VOLUME II

Together for Energy: How Partnership Programs Support Energy Access

World Bank Group Support to Electricity Access, FY2000-2014

AN INDEPENDENT EVALUATION

IEG
Independent Evaluation Group
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WHAT WORKS

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World Bank Group Support to Electricity Access, FY2000–2014, Volume 2

Together for Energy: How Partnership Programs Support Energy Access

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

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Abbreviations and Acronyms

CODE	Committee on Development Effectiveness (World Bank)
GPR	Global Program Review
IEG	Independent Evaluation Group
IEGCC	IEG Country and Corporate Evaluation
AFTG1	Africa Energy Unit-1
AFTG-2	Africa Energy Unit-2
ASTAE	Asia Sustainable and Alternative Energy Program
BETF	Bank- Executed Trust Fund
CCT	conditional cash transfers
CG	Consultative Group (of ESMAP)
DFID	Department for International Development
EASWE	Water and Energy Management Unit, Sustainable Development Department, East Asia and Pacific
ESMAP	Energy Sector Management Assistance Program
GFR	Grant Funding Request
GPOBA	Global Partnership on Output-Based Aid
GRM	Grant Reporting and Monitoring
IAP	indoor air pollution
ICM	Implementation Completion and Monitoring
LCSEG	Latin America and the Caribbean Region Energy Unit
LA	Lighting Africa
M&E	monitoring and evaluation
NGO	nongovernment organization
OBA	output-based aid
PicoPV	basic solar lantern
RBF	Result-Based Financing
RETF	Recipient- Executed Trust Fund
SAR	South Asia Region
SASDE	South Asia Region Development Effectiveness Unit
SASSD	South Asia Region Sustainable Development Department
SE4ALL	Sustainable Energy for All
SEGES	Oil, Gas, and Mining Department
SHS	solar home systems
SSA	Sub-Saharan Africa
TA	technical assistance
TAG	Technical Advisory Group
TTL	task team leader

Acknowledgments

This report was written in conjunction with IEG's evaluation of the World Bank Group's electricity access activities as a complementary review of partnership programs active in energy access. Some of the main findings of this review are integrated in the electricity access evaluation. It follows a modified format for global program reviews. Anna Aghumian and Rasmus Heltberg were the task team leaders. Andres Liebenthal and Anna Amato completed the team which was supported by Yasmin Angeles. Fernando Manibog was the peer reviewer. The team is grateful to the many people listed in appendix C who agreed to be interviewed for this study.

Overview

The goal of providing universal access to modern energy services has been endorsed in the 'Sustainable Energy for All' initiative co-chaired by UN Secretary-General Ban Ki-Moon and World Bank President Jim Kim and mirrored in the World Bank Group's latest energy sector strategy. Reaching this goal requires the World Bank Group not only invest more in its client countries but also deepen and use more effectively its partnerships to pool together diverse resources, knowledge and expertise from other development partners.

This study aims to complement IEG's sector evaluation of the World Bank Group's support for electricity access which assesses the effectiveness of the Bank Group in putting its client countries on track toward universal access to electricity. This study was commissioned and written with a view to inform the sector evaluation by reviewing the role and effectiveness of Bank Group partnership programs that contribute to the energy access agenda.

The review is the first attempt to mainstream partnership aspects in major IEG evaluations. As such, while building on IEG's standard evaluation framework for Global Program Reviews, it departs from this framework in several ways. It is focused on partnership programs' energy access activities rather than the entire programs and assesses aspects of program performance and governance only to the extent they influenced the achievement of results.

The Bank Group has a long record of addressing development challenges, not only via lending and country programs, but also via partnerships. This is true in the energy sector as well. For example, the Energy Sector Management Assistance Program (ESMAP), set up in 1983, is one of the World Bank's oldest partnership programs and has been a major supporter of learning, policy advice, technical assistance, and knowledge management.

The study reviews ESMAP and three other prominent partnership programs housed in the World Bank Group that, among other things, support energy access activities: the Global Partnership on Output-Based Aid (GPOBA), Lighting Africa, and the Asia Sustainable and Alternative Energy Program (ASTAE). The aim was to assess how these partnership programs have contributed to energy access. It also takes stock of how well gender aspects are integrated in the programs' energy access activities. IEG reviewed the relevance and effectiveness of the four programs,

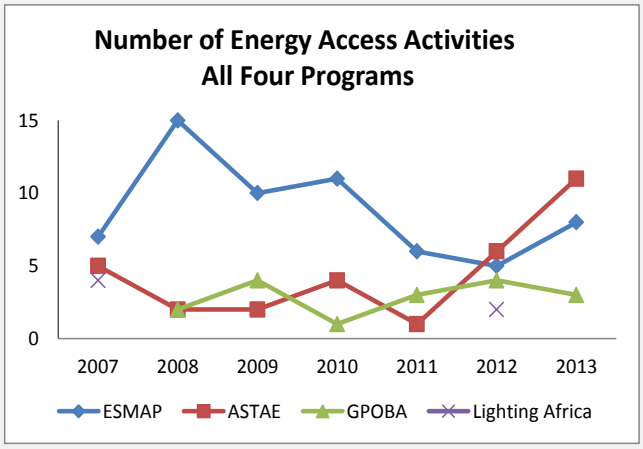
their contributions to energy access, the quality of their knowledge products, and some key insights that emerged from them—all with a view to inform and complement the sector evaluation.

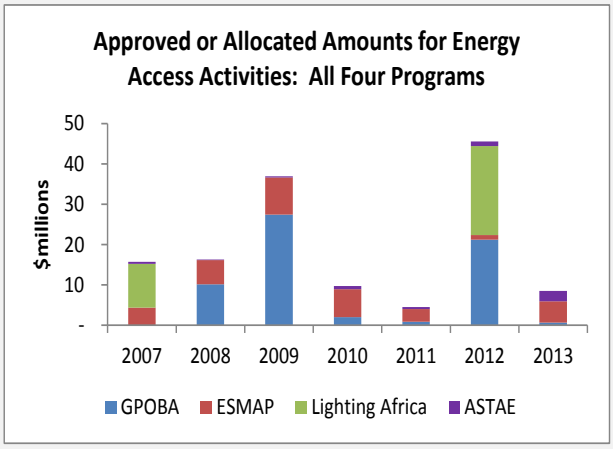
The combined expenditures of these programs exceeded $250 million during the 2007-13 period, of which IEG estimates that about $132 million was for energy access. About 50 percent of this are GPOBA projects. These programs support diverse activities, including generating and disseminating knowledge and supporting preparation of World Bank projects. The lion's share of GPOBA's energy access portfolio provides direct subsidies. On average, the four programs have initiated about 16 energy access activities per year (Figure O.1).

The programs use different and complementary modalities to support energy access:

- GPOBA, set up in 2003, funds output-based aid approaches to improve delivery of basic services to the poor. Its first energy access pilot started in 2006.
- ESMAP, set up in 1983, is a multi-donor technical assistance program aiming to increase countries' capacity to achieve environmentally sustainable energy solutions.
- Lighting Africa, launched in 2007, is a joint World Bank and IFC program aiming to help catalyze markets for quality, affordable, clean, and safe off-grid lighting in Africa.
- ASTAE, created in 1992, is a small technical assistance program housed in the Bank.

Figure O.1. Energy Access Portfolio





Source: IEG staff based on program reports. Data apply only to energy access portions of programs' portfolio.

- All four programs are trust funded. The major donors are the United Kingdom, Netherlands, Sweden, Australia, Denmark, and
- Germany who between them contributed 94 percent of the $349 million the programs received in the 2007-13 period.

Two of the programs—ESMAP and Lighting Africa—have recently had external evaluations which IEG's team drew upon and complemented with a review of the programs' knowledge products. GPOBA has not had an external evaluation since 2007 and ASTAE has never had any external evaluation. GPOBA is undergoing an annual review by its major donor, DFID. However, these reports are not publicly available. ASTAE also had an internal review commissioned by the World Bank's East Asian and Pacific Region which was not available at the time of this review. Due to lack of readily available evaluative material on GPOBA and ASTAE, IEG carried out more in-depth review of these two programs.

Program Performance and Effectiveness

Most of these programs have performed reasonably well and made important contributions to energy access, but the degree to which the programs were integrated and coordinated with other World Bank Group energy operations varied substantially. These programs have room to be more strategic in choice of their activities and to improve their design relevance. The ability of the programs to balance donor priorities and the programs' strategic goals and to manage donor expectations proactively was one of the key drivers behind the programs' successful performance. Performance reporting and monitoring has been uneven but is on a positive trend.

GPOBA Piloting Pro-Poor Approaches in Energy Access

GPOBA has been a pioneer in piloting output-based approaches, including in energy access. It has awarded 12 recipient-executed grants to pilot output-based (OBA) schemes in energy sector projects targeting poor households. These pilots, of which six were completed as of FY2013, seek to boost access to electricity using diverse technologies. Often building on existing IDA operations, projects are well-integrated with the Bank's country level work. The majority of projects offer the poor targeted connection subsidies that support initial access rather than consumption. The projects also create financial incentives for utility companies to extend services to the poor.

GPOBA has demonstrated the feasibility of the OBA approach in the energy sector and, particularly, in extending energy services to the poor. Its pilots have produced useful

practical lessons on the strengths and weaknesses of applying OBA approaches. Some projects achieved or exceeded their initial targets for number of new household connections such as in Bangladesh, where GPOBA helped fine tune subsidies to target poorer households dovetailed within the context of a larger IDA investment in a mature sector. Other projects did not meet connection targets for a variety of reasons, some linked to external factors outside the control of GPOBA, others because of project design issues. In Ghana, for example, GPOBA gave microcredit to poor consumers for buying solar PVs but the private suppliers had limited access to trade finance to supply solar PVs to local markets. The project design initially did not anticipate such a constraint. A project in India misread consumer demand because it relied on an outdated beneficiary survey. Some other GPOBA energy access projects did not provide sufficiently large incentives to make it profitable for utilities and suppliers to connect poor households. A conclusion to draw from these projects is that a more agile and less prescriptive approach to address the market constraints and project design issues, as they are revealed during implementation, would improve performance. Such agility and real-time learning is especially important in pilot projects.

GPOBA's program-level results framework is a work in progress. The program has articulated a strategic framework in its 2008 "Vision Statement" that lays out the program's theory of change and how it will achieve its strategic objectives. However, this strategic framework has not been operationalized further or used to monitor and report on the program's progress toward higher-level objectives (that is, mainstreaming of OBA and becoming a Center of Expertise). This makes it harder to assess the program's overall design relevance and effectiveness in achieving its objectives.

GPOBA's aspiration to become a global Center of OBA Expertise is a work in progress. Currently, the lion share of program's resources is funding OBA pilots, while learning from its own pilots can be limited. Sponsoring a broader range of RBF mechanisms and focusing more on innovation and learning from own and others' experience, while strengthening in-house expertise, might enhance the program's global relevance and reach. DFID's recent annual review also considers that GPOBA's current focus and approaches carry the risk of it becoming marginalized in a context where people inside and outside the Bank are deploying a growing array of RBF instruments, far broader than GPOBA's approaches.

ESMAP: Promoting Knowledge and Learning in the Energy Access Agenda

The external evaluation of ESMAP 2007-2011 found that ESMAP has been very successful in influencing World Bank lending operations, and depending on context, has been relatively successful in catalyzing private sector investment and moderately successful in influencing the donor community. ESMAP's new M&E framework is well-designed to track the results of its activities and to focus on key outcomes.

IEG's review also concluded that ESMAP has satisfactorily performed as a producer and promoter of knowledge and learning in the energy access agenda. Its best publications have contributed to the advancement of knowledge in this area with objectivity and rigor, their conclusions and recommendations have been useful for the intended purpose, and they are readable by the intended audience.

ESMAP is a good practice example of a multi-donor umbrella facility that is aligned with the Bank's work in the sector and effectively run. It has performed reasonably well in its core functions of think tank, knowledge clearinghouse, and operational leveraging. Its knowledge products have informed the design of policy reforms and the piloting of technical innovations, whose preparation and capacity building the programs has also supported.

Lighting Africa: Promoting Market-Based Solutions

The external mid-term evaluation of IFC-World Bank Lighting Africa Program concluded that Lighting Africa had been a highly relevant and innovative program that had made important contributions to the rapid growth of the market for quality portable off-grid lighting. While the full extent of the program's contribution cannot be established, the fact that a stakeholder survey attributed 30 to 60 percent of all quality solar lighting products (in Kenya and Ghana) to the program suggests substantial impact. The most recent external evaluation of Lighting Kenya and Lighting Africa's IFC part also underscored the need to carry out more work to determine the extent to which solar lamp sales can be attributed to the program. On the other hand, Lighting Africa's results monitoring framework has been in suspension, and its reporting to donors and the public has been erratic. Although both the Bank and the IFC continued to monitor progress through their own internal institutional tools, it would have been useful to have joint tracking and reporting of progress to get a complete picture of the program as a joint World Bank-IFC endeavor. IEG's own review concluded that the main drivers of Lighting Africa's relevant

and effective facilitation of the market for off-grid lighting in Africa were its provision of market intelligence, quality certification, and testing infrastructure. This focus on unsubsidized approaches bodes well for the long-term sustainability of its achievements and could potentially inform the development of market-based approaches in other areas, such as for improved stoves.

ASTAE: Targeted Support to Energy Assess in East Asia and Pacific

ASTAE provided best value when it remained close to its mandate of early project identification and preparation. Funding from the program allowed Bank teams to pilot new models and carry out in-depth project preparation work in East Asia and Pacific and to a lesser extent in South Asia. Its knowledge products were less strategic. A few ASTAE-supported reports reviewed did not meet the expected standards with respect to analytical rigor and completeness of coverage. ASTAE's record keeping was poor for many years, making access to ASTAE data difficult and creating accountability gaps. The program's results framework does not match its scope and resources. Rather than focusing on own inputs, outputs, and intermediate outcomes, ASTAE's results framework aims for high-level indicators and targets, such as "total World Bank project lending catalyzed by ASTAE activity" or "increase in number of households with access to modern energy", that are beyond the program's capacity and scope.

Grant Making Mechanism Has an Important Influence on Program Performance

Of the four programs reviewed, three—GPOBA, ESMAP, and ASTAE—systematically allocate grants to fund activities implemented by the World Bank Group and recipient countries. GPOBA and ASTAE's mechanisms rely on "calls for proposal", while ESMAP uses "block grants".

Several evaluations of ESMAP found that its annual block grant mechanism is effective, transparent, and efficient. The two programs using calls for proposal had weaknesses related to accountability and strategic use of funds, such as: idiosyncratic approaches to grant-making with variable process quality and efficiency; imposing grant processing and reporting requirements that are additional to the Bank's own requirements; and heavy involvement of donors. In contrast, annual block grants were appreciated by recipients as a more predictable source of funds for the regional energy sector units that can be factored into their work plans and align with sector priorities.

Integrating Gender Is Still a Work in Progress

The programs are taking steps to integrate gender aspects. ESMAP and ASTAE have been the most "gender

conscious", by helping to develop methodologies for integrating gender into the energy sector's work. ESMAP's external evaluation found that, while gender and social issues were well-covered in program documentation, no systems ensured systematic gender integration in projects. Only twelve percent of ESMAP activities in the FY2009–2012 period had gender considerations or components. Although most ESMAP-supported sample publications referenced benefits for women, only a few offered a deeper treatment of gender. Following the external evaluation, ESMAP put in place a systematic gender screening procedure.

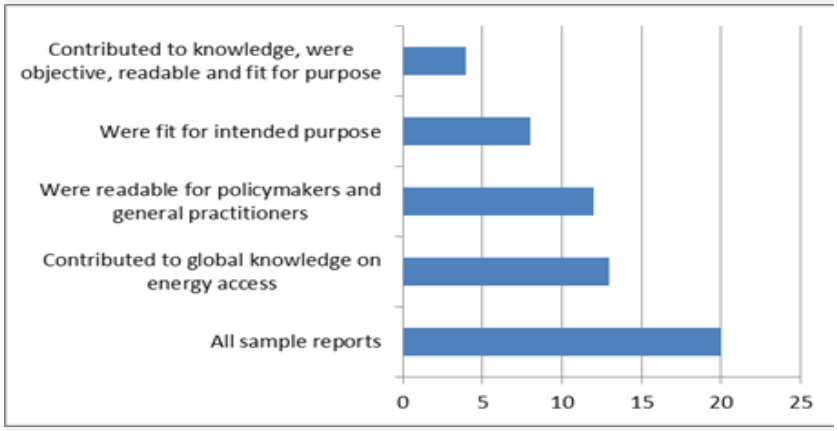
None of the GPOBA subsidy projects under this review monitored gender-related indicators. More recent activities of the program pay more attention to gathering data disaggregated by gender.

