emerging global challenges and increasing support to innovation and transformation.** Particularly in large middle-income countries, the WBG's financing will continue to constitute a small fraction of their total energy investment. Increasingly, the WBG will be in a strong position to respond to requests from clients to help them transform their energy landscape, playing a catalytic role in supporting commercial-scale renewable energy, supply- and demand-side energy efficiency, and emerging clean technologies and related infrastructure facilities. The WBG can leverage carbon finance and other financing instruments such as the Clean Technology Fund and the Carbon Partnership Facility, facilitate technology partnerships, and provide technical assistance and policy support. Furthermore, as the global carbon market continues to mature, the WBG will be able to leverage private investment through innovative applications of its core instruments, such as guarantees and loans, linked to future carbon credit streams. IFC and MIGA have already developed and piloted such applications of their guarantee instruments.

36. **In addition to the above two broad categories, energy resource endowments, the size of the economy, progress in achieving satisfactory performance and strengthening governance of the energy sector, and the socioeconomic profile are among other factors that will shape the WBG's operations in individual countries**. Small countries, landlocked

countries, and island economies have unique needs. Regions within a large country may be as varied in income and the state of energy sector development as between countries. The WBG will continue to tailor its engagement according to each country's specific conditions and client demand, and in doing so, the energy strategy will be aligned with the WBG's six strategic themes (annex 10) endorsed by the Development Committee at the April 2008 Spring Meetings.

Scope

37. **Energy is an important input to all sectors of an economy, calling for close coordination between the energy strategy and those in other WBG sectors**. The energy strategy will be aligned with various documents including DCCSF and the forthcoming World Development Report 2010 on climate change; the existing governance and anti-corruption, transport business, and health strategies; and several strategies and strategy updates currently under preparation including environment, urban, private sector development, water, and social development. In particular, the energy strategy will, among others, take the principles and criteria specified in DCCSF and detail operational implications as needed. Appendix 1 delineates the scope of the energy strategy and energy-related activities covered by other sector strategies. Among the energy-related topics in the urban and environment sector strategies are two strategic pillars—urban poverty and slum upgrading, and urban environment and climate change—in the urban strategy (FY10) and an assessment of safeguards policies and exploration of new tools and products for carbon transactions in the environment strategy (FY11). Carbon transactions are particularly important for accelerating adoption of GHG-saving measures and technologies in the energy sector.

38. **The energy strategy will build upon existing regional initiatives and strategies and recent sub-sector strategies and business plans**. Among the regional strategies and business plans are the Africa Action Plan and the regional energy strategies for Africa and Latin America and the Caribbean. Annex 11 describes sub-sector strategies for new renewable energy, energy efficiency, hydropower, small-scale natural gas to power, and extractive industries (EITI++). The WBG staff's understanding of the main issues in WBG client countries and priorities identified for future WBG engagement are provided in Appendix 2 as a starting point for seeking input from the WBG's stakeholders.

39. **In making choices, the strategy will reflect the lessons learned in the past two decades**. For example, making energy affordable is important for meeting the basic energy needs of the poor. But even after lowering prices through improving supply efficiency and making appropriate use of targeted subsidies, some among the poor will find modern energy services unaffordable. Social protection schemes can help, but they have limitations. Shifting away from traditional use of solid fuels is particularly challenging because, unlike electricity, cooking and heating fuels are usually for consumption, not production. The primary determinant of fuel switching is the household's ability to pay and poor households are cash-constrained. Global experience also shows that effective targeted subsidies for liquid fuels are rare. The focus should be on raising the income of the poor, which lies largely outside the scope of the energy sector. In this context, the energy sector's contribution to equitable economic development is an important aspect of reducing energy poverty. Lessons on facilitating regional energy trade, energy efficiency improvement measures, public-private partnerships, sector reform, adoption of low-carbon technologies, and transition to modern household energy will be examined in background and other papers and discussed during the consultation.

Proposed Areas of Action

40. The twin objectives and the two strategic supporting pillars call for action in a number of areas.

41. **Help expand capacity, conserve energy, and achieve more efficient management—both technically and administratively—of energy supply and demand to increase reliability and access.** For increasing these, all options will be considered: diversification to different sources of energy where economic and for different uses (such as modern use of biomass, biogas, geothermal, micro- and mini-hydro, co-generation, wind, and solar for heating and electricity); grid-based and off-grid electricity supply including distributed generation as well as transmission planning to integrate renewable energy in grid supply; reducing technical and non-technical losses in, as well as expanding, transmission and distribution; enhancing efficiency in district heating; large-scale as well as small early-stage gas to power (annex 11); energy trade and regional integration of energy markets; and demand-side management (residential, commercial, agriculture, transport, industry). Diversification can strengthen supply reliability. Tools available in the energy sector to serve the poor include commercial arrangements like cooperatives, pro-poor methods of financing connections for electricity and natural gas, and making lifeline rates affordable for energy distributed through networks. In the oil sector, a number of countries with large subsidies for petroleum products have experienced supply shortages and high prices on the black market, reducing the energy security particularly of the rural poor. Large universal oil price subsidies also deter penetration of high-efficiency measures and new renewable energy. This underscores the importance of subsidy reform.

