

Approach Paper

Evaluation of the World Bank Group's Support for Electricity Access

December 2, 2013

Background and Context

1. Access to electricity is a necessary input to economic growth and poverty reduction. It is also a key ingredient for achieving the welfare outcomes of the Millennium Development Goals (MDGs) for health, education and gender equality. As of 2013, about 1.2 billion people or about one-sixth of the world's population and mostly poor, lack access to electricity. Even where electricity is within reach, inability to pay for an electricity connection and ongoing consumption is a significant barrier for many. Given the urgent need to address the large gap in electricity access, the goal of providing universal electricity to all by the year 2030 has been articulated in the "Sustainable Energy for All"¹ (SE4All) initiative unveiled by the United Nations and the World Bank in 2012.

2. In addition to the population that does not have access to electricity, up to a billion people², especially in developing countries, are subject to unreliable and low quality of power supply resulting in outages and brownouts and therefore, reduced benefits from electricity use. It is recognized that inadequate electricity generation capacity and concomitant transmission and distribution networks is at the core of the constraints. Thus, the electricity access challenge goes beyond basic connectivity to ensuring that the supply is affordable, adequate, reliable, and of acceptable quality.

3. While keeping the focus on electricity access for households, it needs to be kept in mind that the household sector accounts for a relatively small portion (about 25 percent) of global/national electric power demand, while industry, business/commerce, government, health & education services, agriculture, etc., account for about 75 percent³. The technical performance, financial viability and reliability of the entire electricity delivery system spanning generation, transmission and distribution is largely anchored by the industrial sector which provides for continuous off-take of electricity⁴ and is generally capable of paying remunerative tariffs.

4. It is acknowledged that providing universal access to electricity presents a huge challenge, and requires large investments, supported by robust policy and institutional frameworks in countries that are in need of improving electricity access. The largest populations without electricity access are concentrated in Sub-Saharan Africa and South Asia, and the two regions face uphill tasks in expanding access, while contending with growing populations. However, successful country experiences in achieving high/universal electricity access in the past few decades point to encouraging drivers of performance that could be emulated in lagging countries in all regions.

5. The WBG has a long record of supporting electricity access. The World Bank has covered the whole range of interventions that impinge on electricity access – physical investments in generation, transmission and distribution as well as support for the enabling framework for

policy, regulation, and institutional capacity building. The IFC's role has been most prominent in investments for generation followed by transmission and distribution together with advisory services at the transaction level. MIGA, through its guarantees and insurance has also principally supported generation followed by transmission and distribution.

6. Going forward, the WBG has committed to, and thus would be expected to, play a major role in supporting access-deficit countries to mobilize the required financing, especially from private sector, and to prepare client nations for meeting the electricity access challenge through policy advice and technical assistance. As the WBG gears itself for the expanded challenge of the SE4All objectives, IEG is conducting an evaluation of the effectiveness of the World Bank Group (WBG) in helping its client countries expand access to electricity that is adequate, affordable, and meets quality and reliability standards. The study seeks to learn from past experience and apply useful lessons to future WBG activities for expanding electricity access in client countries. This Approach Paper delineates the background and justification for the study, methodological approaches for the evaluation, the planned sources of evidence on WBG performance, main collaborators and stakeholders, and a dissemination plan for the evaluation's findings, lessons and recommendations.

7. This evaluation stands to benefit from, and collaborate with, several relevant completed and ongoing studies in IEG that impinge on electricity access. This will build upon the findings of the New Renewable Energy study (2006) and the Welfare Impact of Rural Electrification (2008), and draw upon the findings from a three-phase study on Climate Change, Energy Efficiency and Electricity Access (2008, 2010 and 2013). An active collaboration has been established with the ongoing study on Public-Private Partnerships (IEGPE), and the new study on Global and Regional Partnership Programs (IEGCC), both of which cover relevant electricity access issues. The findings of the Small and Medium Enterprises study which is at an advanced stage, and which has identified electricity as a key constraint for this sector, will be useful for this study. This study will also look to findings on feedback mechanisms that are of relevance to the WBG's electricity access effort, from the 'Learning and Results in World Bank Operations' (IEGPS1) study that is now underway.

ELECTRICITY ACCESS AND DEVELOPMENT

8. **Electricity Access is a necessary input for economic growth and poverty reduction.** The overall link between energy, economic growth and poverty reduction is central to development thinking and is well documented in the available literature⁵. Available data⁶ indicate that countries with higher levels of energy access are associated with lower levels of poverty. The importance of electricity access seems to emerge particularly at the earliest stages of development.⁷ Increased electricity access leads to a gradual broadening of electricity-based services⁸, and enables a reallocation of time and effort away from manual labor towards mechanization which involves adoption of new technologies, resulting in increases in productivity and economies of scale; growth of higher income-generating activities; and trends toward greater specialization. The benefits from higher electricity access appear to be consonant with the WBG's broader goals of eradicating poverty and improving shared prosperity.

9. **Electricity access contributes to welfare outcomes.** A preliminary literature review suggests a direct relationship between electricity consumption and the Human Development Index (HDI). Evidence suggests that the bundling of services like electricity, water, sanitation, health and education has led to major benefits for local populations⁹. Electricity use also contributes to income growth and provides benefits to the community and the rural poor in human development terms¹⁰. IEG’s study of rural electrification benefits¹¹ confirmed welfare gains to the rural population in broad terms and identified requisites for improving project/ intervention focus and relevance, especially for gender focused benefits. The welfare benefits of rural electrification for a household typically range from US\$10 to US\$20 a month, or up to US\$1 per kilowatt hour (kWh). These benefits are much higher than the cost of supplying electricity to rural areas, which ranges between US\$0.15 to US\$0.65/kWh¹². Affordable energy services including electricity are a necessary input for achieving the (MDGs (Attachment 2).

10. **The economic costs associated with unreliable and poor quality of electricity supply can be high.** Indications are that a very large segment of those with access today, especially in lower- and middle-income countries, are severely impacted by a substantially higher incidence of electricity supply interruptions (blackouts, rationing of supply) as well as quality problems (poor and highly fluctuating service voltages) compared to high income countries. The economic consequences of unreliable electric supply to business and industry as well as households, arise from the high incidence of investment in self mitigation options (back-up generators) and self-provision of electricity, entailing high operating costs and revenue losses that studies show to be a sub-optimal investment across the economy (Table 1).

Table 1: Indicative Power Outages in Countries with Different Income Levels
(Based on survey data)

Country Income Category	Firms mentioning electricity as major or severe constraint (%)	Average number of power outages per month per firm	Firms experiencing more than 30 power outages per month (%)	Firms owning Generators (%)
High	4.9	1.3	0.2	-
Upper-middle	8.3	13.0	6.2	28.0
Lower-middle	14.3	13.8	9.1	24.1
Low	26.4	64.0	34.1	42.4
Average	15.6	27.6	15.2	31.1

Source: Alby et al (2010)

11. **To address all the attributes of electricity access – adequacy, reliability, quality and affordability – and to secure the financial viability of the electricity sector, attention must be directed to all the components of electricity infrastructure – generation, transmission and distribution.** It is only when sufficient generation capacity is available that the accompanying transmission and distribution networks can serve diversified consumer demand – industry, services and households – in a financially viable manner. Expansion of generation, transmission and distribution needs large capital investments, capacity for planning the grid/off-grid interface and policies and regulation for ensuring financial viability and affordability for the consumer. In the face of resource constraints, and generally deficient public utilities, there is a clear case for increasing mobilization of financial resources for electricity infrastructure development and appropriate incentives and frameworks for efficient and sustainable operation of the sector. This study will therefore assess the WBG’s role in

supporting client countries for electricity access across the entire range of electricity infrastructure through physical investments, guarantees and policy advice and support for enabling framework.

THE CHALLENGE OF EXPANDING ELECTRICITY ACCESS

12. **The electricity access challenge is most marked in Sub-Saharan Africa and South Asia.** The global population without access to electricity is concentrated in Sub-Saharan Africa, South Asia, and to a lesser extent in East Asia and the Pacific. These regions face big challenges in mobilizing the large investments required for expanding access to electricity and making it available at affordable prices. In Sub-Saharan Africa, the number of people gaining access to electricity during 1990-2010 (140 million) was overwhelmed by population growth (340 million). South Asia fared better during this period by connecting 647 million people, while the overall population grew by 489 million, but the region has to contend with a large access deficit and a growing population. Going by current trends, Sub-Saharan Africa is expected to fall further behind others as the region with the largest electrification deficit (Table 2). Countries in East Asia including Laos, Philippines and Indonesia, which have achieved high levels of access, have to gear themselves for the “last-mile” effort where the next stage of grid network extensions will be increasingly challenged by population settlement patterns that are less nucleated and require longer and progressively expensive connections. The question for them is how the upgrading can be done sustainably and how the necessary resources will be obtained.

Table 2. Population with and without Electricity Access by Region

Region	Share of Population with Access 2010	Population added during 1990-2010 (Million)	Population gaining Access 1990-2010 (Million)	Population without Access 2010 (Million)
Europe and Central Asia	100%	12	19	0
Latin America and the Caribbean	95%	146	167	30
East Asia and the Pacific	95%	350	463	102
Middle East and North Africa	94%	106	120	18
South Asia	74%	489	647	417
Sub-Saharan Africa	32%	344	155	589
WORLD	80%	1,447	1573	1,157

Source: SE4ALL (2013)

13. **Countries achieving high/universal electricity access in recent decades point to apparent “drivers of performance”.** Several countries around the world – e.g. Brazil, Chile, China, South Africa, Thailand, Tunisia and Vietnam – have achieved near universal access to electricity during the last two decades, many under challenging circumstances. In recent years, Lao PDR has made impressive strides toward that goal. Indonesia and the Philippines have led successful electrification programs in the past, which now are in need of greater momentum. In terms of off-grid household electrification, Bangladesh and Sri Lanka have made significant progress. Together, these countries span a wide range of low to middle income levels. A

preliminary review suggests some drivers of performance are present to a higher degree in countries that have gained higher levels of electricity access. (Box 1).