Contributions to Knowledge and Learning on Energy Access

Quality of Knowledge Work Is Uneven with the Best Adding to Global Knowledge

The four energy sector programs reviewed have a common mandate for the creation, dissemination, and application of knowledge. IEG reviewed in-depth a sample of 20 reports sponsored by the four programs (mostly ESMAP) and covering an array of energy access issues. While their knowledge products were of uneven quality, the better ones have advanced the understanding of the challenges associated with providing modern energy services to the poor, and their follow-up activities have helped define and pilot innovative solutions. The best publications substantively contributed to the global body of knowledge with objectivity and rigor. Their conclusions, lessons, and recommendations are useful for the intended purpose, and they are readable by the target audience. Four of the 20 sample publications met this gold standard while eight could be considered fit-for-purpose (Figure O.2).

Figure O.2. Assessment of 20 Energy Access Knowledge Products, 2009-2014



Source: IEG assessment.

Conclusions and Lessons

PROGRAM EFFECTIVENESS AND THE CHALLENGE OF UNEVEN PERFORMANCE

While each of these programs has contributed to expanding knowledge and influencing the design of energy access interventions to varying degrees, there are cross- cutting lessons pointing to a strong link between the design, funding, and management arrangements of the programs and their overall performance and effectiveness:

- Excessive donor engagement can have as much a distorting effect on the programs as narrowly earmarked funding. ESMAP managed donor expectations proactively and maintained a better balance between donor priorities and the program's strategic goals than ASTAE and GPOBA.
- Some weaknesses in program performance—especially those related to M&E and trust fund oversight found in ASTAE and partly in Lighting Africa—could have been prevented had the Bank adopted a more systematic and unified approach to overseeing its partnerships and other trust-funded programs;
- Periodic evaluations of the learning and scalability potential of pilots and innovations are critical for the programs to maintain their relevance and to provide value for money. Such evaluations should be planned upfront and integrated in M&E frameworks;
- Accountability and results-orientation could be strengthened via more effective M&E and results frameworks that depict the underlying theory of change. M&E can also be an important learning tool for pilot programs, helping to document implementation and results;
- Gender equality could be addressed more systematically. A starting point would be considering gender systematically in program and project cycles and integrating gender into M&E frameworks.
- For partnership programs that issue grants, the grant process is an important part of program's performance and a critical factor in effective delivery of results. The design and handling of grant processes strongly determine the accountability for funds and their strategic use.

THE CHALLENGE OF ENSURING QUALITY OF KNOWLEDGE PRODUCTS

The quality of the knowledge work sponsored by these four programs varies. While the best knowledge

products made significant contributions to global knowledge, fewer than half of sample publications were found to be objective, analytically sound, and fit for purpose. Several of the reports lacked a sound analytical framework and/or could be perceived as leaning towards advocacy and political correctness. Only a few reports offered in-depth treatment of gender.

The major lesson from the review of the sampled knowledge work is the need for more systematic scoping, quality assurance, and dissemination of knowledge products:

- Guidance on scoping: A clearer strategic vision could guide the design and scoping of knowledge work with an aim to fill outstanding gaps;
- Quality assurance: Quality assurance should be improved. Too often, the sampled reports had common flaws such as absence of a structured analytical framework, insufficient objectivity, and inadequate coverage of gender dimensions.
- Systematic dissemination of knowledge products: The impact of the reports could often have been enhanced through more systematic outreach and integration with training and project activities inside and outside the Bank.

NURTURING VIABLE ENERGY ACCESS BUSINESS MODELS AND KEEPING BROADER POVERTY FOCUS IS A WAY TO GO

The findings from the sampled knowledge work and the review of the models that partnership programs promoted suggest several lessons for pursuing the SE4All goals:

Nurture viable business models. Investments in infrastructure need to be complemented with viable business models that can deliver low-cost energy services to hard-to-reach locations and consumer groups. The proposed goals cannot be achieved by meeting the investment costs alone, but will need to be sustained by continuing technical assistance, capacity building, operational subsidies, and fostering an enabling environment for private investors. This points to the need for flexible design of energy access subsidies that address both demand and supply barriers and does not undermine market-based solutions.

Sharpen the focus on the poor. Evidence that even with sophisticated targeting mechanisms the benefits of energy access tend to flow to the better-off households in poor villages and communities points to the importance of sharpening the focus on the poor through the use of complementary programs such as:

- Empowering the poor to participate in design and

rollout of energy supply infrastructure and subsidy schemes;

- Improving access to credit to enable the poor to finance the connection charges, internal wiring, solar homes systems, advanced cook stoves, and productive equipment that they may need to take full advantage of modern energy;
- Training and capacity building to ensure that the poor can operate energy equipment in a safe manner, maintain it for the long term, and take advantage of business opportunities brought about by energy expansion; and
- Making deliberate and systematic effort to foster gender-informed designs of all interventions.

1. Introduction, Purpose, and Methodology

Sustainable Energy for All—A Compelling but Challenging Goal

There is a broad international consensus for the goal of providing universal access to modern energy services. This goal has been strongly endorsed by the leadership of the UN and the World Bank and declared in the 'Sustainable Energy for All' (SE4ALL) initiative co-chaired by UN Secretary-General Ban Ki-Moon and World Bank President Jim Kim.

The World Bank Group's latest energy sector strategy mirrors the SE4All goals of achieving universal access, accelerating improvements in energy efficiency, and doubling the global share of renewable energy by 2030. It announces specific commitments to help meet the SE4All goals. As expressed in the World Bank Group's 2013 energy strategy paper, "supporting universal access to reliable modern energy is a priority. Economic growth, which is essential for poverty reduction, is not possible without adequate energy. And economic growth cannot be said to be building shared prosperity as long as 1.2 billion people are without access to electricity and 2.8 billion are without modern cooking facilities. Lack of energy limits opportunity, job creation, business development, and access to health and education."[1]

The pursuit of universal energy access faces major challenges related to cost, affordability, technology, and the need for cross-sectoral solutions. Energy is expensive, and the cost of supply often exceeds the ability and willingness to pay of low-income families. A 2008 IEG evaluation of rural electrification found that it is difficult to generalize about the potential welfare impacts, as they are highly context specific.[2] Energy costs are especially prohibitive in rural areas, where low density of demand raises costs and reduces profitability for prospective energy suppliers. Energy access issues often require coordination with the development of complementary sectors: credit programs may be needed to facilitate uptake by poorer households; business development services may be required to help small businesses take advantage of electrification; and health campaigns may be needed to raise awareness about the (very detrimental) health impacts of indoor air pollution and stimulate the demand for improved cookstoves.[3]

Partnership Programs Have Long Contributed to Energy Access

The Bank has a long record of supporting electricity access through projects and partnership programs such as the Energy Sector Management Assistance Program (ESMAP) which has been a major supporter of learning, policy advice, technical assistance (TA), and knowledge management on access issues since its inception in 1983.

In support of the UN-World Bank Group commitment to universal energy access—and in order to complement IEG's sector evaluation of the Bank Group's work in energy access—IEG has undertaken a review of a cluster of four partnership programs that support energy access activities. It aimed to assess to what extent these partnership programs have contributed to the objective of universal access to modern energy services. It also assessed the extent to which this objective has been pursued in a gender sensitive manner, in line with the World Bank Group's commitment to empower women in the energy sector.

The review focused on the Global Partnership on Output-Based Aid (GPOBA), the Energy Sector Management Assistance Program (ESMAP), Lighting Africa, and the Asia Sustainable and Alternative Energy Program (ASTAE). These four programs were selected because they are the largest and most prominent World Bank Group-supported partnership programs engaged with energy access (they also engage in other areas but this review focuses on their energy access activities). Their combined expenditures were almost $270 million during the 2007–13 period, of which IEG estimates that about $132 million was for energy access (Table 1.1). More than 50 percent of these comprise GPOBA's subsidy projects. On average, the four programs have initiated about 16 energy access activities per year during this period (Figure 1.1).

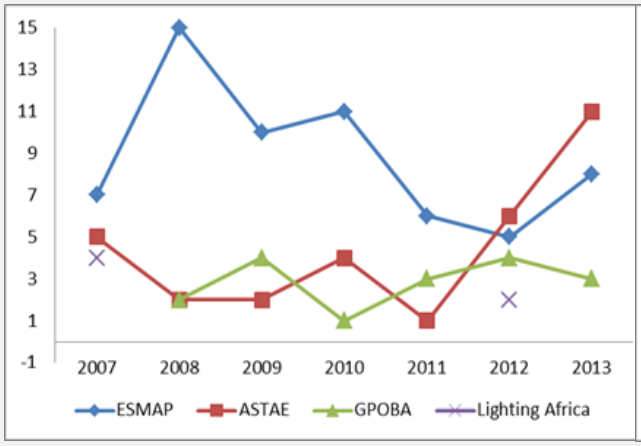
Table 1.1. Expenditures/Disbursements All Four Programs FY2007–2013 (US$ millions)

	GPOBA	ESMAP	ASTAE	Lighting Africa	Total
Program Activities	116.24	95.18	9.61	15.67	236.7
Mgmt. and Admin Costs	13.22	12.75	2.27	3.41	31.65
Total	**129.47**	**107.93**	**11.88**	**19.08**	**268.36**
Percent Administration (average)	10 percent	12 percent	19 percent	18 percent	

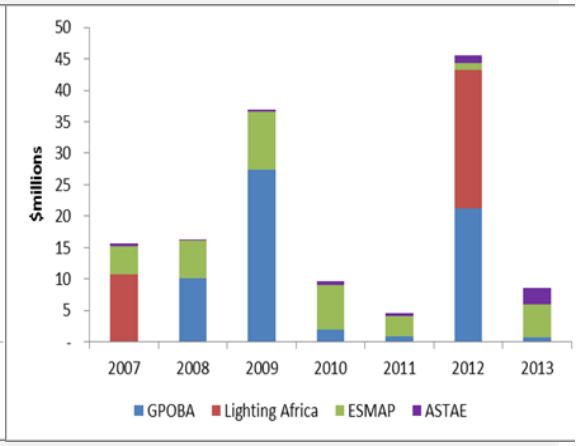
Source: GPOBA: Total amounts and subsidy amounts from CFP; Mgmt. & Admin. Costs from Annual Reports; ESMAP: Baastel Report for 2007 to 2010; CFP for 2011 to 2013. ASTAE: Annual reports used primarily for 2007 to 2011 and CFP used for 2012 and 2013. Lighting Africa: Dalberg Report for 2008 to 2010; Annual report for 2011; World Bank and IFC Staff reports for 2012 and 2013.

Figure 1.1. Energy access portfolio-GPOBA, ESMAP, Lighting Africa, and ASTAE (FY2007–2013)

a. Number of Energy access activities by approval year



b. Amounts allocated for energy access activities by approval year



Source: IEG staff based on program reports. Data apply only to energy access portions of programs' portfolio.

All four programs promote energy access with technical assistance and knowledge activities. These constitute the entirety of Lighting Africa's and the major part of ESMAP and ASTAE's energy access portfolios. ESMAP and, especially, ASTAE, also support preparation and implementation of World Bank energy access projects. GPOBA's main thrust lies in targeted subsidies for energy access. (Figure 1.2).

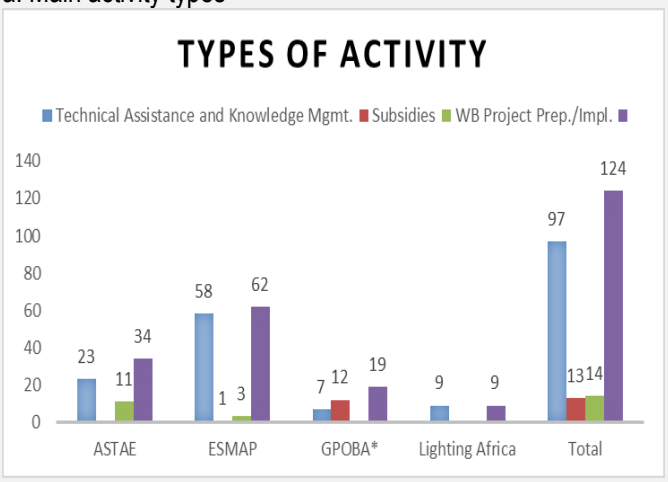
GPOBA was established as a partnership program in 2003 to fund, design, demonstrate, and document output-based aid (OBA) approaches to improve delivery of basic services to the poor in developing countries. As of June 30, 2013, the GPOBA had funded a diverse portfolio of 36 projects, with total commitments of $161.3 million. Energy access accounted for 12 (33 percent) of these projects and for $68.1 million (42 percent) of total funding. In addition, GPOBA has supported knowledge and learning program to extract, analyze, and share lessons from the design and implementation of OBA approaches.

ESMAP was established in 1983 as a global, multi-donor technical assistance trust fund administered by the World Bank. Its mission is to assist low- and middle-income countries to increase their know-how and capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. Given this mission, ESMAP has focused on analytical and advisory services, which include technical assistance, economic and sector work, capacity building, and knowledge generation. The program covers a wide range of energy issues, including energy access starting in the early 1990s. Based on its 2013 portfolio

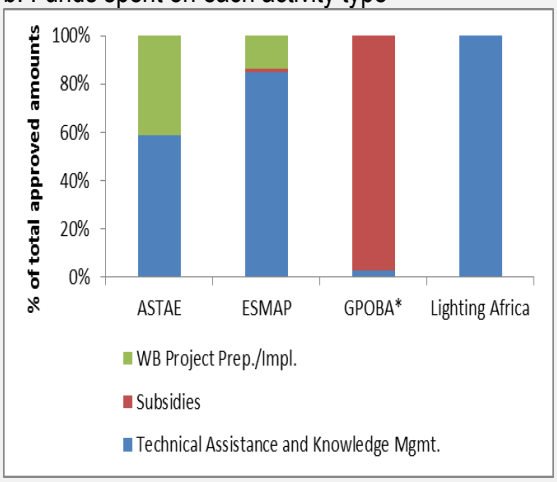
review, energy access accounted for 39 (21 percent) of ESMAP's completed activities and $12.3 million (26 percent) of total budget allocations during the FY2009–2012 period. Fourteen (36 percent) of these activities informed policies and strategies, 3 (8 percent) increased knowledge, 4 (10 percent) generated innovative approaches and solutions, 11 (28 percent) informed development financing, and 7 (18 percent) increased client capacity.

Figure 1.2. Energy Access Activities Supported by GPOBA, ESMAP, Lighting Africa, and ASTAE (FY2007–2013)

a. Main activity types



b. Funds spent on each activity type



*Some GPOBA-funded subsidy projects also have TA not counted here.
Source: IEG staff based on program reports. Data apply only to energy access portions of programs' portfolio.

Lighting Africa, a joint program of the World Bank and IFC, was launched in 2007 with the aim of improving access to clean, affordable lighting in Africa. Its goal is to help catalyze markets for quality, affordable, clean, and safe off-grid lighting, and ultimately to create a sustainable commercial platform that will realize the vision of providing 250 million people with modern off-grid lighting by 2030. The overall approach is to demonstrate the viability of the market by providing market intelligence, improve the enabling environment by developing a quality assurance infrastructure, facilitate business to business interactions, help governments address policy barriers, provide business development services, and facilitate access to finance for manufacturers, local distributors and other stakeholders. Donors have contributed about $22 million to Lighting Africa in 2007-2013. The Global Environment Facility was the largest donor providing more than one third of the funds. As of June 2013 Lighting Africa had disbursed $16 million, of which $5.1 million (about 30 percent) was allocated to knowledge products and dissemination.