42. **Take advantage of synergies. Explore international financing to buy down incremental costs.** Frequently, there are synergies between increasing reliability and access on the one hand and low-carbon means of achieving this goal on the other. Supply- and demand-side efficiency improvement and use of renewable energy in off-grid applications are two examples. External factors will play a critical role. There is no country that always chooses low-carbon technologies because they are not always the lowest-cost options and affordability is important, even in developed countries and especially for the poor in developing countries. The WBG will continue to maintain the position, stated in *FFT*, that it will help countries pursue higher-cost alternatives with global benefits for improving access and supply reliability if the incremental costs are covered by international financing. Greater availability of new climate financing for all developing countries—ultimately linked to a successful outcome of international climate negotiations—will enhance the WBG's ability to support climate-friendly alternatives.

43. **Respond to trade-offs where justified**. An example of a trade-off drawing attention is coal-based generation. In some countries, electricity from coal is significantly cheaper for providing base load power (continuous generation for basic demand; see annex 3) than any other source. Although financially attractive, coal combustion generally emits more GHGs per unit of electricity produced than any other fuel. There will be situations where international climate financing will be able to buy down the cost difference between coal and a much less GHG-intensive alternative, but not always. Smaller and poorer countries—with limited potential for energy diversification and high vulnerability to oil price shocks—have so far been least able to access such financing sources. In this context, DCCSF concluded that the WBG could use its traditional financing instruments to support client countries to develop new coal power projects under certain conditions (see Box 1). The strategy will elaborate on how to apply the various considerations cited in DCCSF in practice. As for coal mining, apart from the capture and

utilization of coal bed methane, financing in support of traditional coal mining since FY03 has amounted to only 0.2 percent of the total WBG energy operations. Support for coal mining will be guided by the management response to the Extractive Industries Review and will depend on development impact and overall consistency with local and regional development strategies.

Box 1. Factors to consider when engaging in coal-fired power generation.

DCCSF concluded that the WBG could use its traditional financing instruments to support client countries to develop new coal power projects by considering the following:

(1) There is a demonstrated developmental impact of the project including improving overall energy security, reducing power shortage, or increasing access for the poor.
(2) Assistance is being provided to identify and prepare low-carbon projects.
(3) Energy sources are optimized, looking at the possibility of meeting the country's needs through energy efficiency (both supply and demand) and conservation.
(4) After full consideration of viable alternatives to the least-cost (including environmental externalities) options and when the additional financing from donors for their incremental cost is not available.
(5) Coal projects will be designed to use the best appropriate available technology to allow for high efficiency and, therefore, lower GHG emissions intensity.
(6) An approach to incorporate environmental externalities in project analysis will be developed.

44. **Take account of environmental and social effects of energy supply and use**. Environmental sustainability requires support for energy efficiency improvement (both supply and demand), energy conservation, energy investments with low lifecycle GHG emissions, environmental management systems, gas flaring reduction, minimizing local pollutant emissions and discharges, and environmentally responsible waste disposal (such as fly ash). The WBG makes use of a number of initiatives, programs, and partnerships to address these issues (annex 7). Also important is social inclusion, including the gender dimension of energy sector development. WBG activities in energy will continue to pay due attention to community participation and ensuring that women, minority groups, indigenous peoples, and others participate in appropriate decision-making processes and benefit from energy sector development. Given a growing number of requests for financing ethanol and biodiesel projects received by both the agriculture and energy sectors, the strategy will also consider, in close coordination with the WBG's agriculture sector, when and how the energy sector might consider engaging in biofuels. In so doing, careful consideration will be given to the potential social and environmental risks of biofuels: upward pressure on food prices, intensified competition for land and water, and land-use change that may outweigh the GHG benefits of fossil fuel substitution.

45. **Support countries in their efforts to shift to a low-GHG-intensity path**. Because energy is used in a wide range of sectors, this requires cross-sectoral coordination at the country level. Raising awareness—about efficient or renewable lighting options as new schools and health clinics are built, and taking appropriate account of GHG emissions in setting building codes, vehicle efficiency, and industrial efficiency standards, to mention a few examples—will be important steps. Private sector participation will be crucial, underscoring the importance of creating an enabling environment. Significant attention will be paid to helping formulate policies (pricing, regulations, incentives) needed, leverage specialized climate finance, develop institutions, and make best use of additional financing mechanisms. An important aspect of the WBG's engagement is to help countries access international financing sources and mechanisms, as well as help structure financing packages that would make investments with additional climate benefits competitive and financially attractive. The evolving financing architecture for climate