Box 1. Identifying Drivers of Performance towards Universal Electricity Access

Countries that have successfully transitioned to higher levels of access in the last two decades cover a wide range of incomes, from low (e.g. Vietnam, Laos, Sri Lanka) to middle (e.g. Argentina, Brazil, Thailand). This seems to imply that high or universal access to electricity is within the reach of all countries if they can emulate, in their own context, the principles and strategies pursued by successful countries.

In 1990, approximately one-third of all countries of the world had already achieved universal or near-universal access to electricity having provided connectivity to 95 percent of more of their households. These countries mainly comprised OECD countries; and ex-socialist countries, which were mostly in the middle income category, and were generally committed to universal access to infrastructure as a matter of state policy. In the twenty year period 1990-2010, several countries of the world have moved from Low/Medium Electricity Access (below 85 percent) to High Access (between 85 and 95 percent) and to Universal/near-Universal Access (greater than 95 percent). Over the 1990s, the implementation of sector-wide reforms and privatization programs in several Latin American and Caribbean countries contributed to the achievement of high access levels by the end of the decade.

Box 1 Table 1: Transition of countries from Low to High/universal access (1990-2010).

	1990	2000	2010	1990-2010
<i>Universal/near-Universal Access:</i> ≥95%	67	87	95	+ 28
<i>High Access:</i> 85%-94%	35	38	35	=
<i>Low/Medium Access:</i> < 85%	110	87	82	- 28

Source: SE4All 2013; Authors' calculations.

Some significant drivers of performance are indicated by a preliminary review of the available literature relating to countries in different regions of the world¹³. Countries that have transitioned to High/Universal Electricity Access in the last two decades appear to display the following factors to a higher degree than those that have lagged behind:

- Strong and sustained Government commitment to a nationwide electricity access scale-up program and implementation rollout plan, as a key driver of the vision for national development and modernization; backed by adequate resources, and public support for the poor to obtain access to electricity.
- Supportive policy framework for enabling sector outcome targets for access linked to the national vision; comprehensive institutional arrangements with strengthened institutions accountable for results. Including provision for private sector participation, as appropriate in generation, and network expansion.
- Ensuring the financial viability of power utilities, and the adoption of rational tariffs and well-designed subsidy policy and delivery mechanisms targeted to improve affordability of electricity services especially for the poor.

These drivers of performance do not provide a universal recipe but point to principles constituting an umbrella of enabling environment for electricity access improvements. Some countries (e.g. Vietnam, Thailand, Tunisia) succeeded through financially viable state owned enterprises, whereas others through large-scale privatization policies (e.g. Chile, Argentina).

Source: Authors

- 14. Achieving global universal access to electricity requires large scale investments and private participation.** The International Energy Agency estimates that the achievement of universal electricity access requires additional investments of about US\$900 billion between 2010 and 2030.¹⁴ More than 60 percent of that would be in sub-Saharan Africa, which needs an extra \$19 billion per year to achieve universal access by 2030. Developing Asia accounts for 38 percent of the additional investments required to achieve universal electricity access.¹⁵ Government resources are inadequate to fund the expansion of electricity access as these also compete with other development opportunities in the allocation of scarce resources as well as opportunities for policy and institutional reform.¹⁶ These requirements also far exceed the scale of financing from multilateral banks and bilateral donors. For instance, the WBG contributed about US\$62 billion towards investments in the energy sector during 1999-2013 (excluding Development Policy Loans). Private sector investments in low and middle income countries' electricity sectors totaled US\$ 558 billion¹⁷ during the period 1999 to 2012, or a yearly average of about US\$40 billion.
- 15. Private participation can contribute to innovation and greater efficiency in electricity sector operations.** Electricity sector efficiency improved where private participation and reforms have advanced, according to an OED/OEG/OEU evaluation of the WBG's experience with private participation in the electricity sector.¹⁸ In countries where reforms and private participation have advanced, energy access increased, service quality improved and financial subsidies reduced.¹⁹ Fiscal benefits have also increased. Promoting private sector participation can thus help address electricity supply shortages and poor service quality, as well as improve financial performance and governance. In the WBG, private participation has been an important component of its electricity sector policy since 1993 although IFC's first investment with independent power producers (IPPs) started a few years earlier.²⁰ The study will examine the role of private sector in electricity access development in select countries and assess the WBG's role in contributing to the same.
- 16. In addressing the renewed electricity access challenge, especially in sub-Saharan Africa and South Asia, the WBG needs to learn lessons from its past involvement in this effort.** Given the access gaps that are expected to expand with projected population growth, especially in Sub-Saharan Africa and South Asia, the WB, IFC and MIGA are faced with the renewed challenge of enhancing their effectiveness in helping client countries achieve adequate, reliable, and affordable access to electricity. In doing so it has to learn from its efforts in the last few decades across all elements of electricity access spanning generation, transmission & distribution, as well as policy advice and technical assistance to underpin the functioning of the electricity sectors of client countries.

THE WBG'S ROLE IN EXPANDING ELECTRICITY ACCESS

17. **The WBG's strategy for Electricity Access has evolved with client needs and its own perceived role in global development.** The core elements of the WBG's support and strategy for power sector over the last five decades are summarized below:

- *1970s and 1980s:* The WBG focused on investments in generation, transmission and distribution in vertically integrated national electricity companies, emphasizing least-cost expansion planning, marginal cost pricing, utility efficiency standards, etc. The primary focus was on expanding generation supply and networks. Some of the key policy documents governing this period were the OMS 3.72 (1978), power sector support strategy (1983) and corresponding operations directive (1987).
- *1990s:* The WBG expanded the scope and adopted a new wave of rural electrification projects that was carried through the 2000s, with renewable energy as the choice among off-grid options. This evolution was supported by a greater involvement of the private sector, and the advent of the low carbon agenda at the global level. Moreover, power sector privatization and energy sector reform more broadly became the main focus of WBG projects, which then shifted from supporting state owned enterprises to unbundling and power market development. The policy paper on power sector (1993) governed the WBG's support during the 1990s.
- *2000-2012:* The WBG shifted again from rural electrification toward the scaling-up of electricity access nationwide, with supporting the energy infrastructure at its center. The focus was again on strengthening national utilities as the major driver of access rather than their privatization. New instruments were also developed, such as the comprehensive Sector Wide Approaches (SWAs). The WBG aimed to improve focus on environmental concerns and impacts of power sector deliberated in the Fuel for Thought environment strategy (1999), which culminated in policy guidelines in the Strategic Framework for Development and Climate Change (2008).
- *Most recently,* in 2012, WBG became partner of the Sustainable Energy for All (SE4ALL) global initiative launched with the Secretary-General of the United Nations and the International Energy Agency (IEA) to reach universal energy access, improve energy efficiency, and increase the use of renewable energy by 2030. In July 2013, the WBG outlined its future sector directions in the document "Toward a Sustainable Energy Future for All", containing a number of actions and initiatives to improve electricity access.

18. **The electricity sector accounts for a significant share of overall WBG commitments during FY1999-2013.** Projects, investment operations and guarantees that relate to generation, transmission & distribution of electricity; improving energy efficiency, reliability and quality; as well as those addressing electricity sector policy and capacity, all contribute to electricity access. In these terms, over the fifteen year period spanning FY1999-2013, 581 IBRD/IDA projects contained one or more electricity access-related components, being 13 percent of all IBRD/IDA projects. Net commitments for electricity access during this period amounted to US\$44 billion, about 11 percent of overall IBRD/IDA commitments over this period (US\$422 billion). For IFC, investments in electricity access accounted for 5 percent of the total number of projects (232 out of 5135), and 6 percent of commitments (US\$7 billion). About 8 percent of percent of all IFC's

technical and advisory services during 1993-2013 were directed towards electricity access. MIGA provided 63 guarantees for electricity access during 1993-2013, being 10 percent of the 610 guarantees provided during the period. The amount guaranteed was US\$ 5 billion, about 20 percent of all guarantees (25 billion) for the 1999 to 2013 period. (Table 3).