Table 1.2. Comparing the Programs

Program	GPOBA	ESMAP	Lighting Africa	ASTAE
Type and scope	Global TA and investment program	Global Technical Assistance program	Africa Regional Technical Assistance	Regional Technical assistance program for East Asia Pacific and South Asia
Size (2007-2013)	116.24	95.18	15.67	9.61
Goal	Facilitate learning on the potential contribution of OBA approaches to the delivery of basic services	Assist low- and middle-income countries to increase know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth	Improve access to clean, affordable lighting in Africa.	Scale-up the use of sustainable energy options in Asia to protect the environment and reduce energy poverty
Energy Access objective	Design and implement OBA to support the sustainable delivery of basic services to the poor. Encourage the adoption of OBA approaches by developing countries, donors, and international financial institutions (mainstreaming); Identify OBA best practices and disseminate	Energy Access: ESMAP supports initiatives to reduce energy poverty by expanding access to modern, safe, affordable and sustainable energy services	Facilitate the transition from fuel-based lighting to clean, modern lighting by mobilizing and supporting the commercial sector to supply high quality, affordable, and clean lighting to 2.5 million people by 2012.	Achieving this objective rests on promoting ASTAE's three pillars for sustainable development: • Renewable Energy • Energy Efficiency • Access to Energy

Program	GPOBA	ESMAP	Lighting Africa	ASTAE
	information and guidance.			
Main types of activities types	Investment projects applying OBA models; Generating knowledge; Operational support to mainstream OBA.	Upstream advisory and analytical activities ; Some operational support	TA; Market Intelligence; Product Quality Assurance; Access to finance; Consumer education LA Development Marketplace	Operational support in East Asia and Pacific region (and some in South Asia); Dissemination of knowledge

Source: IEG.

The Asia Sustainable and Alternative Energy Program (ASTAE) was created in 1992 with the mandate to scale up the use of sustainable energy options in Asia. In 2002 the program scaled up and broadened its objective by adding a third pillar—access to modern energy services—designed to address energy poverty and its impact on the environment. ASTAE has supported World Bank energy access operations by: supporting innovative investment delivery mechanisms, enhancing policy and regulatory frameworks, building capacity, and sharing knowledge. During 2007-13 ASTAE funded 34 energy access activities in the amount of $6.5 million ranging from project preparation work to knowledge generation and dissemination.

How Do These Partnership Programs Compare?

Each of these four programs has different scope, coverage and approach to improving access to energy by promoting a range of technological and market solutions (Table 1.3).

Table 1.3. Comparing approaches to promote energy access

Program	GPOBA	ESMAP	Lighting Africa	ASTAE
Type	TA and investment (primarily recipient-executed grants	Technical Assistance	Technical Assistance	Technical assistance
Geographic scope	Global	Global	Regional: Sub-Saharan Africa	Regional: EAP &SAR

Program	GPOBA	ESMAP	Lighting Africa	ASTAE
How the program solves energy access problem?	Pro-poor solution: provides targeted subsidies to facilitate access to energy services regardless of technology	Technological solution and policy work: Promotes energy technologies depending on the specific situation; improves institutional and regulatory framework	Market solution: creating enabling conditions for private sector participation	Technological solution and policy work: Promotes energy technologies depending on the specific situation; improves institutional and regulatory framework
Energy technology the Program supports	Seeks output-based aid solution to facilitate energy access regardless technology type	Covers all range of technologies for providing energy access (grid, mini-grid, off-grid) and policy issued related to energy access	Off-grid solar lanterns	Covers all range of technologies for providing energy access

Source: IEG.

GPOBA and ESMAP—the two largest programs—are global in scope. ESMAP's objective is broad and its upstream knowledge work, which is the program's main contribution, covers policy, legal, regulatory, and institutional aspects as well as technologies to expand access to energy. GPOBA's subsidy projects fund energy access regardless of the applied technology. Ensuring that the poor get access to basic services is key for GPOBA and to achieve that the programs applies a specific output-based aid model that is built on the provision of targeted subsidies.

Both ASTAE and Lighting Africa are regional in scope, focusing on the regions with the lowest access to electricity rates in the world—Asia and Sub-Saharan Africa respectively. Lighting Africa pilots market solution to improving access to energy in Sub-Saharan Africa. The program's objective is narrowly defined. It promotes one type of off-grid technology: basic solar lanterns (PicoPV) predominantly for lighting in households in selected Sub-Saharan countries. ASTAE's original focus was on renewable energy. However the program covers all spectrum of technologies — grid and off-grid, including photovoltaic systems, micro hydro power plants, improved cookstoves, biogas plants, and digesters.

All these programs, except for Lighting Africa, are partnership programs with governance structures that separate management and governance functions (table 1.4). The Bank shares authority and accountability for strategic direction and oversight of these programs through the governing bodies which include the donors

and the Bank. However, these structures function differently in each of these programs in terms of the balance of decision-making power between the World Bank and other partners. In some instances, the Bank makes most of the decisions and treats the program as a trust-funded program managed by the Bank, while in another cases donors are more involved. Lighting Africa's structure is different. It is a joint initiative of the Bank and IFC. This design has implications for both the governance and management of the program. First, Lighting Africa has two program managers – one for the Bank and one for the IFC. Teams collaborate daily on strategic and operational issues but their work-- and their funding—are managed independently. The programs also raise donor funds independently. The program receives much of its funding from the World Bank and the IFC, as well as from other global and regional partnership programs (table 1.4).

Table 1.4. Governance and Management Arrangements

Program	GPOBA	ESMAP	Lighting Africa	ASTAE
Program type	Partnership program Multiple single TFs and MDTF	Partnership Program Funded by single MDTF	World Bank-IFC joint Trust Funded program	Partnership Program (single MDTF established recently)
Location	Housed in the Bank Urban, Rural & Social Development GP	Housed in the Bank Energy & Extractives GP	Housed in World Bank and IFC	Housed in the Bank Energy & Extractives GP
Governance	Program Council (represented by each donor and the World Bank) Chaired by Senior Director	Consultative Group of Donors Chaired by Senior Director of the Energy and Extractives GP (formerly SDNVP)	No overall governing body	Consultative Group of Donors (subset of ESMAP's Donor group) Formerly chaired by SDNVP
Management	Urban, Rural & Social Development GP	Energy and Extractives GP	Jointly managed by Africa Energy Practice, (Energy and Extractives GP) and IFC Advisory Services Africa Regional Management (in Nairobi, Kenya)	Energy and Extractives GP (under ESMAP, after July 1, 2014)
Advisory bodies	Panel of Experts	Technical Advisory Group	--	Technical Advisory Group

Source: Program websites; Program Charters.

The major donors to GPOBA, ESMAP, and ASTAE were the United Kingdom, IFC (for GPOBA), Netherlands, Sweden, Australia, Denmark, and Germany who between them contributed 94 percent of the $411 million the programs received in the FY2007–2013 period. (Table 1.5).

Table 1.5. Donor Contributions for the GPOBA, ESMAP, and ASTAE, FY2007–2013 (US$ millions)

Donor	GPOBA	ESMAP	ASTAE	Total
Australia	37.35	7.23		44.58
Austria		4.35		4.35
Canada		0.5		0.5
Denmark		27.33		27.33
European Union	1.8			1.8
IFC	62.8			62.8
Finland		1.53		1.53
France		3.64		3.64
Germany		18.24		18.24
Iceland		1.6		1.6
Lithuania		0.06		0.06
Netherlands	28.3	32.96	10	71.26
Norway		8.44		8.44
Sweden	38.8	4.68	7.16	50.64
United Kingdom	96.8	13.59	4.68	115.07
Total	**265.85**	**124.15**	**21.84**	**411.84**

Source: Program annual reports: CFP trust funds database

Table 1.6. Donor Contributions for Lighting Africa (FY2007–2013)

Donor	Amount (US$ millions)
Global Environment Facility	7.85
Italy	4.26
Africa Renewable Access Program (ESMAP-funded)	3.08
Public-Private Infrastructure Advisory Facility	1.52
IFC	1.35
Norway	1.28
Luxembourg	0.76
Energy Sector Mgmt. Asst. Program MDTF	0.42
REEEP	0.40
Asia Sustainable & Alternative Energy Prog.	0.26
Energy Sector Mgmt. Asst. Program TF	0.25

Donor	Amount (US$ millions)
Global Partnership on Output-based aid	0.25
World Bank	0.20
Good Energies Inc.	0.08
Total	**21.94**

Source: Program management: Lighting Africa Evaluation.

Despite the difference in their approach and structures, all four programs have goals that are relevant to helping the Bank Group and its clients learn about how to achieve universal energy access. Their broad objective is to help countries address the obstacles to energy access through diagnostic analyses, knowledge sharing, design and piloting of innovative delivery mechanisms, and capacity building. Much of this knowledge and piloting can, at least in principle, be more efficiently done by global programs than by individual donors or countries.

Scope, Methodology, and Timeframe

The review assessed the relevance and effectiveness of the four programs through the following evaluation questions:

- To what extent have the four selected partnership programs contributed to their objective of assisting client countries in improving access to energy in a gender sensitive manner? Were their design, strategies, and activities appropriate for achieving this objective?
- To what extent have the programs achieved their intended results in energy access and how well have they performed?
- To what extent have the programs delivered knowledge products of high quality that generate new evidence and provide sound analysis and recommendations fit for the purpose of supporting decisions on the promotion of universal access to energy?

This review adopts a customized approach to assessing each of the four programs. This approach was chosen because the programs are vastly different in size, scope, and quality of their results frameworks. Two of the programs—ESMAP and Lighting Africa—have recently had external evaluations which IEG's team was able to draw upon. IEG did not review these programs in depth, and chose instead to focus on the quality and relevance of programs' knowledge products, something that had not been substantially covered by external evaluations. In contrast, GPOBA has not had an external evaluation since 2007 and ASTAE has never had any external evaluation since its inception in 1992. In the absence of recent external

evaluations, IEG carried out more in-depth review of ASTAE's and GPOBA's performance and took a broader look at drivers of program effectiveness beyond their portfolio of energy access activities.

This cluster review also departs in several ways from IEG's standard evaluation framework for Global Program Reviews:

- its perspective is sectoral, rather than program specific;
- it is not necessarily complemented by a recent external evaluation of the programs (allowing IEG to also cover partnership programs that have not recently been independently evaluated);
- it is focused on the programs' energy access activities, not the overall performance of the program; and
- it pays very limited attention to governance and management structures and programs' cost-effectiveness.

In support of the Bank Group's emphasis on the "science of delivery"—and in line with the programs' common mandate for creation, dissemination, and application of knowledge—the review adopts a special focus on knowledge and learning. This was done through an in-depth assessment of a sample of 20 recent knowledge products, published from 2009-2014. This five-year timeframe was chosen to capture the most recent publications. The sample was purposively selected to include substantive publications from all four programs and covering a wide range of energy access topics. However, the lion share of knowledge products (14) reviewed are ESMAP-sponsored, since it supports by far the largest number of knowledge products among the four programs. The desk review was supplemented by interviews with authors and energy sector staff using and following-up on these knowledge products.

The review findings are based on an assessment of these four programs based on multiple sources: a desk review of key documents such as major sector reports, annual reports, monitoring reports, and external program evaluations; portfolio analysis of World Bank activities and projects funded by these four programs; interviews with GPOBA, ESMAP, Lighting Africa, and ASTAE staff and selected World Bank Group task team leaders (TTLs) that have implemented activities supported by these programs; evidence gathered from country visits in the framework of IEG's ongoing Evaluation of the World Bank Group's Support for Electricity Access; and, as mentioned, in-depth assessment of a sample of 20 knowledge products supported by the programs. Attention to gender was a cross-cutting concern throughout the review.

The review covers the following timeframes for the programs:

- GPOBA's work in the period of FY2006–2013 when the first pilot OBA project in energy access started;
- ESMAP's work in the period of FY2009–2013;
- Lighting Africa's work since its inception in 2009;
- ASTAE's access to modern energy related activities in the period of FY2007–2013. This includes the completed and on-going activities under two business plans covering the periods of FY2007–2011 and FY2012–2015.

The remainder of the review is organized as follows. Chapter 2 reviews the programs' performance and results. Chapter 3 assesses the quality of the programs' knowledge products based on a sample of 20 publications and a review of GPOBA's approach to piloting. Chapter 4 summarizes selected key insights on approaches to expanding energy access that emerged during the course of conducting this review. Chapter 5 presents concluding challenges for the future. Appendixes contain detailed program descriptions and other supportive material.

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[1] *Toward Sustainable Energy Future for All – Directions for the World Bank Group's Energy Sector,* World Bank Report 79597, Washington, July 2013.

[2] *The Welfare Impact of Rural Electrification - A Reassessment of the Costs and Benefits: An IEG Impact Evaluation*, IEG, World Bank, 2008

[3] *Modernizing Energy Services for the Poor: A World Bank Investment Review – Fiscal 2000-08*, by Douglas Barnes, Bipul Singh, Xiaoyu Shi, ESMAP, December 2010.

2. Program Performance and Effectiveness

This chapter assesses program performance and effectiveness: to what extent the four partnership programs have achieved their expected results and supported the goal of universal energy access. The chapter assesses each of the programs based on:

- The available evidence on results as reported by external evaluations and programs' own M&E, where available;
- The available evidence on performance of the programs to the extent it affected the achievement of results;
- The relevance of their design and activities in relation to their strategy for promoting access to energy;
- The extent of gender mainstreaming.

The review finds that although most programs have made important and different contributions, program performance has been very uneven and there are serious accountability gaps. All four programs have supported activities of material importance to energy access and the World Bank Group's mandate, but the degree to which the programs were integrated and coordinated with other World Bank Group energy operations has varied substantially. Programs have room to improve design relevance and to be more strategic in their choice of activities; in part, this will require maintaining a proper balance between donor priorities and program's strategic goals. Performance reporting and monitoring has been weak for most of these programs but has improved since 2012.

Global Partnership on Output-Based Aid

PILOTING PRO-POOR APPROACHES IN ENERGY ACCESS

GPOBA's objective is to facilitate learning on the potential contribution of OBA approaches to the delivery of basic services by: (1) Supporting the design, implementation and evaluation of a program of individual pilot OBA schemes; (2) facilitating the identification and dissemination of knowledge on issues relating to the role and application of OBA; and (3) contributing to the financing of output-based payments for services under OBA schemes. The program started in 2003 with the original mandate to assist in preparing OBA projects and to document and disseminate the lessons learned. The provision of subsidies for OBA pilot projects started in 2005 funded from an additional contribution from DFID.[1]

While the program made substantial effort in taking stock of and disseminating the key lessons from OBA practices, its objective to mainstream OBA approaches inside the World Bank Group is still a work in progress. An assessment in 2009 found that the Bank's OBA portfolio as of 2009 was 131 OBA projects with a total value of $3.5 billion of which only about 50 were GPOBA-funded.[2] The approach championed by GPOBA is a subset of the larger universe of results-based financing (RBF) instruments (Box 2.1). Important gaps remain in understanding the merits of the variety of RBF and in systematically distilling and facilitating critical learning. Information on how projects using a variety of RBF models perform in comparison with more traditional lending operations is scarce and dated.

To become a knowledge hub for OBA approaches, GPOBA should go beyond learning from its own experiments and tap into the global wealth of results-based financing work and develop stronger in-house expertise. The most recent annual review carried out by DFID stressed the need for GPOBA to engage proactively with the wider RBF community (inside the Bank Group and more broadly) to ensure that its focus on OBA is not marginalized and GPOBA's ambition to become a Center of Expertise is perceived as relevant to those working with a wider range of RBF instruments.[3]

In line with its mandate to design, pilot, and document OBA approaches to improve the delivery of basic services to the poor in developing countries, GPOBA has piloted 12 OBA schemes to projects in the 2006-2013 period (these are recipient executed grants) that use diverse technologies to ensure access to electricity (see table A3 for the full list). GPOBA's pilots partner with both public and private entities. These projects are well-integrated with the Bank's country level work and often build on existing IDA operations. Of these 12 subsidy projects only six were closed at the time of this review (see appendix table A.3). It should be noted that since these pilots have been recently closed, the lessons from design and implementation are still being documented and incorporated in new OBA projects which are beyond the scope of this review (Mali, Solomon Islands, Vanuatu, ndZambia) and one scale-up (Bangladesh renewable energy program to be funded by GPOBA) is in the pipeline for FY2015. Lessons learned from OBA in the energy sector are also incorporated in setting up Climate Change Facilities in client countries (e.g., Ethiopia).