change mitigation requires that the WBG maintain flexibility in its use of instruments and programs. And irrespective of the mechanisms eventually agreed upon for global GHG emission mitigation, a de facto price of carbon will likely emerge. Given the long economic life of capital stocks in energy, it is important to think through the implications of different price scenarios on current and future investment plans. The WBG can help countries assess policies and strategies under different scenarios, including a focus on assessing the potential of energy efficiency and renewable options. Some client countries are considering nuclear power generation as an option in their energy balance, and are seeking WBG support to analyze this option as part of their overall energy strategies. When requested by client governments, the WBG will respond in the context of the overall country energy sector analytical work programs. However, because the issues are complex (economic, financial, environmental, social, safety, and non-proliferation), instead of building internal capacity in this area, the approach would be to build strategic knowledge partnerships with leading institutions and academic centers of excellence that have this capacity, and using these partnerships to respond to client requests. The WBG would continue with its policy of not financing nuclear power generation.

46. Building upon DCCSF, the WBG will continue to develop and apply methods for GHG analysis. The focus is on facilitating access to, and effectively using, additional climate finance and helping identify new business opportunities. The Bank is working closely with clients and local institutions—in consultation with civil society and other multilateral development banks—to develop and pilot methods to analyze GHG emissions in energy, transport, and forestry on a demand basis. The pilot will eventually be extended, for learning and information purposes, to a larger pool of projects. An emerging approach is to place the GHG analysis, focusing on net emissions from a project, in the context of its development impact and assess the trade-offs where applicable. IFC has been carrying out systematic accounting of GHG emissions in its real sector portfolio since February 2009, and lessons from IFC's experience will inform the strategy.

47. **Promote technology for global and local environmental sustainability**. Significant technological breakthroughs—for, for example, storing energy for intermittent renewable electricity (annex 3), concentrating solar power, and carbon capture and storage—are needed to put the world economy on an environmentally sustainable path in the coming century. Support for technologies that are particularly suitable for developing countries is also important. While the WBG has historically not financed pre-commercial technologies, it is continuing to work with GEF to help introduce relatively new technologies that require special incentives to be commercially competitive, or technologies that are proven elsewhere but new to the country, for demonstration effects. How the WBG can best contribute to promotion of clean technology in developing countries—including knowledge brokerage, South-to-South cooperation, and cooperation with regional banks—will be among the key questions that the energy strategy will consider.

48. **Help achieve sound operational and financial performance**, which is a pre-requisite for achieving the twin objectives. The performance of the energy sector can be improved by increasing supply efficiency, reducing technical and commercial losses in the power and gas sectors, moving toward cost recovery, and introducing stronger incentives. Institutional development is essential. Public-private partnerships can play an important role in improving the sector's financial performance.

49. **Work to target energy price subsidies**. Large universal price subsidies—all too often regressive—make financial sustainability difficult. Phasing out large price subsidies requires a sustained political commitment. A strategy based on sound analysis of winners and losers,

effective communication with a wide range of stakeholders to demonstrate that the benefits far outweigh the costs, and a credible plan to protect the poor can help forge such a commitment. The WBG can assist governments in protecting the poor through designing safety net programs and, where appropriate, efficient targeted subsidies. Energy efficient improvement could, as suggested by IEG (paragraph 26), ease the burden of the transition to market-based energy prices.

50. **Help strengthen governance**. Strong sector performance is underpinned by strong governance. Decades of experience in the power sector in developing countries, for example, point to the importance of improving corporate, regulatory, and market (particularly commercially oriented) governance (Besant-Jones 2006). This approach paper proposes that the WBG increase efforts to strengthen the corporate governance of public utilities; help governments and state agencies establish clear and fair legal, regulatory, contractual, and fiscal frameworks; regulate the sector effectively and improve market governance; systematically collect data; and make information—policies, regulations, energy supply and demand, prices, taxes, assistance provided to energy enterprises, and contingent liabilities for the state—regularly available to inform both the public at large and investors. Institutional and sector reform supported by good governance has been a long-standing agenda in the energy sector, but progress has been slow in many countries. The supporting work for the energy strategy will review the experience to date and consider different approaches in varying circumstances to propose the WBG's future role.

51. **Assist resource-rich countries in the management of extractive industries across the entire value chain**. Significant exporters of hydrocarbons face a unique opportunity and challenge. The sheer size of oil income compared to other sources makes the countries overly oil-dependent, but oil prices and hence their revenues are extremely volatile and unpredictable, subjecting both the government and the economy to rapidly swinging booms and busts. A concentrated revenue stream such as oil income tends to create a politically powerful minority, foster competition for capturing resource wealth, make it easier to have a non-transparent mechanism of accounting for and distributing resource wealth, and feed corruption. Against this backdrop, the Bank's energy sector is working with macro-economists to expand support for strengthening the governance of hydrocarbon extraction and revenue management through EITI++.