Table 3. Electricity Sector as a share of all WBG Operations FY1999-FY2013

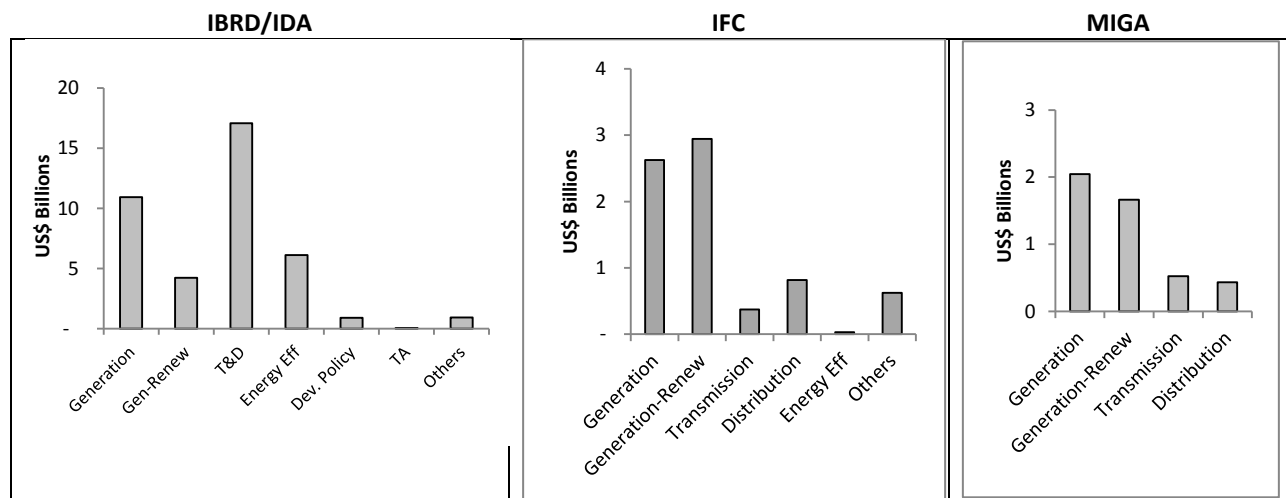
	Projects / Operations / Guarantees			Commitments*		
	All (No. of Projects)	For Electricity Sector (No. of Projects)	For Electricity Sector (%)	All (US\$ Billion)	For Electricity Sector (US\$ Billion)	For Electricity Sector (%)
IBRD/IDA –Core Energy Sector Projects	4376	291	7	422	37	9%
IBRD/IDA –Non-Core Energy Projects		290	7		7	2%
All IBRD/IDA	4376	581	13%	422	44	11%
IFC – Investments/Guarantees	5135	239	5%	120	7	6%
IFC – Advisory Services	803	67	8%	0.9	0.08	8%
MIGA Guarantees	610	63	10%	25	5	20%

Source: WBG Data

* Gross volumes in the case of MIGA

19. **There is approximately equal emphasis on electricity generation including new renewables²¹, and transmission & distribution, in the IBRD/IDA portfolio, while the IFC and MIGA’s portfolios are more oriented towards supporting generation.** For IBRD/IDA, transmission & distribution, and generation including new renewables account respectively for 38 percent and 42 percent of its electricity access portfolio. IFC is more oriented towards generation which accounts for 75 percent of its electricity access portfolio, followed by transmission & distribution with 16 percent. MIGA’s gross exposure was shared as 80 percent and 20 percent between generation and transmission & distribution.. (Figure 1).

Figure 1. WBG Lending for Electricity Access by sub-sector (FY1999-2013)



Source: WBG Data

20. **Sub-Saharan Africa accounted for the highest share of commitments for IBRD/IDA and MIGA, while Latin America and the Caribbean and Europe were Central Asia led for IFC.** Over the 1999-2013 period, Sub-Saharan Africa led IBRD/IDA and MIGA commitments for electricity Access with shares of 27 percent and 34 percent respectively. In the case of IFC, Latin America and the Caribbean (25 percent) and Europe and Central Asia (19 percent) received the largest shares (Table 4). Within regions, the distribution of commitments for various sub-categories varied widely. For instance, for IBRD/IDA, the emphasis on energy efficiency was higher in each of Europe and Central Asia, Latin America and the Caribbean and the East Asia and the Pacific regions, accounting for about a quarter of the commitments in each of these regions. The other regions – South Asia, Sub-Saharan Africa and Middle-East and North Africa received between 3 percent and 15 percent each. A more detailed picture of the distribution of commitments among sub-categories in each region for IBRD/IDA, IFC and MIGA is presented in Attachment 3).

**Table 4. WBG Commitments* for Electricity Sector (FY1999-2013):
Distribution by Region**

Region	IBRD/IDA	IFC	MIGA
Sub-Saharan Africa	27%	15%	34%
East Asia and the Pacific	16%	15%	8%
Eastern Europe and Central Asia	21%	19%	17%
Latin America and the Caribbean	9%	25%	30%
Middle-East and North Africa	6%	9%	0%
South Asia	21%	16%	10%
TOTAL	100%	100%	100%
Total Commitments (US\$ billion)	44.0	7.1	5.0

* Gross volumes in the case of MIGA

21. **The World Bank has long been an important source and channel for providing policy advice and capacity building.** The IFC also provides advisory services: the Bank through its lending and trust-funded Non-Lending Technical Assistance activities and its participation in Global & Regional Programs, and the IFC through its formal Advisory Services Program. One major advisory instrument of the Bank that has addressed energy access consistently since its inception in 1983 is the multi-donor-funded Energy Sector Management Assistance Program (ESMAP). ESMAP has an energy access scale-up program focused on Africa, namely, the Africa Renewable Energy Access Program (AFREA). The joint WB-IFC Lighting Africa pilot enabled lighting in several poor regions of select countries and is expected to scale-up and broaden reach across Africa and other countries. Project Preparation and Advisory services to scale-up electricity access are also being provided through the Asia Sustainable and Alternative Energy Program (ASTAE). IFC has advised governments on structuring public-private partnership transactions, within which its advice related to power projects is intended to increase electricity access, improve the quality of supply and distribution, and reduce government budget outlays.²²

DEFINING THE DIMENSIONS OF ELECTRICITY ACCESS

22. Electricity access is more than a binary metric. It is not only a matter of those who do not have electricity today; it is also very much an issue of the Adequacy, Reliability, Quality and Affordability of access.²³ While each of these terms are widely used and understood, in practice, there can be considerable variation in the manner in which they are defined and measured. For instance, electricity access can be counted in terms of verified connections to households with a meter, or at the other extreme, an entire village can be presumed to have access when a distribution line is run through it, irrespective of actual household connectivity. (Attachment 4).

23. This study will lay out the definitions of electricity access and each of its attributes and the range of indicators that will be used to measure them. Access would be measured by total connections by customer category, urban, rural, proportion of female population served, etc.; number of households connected with breakdown by urban and rural grid connection, rural off-grid connection, population served by renewable sources, etc. The availability of data for various indicators across select countries will be noted. The study will assess the availability of data and need for improving the data collection in the broader context of country capacities for monitoring and evaluation.

24. For the purpose of the study, “electricity access” is defined to include the provision to residential, commercial, industrial, institutional and other users of adequate and affordable electricity supplies that meet quality and reliability standards. Each of these attribute is described briefly below along with some of the key metrics for the study.

Adequacy: Adequacy is the ability of the system to meet consumer needs for electricity use and reflects the available electricity generation capacity. This will be measured in terms of gap between peak load and installed / available capacity (Mega Watt or MW) of different types (e.g. thermal, hydro, wind, etc.) in the generation mix; production/consumption (Megawatt-hours or MWh).

Reliability: From the consumer’s perspective reliability is the frequency and duration of power sector outages, the extent of advance notification about service interruptions, and service restoration times. From the electricity producer’s point of view reliability relates to the state and management of the transmission and distribution network, and manifests itself in equipment and service breakdowns. Reliability will be measured in consumer terms as hours and frequency of outages per month/year, and for the utilities in terms of average interruptions per year (nationally, regionally as available), transmission and distribution losses.

Quality: The quality of electricity supply is crucial for getting optimum benefits from lighting, and overall equipment life and performance. Quality of electric supply will be measured to the extent possible in terms of data relating to voltage and frequency variations within specified standards of service, and impacts on equipment and quality of life.

Affordability: Affordability is framed in terms of the ability to pay for one-time fixed connection costs, and for monthly consumption. The acceptable norms of Affordability can vary widely in different contexts and country data / household expenditure surveys would be utilized.

Purpose, Objectives, and Audience

25. The *purpose* of this evaluation is to obtain evidence-based findings, develop broadly-applicable lessons, and propose recommendations that could enhance the WBG’s effectiveness in meeting its global commitments in support of achieving universal electricity access.

26. *Main Audiences.* The primary audiences of the evaluation study is the WBG Boards of Directors, WBG management, WBG staff involved in electricity access operations, concerned civil society organizations, client governments, beneficiaries of electricity access, and the WBG’s partners in the bilateral donor and MDB community, especially those engaged in SE4All.

Evaluation Approach, Questions, and Scope

27. We propose a country-focused evaluative approach for the study. The purpose of this analysis is to develop an integrated assessment of the electricity access effort using the country as the unit of inquiry. The analysis will begin with taking a holistic look at the electricity access effort in the country context. Regional power grids play a crucial role in several contiguous or geographically close countries, and their impacts on countries will be examined as part of the country-focused analysis. This is expected to shed light on the most important ‘drivers’ of the electricity access trajectory for the country. Further analysis is expected to uncover why and how these drivers were able to yield results in each country’s circumstances and to what extent these experiences could be replicated in other country situations. About 40 countries will be chosen for in-depth country-focused analyses – including several for field-based work – based on the importance of access issues, population without electricity access, potential lessons from successful and less successful access programs, and WBG-wide involvement. In addition the electricity access experience of some countries that are not currently WB clients will also be examined to draw lessons from their experience. Further details of this approach and scope are provided under paragraph 39 and in Attachment 9.

28. Within this holistic country-based analysis, the role of the WB, IFC and MIGA will be examined to establish how they have contributed to the adequacy, affordability, reliability and quality of the country’s electricity supply. This enquiry will also be directed to help identify the level of synergy between and across the WB, IFC and MIGA and the extent to which they have worked jointly or in sequence. By synthesizing the findings across groups of countries with the WBG’s role and effectiveness, common lessons are expected to be derived that can drive future efforts at improving electricity access.

29. The study would address the following over-arching question

“To what extent has the WBG been effective in the past, - and going forward, how well is it equipped, - in putting its client countries on track toward universal access to electricity that is adequate, affordable, and of the required quality and reliability?”

30. To answer this question, while at the same time enhancing the utilization of the evaluation’s results, the study will follow three main lines of inquiry that are keyed to the WBG’s principal functional roles, namely, (a) Lender, investor, guarantor, insurer; (b) Source of policy support and advisory services; and (c) Global and regional development partner.