In its pilot energy access projects, GPOBA either acted as a frontrunner introducing the concept of output-based aid in the sector, like in Armenia and Colombia, or aimed to replicate or improve the targeting of the results-based financed activities of existing World Bank and IFC projects, such as in Bangladesh, Nepal, and Bolivia. For the projects where GPOBA replicated the OBA model already applied in large

investment operations, GPOBA's value added was the fine-tuning of subsidy targeting to reach the poor. In most of the cases, GPOBA built its projects on implementation arrangements of IDA operations to reduce the transaction costs and improve effectiveness.

GPOBA addresses issues on both the supply and demand side of service provision. On the demand side, the low demand for energy access in poor households is mainly due to high upfront connection costs and high tariffs. GPOBA scheme addresses this issue by offering the poor targeted subsidies to facilitate their access: in the majority of its 12 energy access projects, GPOBA offers connection subsidies that support initial access rather than consumption.

On the supply side, especially in low income countries, most electricity utilities have low cost recovery and are unable or unwilling to spend on capital investments for extending the grid to remote or sparsely populated geographic areas. It is less profitable for suppliers to sell solar PVs in remote areas as well. GPOBA's OBA scheme creates additional financial incentives for those public utility companies or private entities to reach out and extend their services to the poor.

GPOBA pilots in electricity access have had mixed results and often faced implementation challenges. Of the six closed subsidy projects, projects in Armenia, Bangladesh and Colombia achieved and even exceeded their original targets, while the India Slum Electrification project failed because of extended delays in the implementation and the use of an outdated beneficiary survey. In Ethiopia, a government-imposed moratorium on new connections outside the control of GPOBA led to significant delays to most energy access programs in the country and resulted in five times fewer household connections than expected. Successful projects resulted in an increased number of households with new or improved access to electricity.

The uneven implementation and results of these pilot projects point to certain issues in how well project designs addressed key supply and demand barriers to energy access:

- GPOBA relies on an approach with a fixed subsidy scheme where the level of subsidy and schedule of disbursement to providers are determined upfront. This has proven problematic in cases where subsidy levels were insufficient to convince utilities and suppliers to prioritize poor households. In Armenia, for instance, the gas company placed low commercial value on those additional consumers it would gain through the OBA scheme (their

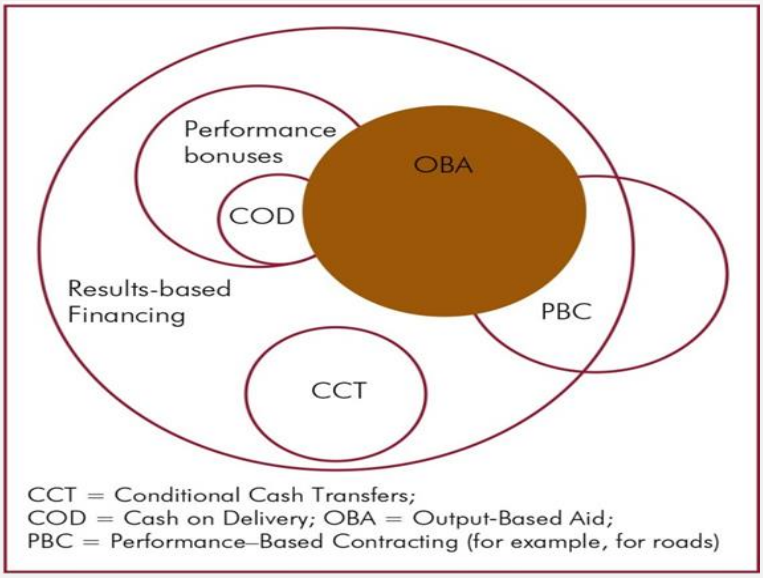
gas consumption was three times lower than the country average), and therefore was not very interested in the GPOBA project.

- GPOBA requires that suppliers are paid after work has been completed. Contractors and suppliers lacking access to working capital (a common occurrence) find it hard to finance upfront connection costs. A GPOBA project in Ghana which aimed to provide solar PVs to remote rural areas by providing microcredit to households stalled as vendors lacked the necessary working capital. The original design of the project did not anticipate such supply constraint. The project started to progress only after project team's special effort to engage local banks to provide credit to interested private companies. While eventually the project succeeded and suppliers were able to find ways to finance their working capital and trade finance needs, ARB-APEX Bank decided that it no longer wanted to support the development of new business lines for its member banks. The continuing lack of access to working capital and trade finance and the decision not to start a successor project that would continue the subsidy program jeopardizes the business model that GPOBA had piloted.[4]
- On the demand side, in India Mumbai Improved Electricity Access to Indian Slum Dwellers Project, many poor households proved unwilling and unable to pay their share of up-front costs. This had not been anticipated in the project because the beneficiary survey to inform the project was carried out five years before the first connections were made.

Like other approaches to aid, the OBA approach is also vulnerable to external risks. For example, GPOBA-sponsored projects in Bolivia and Ethiopia suffered major delays from political uncertainty and changing government priorities. However, the key factor determining success is how well the OBA model addresses supply and demand factors.

Box 2.1. Results-Based Financing (RBF) approaches and GPOBA's Output-Based Aid (OBA) Approach

GPOBA's OBA model is a small subset in the variety of RBF approaches. GPOBA defines Output-Based Aid (OBA) as "a strategy for applying public money, through performance-based contracts, to subsidize the cost of delivering basic services and target these on the poor. OBA involves the delegation of service delivery to an operating entity, under arrangements that tie the disbursement of funding to pre-specified services or outputs that are delivered." A distinctive feature of output- based aid is that "outputs are defined as closely to the desired outcome or impact as contractually possible." Unlike some other RBF schemes, GPOBA's model not only pays after the specified service is provided by the private vendor or public utility but also includes targeting in the design of the project to include market segments that would otherwise not be profitable to serve; GPOBA also hires Independent Verification Agents to monitor and verify the outputs.



Source: Johannes, L., Mimmi, L., and Mumssen, Y. 2010. "A Snapshot of the OBA Universe," OBA Approaches.

REPLICATION, EXPERIMENTATION, AND LEARNING

The purpose of pilot projects is to learn about designs and mechanisms that can be effective, efficient, and support scaling up. IEG's review of GPOBA pilots in energy access found several issues in project design that are important to consider before replicating the model on a larger scale.

GPOBA requires very specific targeting and verification methods that may not always be affordable and do not support administrative, financial, and technical efficiencies that would be required for replicating and scaling the pilots:

- While geographic targeting and self-selection (when granting higher subsidies for more basic solutions, or providing subsidies only some time after the service has become available) can be implemented easily, more sophisticated targeting schemes can be costly, time- consuming, and challenging in low-income countries with limited technical capacity. For instance, Uganda's Grid-Based OBA Facility Project designed a targeting mechanism that required undertaking a poverty mapping exercise by a private electricity distribution company.
- Gradual grid-connections, that result from self-selection targeting, are technically and financially inefficient. It is more efficient for a utility company to connect all houses in a particular neighborhood than to connect selected eligible houses one-by-one, as it was designed in GPOBA's Uganda and Ethiopia projects.
- The long-term follow-up maintenance visits—part of several GPOBA projects—required for suppliers to receive final payment, also proved unrealistic. Such schemes would likely be hard to sustain after closing the GPOBA projects unless there is a follow up Bank operation or the project is able to create and build on strong community ownership. GPOBA's Bolivia project, for instance, envisaged maintenance contracts for four years, two years beyond the project duration. It was unclear who would make sure that service is provided and make the last payment to the service providers. The Ghana project had to make revisions in the service conditions to complete maintenance services before the close of the associated Bank project.
- The targeting methods devised in the GPOBA pilots do not always allow the suppliers to choose the least-cost alternatives to deliver the services, and the subsidy schemes do not provide sufficient financial incentives to cover those population groups that were otherwise unprofitable to cover.
- The funds allocated for output verification are high compared to the value of subsidies. While it is important to verify the outputs at piloting stage, they add to the complexity of GPOBA's approach.

While some of these limitations are common for other RBF approaches as well, a broader approach to learning and experimentation would likely add more value. This would mean sponsoring an application of a broader and less prescriptive range of results-based financing approaches that would allow more innovation and more engagement of the private sector. This could enhance the learning potential of GPOBA projects. While testing the OBA approach in new sectors (such as water and sanitation) or areas (such as fragile countries) can provide useful insights, the pilots reveal similar cross-cutting lessons stemming from GPOBA's approach.

The program could consider sponsoring more analytical work and direct more resources toward building a knowledge center for results-based financing approaches to complement its mainstreaming efforts. More recently, the program reinvigorated its technical assistance window to provide non-lending technical assistance to helping clients building OBA facilities and introduce OBA schemes in the energy sector. This effort is highly appreciated by World Bank teams since it would allow more flexibility in experimenting with variations of OBA approach.

GPOBA's work in mainstreaming output-based approaches could be enhanced by providing more non-lending technical assistance to support Bank operations in testing more varied approaches to results-based financing. It could also provide more sector-specific, technically in-depth analysis, including of cross-cutting factors critical for success of the OBA approach, such as design of subsidies or access to finance. It should be noted that starting FY2014 the program has done more work in this direction. Some of the examples include technical assistance, allocated to support of Bank's RBF and PforR preparation. GPOBA supported the preparation of Tanzania Education PforR which is the first and only PforR in access to basic services (as of end FY2014). Further, GPOBA carried out multiple OBA trainings for donors and partners.

MONITORING AND REPORTING

GPOBA has established a good reporting system to monitor its projects; verifiable outputs tied to disbursements are necessary for OBA and results frameworks and monitoring arrangements are therefore designed upfront. GPOBA-funded investment projects follow the same supervision and monitoring procedures as other Bank projects. GPOBA staff participates in supervision missions for projects that experience difficulties. In addition, the program has developed its own semi-annual monitoring report template to report to donors on project progress and issues in need of attention. These reports provide detailed monitoring of GPOBA's portfolio of technical assistance, dissemination activities, and subsidy projects on a bi-annual basis and analyze implementation progress and trends. While it is unusual that donors are informed about project progress with this frequency, Bank task teams interviewed by IEG found the reporting to be light and not burdensome.

GPOBA operates and reports on annual work plans (IWAP). These plans are clear on what the program intends to achieve annually and on M&E activities at project or aggregate level (e.g., ICRs, GRMs, synthesizing lessons from several projects, conducting impact evaluations). GPOBA issued a "Vision Statement" in 2008 with an accompanying strategic framework describing how the program aims to achieve its strategic objectives. This strategic framework depicts program's theory of change

and offers indicators to measure program's achievements of higher level goals. However, this strategic framework has not so far been used to report on progress toward higher-level objectives (that is, mainstreaming of OBA and becoming a Center of Expertize). The paucity of higher order reporting makes it hard for IEG, donors, and other stakeholders to assess to what extent the program's design and approaches remain relevant, given also that the Bank has adopted a "Program-for-Results" instrument and a variety of RBF approaches are being tested. One donor has expressed concern that GPOBA's current focus and approaches carry the risk of it becoming marginalized.[5]

The program is stronger on information-sharing than on transparency. GPOBA's annual work plans, meeting minutes of the Program Council, and activity progress reports are not publicly disclosed. Good practice in partnership programs is to have more transparency in disclosing the key documents of the program. This being said, the program's website is a useful source of information about the World Bank and GPOBA projects with output-based components. The World Bank operations system still does not allow making an inventory of projects applying output-based principles.

Energy Sector Management Assistance Program

PROMOTING KNOWLEDGE AND LEARNING IN THE ENERGY ACCESS AGENDA

The External Evaluation of ESMAP 2007–2011 reviewed the outcomes and achievements of the program during the five-year period from July 2006 to June 2011. Based on a desk review of 50 activities, including 9 on energy access, supplemented by interviews and selected field visits, and excluding projects whose outcomes are unknown or too early to assess, the External Evaluation found that the objectives had been fully met in about half of the cases, and partly met in the remaining ones. Overall, the evaluation concludes that, given its relative size in terms of both staff and budget, ESMAP has been very successful in influencing World Bank lending operations, and depending on context, has been relatively successful in catalyzing private sector investment and moderately successful in influencing the donor community. Main success factors relate to the existing relationships and reputation of the World Bank in client countries, as well as existing demand and timing of delivery of ESMAP products.[6]

IEG's own review for this study also concluded that ESMAP has performed reasonably well as a producer and promoter of knowledge and learning in the energy access agenda. Its best publications have contributed to the advancement of knowledge in this area with objectivity and rigor, their conclusions and

recommendations have been useful for the intended purpose, and they are readable by the intended audience.

MONITORING AND REPORTING

As outlined in ESMAP's 2008–2013 Strategic Business Plan, and reflecting the underlying theory of change that ESMAP, with its three core functions – think tank, knowledge clearinghouse, and operational leveraging – will help its client countries make better policy decisions and translate these decisions into results-oriented strategies and programs, the new results framework "will use logic models to trace the chain of causality between inputs, activities outputs, outcomes and impacts for its core functions. For example, indicators for the think tank function could measure the quality and use of knowledge products created by ESMAP." [7]

The ESMAP Portfolio Review 2013 represents the first comprehensive application of the programs new results monitoring framework, created in FY2009.[8] It reports that energy access accounted for 38 (21 percent) of ESMAP's completed activities and $12.3 million (26 percent) of total budget allocations during the FY2009–2012 period. The Portfolio Review discusses the outcomes of these activities and, in most cases, underpins the discussion with an appropriate outcome indicator. Thus, based on the portfolio review, 14 of the energy access activities "informed" policies and strategies, 3 increased knowledge, 4 generated innovative approaches and solutions, 11 "informed" development financing, and 7 increased client capacity.

In line with the new results framework, ESMAP's recent annual reports have supported their coverage of outcomes with monitoring indicators, such as the actual "number of policies and strategies informed", "number of lending operations influenced", "client capacity increased" by ESMAP activities in that particular year, as well as (from 2013) the total number of academic references of ESMAP's products – a useful indicator of their impact on knowledge.[9] The outcomes are not disaggregated by focal area (energy access, clean energy, energy efficiency, and energy assessments and strategy) but they convey a quantitative impression of aggregate results. Thus, for example, in FY2013, ESMAP activities (in all four focal areas) are reported to have informed 9 World Bank lending operations (with a total volume of $1.2 billion), informed 18 policies and strategies, increased client capacity with 9 activities, increased knowledge with 5 activities, and were referenced 161 times in academic publications.[10]

In IEG's assessment, ESMAP's newly revised M&E framework is well-designed to track and report on the entire results chain of each activity. By focusing attention on key linkages and outcomes, it has helped direct the program's support for and

involvement with selected pilot projects in a highly relevant manner for implementing a series of innovative (but also risky) initiatives at the cutting edge of the energy access agenda.

Lighting Africa

PROMOTING MARKET-BASED SOLUTIONS TO ADVANCE ENERGY ACCESS

The external Mid-term Evaluation of IFC-World Bank Lighting Africa Project, covering the period from program inception in 2007 to June 2011, concluded that Lighting Africa had been a highly relevant and innovative program that had made important contributions to the growth of the market for quality portable off-grid lighting. Among other things, the evaluation found that the market intelligence reports, such as Solar Lighting for the Base of the Pyramid, have been widely used by industry participants for insights into product design, advocacy with internal corporate stakeholders, and the mobilization of funding from investors and banks. The mid-term evaluation also found that the policy and regulation component still had few concrete examples of enabling environment reforms that could be directly linked to the program.[11] Comparing the early outcomes in the two pilot countries, Kenya had better results than Ghana because of smaller market size, harder to access off-grid consumer base, less developed renewable energy market, and more limited government buy-in in Ghana, among other reasons. The presence of another IDA off-grid energy initiative with different execution modalities but competing objectives and overlapping beneficiary groups is reported to have been another complication in Ghana.[12]

Lighting Africa's mid-term evaluation also pointed to certain shortcomings with respect to the program's chosen monitoring indicators, which have tracked key market developments, rather than the incremental contribution. Both the World Bank and IFC LA teams reported the issues they had with monitoring indicators. On IFC side the main challenge the team faced was how to fit the pilot program within a set of defined IFC standard indicators that did not have much room to develop customized indicators more appropriate for capturing the impacts of a transformational and market based program. Lighting Africa had to track a large number of indicators (71 outputs and 43 outcome level indicators). Following the recommendation of latest evaluation of IFC's Lighting Kenya and Lighting Africa Global (December 2014)[13] which is beyond the coverage of this review, the LA team is working on improving its results framework. The team has identified a small set of key indicators for which the team reports results in their supervision reports.