Implementation aspects

52. **Any sector strategy should make the most of the WBG's comparative advantage**. The World Bank's ability to bring lessons of experience from around the world about *how* to improve sector performance and our policy advice are generally considered its comparative advantage. Among IFC's comparative advantages are its technical skills, environmental and social safeguard expertise, global reach, and its membership of the WBG. MIGA's comparative advantages are its knowledge of countries and sectors, global reach, dispute settlement and mediation services, and its membership of the WBG. The strategy will assess what different roles the WBG institutions can play to their strengths, given different competencies and market niches, and how they can best complement and leverage each other. The strategy will also assess the relative strengths and suitability of different WBG instruments in varying circumstances and analyze the comparative advantages of, and potential division of labor among, other development partners including United Nations agencies.

53. **The WBG will make effective use of the complementary roles of the public and private sectors**. The private sector can provide much needed capital as well as technical and management expertise, and help reduce the financial burden on the state. However, attracting and retaining private investment generally requires a regulatory framework that creates a level-playing field and where contracts are honored. Among countries that seek private financing, those that have demonstrated a strong commitment to sector reform have been better able to attract significant private investment and on much better terms. The WBG will provide financing and advice to encourage and support effective regulatory frameworks and help countries create an enabling environment for attracting private investment, making use of the WBG's comparative advantage in providing experience and the lessons learned from across a range of sectors and multiple management and investment arrangements.

54. **Knowledge management is one comparative advantage of growing importance to all three institutions**. The decline in energy sector activities in the late 1990s and early 2000s means that staff skills to maintain this comparative advantage have not necessarily been sustained. The success of knowledge generation and sharing activities depends crucially on the quality of the products—there will always be demand for, and greater acceptance of, high-quality knowledge products. Going forward, there is a need to strengthen skills for both increasing the WBG's operations in energy efficiency and renewable energy and enhancing knowledge management. Recent price shocks and supply disruptions in the energy sector have also highlighted the importance of just-in-time policy and technical advice. The WBG is also increasingly acting as a knowledge broker for South-to-South knowledge transfer. The energy strategy will examine how to strengthen knowledge management and adapt to shifting priorities in the WBG's operations.

55. **Collaboration inside and outside the WBG can increase our effectiveness**. SIAP stresses the importance of the WBG's leveraging its limited financing through additional private financing and aid resources, and making use of products that mitigate financial risks and reduce costs. GEF, carbon finance and the Clean Technology Fund can leverage a substantial portfolio, as can innovative financial instruments such as the WBG's guarantees and sub-national business—since 1997, IDA guarantees have enabled poor countries to leverage their limited IDA resources ten-fold through project financing. Donor coordination through co-financing could be attractive, but the associated transaction costs are often high, not least because procurement procedures and safeguards policies and their application differ from institution to institution (annex 12). Partnerships with universities and think-tanks can also help strengthen knowledge management. The energy strategy will draw upon lessons in IEG's forthcoming review of the WBG's safeguards policies as well as our experience with other donors. Building upon a recent Board paper on IDA-IFC collaboration, the energy strategy will explore how incentives to encourage cross-institutional (as well as inter-sectoral) interactions and building synergies in business opportunities across WBG institutions, including through the IDA/IFC Secretariat—recently established within the WBG with the goal of improving and increasing collaboration between the World Bank and IFC in IDA countries— might strengthen the overall effectiveness of the WBG.

Steps for Preparing the Strategy

56. **The energy strategy team will continue to assess the WBG's performance** by reviewing Country and Partner Assistance Strategies[5] to see the extent to which energy issues have been incorporated into country programs, new IEG and QAG reports, data on lending patterns and outcomes, self-assessment made by staff, and views expressed and information gathered during the external consultation. Lessons learned will be synthesized and discussed to guide the strategy. Other sector strategies and IEG's forthcoming evaluation of the WBG's project-level experience in promoting technologies for renewable energy and energy efficiency will be important inputs.

57. **The energy strategy will develop a results framework with a manageable number of measurable indicators** based on a common definition to enable cross-country comparison and to assess the implementation of the strategy. Several IEG reviews of the energy sector have stressed the need to strengthen monitoring and evaluation. A results framework and new monitorable indicators for the next 4–5 years will be developed in coordination with the development of core IDA indicators currently underway as well as indicators being developed in other strategies and strategic frameworks. They will be assessed and realigned as needed mid-way through the implementation of the strategy. A challenge that requires careful consideration is how to strike a balance between seeking meaningful economy-wide outcomes—over which the WBG typically has little control and hence are not good measures with which to assess the WBG's performance—and specific results that can be reasonably tied to the WBG but that may have little, if any, influence on national statistics. The resources needed to collect the requisite data across the developing world present another challenge. In alignment with core IDA indicators, the indicators for the energy strategy are likely to be based largely on WBG project interventions.

58. Table 1 provides the timetable for completing the energy strategy. A preliminary outline of the strategy can be found in Appendix 3.