31. Corresponding to the lines of inquiry, three key evaluation questions and sub-questions are indicated below. The study will place strong emphasis on identifying the underlying factors for successful, mixed, weak or failed performance in the WBG functional areas covered by these questions; and the inter-relationships between them in different country contexts.

Evaluation of the WBG’s role as lender and investor, and guarantor

- I. *Based on the results of the WBG’s lending, investments and guarantees, to what extent did the Bank Group achieve its policy, strategic and operational objectives for delivering electricity access?*
- How effective has the WBG been in:
 - generating and applying cutting-edge knowledge on electricity access through projects and investments?
 - contributing to greater welfare outcomes through increased electricity access?
 - catalyzing private sector investments in providing access to electricity?
 - supporting a viable electricity sector?
 - How well do the WBG’s project-level Results Frameworks, core sector indicators, and the Corporate Scorecard adequately reflect the operational realities of delivering electricity access in client countries?
 - What are the external and internal factors that influenced and affected the WBG’s ability to achieve those objectives?

Evaluation of the WBG’s policy support and advisory role

- II. *To what extent has the WBG been effective in helping to establish and support the enabling frameworks in client countries for improving electricity access?*
- How effective has the WBG been in generating and applying cutting-edge knowledge on electricity access through AAA, ESW and policy advice?
 - To what extent has the WBG supported and added value to the sector policy, legal, regulatory and institutional frameworks and capacity for improving electricity access?
 - To what extent has the WBG supported and provided advice for sector policy for improved electricity access to the poor?
 - Have IFC advisory services helped to stimulate and improve private sector interest and the quality of transactions?
 - What support has the WBG offered its country clients for strengthening M&E capacity and conducting impact evaluations related to energy access?

Evaluation of the WBG’s leadership or partnership roles in global and regional programs

- III. *To what extent has the WBG facilitated and enabled regional and global partnerships in support of the electricity access agenda?*
- How effectively did the WBG utilize partnerships for supporting countries in electricity access development?
 - How effectively did the WBG create/mobilize synergies among global/regional stakeholders—including with the private sector—to increase electricity access?

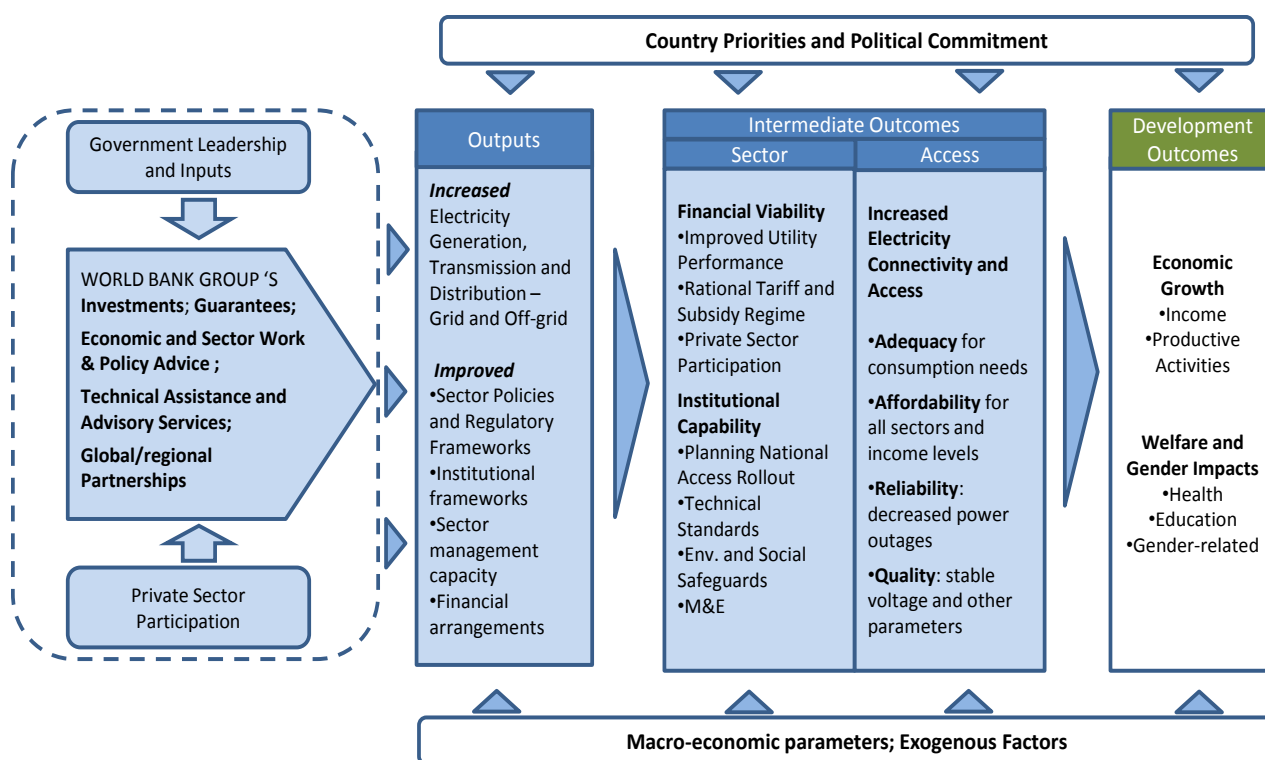
32. The above lines of enquiry are expected to lead to a broader and deeper understanding of the WBG’s performance drivers and how the Group’s internal processes/ requirements, culture, incentive systems, etc., contribute to such performance. The findings are also expected to inform the WBG on how to build on its key areas of comparative advantage across the WB, the IFC and the MIGA and improve the synergy towards a One-Bank, and suitably focus its global commitments on electricity access agenda.

Evaluation Design and Evaluability Assessment

RESULTS FRAMEWORK FOR THE STUDY

33. The study will be guided by the following broad results framework that traces the link between inputs, outputs, intermediate outcomes and development outcomes. Overall, the intermediate outcome categories listed below are broadly amenable to definition, measurement and attribution to WBG interventions. In respect of development outcomes, while they can be clearly defined, measurement and attribution may be less clear than in the case of intermediate outcomes. Therefore, for characterizing development outcomes, there will be greater reliance on the proposed Systematic Review of Impact Evaluations on welfare and development outcomes of electricity access interventions, although the country case-studies will also attempt to identify development outcomes to which the WBG may have contributed. (Figure 2)

Figure 2. Electricity Access Evaluation Study: Results Framework



Source: Authors

34. The causal links in the above results framework will be analyzed in greater depth, taking into account the “mediating factors” that enable the achievement of desired outcomes. The “drivers of performance” and broadly applicable lessons will be derived from the portfolio-level analysis, and will be grouped in terms of the mediating factors, and covering enabling country/sector characteristics, policy conditions, and organizational competencies.

35. To support lesson-learning, the IEG study would first assess both quantitative and qualitative results data at the level of individual projects, investments, or guarantee operations. A further step would be to conduct in-depth Project Performance Assessment Reports (PPARs) and Country Case Studies for a sub-sample of countries and projects purposefully selected to represent major categories. To supplement this assessment at the project and country levels, the study would also conduct in-depth analyses of important themes that emerge as drivers of performance for successful delivery of electricity access. Based on the preliminary literature review and analysis (described in Box 1), four themes have been initially identified for review at country level. These themes will be supplemented by others that are identified in the course of the study.

- Planning the National Access rollout
- Promoting Financial Viability; Rational Tariffs and Subsidies
- Enabling Private Participation
- Welfare and Gender Impacts of Electricity Access

COMPLEMENTING PAST IEG EVALUATIONS; COLLABORATING WITH ONGOING ONES

36. This evaluation study will build upon earlier IEG evaluations, including the studies on Private Sector Development in the Electric Power Sector (OED 2003), New Renewable Energy (IEG 2006), Rural Electrification (IEG 2008), and the three evaluations on the WBG and Climate Change (IEG 2008a, IEG 2010, and IEG 2013). In particular, with respect to the study on Rural Electrification, this study proposes to update the knowledge on the linkage between electricity access and welfare outcomes (see Box 3), and to assess the progress made by the WBG in this regard. For global environmental aspects, the current evaluation will rely on the findings and lessons from the studies on Climate Change and the World Bank (Box 2). Projects covering electricity access account for a significant portion of the portfolio covered by the recent Global Program Review of the WBG’s Partnership with the Global Environment Facility (GEF). Relevant findings from this study will be complemented by the current evaluation.

37. Other ongoing IEG evaluation studies address various aspects of electricity access, and their findings and lessons will be suitably reflected in this evaluation. The study team is collaborating with the recently commenced review of Global and Regional Partnership Programs (GRPPs) and large Multi-donor Trust funds (MDTFs) (IEGCC). The GRPP and MDTF review covers four programs – Energy Sector Management Assistance Program (ESMAP), Asia Sustainable and Alternative Energy Program (ASTAE), Lighting Africa, and Global Partnership on Output-based Aid (GPOBA), each of which have significant involvement with electricity access. The ‘Evaluation of Public-Private Partnerships (PPP) in infrastructure’ (IEGPE) includes case studies on selected countries with PPP in the electricity sector, which can be complemented as required by the current study.

38. The findings from the new evaluation on ‘Learning and Results in World Bank Operations’ (IEGPS1)’ would be of relevance to this study in terms of feedback mechanisms for improving future WBG operations. Relevant findings of the ongoing evaluation of WBG’s assistance to Small and Medium Enterprises – which has identified electricity access as a major constraint in this sector – will also be taken into account.