As for the World Bank Lighting Africa projects, since the Bank side of LA funding is consolidated under ESMAP funding since July 2014, the initiative is implicitly covered by the results framework, M&E, and reporting systems of ESMAP. To what extent the ESMAP's M&E framework would be able to capture the progress of this pilot program is still be seen.

Thus, while the impact indicators attribute 100 percent of the quality-certified product sales to the program, in the absence of an ex-ante market forecasting model based on the program's underlying theory of change, the additionality attributable to the program cannot be established with accuracy. Nevertheless, based on interviews and surveys in the two pilot countries, the evaluation found that manufacturers and distributors attributed 50-60 percent of their sales in Kenya and 30 percent of those in Ghana to the Lighting Africa program, which suggests that its impact was substantial. Lighting Africa IFC program's final evaluation also acknowledged that more work is needed to determine the extent to which solar lamp sales can be attributed to the programs and has made specific recommendations to improve the program's monitoring and evaluation before starting new interventions. Among those is to improve attribution of sales to the LA program by carrying out baseline studies in comparator countries that are not targeted for intervention.

MONITORING AND REPORTING

Since the expansion of Lighting Africa its results monitoring framework has been in suspension. Lighting Africa last published its Annual Report in 2011, and after that it has only issued a first and only Donor Update in November 2012. [14] After that period, the World Bank part of the program is monitored through the standard trust fund monitoring tools (GFR and GRM), while the IFC part of the program reports every six month through standard Program Supervision Reports s. IEG also had a hard time to compile financial information on past and present trust funded activities of Lighting Africa. There was no overall and easily accessible record or systematic reporting, the data was outdated. In light of the rapid scale-up of the program from its initial pilots in Ghana and Kenya to other countries in Africa and Asia, the lack of results monitoring and reporting system is an important gap for the accountability framework of the program. Although both sides of the program, the Bank and the IFC, continue to monitor the progress through their own internal institutional tools, integrated tracking of progress would have been useful in providing a complete picture of the program as a joint World Bank-IFC endeavor.

The 2012 Donor Update reports that its target of reaching 2.5 million people with modern lighting products sales in Africa has been surpassed by far; the market grew

by 115 percent annually from FY2011 to FY2012, [15]though as noted this cannot be fully attributed to the program. Aside from market intelligence, the program's most effective contributions appear to have included the establishment of quality standards and testing infrastructure, and business development assistance for numerous importers and distributors of quality solar lighting products. While the program has, to date, only reached about 2.5 percent of its potential market in Africa, there is room for continued expansion in Africa and other regions.

IEG's own review was able to confirm that Lighting Africa has played a relevant and substantial role in facilitating the development of the market for off-grid lighting in Africa. Its primary focus on the development of unsubsidized approaches bodes well for the long term sustainability of its continued expansion in Africa and other regions. The program's design and experience could potentially inform the development of market-based programs in other areas, such as for improved stoves. The most recent evaluation of Lighting Kenya and Lighting Global also recommended the program not only to expand its reach other markets but also to explore the opportunity to scale up—that is, move up the ladder of energy access. The program's impact was not just in transforming the market for solar lamps, but also in supporting the development of larger solar systems.[16]

Asia Sustainable and Alternative Energy Program

TARGETED SUPPORT TO ENERGY ASSESS IN EAST ASIA AND PACIFIC

As a small technical assistance program housed in the Bank, ASTAE claimed to support (i) early program identification work; (ii) project identification and preparation, and supervision ; (iii) project-related capacity building in client countries; (iv) assistance to TTLs for the mobilization of additional funds.

IEG has identified 34 ASTAE-funded (both completed and on-going) activities in the period of FY2007–2013 in the amount of $6.5 million that aimed to support energy access primarily in East Asia and Pacific region (table 7). Many of these activities are linked to World Bank projects supporting different technological solutions ranging from rural grid and off grid electrification to renewable energy solutions, clean cooking, and heating. IEG's assessment of these activities indicate that two types of activities make up two-thirds of ASTAE's funding— 1) "downstream" activities including project preparation, early identification, piloting of new approaches and some implementation support work and, 2) stand-alone technical assistance, mostly comprised of knowledge products. The latter comprised one-third of ASTAE's activities and absorbed about one-third of its resources.

At activity level, ASTAE's funding generated valuable outputs in many countries of the East Asia and Pacific region. Especially "downstream" activities— those related to early project identification and preparation—were meaningful in supporting large Bank lending operations. The TTLs also valued ASTAE's contribution in helping to disseminate the lessons from some of Bank lending operations.

The relevance and effectiveness of ASTAE-funded stand-alone activities, especially reports, is less evident. IEG could not find sufficient evidence of client country demand for some of the publications that we followed up. Follow up interviews with the TTLs revealed that some of these reports were not linked to or not expected to lead to lending operations. In some instances this was due to the fact that the reports did not reflect issues of highest priority for recipient countries.

In the light of the fact that ASTAE claimed to carve out its niche in relation to ESMAP by focusing on "downstream" activities rather than supporting "upstream" analytical work, ASTAE's investing in "upstream" work demonstrates that the boundary between ASTAE and ESMAP in this area is quite subtle. Unlike ESMAP, ASTAE does not have a strong internal control mechanism to ensure the quality of knowledge products.

As for geographic coverage, the program's relevance of design remained weak for many years. By its original design, ASTAE covers two Bank regions. However, proposals from one of these regions were discouraged during the last decade, reflecting apparent bias rather than strategic considerations.

Table 2.1. ASTAE Funded Activities in Energy Access, FY 2007–2013

Type of Activity	Number of Activities*	Grant Amount (US$ millions)
Project preparation, early identification work	9	2.1
Project implementation, supervision	3	0.6
Knowledge products, other stand-alone TA	11	2.2
Disseminating project level lessons	8	0.8
Client capacity building/ tools	3*	0.8
Total	**34**	**6.5**

Source: IEG.

MONITORING AND REPORTING

ASTAE's theory of change with regard to its contribution to energy access assumes that by providing targeted technical assistance to selected Bank lending operations in the energy sector, the program will influence the World Bank lending and country policies in EAP and SAR regions and achieve its objective of scaling up the use of sustainable energy options. The program's results framework formulated in 2011 expects to measures program's success in contributing to energy access 1) by increase in World Bank investments related to ASTAE energy access pillar; 2) increase in access to modern energy services; 3) adoption of solutions for scaling up deployment of renewable energy technologies and; 4) fostering of better informed policy decisions and enhanced sector capacity. While the program's theory of change is clear, the adopted indicators and targets are over-ambitious and do not match with the scope of a small trust-funded program.

ASTAE's results framework could be redesigned to focus on the program's own inputs, outputs and intermediate outcomes that can be attributed to the program's interventions rather than to show a commitment to high-level targets that are beyond its scope. This way the program could use its monitoring and evaluation framework as an accountability tool. Striving to demonstrate high-level impact makes the program to unnecessarily exaggerate its influence. Use of indicators and targets that were beyond the reach and scope of program are confusing and did not do justice to the program.

To date, there has been no external evaluation of ASTAE. [17]This is highly surprising for a program that has existed since 1992 and a serious and surprising omission.

IEG had difficulty determining what activities the program had funded and the results of those activities. Activity-level information is scarcely available in routine Bank systems; annual reports and occasional donor reports are partial and incomplete but often the only sources of information on ASTAE-supported activities. These reports often fail to indicate the most basic project and grant information. Titles of ASTAE-funded activities sometimes change during implementation; they are not linked to the Bank project they support. The program was late in adopting the Bank's standard trust fund tools. Due to lack of basic record keeping there was almost no institutional memory of the program when ASTAE's Coordinator has changed few years ago. Such accountability gap poses a reputational risk to the Bank. The situation has improved after 2012, when the new ASTAE MDTF was established and the ASTAE coordinator made the compliance with the trust funds management tools (GFR, GRN, ICM) obligatory for each ASTAE-funded activity. It would be helpful for the program to create a basic

monitoring framework to keep track of inputs, activities and outputs and link them to its objectives.

IEG found shortcoming in donor oversight as well. The joint ESMAP/ASTAE Technical Advisory Group (TAG) has paid uneven attention to ASTAE. TAG reports have limited assessment of ASTAE's strategy and key activities and sometimes appear misinformed, as when the TAG praises a "regional" initiative which, however, at the time had already been reduced to cover a single country.[18]

Grant Making Process Is an Important Indicator of Effective Performance

Of the four programs reviewed, three— GPOBA, ESMAP, and ASTAE — systematically allocate grants to fund activities implemented by the World Bank Group (BETFs) and/or the recipient countries (RETFs) (mostly GPOBA).

GPOBA and ASTAE use traditional "call for proposal" approach, while ESMAP is using a "block grants" method.[19]

GPOBA provides single grants through its Window 3 funding with an average grant size of $4.5million. IEG found GPOBA's grant-making mechanism onerous and lengthy. According to the Program's Operation Manual, besides the general criteria, each donor that set up non-core funds has its own grant eligibility and approval criteria. These donors also have different criteria for evaluating and selecting subsidy projects (Window 3). For example, DFID and IFC have restricted their allocations under Window 3 for the World Bank Group only, while the Netherlands did not place such a limitation. DFID, IFC, and the MDTF donors review all concept notes for each Window 3 activity, while the Netherlands left it at the discretion of the GPOBA Program Manager. Task teams interviewed by IEG found GPOBA's grant allocation process heavy and time-consuming. It takes from six to nine month for proposals to receive final approval. Whenever a project has to be restructured, a frequent occurrence, a proposal has to be resubmitted to a panel of experts.

ASTAE's grants are small in size (on average $120,000). Its grant making process is light. Approval of grants has been delegated to the program's management led by the Sector Manager of East Asia and Pacific Region Water & Energy Management Unit. Grants are awarded swiftly and on a rolling basis. Some task team leaders interviewed by IEG valued ASTAE for its flexibility: funds are made available on a rolling basis and ASTAE is flexible in approving grant extensions. However, in the light of the fact how scattered and scarce the reporting against those grants was over the years, IEG finds little value in such approach.

ESMAP is using block grants approach (Annual Block Grants) which assumes $500,000 annual flat allocation to energy operations units of all six regions of the Bank plus variable allocation based on a set of performance based rules. The program allocates its funds through a single call for proposals at the beginning of each fiscal year. Several evaluations of ESMAP found ABG method effective and transparent and being instrumental in enhancing the partnership's efficiency.

The two programs using call for proposal approach had the weaknesses related to the level of accountability and strategic use of funds. Idiosyncratic approach to grant–making process and therefore, a large variation in the quality and efficiency of the process, parallel to the Bank grant processing and reporting requirements, and heavy involvement of the donors are common for such programs. The unpredictability of the funds that the TTLs hope to receive through "call for proposals" and the timing of receiving those funds prevent a full integration of the trust-funded work into the general work stream of the units as well. In contrast, ABGs are more predictable funds for the regional energy sector units and can be factored into their work plans, thus, ensuring better alignment of trust-fund resources to the regional energy sector strategies and priorities. The downside of ABGs, some TTLs mentioned, is that these large annual block grants to regional sector units create incentives for large proposals and rapid disbursement.

While each of these grant issuing mechanisms has its pros and cones, IEG's 2011 Trust Funds Evaluation has found that request for grant proposals are not effective for allocating non-country specific trust funds. The evaluation recommended replacing those with block grants which are more efficient, since they avoid multi-stage Bank-wide selection process and will allow adequate Bank management accountability for the allocation of trust fund resources.

Integrating Gender—A Work in Progress

While none of these four programs have explicit gender-related objectives, the integration of gender aspects in their activities is becoming more urgent and the programs are taking steps to address that gap. The pressure to pay more attention to gender aspects is coming from 1) the growing empirical evidence demonstrating the different socio-economic impact access to energy can have on men and women, and increased awareness of the impact of indoor air pollution, 2) increased attention to gender mainstreaming inside the World Bank Group, as well as 3) stated donor priorities.

Among the four programs, ESMAP and ASTAE have been the most "gender conscious", by helping to develop methodologies for integrating gender into the energy sector work. ESMAP has helped to generate and compile knowledge on how to integrate gender perspectives in the energy sector. Its handbook on integrating Gender Considerations into Energy Operations and the online compendium of gender resources offer practical help. ESMAP is also part of the Advisory Group of the Energia— an international knowledge network program focused on gender and sustainable energy. Nevertheless, ESMAP's external mid-term evaluation found that, while gender and social issues are generally well-covered in program-level documentation, no systems appeared to be in place to ensure that such issues are systematically integrated at the project level. With the exception of a small number of specifically gender-focused initiatives, gender was almost absent from the project portfolio. ESMAP's Portfolio Review 2013 reports that of the total portfolio of 271 ESMAP activities, only 32 had gender considerations or components, far below the corporate scorecard target (announced in 2012) of 55 percent for World Bank and 60 percent of IDA operations.[20] Following the assessment of ESMAP's external evaluation, ESMAP has put in place a systematic gender screening procedure since FY2013. All activities proposed for annual block grant funding are systematically reviewed by the ESMAP gender team, and opportunities to enhance gender consideration are identified and recommended for incorporation.

IEG's review found that most of the ESMAP-supported sample publications had appropriately referenced the impacts and benefits for women when discussing the rationale for expanding energy access, but only a few of the reports had deepened the knowledge and understanding of this area. On the other hand, those few reports that treated gender seriously made significant contributions to the knowledge and understanding about the impacts of energy access expansion on women, and some of the challenges and opportunities available for enhancing such impacts, as will be discussed in Chapter 3.

ASTAE was the pioneer in funding one of the first studies in the World Bank to address the issues around energy and gender in 2000. The study "Energy, Poverty and Gender" aimed to understand how access to modern energy, poverty and gender equality is linked and what are the lessons learned (China, Indonesia and Sri Lanka). This study also developed a monitoring and evaluation methodology (also supported by ESMAP) for integrating gender aspect into rural electrification projects. As a follow up to that study throughout these years ASTAE funded several cookstove programs tailored to women. The program's results framework does not have gender and poverty related indicators but claims to report targets and indicators or any qualitative or quantitative results when relevant. The Program's

funding application also requires specifying direct and/or indirect gender, poverty and environmental impacts as well as regional impacts, including indicators and targets.

Monitoring gender-related indicators is not embedded in GPOBA's design. IEG found no evidence of gender mainstreaming in those 12 energy access projects. The only exception is GPOBA-funded impact evaluation of solar home systems in Bangladesh which assessed the results through gender lenses as well. More recent initiatives of GPOBA that are beyond the scope of this review plan to assess gender aspects. Those include the "Impact assessment of Ethiopia electrification project" (forthcoming) and "Mali Rural Electrification Hybrid System Project" due to start in 2014. The latter has an explicit gender-related indicator in the project's results framework.

Lighting Africa also does not have explicit gender objectives and does not monitor gender impacts systematically. IFC's completion note for Lighting Africa Kenya reports that the program experienced difficulty in finding women technicians. Thus, while the program aimed to train 80 technicians, of whom 20 percent should have been women, it actually trained 94 technicians, of whom only 10 were women. While no gender-specific monitoring is available for Lighting Ghana, the continuing projects under the ongoing Lighting Global program have been designed with an outreach program to include women's groups in the supply chain, and the number of women participants in training events has also been included as a monitoring indicator.

With all four programs addressing energy access which can benefit women significantly, it is important that they address gender equality issue more systematically. That could be done through integrating gender into their monitoring and evaluation frameworks and explicitly reflecting it in all aspects of programming, budgeting, and implementation.

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[1]Johannes, L., Mimmi, L., and Mumssen, Y., 2010. "A Snapshot of the OBA Universe", *OBA Approaches*.

[2] GPOBA and IDA-IFC Secretariat Report, 2009

[3] Annual review of Global Program on Output-Based Aid-2, DFID, September 31, 2014 (unpublished). While beyond the scope of this study, the program reports some recent steps in this direction that include reviewing ESMAP's RBF studies, recruiting Bank task managers with RBF and OBA experience, engaging in a constant dialogue with other development partners, Asian Development Bank, Sida, DFID, KfW, Millennium Challenge Corporation on RBF/OBA models in different sectors.