Table 1 Energy Strategy Timetable

Date	*Item*
Oct 2009	Key documents posted on the Energy Strategy Web site
End-Jan 2010	Start of face-to-face, video-based, and Web-based consultations
May 2010	Close of the first comment period
Sep 2010	Committee on Development Effectiveness discussion of the strategy
Oct–Nov 2010	Draft strategy posted for a second comment period
Jan/Feb 2011	Board discussion of the strategy
Apr 2011	Publication of the strategy

External Consultation

59. **This approach paper forms the basis for external consultation**. The approach paper is supplemented by a series of background notes that are posted on the Energy Strategy Web site as annexes to the approach paper. Additional background papers and briefs are being prepared and will be posted as they become available (Appendix 4).

60. **The strategy team will make combined use of Web-based, video-based, and face-to-face external consultations**. During the consultations, input will be sought on the priorities of

[5] Over the last few years, most Country Assistance Strategies prepared for IBRD countries have been entitled Country Partnership Strategies, but there is not corporate distinction between the two documents.

the stakeholders, the appropriateness of the twin goals and the two strategic supporting pillars proposed, and of the associated approaches.

- The approach paper, associated annexes, and key reference documents will be posted on the Energy Strategy Web site between October 2009 and May 2010. The approach paper will be made available in six languages, all other documents will be in English. The electronic comment period on the approach paper will begin in January and last until May 2010.
- Face-to-face meetings will be held beginning in January 2010, consisting of country consultations, sub-regional consultations in some regions, and one regional consultation in most regions. A wide range of stakeholders—country authorities, civil society organizations, private sector, academia, and media—will be invited to participate in these meetings. Comments received and summaries of public consultation meetings will be made available on the Web site in English and, as much as possible, in the language of the consultation meeting.
- Videoconferences will be held with stakeholder groups within regions.
- Limited separate consultations, led by IFC, will be held with private sector firms and industry associations.

There will also be face-to-face consultation with international civil society organizations, representatives of other multilateral development banks, bilateral donors, and other energy experts in addition to the above meetings.

Appendix 1: Scope of the Energy Sector's Activities

Energy is an input in various other sectors for which WBG strategies, policies, and strategic frameworks exist and which deal with issues linked to energy. Which aspects of the energy sector will be covered by which other sectors is tabulated below.

Sector and key documents	*What the energy sector will cover*	*What the counterpart sector will cover*
Environment "Development and Climate Change: A Strategic Framework for the World Bank Group" (FY09), Strategy (FY11)	Development case for coal and other fossil fuels	Emission standards for production, transport, and combustion of fossil fuels in consultation with technology specialists; other safeguard issues; air/water/soil quality management; environmental health
	Entire power supply chain from generation to distribution including renewable	Environmental effects, other safeguard issues
	Renewable energy outside of power generation	Safeguards
	Hydro power	Safeguards
	Energy efficiency in energy supply	Safeguards
	Energy efficiency in industry (IFC)	Overlap with environment
	Household energy use efficiency (including efficient lighting)	Overlap with environment
	Access to modern commercial energy	Overlap with environment; environmental health
	Limited treatment of improved stoves based on traditional use of solid fuels (firewood, coal, dung)	Overlap with environment; environmental health
	Biofuels – cost-effectiveness, standards, policy	Environmental effects of biofuels including lifecycle analysis
	GHG emissions accounting in the energy sector	
	Including nuclear power in policy dialogue	
Transport Business Strategy (FY08)	Supply of transportation fuels Subsidies and taxation of transportation fuels	Modal shift for passenger and freight transport, transport planning, traffic management, demand management
Urban Strategy (FY09)	Impact of urbanization on energy use, access	Densification, urban planning
Water Strategy (FY04)	Efficiency of energy use in water supply operations Water requirements for energy supply Impact of water shortage on energy supply The energy sector will also contribute to multi-purpose water infrastructure and synergistic investments in energy and climate adaptation.	All other water sector issues
Health Strategy (FY07)	Supply of power to health institutions, efficiency of energy use in health	All other health sector issues Environmental health