Box 2. IEG’s Three Phase Study on Climate Change, Energy Efficiency, and Electricity Access (2008, 2010, 2013)

IEG has studied the WBG’s efforts for dealing with Climate Change, including the Energy sector through three major studies (Climate Change and World Bank Group Phase I, II and III*) completed in 2008, 2010, and 2013. The Phase I report covered the World Bank’s Win-Win Energy Policy Reforms - energy price reform and policies for energy efficiency – both of which offer potentially large gains at the country level together with significant reductions in greenhouse gas emissions. One of the report’s conclusions is that “there is no significant trade-off between climate change mitigation and energy access for the poorest. Basic electricity services for the world’s un-connected households, under the most unfavorable assumptions, would add only a third of a percent to global GHG emissions, and much less if renewable energy and efficient light bulbs could be deployed. The welfare benefits of electricity access are on the order of \$0.50 to \$1 per kilowatt-hour, while a stringent valuation of the corresponding carbon damages, in a worst case scenario, is a few cents per kilowatt- hour.”

The Phase II report looked at the Bank’s experience (including carbon funds) and that of IFC in promoting technologies for renewable energy and energy efficiency. The evaluation noted the Bank’s record of supporting country reform for subsidy reductions. While the Bank has done innovative work on efficiency measures, particularly on the demand side, overall the Bank’s support for non-price policy measures has been modest and needs to be improved. The Phase II Report recommended that WBG should continue to provide support for adoption of climate-friendly development policies and to support the transfer and adaptation to local conditions of existing technologies, policies, and financial practices. The WBG has been successful in this kind of technology transfer—but only when demonstration and diffusion mechanisms were well thought out. In a world where the private sector is driving growth and dominating capital flows, the WBG can help the public and private sector work together more effectively and systematically.

The Phase III evaluation notes that adaptation was recognized in the Bank Group’s Clean Energy Investment Framework (2006–08), but achieved a higher profile with the 2008 adoption of the Strategic Framework for Development and Climate Change (SFDCC). Overall, the SFDCC witnessed a striking increase in the profile of climate adaptation at the Bank Group. Accomplishments included: a take-off in explicit reference to climate change adaptation in World Bank project documentation; substantial analytic work; and increased attention to climate adaptation in Country Assistance Strategies. The SFDCC was less successful in articulating specific strategic directions and operational procedures that would be responsive to country demands while tapping the Bank Group’s potential to provide guidance on pursuing this new agenda.

*IEG 2008. Climate Change and WBG Phase I: An Evaluation of World Bank Win-Win Energy Policy Reforms.

*IEG 2010. Climate Change and WBG Phase II: The Challenge of Low-Carbon Development

*IEG 2013. Adapting to Climate Change: Assessing the World Bank Experience

COUNTRY-FOCUSED EVALUATIVE ANALYSIS

39. Based on the evaluative approach described above (para 27) the Country-focused Evaluative Analysis will draw upon several evaluative instruments (a) Project Portfolio Review; (b) Extended Literature Review; (c) Country Strategy Review; (d) Field-based Inputs; (e) a Systematic Review of Impact Evaluations; (f) Staff, Government and Beneficiary Interviews; and (g) Thematic Notes. The purpose and coverage of each instrument in described below.

a. *Project Portfolio Review.* The portfolio analysis will be based on the Project Appraisal Documents (PADs), Implementation Completion and Results Reports (ICRs) IEG’s ICR Reviews, Expanded Project Supervision Reports (XPSRs), Project Completion Reports (PCRs), Project Evaluation Reports (PERs) and Project Performance Assessment Report (PPARs). The study will also draw on lessons learned from relevant cluster reviews of IFC and MIGA projects. The broad evaluative categories of this scheme are access-related outputs and outcomes arising from physical asset creation; regulatory and policy improvements; institutional capacity building; improving financial viability; M&E systems; and environmental and social safeguards. This review will cover all WBG projects, operations and guarantees addressing one or more of the elements of electricity access, and have been approved or initiated between FY1999 and FY2013; the emphasis will be on closed/mature projects/ investments, and ‘core’ projects in the case of IBRD/IDA as indicated in Table 5. In the case of IBRD/IDA, a project is included in the portfolio cohort if it is mapped to any of the standard sector codes covering electricity generation including renewable sources, transmission, distribution, energy efficiency, development policy or technical assistance support for the electricity sector. Projects that are mapped to the Energy Sector Board will be considered “Core” energy sector projects while those belonging to other sectors will be considered “Non-Core” energy projects. We expect about a third of the non-core energy projects to be relevant for the study. A region-wise picture of commitments for electricity access over the FY1999-2013 period is provided in Table A of Attachment 5.

Table 5. WBG: Closed/Mature Projects/Investments/Advisory Services/Guarantees Approved FY1999-2013

Type of Operations	Number
WB Core Energy Sector Projects	129
WB Non-Core Energy Projects	230
IFC Investments/Guarantees	65
IFC Advisory Services (FY2009-2013)	19
MIGA Guarantees	32

b. *Extended Literature Review.* This will consist of a review of Bank ESW and Non-Lending Technical Assistance, and relevant literature emanating from the WBG as well as other sources. The literature will focus on the last fifteen years but will go back farther in time as needed to support individual desk and field country studies. About 136 reports have been identified from WBG sources – working papers, publications, research papers, sector strategies – from DEC, regions, energy anchor, ESMAP and ASTAE etc. Similarly several academic papers, reports and publications from external sources - general publications, academic journals, multilateral banks, IEA, US Department of Energy etc. have been identified. The literature review will also draw upon presentations from workshops in the annual Sustainable Development Network Week events, and other occasions. The literature review will follow the same organization of issues as laid out for the Project Portfolio review as discussed above. The WB has a variety of non-lending technical assistance on electricity access. Some of these activities overlap with ESW and the end-products for these activities will be covered under the Extended Literature Review. Other activities relating to workshops, conferences, surveys, and policy advice

will be analyzed under the NLTA review, again using the same analytical scheme as the portfolio and ESW/literature reviews. (Tables B and C in Attachment 5 present a region-wise classification of documents identified for the internal literature review.)

- c. *Country Strategy Review*. This review will draw upon Country Partnership Strategies (CPS), CPS completion Reports, IEG's CPS Completion Report Reviews, country-focused studies, and country project documents.
- d. *Field-based Inputs*. To add to the richness of the country-focused portfolio review, about six *field-based country case studies* will be prepared. The proposed countries have been chosen to cover several regions, electricity access levels; income; country size; varying policy, regulatory, and institutional conditions; private sector participation levels; and WBG-wide involvement including financial commitments. The field-based case studies will have the benefit of hearing directly from government officials, beneficiaries, private sector representatives, civil society, and project site visits. Additionally, the portfolio analysis will benefit from at least four field-based cluster Project Performance Assessment Reports (PPARs) that will be carried out during the study. For projects covered by PPARs, the additional evidence that is available beyond the ICRRs will be highlighted in the analysis, and will be seen in perspective vis-a-vis projects that draw only upon ICRRs as evidence. The Field Case Studies and cluster PPAR projects have been selected to cover a variety of countries / regions and electricity access issues, and the involvement of WB, IFC and MIGA to identify the extent of synergies between the units. Attachment 6 presents the proposed list of field-based inputs – PPARs and Field Case Studies and salient issues of interest in each of them.)
- e. *Systematic Review*: A Gap-map exercise has already been initiated to identify existing impact evaluations of electricity access and the key gaps in available evidence. The goal of this exercise is to critically analyze the existing evidence along the causal chain framework linking key policy interventions with intermediate outcomes and final impacts. This evidence-based analysis could add value by strengthening the Results Frameworks required at the appraisal stage of electricity access projects, and by helping to identify future research areas. All relevant impact evaluation studies within the World Bank as well as those conducted by outside researchers will be reviewed. Sources for impact evaluations would include the Development Impact Evaluation (DIME) Initiative, the International Initiative for Impact Evaluation (3ie), EGAP (Experiments in Government and Politics) and J-PAL (AL Jameel-Poverty Action Lab) and on-line knowledge resources such as EconLit will also be used. (Box 3). Depending on the amount of available evidence, a Systematic Review of the welfare impacts of electricity access will be carried out. The use of crowd-sourcing and big data will also be explored.
- f. *Interviews*: Interviews will be conducted with sector staff – technical specialists, task team leaders, researchers, and managers to tap their experience and gather their views on issues of evaluative interest as they apply to them. In the course of PPARs and country field case studies, there will be greater opportunity to hold discussions with field-based Bank staff, government officials, civil society, researchers and beneficiaries. Structured meetings with groups of staff will be also be carried out during the course of the study as discussed under “Dissemination” (paras 45-46 below).

g. *Thematic notes:* The study aims to prepare four thematic notes on the following topics: (a) Planning the National Access rollout; (b) Promoting Financial Viability, Rational Tariffs and Subsidies; (c) Enabling Private Participation; and (d) Welfare and Gender Impacts of Electricity Access. The thematic notes will draw upon the literature review, country case studies, NLTA review, portfolio studies as well as interviews with various stakeholders as discussed below. Indicative coverage of the thematic paper on Planning the Access Rollout is presented in Attachment 8.

Box 3. Welfare Gains from Access to Electricity: Systematic Review and “Gap-Map”

The relationship between access to electricity and welfare gains becomes particularly important when assessing the cost-effectiveness of rural electrification projects. Rural electrification projects are often justified because they are intended to promote household welfare by providing a better quality of life or more productivity. This view, along with the significance of other sources of modern energy, has resulted in modern energy and electricity services being recognized as essential to fulfilling the Millennium Development Goals (United Nations 2005).