[4] Interview with the TTL and GPOBA's Ghana Monitoring report, December 2013.

[5] *Annual review of Global Program on Output-Based Aid-2*, DFID, September 31, 2014 (unpublished)

[6] *External Evaluation of ESMAP 2007-2011 – Final Evaluation Report*, Le Groupe-conseil Baastel Itee, Canada, June 19, 2012.

[7] *ESMAP Portfolio Review 2013*, World Bank, November 2012

[8] *2008-2013 Strategic Business Plan*, ESMAP, July 2009. The portfolio reviews prepared afterwards (i.e., FY2010–2012) already covered outcomes in line with the results framework.

[9] *Annual Report 2013*, ESMAP, December 2013.

[10] No time series is available as the 2013 Annual Report represent the first full reporting based on ESMAP's new results framework.

[11] *Mid-term Evaluation of IFC-World Bank Lighting Africa Project*, Dalberg Global Development Advisors, November 1, 2011.

[12] The Ghana: Energy Development and Access Project (P074191) had a component to sell solar PV products to 15,000 households.

[13] *Evaluation of Lighting Africa Program: Final Report for International Finance Corporation*, Castalia, December 2014,

[14] No further Donor Updates or Annual Reports are planned by Lighting Africa, as the funding from the donor who requested it has ended.

[15] *Lighting Africa Donor Update – Issue 1 – July 2011 – June 2012*, September 2012.

[16] Evaluation of Lighting Africa Program: Final Report for International Finance Corporation, Castalia, December 2014, p.59.

[17] The newly commissioned independent evaluation of ESMAP would also cover ASTAE.

[18] See TAG Report to the Consultative Group Meeting, March 1, 2013, p. 17. "Access to Electricity Solutions in South Asia" originally aimed to cover several South Asian countries but at the time of the TAG report was already reduced to cover only one country, India.

[19] "After donors establish a trust fund, the resources are allocated to specific activities. The allocation methods for RETF resources differ significantly from IDA's formula-based allocation system. Likewise, the allocation of BETF resources differs from that of the Bank budget, which is derived from unit work programs. There are three general ways in which trust funds are allocated: call for proposals, block grants, and country-specific allocations. " "Call for proposal" is a generic term used in IEG's 2011 Trust Funds evaluation to describe a grant allocation where typically, a network anchor or region invites staff to submit proposals responding to published criteria and organizes a process to select the ones to receive funding. (p. 52)

[20] *ESMAP Portfolio Review,* 2013, p. 24.

3. Contributions to Knowledge and Learning

A large share of the World Bank Group's knowledge and technical assistance work is funded through trust-funded programs. Trust funds finance 46 percent of the Bank's knowledge services and 90 percent of IFC advisory services. The four energy sector programs reviewed have a common mandate for the creation, dissemination, and application of knowledge as the underlying strategy for pursuing their objectives. This review of programs' effectiveness would not be complete without an assessment of their knowledge contributions.[1] The assessment was also inspired by the aim of becoming a "Solutions Bank" that blends knowledge and financing based on client needs.

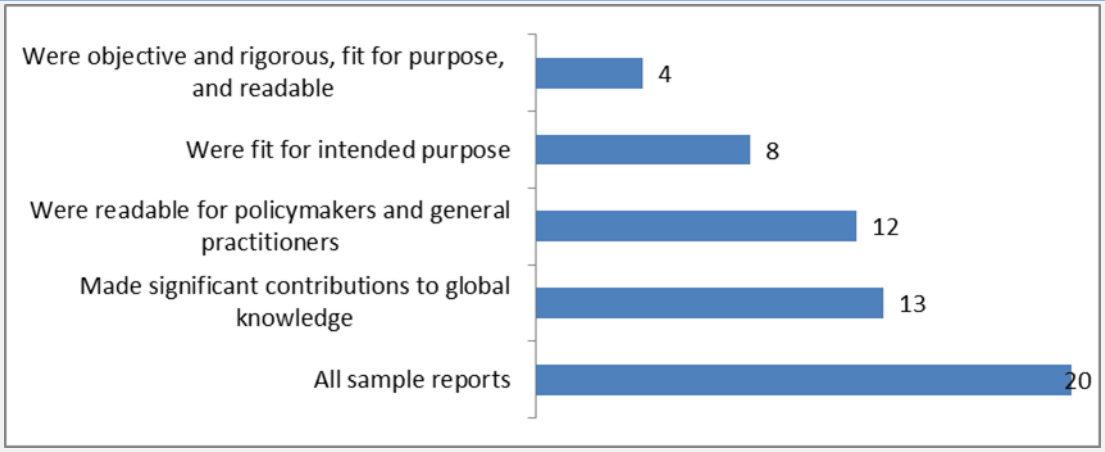
To what extent have the programs delivered knowledge products of high quality that generate new evidence and provide sound analysis and recommendations fit for the purpose of supporting decisions on the promotion of universal access to energy? In search for an answer, IEG selected—and read in depth—a sample of 20 reports published from 2009-2014. They were purposively selected to include substantive publications from all four programs and cover a wide range of energy access issues at the global or regional level, as well as a few that were focused on field study countries of IEG's *Evaluation of the World Bank Group's Support for Electricity Access*. The sample is intended to represent a diversity of methodologies and themes, but its small size in relation to the total program portfolios precludes any claim to statistical robustness for the conclusions.[2] The list of reviewed publications is appendix B, and the review template is appendix D. Of the 20 reports, 10 were sponsored by ESMAP, and four were jointly funded by ESMAP and the other three programs. The sample also included two reports from GPOBA, ASTAE, and Lighting Africa respectively. The desk review was supplemented by interviews with key staff involved in the preparation, implementation and follow-up of these program activities. The list of people interviewed is appendix C.

The quality and relevance of the selected reports was assessed based on the following criteria:[3]

- Contribution to new knowledge that is not available from other sources (subsidiarity principle);
- Good use of World Bank Group's comparative advantage (objectivity and global perspective);
- Readability; and
- Fitness for purpose.[4]

Overall, the best publications substantively contributed to the global body of knowledge with objectivity and rigor, their conclusions, lessons, and recommendations are useful for the intended purpose, and they are readable by the target audience. Based on the assessments for this review, four of the sample publications have, by and large, have met this gold standard (see Figure 3.1). A good example is an ESMAP-funded report on improving energy access to the urban poor in developing countries.[5] It documents and analyzes eight innovative projects that had varying success in providing energy access to the urban poor, methodically discusses the barriers they faced, how they were overcome, and derives the lessons learned. Another example is ESMAP report that sharply focused on the promotion of productive uses of electricity in rural areas of Peru with conclusions and lessons that convey important messages to inform decisions on such projects in other countries.[6]

Figure 3.1. The Quality and Relevance of Sample Knowledge Products (n=20)



Source: IEG assessment.

Contribution to New Knowledge that Is Not Available from Other Sources

IEG's review found that thirteen of the 20 sample reports have made at least some contribution to the global body of knowledge on energy access. They generated new data, information and analysis that are useful to inform policy, program and project decisions for the promotion of universal access to energy. In five publications, the contribution was modest and in two cases, minor.

The most significant contributions to new knowledge were made by reports that combined sound conceptual analysis with the documentation of field-based evidence from surveys, piloting, and experimentation. Precise and objective

recording and interpretation of results from the ground generated the greatest contributions.

An excellent example is provided by a tightly focused ESMAP supported paper on the issues associated with the estimation of electricity demand curves.[7] The paper presents a brief overview of the underlying theory and demonstrates its application with an econometric analysis using the data base from a 3000 household energy survey in Yemen. The results are compared with those of similar studies in other countries, and demonstrate the importance of basing electricity benefit estimates on survey data rather than the commonly employed shortcuts. In a similar vein, a jointly ESMAP, ASTAE and other funding sources- funded evaluation of the impacts of a Bank-supported rural electrification project in Vietnam, based on a representative survey of 1200 beneficiaries in seven provinces, solidly established that the benefits exceeded its costs.[8] The statistical robustness with which this conclusion is supported makes it particularly valuable for future decisions on grid-based rural electrification in Vietnam and other countries with similar socio-economic conditions.

In the absence of ground-truthing even conceptual rigor can lead to inaccurate conclusions. Thus, for example, a recent GPOBA paper makes a tightly argued, theoretically sound case for the effectiveness and efficiency of results-based financing as an instrument for leveraging private investors to focus the delivery of energy services on the poor.[9] But the case is mainly based on logical reasoning, illustrated with the design of targeted subsidies in a few World Bank projects. One of these involved the subsidization of solar home systems (SHS) in Bangladesh, which the paper asserts are "typically purchased by poorer consumers" since, "by definition…off-grid consumers are low-income." The evidence from the follow up impact evaluation, however, did not support this conclusion. The survey-based impact evaluation found that at most about a third of the households had purchased the system and they tended to be the higher income households in the villages where SHS had been offered, which themselves tended to be the more prosperous of the off-grid villages in the country.[10]

Use of World Bank Group's Comparative Advantage

To what extent did publications reflect analysis based on international good practice and unquestioned objectivity? The results are mixed. Just over half (11/20) of the reports provided an objective analysis of the issues based on international best practice, while the remainder did not fully meet this standard. The best reports take

full advantage of the World Bank Group's ability to offer impartial analyses with a global perspective.

A good example is an ESMAP report on integrating gender into energy operations. The report consolidates available information into a step-by-step approach, each step supported with illustrations from the global experience and reference to additional online resources.[11] ESMAP and GPOBA also funded a comprehensive overview and analysis of the financial and technical issues associated with electricity connection charges, solidly grounded on data collected from every utility in Africa, which concluded with practical, actionable strategies for lowering these costs and enhancing their affordability by the poor.[12]

In reports that fall short of the desired standard, the most common flaw is the absence of a sound analytical framework for deriving conclusions from facts and analysis. This can lead to important issues being left unaddressed in the concluding recommendations. For example, an ESMAP-supported review of World Bank's investments in modernizing energy services discusses the "inordinate effort" required to access grant funds for technical assistance needed in preparing energy access projects, but offers no insights on how to address this issue.[13]

A second common flaw is the omission of key aspects or information that should be essential for a balanced discussion of the issues. For example, an ASTAE-supported regional flagship report on how to achieve universal energy access in East Asia by 2030 carefully considers the economic, financial and institutional factors and leads up to custom-tailored investment scenarios for seven countries.[14] Surprisingly, the recommended scenarios only take account of investment costs-omitting estimates of the associated operational subsidies that would be required. Another ASTAE-supported strategy paper for a clean stove initiative in Indonesia was based on a review of two recent fuel substitution programs, but fails to discuss and consider any lessons from the country's far more relevant decades of experience with numerous and diverse stove programs.[15]

The credibility of some reports is undermined by an insufficiently sober and objective tone. For example, a diagnostic market assessment that underpins Lighting Africa applies a bullish, confident tone: such as , e.g., using 'will' instead of 'may' about its findings—"cost reductions will translate into lower prices", and "industry leaders will consolidate" that make it sound more like an advocacy piece than a balanced assessment of the market.[16] In a different vein, an ASTAE-supported review of Vietnam's rural electrification strategies (intended for policy makers and practitioners in other countries) is characterized by a consistently positive tilt that

detracts from the credibility of the important messages emerging from the country's experience.[17]

Readability

Most of the sample publications were found to the well-articulated and easy to understand for the appropriate audience. A frequent issue revolves around the need to signal the target audience through an appropriate labeling or packaging of the report - as World Bank report, policy note, working paper, discussion paper, research paper, knowledge brief, etc. Over half (12/20) of the reports are written for well-informed decision makers and practitioners. A few are quite technical and mainly intended for technical specialists. Three of the reports are not only technical, but also difficult to read except for the most dedicated specialists. On the other hand, the raw, unedited candor and integrity of a few of most densely-written technical reports yielded some of the more robust and revealing contributions to the understanding of energy access issues.

An illustration is the ESMAP-supported evaluation of the impacts of electrification on small and micro-enterprises in Sub-Saharan Africa.[18] It provides a comprehensive survey of the electrification impact studies literature and of methodological issues associated with the estimation of impacts, illustrated with the example of three survey-based studies in Benin, Ghana and Uganda. This analysis fills an important gap, since the productive uses of electrification can, under certain circumstances, substantially contribute to the financial viability of rural electrification and there have been very few methodologically rigorous, survey-based studies that could provide a solid basis for decisions in this area.

Fitness for Purpose

The reports' fitness for purpose was assessed on the basis of the extent to which their conclusions, lessons, and recommendations are grounded in analysis and relevant for the intended objective. Fewer than half (8/20) of the sample publications have fully met this benchmark. In several of the reports that fall short, their fitness for purpose is impaired by their lack of objectivity and analytical soundness, as already noted. In a few additional cases, the value of the reports is limited by a failure to bring out the full implications of findings, even when the underlying analysis was sound.

A few reports lacked alignment with the intended purpose. A major ESMAP publication with the objective of "recommending ways in which the international

community can promote stoves that are commercially viable, convenient for users and more energy efficient" provides an insightful review of six of the 'best' improved stove programs in India, all of which proved to be unsustainable without government or outside assistance, and concludes by proposing an "intermediate solution" that will require continued government and outside support.[19] The reader is left wondering if it might not have been more purposeful to have focused on a few of the "success stories" whose existence is hinted at, in order to inform creation of commercially viable stove programs. In a different vein, an ESMAP-supported investigation of indoor air pollution (IAP) in Bangladesh aimed to develop recommendations for a large-scale improved stoves program.[20] But while the activity yielded pioneering measurements of IAP, it did not result in any findings or recommendations that could serve in the design of stove programs.Another example of fuzziness about the purpose is provided by a series of country notes that analyze policy and regulatory issues affecting the scale-up of the solar lighting market in Africa.[21] In principle intended to "level the playing field" by removing existing distortions, the notes instead favor off-grid lighting solutions by advocating their exemption from taxes and duties, without considering the potential impacts on competing fiscal priorities and flying in the face of broader efforts to harmonize tax and tariff regimes across product categories. It is possible that this may have contributed to the fact that the external mid-term Evaluation's found few concrete examples of policy reforms that could be directly linked to the program.

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[1] As mentioned, ESMAP's external evaluation did not review knowledge products in depth.

[2] Over the same period, ESMAP, which supported 16 of the 20 reports in the sample, sponsored about 73 energy access activities.

[3] *Sourcebook for Evaluating Global and Regional Partnership Programs – Indicative Principles and Standards*, IEG, World Bank, 2007

[4] The assessment relied on dictionary definitions: Objective: unbiased, impartial, not influenced by personal or institutional agendas; Fit for purpose: well suited for its intended role or purpose.

[5] *Improving Energy Access to the Urban Poor in Developing Countries*, ESMAP, World Bank, Sep. 2011.

[6] *Promoting Productive Uses of Electricity in Rural Areas of Peru: Experience and Lessons Learned*, by James Finucane, Susan V. Bogach, Luis E. Garcia, ESMAP, World Bank Report 74044, June 2012.

[7] *A New Slant on Slopes: Measuring the Benefits of Increased Electricity Access in Developing Countries*, by Margaret Wilson, John Besant Jones and Pierre Audinet, Report No. 53963-GLB, World Bank, February 2011.

[8] *Welfare Impacts of Rural Electrification – Evidence from Vietnam*, by Shahidur R. Khandker, Douglas F. Barnes, Hussain Samad, Nguyen Huu Minh, Impact Evaluation Series No. 38, Policy Research Working Paper 5057, World Bank, Sep 2009.

[9] *Lessons from OBA for Leveraging Finance for Clean Energy*, by Mustafa Zakir Hussain and Catherine Etienne, Working Paper, GPOBA, World Bank, September 2012.

[10] *Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh,* by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013

[11] *Integrating Gender Considerations into Energy Operations,* by Wendy Hughes, Vanessa Lopez Janik and Yvette Bossman, ESMAP Knowledge Series 014/13, September 2013.

[12] *Connection Charges and Electricity Access in Sub-Saharan Africa,* by Raluca Golumbeanu and Doug Barnes, Policy Research Working Paper 6511, World Bank, Africa Region, June 2013

[13] *Modernizing Energy Services for the Poor: A World Bank Investment Review – Fiscal 2000-08*, by Douglas Barnes, Bipul Singh, Xiaoyu Shi, ESMAP, December 2010.