Sector and key documents	*What the energy sector will cover*	*What the counterpart sector will cover*
Education	Supply of power to educational institutions, efficiency of energy use	All other education sector issues
Forestry Strategy (FY03)	Limited treatment of traditional use of biomass	Deforestation, potential impact of biofuel feedstock production on forestry
Agriculture and rural development Strategy (FY03)	Rural electrification Energy subsidies in agriculture Biofuels	Use of energy for production and economic development Impact of biofuels on agriculture, impact of agricultural policy on biofuels
Social protection "For protection and promotion: the design and implementation of effective safety nets" (Grosh and others 2008)	Social safety nets specific to energy	General treatment of social safety net issues
Social development Strategy (FY05)	Political economy of energy sector reform including PSIA	General treatment of the political economy of sector reform
	Community engagement and sharing of benefits across the value chain	Some overlap on community engagement
	Social dimensions of energy use and policy (gender, poor, minority groups, etc.)	Some overlap
PREM	Value chain from awarding contracts to collecting revenues in EITI++	Value chain beginning with revenue management in EITI++
	Reforming energy subsidies, pricing, and taxation, including PSIA and equity considerations	Fiscal and public expenditure frameworks, budget process, overlap on PSIA
Governance and Anticorruption Strategy (FY07)	Governance in the energy sector, particularly related to licensing, contracting, procurement, and revenue collection.	All other aspects of governance in the energy sector in consultation with energy staff Governance in other sectors and improving overall governance in the country
Financial and private sector development	Legal, regulatory, fiscal, and contractual framework for investors Institution strengthening for financial and private sector development Private investment (IFC)	Best practice on regulatory frameworks and incentives for private sector development in collaboration with energy staff Overall investment climate (for example, "doing business" surveys, enterprise surveys) , infrastructure projects database, privatization database, public policy for economy-wide issues, business environment toolkits
Sub-national 3-year program (FY07)	Limited treatment – impact of sub-national government laws, regulations, and fiscal policies; Bank's engagement with sub-national governments in large economies	New lending instruments for sub-regional credits and loans, all other issues

PREM poverty reduction and economic management, EITI Extractive Industries Transparency Initiative, PSIA poverty and social impact analysis.

Appendix 2: Energy Sector Priorities for the WBG Partner Countries and Planned WBG Areas of Focus

A survey of the World Bank's six regions and IFC departments focused on energy asked staff to identify what they saw as priorities for partner countries to address in the next 10 years. The matrix below shows WBG staff's understanding of what these countries see as their priorities in the energy sector.

Priorities in Partner Countries Identified by WBG Staff for the Next 10 Years

Area	*Priorities*
Africa	Increase access to electricity Increase power capacity and improve power reliability. Reduce power sector unit costs, including via improved functioning of utilities. Increase revenue / energy unit generated in certain countries. Improve environmental sustainability of biomass fuel use, including via improved technology, and increase access to cleaner cooking fuels. Develop hydropower in an environmentally sustainable fashion. Develop coal resource in certain countries. Achieve greater integration of regional power markets. Improve energy efficiency.
East Asia and the Pacific	Enhance legal and regulatory predictability. Address energy pricing. Develop local energy resources and increase regional energy trade as means of addressing energy security. Scale up renewable energy. Improve energy efficiency and mitigate environmental effects of coal fired power generation. Enhance reliability and security of supply in the power system. Continue rural electrification by (1) increasing access in less developed power systems; (2) completing the electrification and improving quality of service in more developed power systems; and (3) promoting off-grid renewable energy in distant areas and islands.
Europe and Central Asia	Increase generation capacity. Diversify energy supply and increase energy security. Improve energy efficiency. Work to comply with EU requirements. Improve the financial viability of utilities and develop more social protection mechanisms. Develop and strengthen energy natural resource development. Develop regional gas trade. Increase the use of renewable energy. Increase private sector financing for power. Work for climate change mitigation and carbon trading.
Latin America and the Caribbean	Strengthen energy supply and distribution, and the ability to finance investments. Increase clean energy investment, including energy efficiency and renewable energy. Diversify energy matrix and reduce oil vulnerability. Establish tariff schemes that cover efficient production costs and promote new investments. Establish rational and transparent subsidy programs that are targeted to poor households, avoiding errors of inclusion, exclusion, or regressivity.
Middle East and North Africa	Strengthen energy security. Work toward adequate supply capacity. Improve energy efficiency. Work for financial sustainability of utilities and subsidy reduction. Focus on energy's role in countercyclical fiscal stimulus. Address public-private risk sharing. Shift to cleaner energy. Develop safe nuclear energy.