The correlation between access to electricity and the components of the Human Development Index (HDI): health, education and living standards is well documented in the literature (Kanagawa and Nakata 2008, DfID 2002). Furthermore, access to electricity seems to promote gender equality and security (UNIDO 2011, IEG 2008, WB 2011). However, the evaluation of the improvements of rural electrification on overall quality of life has been sparse (WB 2008). The effects on child nutritional status, fertility, education cannot be identified though a causal chain, although some evidence backs the positive relationship (IEG 2008). Estimating the causal effect of electricity on household welfare is difficult because the impact is difficult to isolate, but access is likely to be a necessary condition and to be correlated with other household characteristics that contribute to welfare (WB 2008).

The WBG made a first attempt in investigating the welfare gains associated to electricity access in 2008 (IEG 2008). This study proposes to update and expand the knowledge on the topic through a Systematic Review of Impact Evaluations that has addressed the linkage between electricity access and welfare outcomes.

Source: Authors.

40. *Design Matrix.* Each of the above instruments will provide inputs to one or more aspects of the evaluation questions. In several cases there will be overlap of questions addressed by each of these instruments. This overlap is consciously built into the evaluation framework so that evidence can be triangulated across various sources of information. The manner in which the evaluation questions interface with the evaluative instruments is laid out in the Design Matrix (Attachment 9). The inter-linkage between the evaluation instruments and the country-focused evaluative analysis is depicted in Attachment 10.

41. *Time Period and WBG activities covered by the evaluation:* The study will cover all projects, investments, guarantees and non-lending technical assistance and advisory services in support of electricity access, and approved during the fifteen period of FY1999 to FY2013. As explained in the section on “country-focused evaluative analysis” below, the emphasis will be on closed/mature projects and investments and other activities, and countries which have received significant WBG support and offer potential for lesson-learning. The start of this period corresponds to when the WBG broadened its strategy from mainly addressing rural electrification toward the scaling-up of electricity access nationwide, and supporting the energy infrastructure at its center. The fifteen year period also allows for five-year period comparisons.

LIMITATIONS

42. The study will cover “Non-Energy Sector” WB projects, or projects that are primarily mapped to sectors other than the energy sector, only to the extent that any of their objectives/components are directly / substantially relevant to delivering or improving electricity access. Some WBG activities may not be intended to have a systemic impact on electricity access as the sector or country level. When such cases arise, the study will recognize the specific objectives of those operations and assess the direct project-level results and the indirect spillover effects. In some projects, this could involve demonstration effects or increased competitiveness in productive sectors served by greater electricity access. The availability and quality of data for the various attributes of access may vary widely across countries.

Quality Assurance and Consultations

43. This approach paper is prepared based on informal consultations with key stakeholders including WBG management, operational staff, and other sector experts. This consultation process will be continued during the evaluation as one way of improving the accuracy, relevance, and usefulness of evaluation findings and recommendations, while always safeguarding the evaluation’s independence. This Approach Paper has been peer reviewed to ensure relevance of the evaluation questions and issues covered, adequacy of scope of the evaluation, and appropriateness of methodology. The final evaluation report will also be subjected to a similar peer review process. Peer reviewers are: Enrique Crousillat (former WB Lead Energy Economist), Michael Toman (Research Manager, DECEE), Dominique Van De Walle (Lead Economist, DECHD), and Anis Dani (Lead Evaluation Officer, IEGCC). The study will also aim to seek out additional experts for inputs on major sector related and evaluative aspects as becomes necessary in the course of the study, in consultation with IEGPS Management. Messrs. Einar Telnes (Norad) and Howard White (International Initiative for Impact Evaluation or 3ie²⁴) have indicated readiness to provide their expert views and comments on select topics during the course of the study.

44. During the evaluation, the team will solicit feedback and comments from stakeholders, including WBG management at various levels and task team leaders and researchers to enhance the usefulness of the evaluation as well as to serve as a reality check. Such interaction is expected to supplement the findings from the portfolio reviews, case studies, PPARs and other components of the study. These interactions will be carried out in a transparent manner while safeguarding the independence of IEG.

Expected Outputs and Dissemination

45. The output of this evaluation will be a report to the World Bank Group’s Board’s Committee on Development Effectiveness (CODE), as part of its oversight role of effectiveness of the World Bank Group operations.

46. The evaluation report will be disseminated in the Bank Group’s headquarters in Washington, DC, and in the field for regions and countries with a strong client interest and/or a large portfolio in the energy sector. A report launch event will be held at headquarters following the CODE meeting, for Bank staff and interested staff from organizations in the area

such as the Inter-American Development Bank, donor organizations, research institutions, and think tanks. Technical briefing/presentations will be held as requested for Board members and senior management. Presentations will be held for sector staff at headquarters and country offices through face-face presentations supplemented by videoconferencing or on-line broadcast as feasible. Dissemination events will be held for client country stakeholders including government officials, industry representatives, beneficiaries, donors, and representatives of civil society groups at appropriate venues, again supplemented by interactive technologies as required.

Resources

47. *Timeline.* The draft report will be completed by FY15Q2, with the final report presented to CODE in FY15Q3.

Table 6. IEG Electricity Access Evaluation Timetable

IEG Management Review of the Approach Paper – One stop	October 2013
Approach paper sent to CODE	December 2013
IEG Management Review – One stop	2nd Quarter FY15
Report sent to WBG Management	2nd Quarter FY15
Report sent to CODE	3rd Quarter FY15
CODE Meeting	3rd Quarter FY15

48. *Budget.* The budget for this evaluation is estimated at US\$900,000, consistent with major IEG sector evaluations. The budget for PPARs will be separately covered. A Systematic Review of the welfare and gender impacts of the improving electricity access has been separately budgeted at US\$150,000, for which trust funding has been sought for sharing costs. Dissemination will require US\$40,000 which would also be targeted for trust funding support.

49. *Team and Skills Mix.* The core evaluation team includes the following IEG staff; Varadarajan Atur, Lead Evaluation Officer – Task Team Leader (TTL); Ramachandra Jammi, Evaluation Officer – Co-TTL; Kavita Mathur (Systematic Review of welfare outcomes) (IEGPS1); Aurora Medina Siy, Senior Evaluation Officer, other IEGPE staff/consultant (IEGPE); Chiara Rogate, Victoria Alexeeva, Sofia Chiarucci, Istvan Dobozi, Fernando Manibog, and Thao Thi Phoung Nguyen (Consultants). The extended team includes TTLs and key staff/consultants of the ongoing IEG Studies – the Public-Private Partnerships Study (IEGPE) and the Global and Regional Partnership Programs (IEGCC). The team may be strengthened by additional sector experts and impact evaluation/systematic review specialists in the course of the study. The evaluation will be conducted under the general supervision of Marie Gaarder, Manager (IEGPS1) and Emmanuel Jimenez, Director (IEGPS).

Attachment 1

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Attachment 2

The relationship of Electricity Access to the Millennium Development Goals (MDGs)

MDG	Contribution of Electricity Access in Achieving MDGs
Goal 1: Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> • Provides less time-consuming and more healthful means to undertake basic household tasks. • Permits income generation beyond daylight hours through lighting.
Goal 2: Achieve universal primary education	<ul style="list-style-type: none"> • Saves time spent on gathering traditional sources of energy, thus allowing school attendance to replace child labor. • Facilitates studying at home and teacher retention in schools. • Enables access to educational media and communication. • Increases educational opportunities and allows distance learning.
Goal 3: Promote gender equality and empower women	<ul style="list-style-type: none"> • Reduces the physical burden of carrying wood. • Frees up time for women to widen their employment and education opportunities. • Allows home study and evening classes. • Improves women's safety.
Goal 4, 5, 6: Reduce child mortality; Improve maternal health; and Combat HIV/AIDS, malaria, and other diseases	<ul style="list-style-type: none"> • Enables night availability, helps retain qualified staff, and allows equipment use (for example, sterilization and medicine refrigeration), thus improving the adequacy of child and maternal treatment. • Benefits health and nutrition directly by enabling access to piped water and allowing refrigerated food storage and indirectly through knowledge (and therefore usage of health services). Estimates show that with a one percent increase in electricity coverage in a province, the child malnutrition rate declines by 1.2 percent. • Reduces women's workload and heavy manual labor that may affect women's general health and well-being. • Improves usage of health services through access to health education media via information and communication technologies (ICTs).
Goal 7: Ensure environmental sustainability	Societies that derive a greater portion of their energy from electricity have lower emissions of pollutants. The promotion of renewable energy sources to generate electricity access reduces GHGs emissions and it is congruent with the protection of the local and global environment.
Goal 8: Develop a global partnership for development	In 2012, the Sustainable Energy for All (SE4ALL) global initiative was launched by the Secretary-General of the UN in partnership with the World Bank and the International Energy Agency (IEA) to reach universal energy access, improve energy efficiency, and increase the use of renewable energy by 2030. The initiative was launched to coincide with the designation of 2012 as the International Year of Sustainable Energy for All by the UN General Assembly.