[14] *One Goal, Two Paths: Achieving Universal Access to Modern Energy in East Asia and the Pacific,* World Bank, 2011

[15] *Indonesia – Toward Universal Access to Clean Cooking*, (by Yabei Zhang, Voravate Tuntivate, Christina Aristanti, Yun Wu), ASTAE EAP Clean Stove Initiative Series, World Bank Report 79279, June 2013. While no ex-post evaluations appear to have been available, and the paper itself highlights one of the beneficiaries as a success, it would have been desirable for the study team itself to have reviewed these past programs' experience with a structured analytical framework to identify their strengths and weaknesses and derive the appropriate lessons.

[16] *Solar Lighting for the Base of the Pyramid – Overview of an Emerging Market*, by Dalberg Global Development Advisors, for Lighting Africa, June 2010

[17] *Vietnam: State and People, Central and Local, Working Together – The Rural Electrification Experience,* (by Defne Gencer, Peter Meier, Richard Spencer, Hung Tien Van), World Bank, Sep. 2011.

[18] *Productive Use of Energy – PRODUSE: Measuring Impacts of Electrification on Small and Micro-Enterprises in Sub-Saharan Africa*, (by Lucius Mayer-Tasch, Mohua Mukerjee and Kilian Reiche), ESMAP, GIZ, 2013.

[19] *Cleaner Hearths, Better Homes – New Stoves for India and the Developing World*, by Douglas Barnes, Priti Kumar, and Keith Openshaw, Oxford University Press, 2012.

[20] *Improving Indoor Air in Rural Bangladesh: Results of Controlled Experiments,* by Susmita Dadgupta, Mainul Huq, M. Khaliquzzaman, and David Wheeler, Knowledge Exchange Series No. 13, ESMAP, March 2009.
[21] *Policy Study Report Note*, Lighting Africa, August 2011. *Policy Report Note – Ethiopia,* (by Marge and Econoler), Lighting Africa, August 2012. *Policy Report Note – Senegal,* (by Marge and Econoler), Lighting Africa, 2012. *Policy Report Note – Ghana,* (by Marge and Econoler), Lighting Africa, 2012. *Policy Report Note – Kenya,* (by Marge and Econoler), Lighting Africa, 2012.

4. Insights on Energy Access from Programs' Knowledge Work

In the spirit of contributing to knowledge and learning, this chapter summarizes some key insights on approaches to expanding energy access that emerged during the course of conducting this review. The main sources for this chapter are knowledge products sponsored by the reviewed programs along with interviews with program staff, task teams, and key informants. The sources for this were selective rather than systematic and comprehensive.

The review of knowledge products and of program experience found that the programs under review have generated new knowledge and supported field testing of some the key assumptions underlying new approaches to expanding energy access. These should be of relevance to energy access practitioners. The key findings and insights of this review underscore and expand on some of those of earlier reviews and evaluations and can be summarized as follows:

- Rural electrification is expensive;
- The benefits of rural electrification are highly context specific;
- Solar technology offers a commercially viable alternative to rural grid expansion;
- Universal access to clean cooking remains an elusive goal;
- The challenge of sustainability calls for the nurturing of new business models;
- Expanding energy to the poor requires creative adaptations of standard business models; targeted energy expansion subsidies are not enough;
- There are several challenges and opportunities for enhancing gender impacts of energy access expansion.

Rural Electrification Is Expensive

Several reports have confirmed the unrelenting logic of least cost expansion, whereby the unit costs of electricity access will continue to rise as the grid expands into ever more remote and thinly populated areas. In Lao PDR, for example, electricity access levels were approximately 50 percent in 2003, and the incremental cost per household connection was $450-$550. By 2010, the access level had reached 70 percent, and the incremental cost per household had doubled to approximately $900.[1] Similarly high incremental access costs have been reported for Senegal, where

they average $725 per household, and Liberia, where the average has reached $950 per household.[2]

Rising costs curves imply that the pursuit of universal access to electricity will have to be supported by a growing level of subsidies that will have to be covered through direct budget transfers or cross-subsidies from the rest of the customer base. However, while there is wide recognition and agreement on the need for subsidies to ensure that the price of electricity is affordable in rural areas while protecting the financial viability of the service providers, their magnitude and fiscal affordability has not been adequately highlighted. Thus, for example, an ASTAE-supported regional flagship report makes extensive references to the need for subsidies and options for addressing them, but only in qualitative terms. It only offers a specific estimate for Cambodia, where the cost of supply is estimated as $0.23/kWh and the affordable tariff for rural households at $0.15/kWh. This would imply a subsidy of $106 million annually for the 2.2 million rural households that are proposed to be connected under the universal access scenario, comparable in magnitude to the incremental investments of $156 million per year required to achieve that target by 2030. However, while the report discusses the country's inability to afford the investment requirements (equivalent to 1.6 percent of the country's GDP), it does not discuss the growing burden of operational subsidies which it will also have to pay for.[3] Given this and other low income countries' very limited ability to afford such subsidies, the absence of the systematic coverage of such major potential fiscal burdens represents an important gap that deserves greater attention.

The technical assistance and capacity building needed to support energy access add to the costs; since cross-sectoral solutions are challenging to implement. A credit program may be needed to facilitate affordability by the poorer households and small and micro-enterprises, business development services may be required to assist potential energy using businesses in rural areas, and a major campaign may be needed to raise awareness about the health impacts of indoor air pollution for potential buyers of improved cookstoves. Such implementation challenges compound the energy expansion challenge.

Benefits of Rural Electrification Are Highly Context Specific

Any discussion of subsidies for rural electrification will need to be informed with a good understanding of the expected benefits, an area where several of the sample publications have expanded on the available knowledge. A 2008 IEG evaluation of rural electrification found that it is difficult to generalize about the potential welfare impacts, as they are highly context specific. Thus, where the Bank had already supported grid-based rural electrification, their value to households appeared to be

above the long-run supply cost of supply, even if the evidence base for many of the benefits remains weak. On the other hand, the economic rationale for off-grid electrification is far from clear, because of its higher costs and lower benefits that are further reduced by technical limitations. [4]

An ESMAP-and-ASTAE supported analysis in Vietnam found that household incomes increased by about 25 percent after 3–4 years of electrification and that school enrollment improved for both girls and boys. Given this, and postulating an electricity supply cost of $0.09/kWh, it concludes that the benefits accrued to participants exceed the costs of electricity supply by more than 4 times. However, while the household benefits of grid-based rural electrification were convincingly shown to exceed the costs of supply in Vietnam, a middle income country, such a finding cannot be generalized to lower income countries and regions. In Cambodia, for example, where the cost of supply (of $0.23/kWh) is about 150 percent higher and income levels are about 30 percent lower, the benefits might only marginally exceed the costs. This points to the need for additional survey-based research on the impacts and benefits of electrification, especially in lower-income countries with higher unit costs for expanding electricity access.

With respect to the benefits of electrification for small and micro-enterprises, the findings are rather more sobering. An ESMAP-supported survey on the impacts of rural electrification in three African countries found no clear indication for positive effects of electricity access on SME performance.[5] The survey found that connected firms use electricity mostly for lighting and phone charging. While some of the firms could benefit from productivity-enhancing electric equipment and appliances, there is also a sharpening of competition and crowding-out of weaker firms that tends to net out any aggregate impact on income and employment. A similar ESMAP-supported report on Peru also provides a cautionary note on the productive users' potential to strengthen the viability of rural electrification. It concludes that promotion of productive uses by small and micro-enterprises in rural areas can be financially viable under certain narrow conditions: if economic growth is reaching the rural areas, the program is supported by strong NGOs experienced in rural development, and credit is available to the potential users.[6]

Solar Technology Offers a Commercially Viable Alternative

At this point, the only portion of the energy access spectrum where the economics are improving is the off-grid solar lighting market, where the costs of supply have declined at an impressive rate. As documented by Lighting Africa's market intelligence reports, the production costs of solar portable lighting devices have been

falling and are expected to continue to decline. In parallel, the advent of LED bulbs and improvements in battery technology have enhanced the quality and durability of the lanterns, and the incorporation of features such as mobile phone charging have greatly increased their attractiveness to consumers. As a result, African sales of quality-certified solar lighting products have grown by at about 90-95 percent per year since 2009 (albeit from a low base). These products have now reached 2.5 percent market penetration across Africa, and 7.5 percent in Kenya, where Lighting Africa has been most active.[7]

On the other hand, while the market for solar lighting is booming, a recent GPOBA-funded impact evaluation of a grant-supported program to disseminate solar home systems (SHS) in Bangladesh concluded that while the willingness to pay was high—implying that subsidies were unnecessary the impact on income generation and education was very limited. In addition, in spite of mechanisms explicitly intended to target the program to the poor, only about a quarter of households had purchased the system and they tended to be the better-off and better educated households in the villages where SHS had been offered, which themselves tended to be the more prosperous of the off-grid villages in the country.[8] Thus, while the subsidized program was successful in meeting its sales targets, it has also tended to undermine the potential for developing the non-subsidized market for solar systems, which would also have to be built on reaching the better-off villages first and, within these villages, the better-off households. Another impact evaluation study (beyond the scope of the sample) carried out in 2013, has found that Bangladesh program has generated a variety of benefits from solar home systems.[9] This points to the need for additional research on targeting mechanisms to help ensure that they can more effectively and efficiently reach the poor and do not interfere with the development of the commercial market.

Universal Access to Clean Cooking Remains an Elusive Goal

Recent WHO estimates indicate that indoor air pollution was linked to 4.3 million premature deaths in 2012 in households cooking over coal, wood and biomass stoves, of which about three quarters (3.3 million) are concentrated in Asia.[10] The new estimate is nearly double the WHO's previous estimate and indicates that indoor air pollution is the largest single environmental health risk globally, linked to about one tenth of all deaths. The ESMAP-supported measurements of indoor air pollution in Bangladesh were highly relevant in this context.[11] The new estimates also underscore the urgency of raising consumer awareness of the health costs associated with using traditional stoves, in order to overcome entrenched attitudes

that have limited the marketability of the costlier improved stoves, as has been highlighted in several of the ESMAP and ASTAE reports.[12]

Several of the reports confirm the perception that, even after thirty-plus years of worldwide piloting and experimentation, sustainable access to clean cooking remains the least advanced and most challenging of the major legs of the energy access strategy.

The four ESMAP and one ASTAE-supported reports in the review sample that focused on clean cooking have helped put this issue back into the mainstream of the World Bank's energy agenda after having received little attention during the previous 15 years. They also provided the conceptual framework for the launch of regional cookstove initiatives in Central America, East Asia and Africa.[13] In contrast to the earlier generations of improved cookstove projects, which had been mainly motivated by the goal of reducing pressure on forests, the recent programs have been driven by a growing awareness of the health impacts of indoor air pollution. Based on lessons from the disappointing results of earlier projects, the newer programs have been designed differently: they emphasize raising public awareness of the harmful health effects of traditional stoves; development and testing of more efficient, durable and user friendly designs; and include microfinance and/or results-based financing components for greater affordability by the poor. While these initiatives are still in their early stages, they have ensured renewed visibility for clean cooking initiatives.

However, there is a need to more purposefully focus on understanding successful clean cooking programs in order to support replication. In the face of nearly universal dearth of successful stove programs, it is difficult to understand why an ESMAP-funded review of a commercially successful improved stove program in Bangladesh fails to document the business model and include any information on the actual performance and durability of the stove.[14] The same technical information is missing from an ASTAE-supported report that features the single commercially successful trainee from an improved stove program in Indonesia that had been implemented by the very organization that partnered with the Bank in the preparation of the report.[15] Similarly, an ESMAP-supported review of clean stove options in Central America fails to analyze cost-and-performance trade-offs between the cheaper ($60-85) and more expensive stoves that are discussed.[16]

Need for Nurturing New Business Models

An important cross-cutting message is that achieving energy access for all is not so much about investing in infrastructure, as about nurturing the emergence of resilient business models that will deliver sustainable energy services to remote and low-income locations. Lighting Africa's experience points to the potential for nurturing commercial business models for the provision of energy access as an alternative to continuing reliance on public utilities and NGO providers. Private entrepreneurs have proved themselves resilient and adaptable for the provision of off-grid lighting products. This is in stark to the challenge of reforming conventional utilities, the fragility of NGO providers, the fiscal unsustainability of many government-led energy access initiatives, and the elusive quest for clean cooking. Amidst daunting logistical, financial, marketing, and capacity challenges, unsubsidized sales of quality-certified solar lanterns have been growing by 90–95 percent per year, the African countries where such products are sold have increased from about 5–10 in 2010 to 20 in 2012, and the number of quality-verified manufacturers has grown from 6 to 25 over the same period.[17]

By contrast, the ESMAP-funded overview of the experience of India's state-led-and-subsidized cookstove programs highlighted the many cultural, technical, institutional, financial, and political factors that conspired to thwart the development of commercially sustainable business model for improved stoves.[18] The GPOBA-funded impact evaluation of the Bangladesh solar home systems program highlighted the fragility of the donor-supported-and-subsidized business model pursued by the provider NGOs in the face of numerous technical, managerial, service quality, and billing issues, even while still focusing on the better-off households in the better-off, more accessible villages.[19] While Bangladesh's SHS program is considered one of the most successful off-grid electrification programs in the world, with demonstrated results in terms of providing electricity to 50,000 households a month, its long-term sustainability remains fragile (i.e., dependent on continued IDA and other donor support). Similarly, the ESMAP-funded assessment of the pilot program for the development of productive uses in Peru, as well as the study on improving energy access to the urban poor have highlighted the tightly circumscribed conditions required to interest traditional power utilities to extend unsubsidized energy access to marginal markets.[20] While Vietnam's experience with rural electrification led by a committed, competent, and resourceful government could achieve nearly universal electrification, this is not a model that is replicable everywhere.[21]

The review of GPOBA's subsidy projects revealed that when successful, the projects resulted in an increased number of household with access to grid and decentralized

types of electricity. However, the benefits generated through the application of its OBA approach in increasing access to electricity are as susceptible to eroding as those arising from traditional input-based approaches. This is partly because the scheme is based on subsidy mechanism and once subsidy is abolished or reduced the likelihood that the benefits will be sustained is very low, and partly because the model does not address some of the key barriers to improving access, such as access to working capital.

Expanding Energy to the Poor Requires Creative Adaptations of Business Models; Targeted Connection Subsidies Are Not Enough

Most of the sample publications point to the impacts and benefits for the poor when discussing the rationale for and experience with energy access promotion, but only a few of the reports have advanced the state of knowledge and understanding in this area.

The GPOBA-funded impact evaluation of SHS in Bangladesh found that only about a quarter of households in villages reached by the program had adopted the system. Adopter households had an average annual income of about $2000, 80 percent higher than non-adopters.[22] This was largely a result of the partner (provider) organizations' practice of selecting relatively well-off households as clients in consideration of their ability to pay, while excluding the poorer households. On the other hand, the report also found that the average households' willingness to pay for a SHS was much (30 percent) higher than the average price of the SHS, which suggests that the program's subsidy was unnecessary for the average household, and could be more effectively focused on the poor.

The ASTAE and ESMAP-supported study on welfare impacts of rural electrification in Vietnam found that household income and landholding had no significant impact on a household's ability to connect to the grid.[23] This is the result of the government's policy to encourage all households to connect once electricity reaches the commune, and because communes help defray connection costs for poor households that could not afford them. Thus, once the grid reaches a commune, poor households do not necessarily fall behind in getting connected. However, with respect to the study's finding that total household incomes had increased by 25 percent per annum after electrification, the available data did not allow a verification of whether poorer households had benefitted as much as the richer ones.

The ESMAP- funded analysis of the benefits of electricity access in Yemen found that, while the demand for electricity was highly inelastic for all income groups, it

was more inelastic for the bottom quartile.[24] The proportion of lower-income households consuming small amounts of high-cost energy greatly exceeded that in other groups and the potential willingness to pay for substitution by grid electricity was much higher. This appears to be due to the fact that many low-income families on occasion used extremely costly energy such as batteries for lighting, entertainment, and information.