Area	*Priorities*
	Work for greater commercialization of natural gas. Enhance regional integration. Pace investment in upstream oil optimally. Manage energy sector structural change.
South Asia	Strengthen energy security (supply reliability, availability, affordability), expand access, and address shortage of supply: • Increase generation, transmission, and distribution. • Reduce technical and non-technical losses in the energy sector. • Increase regional trade. • Strengthen energy sector management and regulation. • Improve financial performance of utilities and strengthen pricing and subsidy reform. • Improve energy efficiency. • Increase renewable energy.
World Bank Oil, Gas, and Mining Policy Division	For significant hydrocarbon producers, ensure that the framework for managing oil and gas maximize the development benefits for the economy. Maximize productive use of oil, gas, and coal through efficient recovery. Develop the appropriate policies and tools to deal with energy price volatility. Move away from universal price subsidies for liquid fuels, supplementing the subsidy removal with targeted social protection measures for the poor where necessary and feasible.
IFC Oil and Gas Division and IFC Mining	Promote the sustainable development of energy extraction, transport, and processing in a way that benefits communities and countries through the provision of the supply and processing of local energy for access/growth and through generation of other economic benefits.
IFC Power Division	Address large, unmet demand for electricity / mismatch between available supply and growing demand in IFC client countries. Address huge needs for investment in electricity sector in developing countries (more than US$200 billion for 2006–10 or a minimum of 2 percent of GDP). Decrease power distribution losses. In most IFC client countries losses in power distribution are in the double digits (11 to 40 percent). These losses create systemic inefficiencies and are environmentally unsustainable. Address the challenges compounded by the financial crisis and unwillingness / high risk perception of project sponsors to invest in developing countries. While some countries have begun reform, most do not have framework for private sector investment (outside of Latin America and the Caribbean), for example tariffs not at cost recovery levels in many developing countries. Help countries reduce their carbon footprint, diversify their portfolio energy sources, and help strengthen their energy security Strengthen the partnership between the World Bank and the IFC for identifying and financing viable projects in rural areas.
IFC Global Manufacturing and Services Department	Promote climate change mitigation in manufacturing and services sectors of focus (energy efficient machinery; construction materials; tourism, retail, and property; forest products) through energy efficient manufacturing, greening of buildings, manufacture and use of renewable energy and clean technology devices, carbon sequestration, and recycling. Specifically, • Support the transfer of solar photovoltaic manufacturing to emerging markets, so as to accelerate cost reductions and increase scale; • Invest in sustainable plantations and sustainable management of natural forests, paper recycling, use of waste wood, and low-value standing timber and wood-waste derived power generation projects; • Implement “green building” techniques in tourism, retail, real estate, and affordable housing projects; • Require manufacturing projects, particularly in energy-intensive processes, to demonstrate high levels of recycling and resource efficiency, or in brownfield projects to commit to energy efficiency upgrades.
IFC Climate Change Unit and	Redirecting investment and technology away from fossil fuels in the power sector. Introducing a wide range of measures on the demand and supply sides, not all of which are

Area	*Priorities*
Sustainable Business Innovator	yet commercially proven, to provide an equivalent energy service to users. Shorten the timeframe to develop and deploy new technologies, and find new means of accelerating technology diffusion. Reduce country-specific barriers to new technology deployment. Continue to work to improve electricity access and reliability.

Source: WBG staff survey.

The energy staff were also asked what they considered to be the areas where the World Bank and IFC should focus to support countries in dealing with these priorities.

Planned Activities of Focus in Partner Countries Identified by WBG Staff

Area	*Activities*
Africa	In the short term work to stabilize power systems across the continent through help with emergency generation, and more importantly with cost-effective interventions that reduce the demand for power. Improve energy efficiency through programs to introduce compact fluorescent light bulbs and tariff schemes that reduce peak demand. In the medium term support regional power trade in order to provide lower-cost energy from least cost expansion. Work to improve the functioning and efficiency of power utilities through improving governance, management capacity, and technical skills. Scale up electricity access, including public facilities such as clinics and schools, via sector-wide engagement through multi-year least-cost programs. In response to the financing challenge of meetings these objectives, play a catalytic role to encourage public-private partnerships and provide a framework for other donor's co-financing. Work with all parts of the WBG to finance large generation and transmission projects through Bank and MIGA guarantees, and IFC direct investments to leverage private sector investment, backstopped by IDA credits and guarantees as necessary. Work with other World Bank sectors and groups (agriculture, rural development, natural resource management, and gender) to develop a program for a more effective and sustainable use of biomass for cooking for rural and urban households. With respect to climate change, take into account the latest financing initiatives of the Bank and other donors by focusing wherever possible on low-emission projects, including new hydro schemes and interconnections that allow hydro to displace thermal power.
East Asia and the Pacific	Provide assistance to commence or complete energy sector reforms with a focus on enhancing power sector transparency, sustainable growth, and benefits for consumers. Facilitate and support investment in power generation and in the development of local energy resources to diversify fuel mix, with a focus on renewable energy and clean energy. Support the development of regional interconnections to increase power trade and integration of power grids. Support government strategies and programs to reduce energy intensity and improve energy efficiency. Support expansion, upgrade, and rehabilitation of power transmission, distribution, and system operation infrastructure. Enhance rural electrification by increasing access and quality of service. Work to support efficiency and low-carbon investment through climate change funding facilities.
Europe and Central Asia	Work with governments to implement energy sector plans. Support programs to improve energy efficiency and the use of renewable energy where possible. Support plans to improve energy security through diversification of sources of supply. In countries with power deficits, work to reduce losses and increase supply capacity. Address restructuring issues in the power sector, particularly in the light of bringing the sector in some countries into line with practices in the European Union.
Latin America and the Caribbean	Address power shortages through lending for hydropower and renewable energy generation, transmission, distribution, and energy efficiency. Develop a strategy for Central America to enhance energy security to meet supply needs and reduce vulnerability to oil price volatility. Work with countries to develop low-carbon programs, initially through the use of the Clean Technology Fund. Work with countries to rationalize tariff schemes and better target subsidy schemes.
Middle East and North Africa	Strengthen energy security. Work toward adequate supply capacity. Improve energy efficiency.