Source: IEA 2010; Meisen and Akin 2008; WB 2005, 2006 and 2011

Attachment 3

**Table A. WB Commitments for Electricity Access: Distribution by Region
Major Lending Categories in Each Region; FY1999-2013**

Region	By Region	Generation	Gen-Renew	T&D	Energy Eff	Dev. Policy	TA	Others	Tota (US\$M)
ECA	21%	14%	11%	35%	28%	11%	0.06%	1%	9,134
SAR	21%	41%	6%	37%	7%	6%	0.13%	4%	8,912
LCR	9%	24%	24%	11%	24%	14%	0.38%	3%	3,890
AFR	27%	18%	1%	67%	3%	3%	0.04%	8%	11,838
EAP	16%	29%	10%	34%	21%	6%	0.22%	1%	7,098
MNA	6%	62%	11%	9%	15%	3%	0.00%	0%	2,580
	100%	27%	8%	40%	14%	7%	0.12%	3%	100%
TOTAL (US\$M)		11,655	3,607	17,401	6,257	2,991	52	1,489	43,452

Source: WBG Data

**Table B. IFC Investment Commitments for Electricity Access: Distribution by Region
Major Investment Categories in Each Region; FY1999-2013**

Region	By Region	Generation	Gen-Renew	Transmission	Distribution	Energy Eff	Others	Total
ECA	19%	15%	52%	1%	23%	0.4%	7%	100%
SAR	16%	40%	37%	18%	0%	0%	5%	100%
LAC	25%	35%	30%	7%	18%	2%	9%	100%
AFR	15%	51%	33%	0%	8%	0%	8%	100%
EAP	15%	37%	53%	0%	3%	0%	7%	100%
MNA	9%	44%	21%	0%	8%	0%	28%	100%
Global	1%	100%						100%
	100%	35%	40%	5%	11%	0.4%	8%	100%

Source: WBG Data

**Table C. MIGA Gross Exposure for Electricity Access: Distribution by Region;
Major Categories in Each Region; FY1999-2013**

Region	By Region	Generation	Gen-Renewables	Transmission	Distribution	Total
ECA	17%	73%	20%	0%	8%	100%
SAR	10%	65%	35%	0%	0%	100%
LAC	30%	32%	15%	32%	21%	100%
AFR	34%	31%	59%	4%	5%	100%
EAP	8%	55%	45%	0%	0%	100%
MNA	0%	0%	0%	0%	0%	100%
	100%	44%	36%	11%	9%	100%

Source: WBG Data

Attachment 4

Issues in Defining Electricity Access

Energy access has no universally agreed-upon definition. It is often treated as a subset of the broader issue of “energy services” provision. The UN Energy interagency (2005) uses the term “energy services” to refer to “the benefits produced by using energy supplies” and add that “the poor obtain energy services by gaining access to modern fuels, electricity and mechanical power.” The International Energy Agency (IEA) defines energy access as: “a household having reliable and affordable access to clean cooking facilities, a first connection to electricity (defined as a minimum level of electric consumption) and then an increasing level of electricity consumption over time”. The Energy Development Index includes the share of population with access to electricity.²⁵

Electricity access is often not specifically defined either, and is usually subsumed under the broader concept of “energy poverty.” The World Bank defines electricity access retroactively as “the percentage of population with access to electricity” in its World Development Indicators,²⁶ whereas the WBG Power Sector Indicators use the more limited definition of “people provided with access to electricity under the project by household connections (#)”. Similarly, the recently released document “Power Market Structure and Performance: Revisiting Policy Options Report” (April 2013) defines access as the “number of residential connections divided by the total population”.

When defined (global databases), electricity access is presently measured as a binary metric, that is, as the number of people having (or not) an electricity connection, with no middle ground. Even the academic literature often does not define electricity access²⁷ and when it does, it seems to also adopt the binary metric.

The World Bank’s Project Appraisal Documents (PADs) and Implementation Completion & Results Reports (ICRs), and IEG’s ICR Reviews, also do not add better measures of access (when defined) other than people or households connected, but they do raise the issues of quality, reliability and affordability.

The SE4All Initiative defines access narrowly as the “availability of an electricity connection at home or the use of electricity as the primary source for lighting”. The SE4All Tracking Framework Report recognizes that this definition is limited because it does not register progress in electrification through off-grid lighting products, and does not capture the broader dimensions of electricity access: adequacy, reliability, quality, affordability.

While lacking a specific definition for electricity access itself, the report “Addressing the Electricity Access Gap” (2012) specifically mentions the attributes of quality, reliability and affordability of access.

Thus, for the purpose of the study, “electricity access” is defined to include the provision to residential, commercial, industrial, institutional and other users of adequate and affordable electricity supplies that meet quality and reliability standards.

Attachment 5

World Bank Group Closed and Active Operations, Economic & Sector Work (ESW) and Analytical and Advisory Assistance (AAA)

	Closed	Active	TOTAL
WB Core Energy Sector Projects	129	162	291
WB Non-Core Energy Projects	230	60	290
IFC Investments/Guarantees	65	174	239
IFC Advisory Services (FY2009-2013)	19	48	67
MIGA Guarantees	32	31	63

Document Type	Sub-Saharan Africa	East Asia and Pacific	Latin America & Caribbean	South Asia	TOTAL
Energy Study	6	2	1	5	14
ESMAP Paper	9	4	8	7	28
Other Infrastructure Study	1				1
Other Public Sector Study		1			1
Policy Note	4		1	3	8
Policy Research Working Paper	8			4	12
Publication	3	1		3	7
Viewpoint				1	1
Working Paper	32	14	5	9	60
Working Paper (Numbered Series)	1		2	1	4
TOTAL	64	22	17	33	136

Region	No. of Activities
East Asia and Pacific	28
Sub-Saharan Africa	26
Europe and Central Asia	6
Middle East and North Africa	15
Latin America and the Caribbean	16
South Asia	8
TOTAL	99

Attachment 6

Proposed Field-based Inputs:

Project Performance Assessment Reports (PPAR) and Field-based Case Studies

REGION	COUNTRY	WBG UNIT INVOLVEMENT			FIELD CASE STUDY	PPAR	PPAR PROJECTS	INDICATIVE FOCUS AREAS
		WB	IFC	MIGA				
SSA	Uganda	✓	✓	✓	Yes	Yes	Power SIL (2002-2008); Energy for Rural Transformation (2002-2009); Power Sector Development Project (2007-2012)	Private Sector Participation; Access Issues
SSA	Ethiopia	✓	✓		Yes	-		Regional Trade; Output-based Assistance for the Poor
SSA	Kenya	✓	✓	✓	Yes	-		Utility Management; Private Sector Participation; Regional Trade
SSA	Nigeria	✓	✓		Yes	-		Private Sector Participation; Sector Reforms
SSA	Senegal	✓				Completed 2013	Electricity Sector Efficiency Enhancement Project; (2002-2009) Energy Sector Recovery Development Policy Credit Project (2003-2009)	Sector Policy Reform ; Financial Viability
EAP	Indonesia	✓	✓		Yes	-		Access Rollout; Off-grid Electricity
EAP	Vietnam	✓	✓	✓	Yes	Yes	Transmission, Distribution and Disaster Reconstruction Project (1998-2007)	Access Rollout; Reliability Issues

REGION	COUNTRY	WBG UNIT INVOLVEMENT			FIELD CASE STUDY	PPAR	PPAR PROJECTS	INDICATIVE FOCUS AREAS
		WB	IFC	MIGA				
							Rural Energy Project (2000-2006) System Efficiency Improvement, Equitization & Renewables Project (2002-2013)	
ECA	Croatia	✓	✓		-	Completed 2013	Renewable Energy Resources Project (2006-2011); Energy Efficiency project (2006-2011); District Heating Project (2006-2011)	Renewable Energy; Energy Efficiency; Policy Reform
LAC	Argentina	✓	✓	✓	Yes	-		Off-grid Electricity Private sector participation
LAC	Nicaragua	✓	✓	✓	Yes	-		Off-grid Renewable Energy – Solar Home System (SHS)
SAR	Sri Lanka	✓	✓	✓	Yes	Yes	Renewable Energy for Rural Economic Development Project (2002-2011)	Off-grid Renewable Energy – SHS; Welfare Impacts
SAR	Bangladesh	✓	✓	✓	Yes	Yes	Rural Electricity and Renewable Energy Development project (2001-2012); Power Sector development TA (2004-2012) ; and Power Sector DPL (2008-9)	Off-grid Renewable Energy – SHS – Role of Intermediary; Welfare Impacts
SAR	India	✓	✓		Yes	-		Enabling Frameworks; Off-grid Electricity; Subsidy/Tariff Regime

Attachment 7

Indicative Issues covered by a Thematic Note

Considerations in Planning a Nation-wide Electricity Access Rollout

The experience of several countries that have reached high or universal access to electricity in recent years points to the importance of developing a systematic national access roll out plan to reach the goal of providing electricity to the entire population. A thematic note will be prepared as part of this evaluation, to examine the nature of this planning process in countries that have achieved universal access in the last two decades – with or without WBG support – and draw lessons for the WBG’s future strategy and operations.

A systematic planning process can establish a clear system for prioritizing the areas to be electrified, while taking into account the conditions necessary for rural development: access to education and health services, an adequate transport system, agricultural potential, and access to markets. For example, Thailand employed a systematic and highly successful approach to plan for rural electrification through setting transparent socioeconomic criteria for prioritizing target areas for access expansion; integrating renewable energy in the broader national development strategy; and taking into account equity considerations. Lao PDR and Vietnam followed similar approaches.

Grid vs. off-grid considerations. Grid-based electricity has been the mainstay of electricity access, as seen from the experience of countries all over the world. The extension of the electricity distribution grid generally is the least-cost approach to reach new consumers and to rapidly increase the number of households with access to electricity. However, as the grid spreads out and becomes gradually more expensive, off-grid options may become cost effective. Also, off-grid electrification may be the only option in places where it is difficult to provide access such as in remote and mountainous areas and small, dispersed islands. In a systematically planned expansion, areas that are not likely to be reached by the grid in the near future may be served by off-grid facilities within a framework that would enable them to be absorbed subsequently into the grid. These transitional off-grid areas are best suited for renewable mini-grid technologies.

Spatial plans based on GIS analysis. In contrast to the traditional and relatively static Master Plan analysis, a spatial plan based on GIS (geographic information system) models may present a far superior dynamic basis for systematic planning of the grid/off-grid interface. This approach enables the identification of communities and households that are to be provided access by taking into account factors such as the existing infrastructure, population densities, and distance from the electricity grid, as well as the local renewable energy resources. The spatial model can be used to rapidly estimate and compare connection costs among different regions and communities. Other inputs for the model include electricity demand, costs, and geographic characteristics. The spatial nature of the model permits accurate representation of the existing electricity network and population distribution, which can form the basis for future expansion decisions.

Attachment 8

Design Matrix: Main Evaluation Questions and Principal Sources of Evaluative Evidence

	Country-focused Evaluative Analysis						Thematic Notes			
	Extended Literature Review	Project Portfolio Review	Field-based Inputs	Country Strategy	Systematic Review	Interviews	Promoting Financial Viability; Rational Tariffs and Subsidies	Enabling Private Participation	Planning the National Access Rollout	Welfare and Gender Impacts of Electricity Access
(1) Based on the results of its lending programs and advisory services, to what extent did the Bank Group achieve its policy, strategic and operational objectives for delivering electricity access?										
What are the external and internal factors that influenced and affected the WBG's ability to achieve those objectives?	✓	✓	✓	✓		✓	✓	✓	✓	✓
How effective has the Bank Group been in generating and mainstreaming cutting-edge knowledge on electricity access?	✓		✓	✓		✓			✓	
How effective has the Bank Group been in contributing to greater welfare outcomes through increased electricity access?		✓		✓						✓
How effective has the Bank Group been in catalyzing private sector investments in providing electricity access?							✓			
How effective has the Bank Group been in supporting a viable electricity sector?		✓	✓			✓	✓			
How well do the WBG's project-level Results Frameworks, core sector indicators, and the Corporate Scorecard adequately reflect the operational realities of delivering electricity access in client countries?	✓	✓	✓	✓		✓				
(2) To what extent has the Bank Group been effective in helping to establish the enabling frameworks for successful electricity access development?										
To what extent has the WBG supported and added value to the sector policy, legal, regulatory and institutional frameworks and capacity for improving electricity access?	✓	✓	✓	✓		✓	✓	✓	✓	✓
To what extent has the WBG supported and provided advice for sector policy for improved electricity access to the poor?	✓	✓	✓	✓		✓	✓	✓	✓	✓

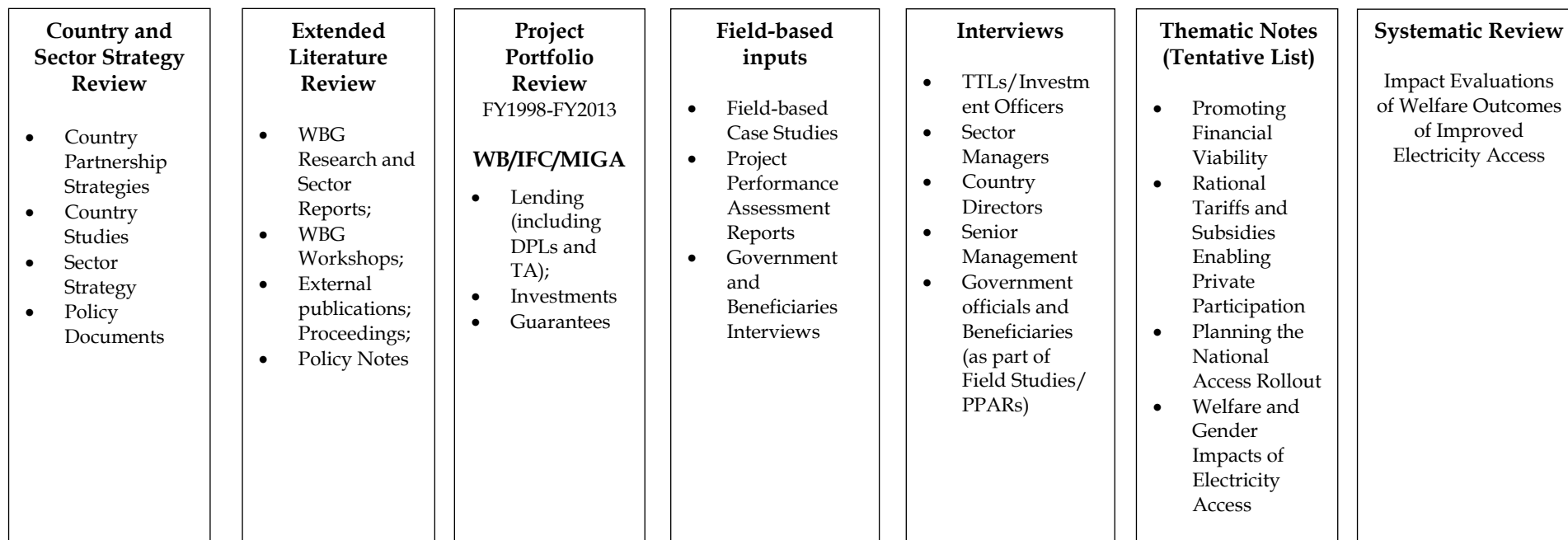
Attachment 8 (continued)

Design Matrix: Main Evaluation Questions and Principal Sources of Evaluative Evidence (contd.)										
	Extended Literature Review	Project Portfolio Review	Field-based Inputs	Country Strategy	Systematic Review	Interviews	Thematic Notes			
							Promoting Financial Viability; Rational Tariffs and Subsidies	Enabling Private Participation	Planning the National Access Rollout	Welfare and Gender Impacts of Electricity Access
Have IFC advisory services helped to stimulate and improve private sector interest and the quality of transactions?		✓	✓	✓		✓		✓		
What support has the WBG offered its country clients for strengthening M&E capacity and conducting impact evaluations related to energy access?		✓	✓	✓	✓	✓				✓
(3) To what extent has the WBG facilitated and enabled regional and global partnerships in support of the electricity access agenda?										
How effectively did the WBG utilize partnerships for supporting countries in electricity access development?		✓	✓	✓		✓		✓		
How effectively did the WBG create / mobilize synergies among global / regional stakeholders – including with the private sector – to increase electricity access?	✓	✓	✓	✓		✓	✓	✓	✓	✓

Attachment 9

Country Focused Evaluative Analysis

Begins with an understanding of: Sector Performance Trends; Key Players and Sector Structure; Regional Aspects; Welfare Issues and Support for the Poor; Generation Mix; Off-grids/Mini-grids; Donors; WBG Synergies; etc., which would be supported by



Endnotes

¹ SE4All 2013. SE4ALL was officially launched in 2012 at Rio+20 Conference. The UN Secretary-General and the President of the World Bank became co-chairs of the Advisory Board of the initiative in April 2013.

² Energy for a Sustainable Future – Report and Recommendations, April 2010, AGEEC, p15.

³ IEA 2012

⁴ Electricity cannot be stored inexpensively; it must be produced instantaneously on demand. Failure to adjust production to demand can cause brownouts or blackouts over a large region. Reliable supply, therefore, requires operating generators to be backed up by "spinning reserve" units that can begin producing instantaneously.

⁵ Khandker et. al 2012

⁶ WHO and UNDP 2009

⁷ Toman and Jemelkova 2003; Toman and Barnes 2006

⁸ SE4All 2013

⁹ Toman and Jemelkova 2003

¹⁰ There are also growing references that electricity access has facilitated transparency, accountability and governance improvements at local levels through better communication technologies.

¹¹ IEG 2008

¹² WB, 2011

¹³ Argentina, Tonga, El Salvador, Indonesia, Lao DPR, Sri Lanka, Peru, Vietnam, Brazil, Costa Rica, Tunisia, Thailand, Chile, and Mongolia.

¹⁴ IEA 2010.

¹⁵ SE4ALL 2013; WB, 2011

¹⁶ Jamasb et al, 2005

¹⁷ Source: PPIAF Database.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ OED/OEG/OEU. "Power for Development: A Review of the World Bank Group's Experience with Private Sector Participation in the Electricity Sector." 2003.

²¹ "New renewables" excludes hydroelectricity

²² Supporting power generation, distribution, and transmission: IFC Advisory Services in Public-Private Partnerships

²³ World Bank 2012.

²⁴ International Initiative for Impact Evaluation (www.3ieimpact.org)

²⁵ The Energy Development Index is composed of 4 indicators: (i) per capita commercial energy consumption, which serves as an indicator of the overall economic development of a country; (ii) per capita electricity consumption in the residential sector, which serves as an indicator of the reliability of, and consumer's ability to pay for, electricity services; (iii) share of modern fuels in total residential sector energy use, which serves as an indicator of the level of access to clean cooking facilities; and (iv) population with access to electricity.

²⁶ Electrification data are collected from industry, national surveys and international sources.

²⁷ See, for instance: Chaurey A., Ranganathan M. and P. Mohanty (2004), "Electricity access for geographically disadvantaged rural communities – technology and policy insights", *Energy Policy*, Vol. 32, Issue 15, pp. 1693-1705; Nouni M.R., Mullick S.C. and T.C. Kandpal (2008), "Providing electricity access to remote areas in India: An approach towards identifying potential areas for decentralized electricity supply", *Renewable and Sustainable Energy Reviews*, Vol. 12, Issue 5, pp. 1187-1220; Khandker S.R., Barnes D.F. and Samad H.A. (2012), "Are the Energy Poor also Income Poor? Evidence from India", *Energy Policy*, Vol. 47; Kooijman-van Dijk A. L. and J. Clancy (2010), "Impacts of Electricity Access to Rural Enterprises in Bolivia, Tanzania and Vietnam", *Energy for Sustainable Development*, Vol. 14, Issue 1, pp. 14-21