Area	*Activities*
	Work for financial sustainability of utilities and subsidy reduction. Focus on energy's role in countercyclical fiscal stimulus. Address public-private risk sharing. Shift to cleaner energy. Work for greater commercialization of natural gas. Enhance regional integration. Pace investment in upstream oil optimally. Manage energy sector structural change.
South Asia	Support the following: • Utility (including electricity and gas) reform, corporate governance, and performance management • Electricity/energy markets, including cross border, inter-state, and intra-state transmission • Thermal power generation (including rehabilitation and maintenance) and hydropower development • Renewable energy, including for rural electricity supply • Energy efficiency and demand-side management.
World Bank Oil, Gas, and Mining Policy Division	Support the Extractive Industries Transparency Initiative. Contribute to EITI++ in selected countries. Implement the natural gas strategy (see annex 11). Manage the Global Gas Flaring Reduction Partnership and follow up on selected countries with policies and projects to reduce gas flaring. Provide technical assistance to governments on upstream legal, fiscal, and transaction issues and on how to organize ministries, agencies, and other government entities. Provide technical assistance on downstream issues.
IFC Oil and Gas Division and IFC Mining	Aim in particular to promote gas development for local use and export, and work with investors where possible for greater energy efficiency in production processes. Selectively support coal mining where there are significant local development impacts. Give particular focus to IDA countries and to frontier regions in other areas.
IFC Power Division	Look to the World Bank to promote a sound regulatory environment for private investment—including renewable energy—and to help bring tariffs to cost recovery levels. Continue to seek power sector investments with energy efficiency improvements by reducing technical and commercial losses. Help countries reduce their carbon footprint, diversify their portfolio energy sources and help strengthen their energy security. Sector studies/joint products will be a key area for cooperation with the WB, IFC and MIGA (IFC advisory services). Continue to focus on financing power sector projects through the infrastructure crisis facility. Address on-boarding and knowledge sharing challenges across IFC regional hubs. In the renewable energy sector build technology and sector expertise.
IFC Global Manufacturing and Services Department	Leverage core business to translate climate change opportunities into new business lines. Target interventions with selected portfolio clients and use the Cleaner Production Lending Facility to open dialogues with clients on cleaner production and energy efficiency. For new business, seek add-on investments to new projects, and look for new opportunities in core sectors. Scale up business in emerging new sectors. Target countries with a critical mass. Use donor concessionary funds to leverage impacts and address barriers.
IFC Climate Change Unit and Sustainable Business Innovator	Continue to define procedures for calculating GHG emissions for non-financial sector investments, and produce pilot studies to develop climate risk assessment tools. Liaise with external climate change processes about the creation of new instruments to leverage climate friendly investments. Work to develop strategies to accelerate transfer of best available technologies using donor funds in supporting commercialization of new energy technologies.

Source: WBG staff survey.

Appendix 3: Draft Outline of the Energy Strategy

Executive summary

1. The context
    - Global energy position and challenges
    - Key energy sector issues for the Bank's client countries

2. Stocktaking and evaluation of Bank policy and performance, including lessons learned

3. Strategic objectives and guiding principles

4. Areas for action

5. WBG's role in promoting clean energy technology

6. Implementing the strategy

7. Results framework and indicators

Annexes

Appendix 4: Background Papers

Several background papers have been prepared and are separately reported as annexes to the Approach Paper. One that has been finished but is too long to be included as an annex is "Reducing Technical and Non-Technical Losses in the Power Sector" (Antmann 2009), which is posted on the Energy Strategy website.

For additional papers, concerted efforts will be made on three topics:

- *Private and public roles in the power sector.* The scale of financing required in the coming decades is daunting. Private sector investment is critically needed, but it alone is unlikely to provide the entire financing; both private and public roles will be essential. This paper will examine private and public roles in this context, and will also draw lessons from experience to date with power sector reform.
- *Energy subsidy reform*. Energy subsidies are measured differently in different countries. This paper will propose an operationally practical methodology for estimating the major energy subsidies for cross-country comparison, review the literature on the incidence of existing subsidies and of their removal on households at various income levels and the effectiveness of social safety nets and/or targeted subsidies, discuss the use of producer subsidies to support new forms of energy, and discuss implementation options for efficient and targeted subsidies where appropriate.
- *The WBG's role in promoting clean technology*. This paper will examine the role of clean technology in a low-carbon future, barriers to commercialization of emerging technologies and their adoption in developing countries, and the possible role of the WBG and its collaboration with other international institutions (such as GEF).

Other papers to be commissioned include a paper on lessons from regional projects, another on lessons from IFC's engagement in the power sector, a summary note on liquid biofuels, and others as needed.

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