These findings point to the importance of carefully designing the grid's customer interface in such a way as to maximize its affordability and accessibility by the poor. An ESMAP-and-GPOBA funded study focused on the prevalence of high upfront charges for a grid connection, which constrain electricity access for low-income families.[25] A main driver of high connection charges are oversized technical specifications, more suited to urban areas with high loads than to low-load rural areas. Another driver of high connection charges is the utilities' lack of incentives to adopt technical solutions that would be more appropriate and affordable to the poor. The study recommends various ways to lower the up-front charges, both by implementing lower cost technical solutions as well as allowing consumers to pay the connection charge over time by rolling it into the electricity tariff or paying it over time through credit schemes provided by the utility.

Yet grid expansion subsidies are not enough: the experiences from GPOBA-funded energy projects indicate that poverty-targeted subsidies for energy access expansion do not necessarily ensure results, particularly in grid expansion. The majority of the 12 GPOBA energy access subsidy projects use poverty-targeted one-off subsidies to defray poor household's connection costs. This choice avoids on-going subsidies and issues of subsidy leakage to the non-poor. However, demand for energy access is often constrained not only by high connection costs but also by the inability of the poor households to pay the monthly electricity bill. Typically, the OBA model in infrastructure requires beneficiaries to pay the ongoing monthly tariff for the electricity, in which the utility company also includes a share of the installation cost that the project is subsidizing. It is challenging to determine a tariff that the poor can afford that also allows utilities to recover their costs. Paying even a share of the one-time installation costs may be unaffordable for poor household: uptake in some GPOBA projects has been weak. In the India Mumbai Improved Electricity Access to Indian Slum Dwellers Project, many poor households proved unwilling and unable to pay their share of up-front costs.

Project design also does not adequately address supply barriers to energy expansion**.** The lesson from completed and on-going GPOBA energy access projects is that the model works better in expanding off-grid than grid energy access, as was done in Bangladesh, Bolivia, and Ghana. The design of the subsidy scheme,

especially the level of subsidy and the disbursement schedule, often did not provide sufficient incentives to convince utilities and suppliers to prioritize poor households. GPOBA requires that suppliers are paid after work has been completed; for contractors lacking access to working capital (a common occurrence), this makes it hard to finance upfront connection costs.

A flexible approach to the design of subsidies and agility to adjust to changing country contexts is needed to make poverty-targeted OBA approaches work better and encourage more innovation and efficiency. One way would be to define the target group and the service but to give more freedom to service providers to design schemes that most cost-effectively deliver the service and achieve desired results.

An ESMAP-funded study highlighted the important role of community empowerment and participation in overcoming the barriers impeding access to energy by the poor.[26] In five of the eight cases covered by the report, the empowerment of poor urban communities played a crucial role in creating leadership and capacity at the local level to build trust between communities and service providers, enable the negotiation of supply agreements that facilitated the extension of the energy supply infrastructure into previously unserved (or illegally served) communities. Its findings point to the importance of stakeholder collaboration as a key strategy for promoting energy access among the poorer communities which had been difficult to reach with the standard utility business model.

Overall, these studies and project experience highlight the importance of flexibility and a willingness to experiment in providing modern energy access to the poor. While the poor's willingness to pay has been shown to be high, the levels of consumption are smaller than for existing customers, so that the development of this market requires creative adaptations of the technical, financial and institutional parameters from that of the standard business models.

Challenges and Opportunities for Enhancing Gender Impacts

IEG's review found that most (14/20) of the sample publications have referenced the impacts and benefits for women when discussing the rationale for expanding energy access, but only a few (4/20) of the reports have deepened the knowledge and understanding of this area. For example, the ESMAP-supported impact analysis of productive uses in Africa found that 22 percent of surveyed firms in Ghana were owned by women, but does not present any gender-disaggregated analytical results.[27]

On the other hand, those few reports that treated gender seriously made solid contributions on the impacts of energy access on women as well as challenges and opportunities for enhancing impacts. The ESMAP paper on integration of gender considerations into energy operations succinctly consolidated the available information supported with illustrations from the global experience and reference to online resources.[28]

The GPOBA-funded impact evaluation of solar home systems in Bangladesh found that female-headed households were more likely than male-headed ones to buy an SHS.[29]Female-headed SHS households were also associated with a higher prevalence of kitchen lighting and an increased sense of security and comfort derived from SHS. Adoption of SHS was found to positively influence women's mobility and economic decision-making. Women were found to use more time for tutoring children, watching TV, and socializing. The report also found that, while all of the participating partner organizations aimed to empower rural women, only one of the four partner organizations has actually trained 3000 women technicians to repair SHS and assemble SHS accessories, while the others had not implemented specific gender initiatives.

Another ESMAP-funded report, on improving energy access to the urban poor, highlights the important role of women and women organizations in overcoming the barriers to energy access in three of eight case studies.[30] In Mumbai, community-based demands for electricity were led by a women's community group, who played a critical role in negotiating legal connections from the utility. In New Delhi, women from the slum communities were supported to organize themselves into self-help groups, helped to articulate their demands, and trained to negotiate for better and legal access to electricity. In each of the cases, the extension of electricity access to slums and pavement dwellers, with the attendant improvement in lighting, helped ensure safety for girls and women.

The report on the promotion of productive uses of energy in Peru found that about 33 percent of the producers that benefited from the pilot activities were women.[31] This had resulted naturally as women entrepreneurs are present in all types of productive activities and play a significant role in sectors of production such as baked goods, milk production, ceramics and textiles.

Another paper, to underpin a clean stove initiative in Indonesia, reports that women dominate the traditional stove making trade – about 40 percent of the businesses are owned by women, 26 percent by men, and 34 percent are owned jointly by women and men – but its recommendations only target women as consumers.[32] As the recommended clean stove initiative is expected to lead to the replacement of

traditional stoves by improved manufactured stoves, this could result in some potential gender equity impact, but it is unclear how this issue could be addressed.

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[1] *One Goal, Two Paths: Achieving Universal Access to Modern Energy in East Asia and the Pacific,* World Bank, 2011

[2] *Connection Charges and Electricity Access in Sub-Saharan Africa*, by Raluca Golumbeanu and Doug Barnes, Policy Research Working Paper 6511, World Bank, Africa Region, June 2013

[3] *One Goal, Two Paths: Achieving Universal Access to Modern Energy in East Asia and the Pacific,* World Bank, 2011. The report (p.107) indicates that an incremental 2.2 million rural households will need to be connected at a cost of $0.23/kWh and an affordable tariff of $0.15/kWh, but does not mention the total amount of the attendant subsidy.

[4] *The Welfare Impact of Rural Electrification - A Reassessment of the Costs and Benefits: An IEG Impact Evaluation*, IEG, World Bank, 2008

[5] *Productive Use of Energy – PRODUSE: Measuring Impacts of Electrification on Small and Micro-Enterprises in Sub-Saharan Africa*, (by Lucius Mayer-Tasch, Mohua Mukerjee and Kilian Reiche), ESMAP, GIZ, 2013.

[6] *Promoting Productive Uses of Electricity in Rural Areas of Peru: Experience and Lessons Learned*, by James Finucane, Susan V. Bogach, Luis E. Garcia, ESMAP, World Bank Report 74044, June 2012

[7] *Lighting Africa Market Trends Report 2012,* by Dalberg Global Development Advisors, for Lighting Africa, June 2013.

[8] *Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh,* by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013.

[9] Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh, by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013.

[10] http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/

[11] *Improving Indoor Air in Rural Bangladesh: Results of Controlled Experiments*, by Susmita Dadgupta, Mainul Huq, M. Khaliquzzaman, and David Wheeler, Knowledge Exchange Series No. 13, ESMAP, March 2009.

[12] *Cleaner Hearths, Better Homes – New Stoves for India and the Developing World*, by Douglas Barnes, Priti Kumar, and Keith Openshaw, Oxford University Press, 2012. *What Have We Learned about Household Biomass Cooking in Central America?*, by Xiaoping Wang, Janina Franco, Omar R. Masera, Karin Troncoso, Marta X. Rivera, ESMAP, World Bank Report No. 76222, Jan 2013. *Indonesia – Toward Universal Access to Clean Cooking*, (by Yabei Zhang, Voravate Tuntivate, Christina Aristanti, Yun Wu), ASTAE EAP Clean Stove Initiative Series, World Bank Report 79279, June 2013.

[13] *Modernizing Energy Services for the Poor: A World Bank Investment Review – Fiscal 2000-08,* by Douglas Barnes, Bipul Singh, Xiaoyu Shi, ESMAP, December 2010.

[14] *Improving Energy Access to the Urban Poor in Developing Countries,* ESMAP, World Bank, Sep. 2011, 107 pp.

[15] *Indonesia – Toward Universal Access to Clean Cooking*, (by Yabei Zhang, Voravate Tuntivate, Christina Aristanti, Yun Wu), ASTAE EAP Clean Stove Initiative Series, World Bank Report 79279, June 2013

[16] *What Have We Learned about Household Biomass Cooking in Central America?*, by Xiaoping Wang, Janina Franco, Omar R. Masera, Karin Troncoso, Marta X. Rivera, ESMAP, World Bank Report No. 76222, Jan 2013, 121pp.

[17] *Lighting Africa Market Trends Report 2012,* by Dalberg Global Development Advisors, for Lighting Africa, June 2013.

[18] *Cleaner Hearths, Better Homes – New Stoves for India and the Developing World*, by Douglas Barnes, Priti Kumar, and Keith Openshaw, Oxford University Press, 2012.

[19] *Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh,* by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013

[20] *Promoting Productive Uses of Electricity in Rural Areas of Peru: Experience and Lessons Learned*, by James Finucane, Susan V. Bogach, Luis E. Garcia, ESMAP, World Bank Report 74044, June 2012. *Improving Energy Access to the Urban Poor in Developing Countries*, ESMAP, World Bank, Nov. 2011.

[21] *Vietnam: State and People, Central and Local, Working Together – The Rural Electrification Experience*, (by Defne Gencer, Peter Meier, Richard Spencer, Hung Tien Van), World Bank, Sep. 2011.
[22] The adopters were also better endowed with assets, income and education. *Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh,* by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013

[23] *Welfare Impacts of Rural Electrification – Evidence from Vietnam*, by Shahidur R. Khandker, Douglas F. Barnes, Hussain Samad, Nguyen Huu Minh, Impact Evaluation Series No. 38, Policy Research Working Paper 5057, World Bank, Sep 2009.
[24] *A New Slant on Slopes: Measuring the Benefits of Increased Electricity Access in Developing Countries,* by Margaret Wilson, John Besant Jones and Pierre Audinet, Report No. 53963-GLB, World Bank, February 2011.
[25] *Connection Charges and Electricity Access in Sub-Saharan Africa*, by Raluca Golumbeanu and Doug Barnes, Policy Research Working Paper 6511, World Bank, Africa Region, June 2013

[26] *Improving Energy Access to the Urban Poor in Developing Countries*, ESMAP, World Bank, Nov. 2011.

[27] *Productive Use of Energy – PRODUSE: Measuring Impacts of Electrification on Small and Micro-Enterprises in Sub-Saharan Africa*, (by Lucius Mayer-Tasch, Mohua Mukerjee and Kilian Reiche), ESMAP, GIZ, 2013.

[28] *Integrating Gender Considerations into Energy Operations,* by Wendy Hughes, Vanessa Lopez Janik and Yvette Bossman, ESMAP Knowledge Series 014/13, September 2013.

[29] *Power From the Sun: An Evaluation of Institutional Effectiveness and Impact of Solar Home Systems in Bangladesh,* by M. Asaduzzaman, Mohammad Yunus, A.K. Enamul Haque, AKM Abdul Malek Azad, Sharmind Neelormi, Md. Amir Hossain, Final Report submitted to the World Bank, May 30, 2013

[30] *Improving Energy Access to the Urban Poor in Developing Countries*, ESMAP, World Bank, Sep. 2011, 107 pp.
[31] *Promoting Productive Uses of Electricity in Rural Areas of Peru: Experience and Lessons Learned*, by James Finucane, Susan V. Bogach, Luis E. Garcia, ESMAP, World Bank Report 74044, June 2012 (68pp).

[32] *Indonesia – Toward Universal Access to Clean Cooking*, (by Yabei Zhang, Voravate Tuntivate, Christina Aristanti, Yun Wu), ASTAE EAP Clean Stove Initiative Series, World Bank Report 79279, June 2013.

5. Conclusions and Lessons

The four partnership programs under review have made relevant, varied, and often substantive contributions in support of energy access goals, but the degree to which they were integrated and coordinated with Bank Group energy sector strategies varied substantially. Programs have room to be more strategic in the choice of activities and to improve design relevance. The overall performance of the programs has ranged from highly relevant and effective to very marginal, with serious accountability gaps in one instance. Performance reporting and monitoring was weak but with an improving trend. While their knowledge products were of uneven quality, the better ones have advanced the understanding of the challenges associated with providing modern energy services to the poor, and their follow-up activities have helped define and pilot innovative solutions.

Program Effectiveness and Performance

GPOBA has played a pioneering role in piloting output-based models in the energy sector and sharing the lessons from its pilots. However, its objective to mainstream output- based approach in the World Bank Groups is still a work in progress. GPOBA's energy access projects are well-integrated in the Bank's country operations and complement World Bank Group energy sector activities. Its energy access pilots have produced practical lessons on the strengths and weaknesses of applying OBA approaches. These lessons can inform potential efforts to replicate on scale. They have demonstrated the need for more flexibility in the design of subsidy schemes, especially the level of subsidy and subsidy disbursement schedules, as well as the need close attention to key supply and demand constraints to energy expansion in low-income countries.

The ESMAP program has performed reasonably well in its core functions of think tank, knowledge clearinghouse, and operational leveraging. Its best publications have contributed to the advancement of knowledge on energy access issues with objectivity and rigor, and their conclusions and recommendations have informed the design of policy reforms and the piloting of technical innovations, whose preparation and capacity building the programs has also supported. ESMAP is a good practice example of a multi-donor umbrella facility that is aligned with the Bank's work in the sector and effectively managed.

Lighting Africa has played a relevant and effective role in facilitating the development of the market for off-grid lighting in Africa, for example by providing

market intelligence and quality certification. Its primary focus on the facilitation of unsubsidized market-based approaches bodes well for the long term sustainability of its continued expansion in Africa and other regions. It has supported market-driven innovation in a manner that complemented other support.

ASTAE provided best value when it remained close to its mandate of early project identification and preparation. The funding from the program allowed the TTLs to pilot new models and carry out in-depth project preparation work in East Asia and Pacific region. Its knowledge products were less strategic. A few of the ASTAE-supported knowledge products included in the review do not meet the expected standards with respect to analytical rigor and completeness of coverage.

While each of these programs has made distinct contribution to advance energy access work, there are cross-cutting findings and lessons pointing to a strong link between the design, funding and management of the programs and their overall performance and effectiveness:

- Results framework: The quality of results frameworks and results monitoring significantly varied across the four programs—a common pattern in many global and regional partnership programs. ESMAP has a strong results framework aligned with its theory of change. The program undergoes periodic external evaluations, and is well-integrated and aligned with the Bank's energy sector. In contrast, ASTAE has never had an external evaluation since its inception. GPOBA's Strategic Framework laid out in its 2008 Vision Statement is underutilized. Its results are only monitored through its annual work plans and at the output level which does not allow assessing the Program's overall effectiveness. Lighting Africa's joint results framework is stalled. While both the Bank and the IFC sides of the program continue to monitor the progress through their own internal institutional tools, consolidated tracking and reporting was lacking—an example of incompatible systems between the institutions of the World Bank Group. Its monitoring and reporting is insufficient for a successful pilot program that is expected to be replicated.
- Managing "donor push": The relationship with key donors had an impact on the design of the programs, strategic priorities, and overall effectiveness. The push to meet the donors' strategic objectives put pressure on ASTAE to adopt an overly ambitious results framework and indicators. GPOBA's key donors are directly involved in the grant-making process, as stipulated in the program's Charter; but this makes the grant-making process unnecessarily onerous.

- Program oversight: Stronger accountability for results is clearly correlated with the quality of oversight and how the programs managed their resources. Those with stronger accountability for results also had better record keeping and oversight of funds. ESMAP and GPOBA scored far better in documenting not only their results but also maintaining well-organized project and grant databases, while extensive detective work was required to trace ASTAE's inputs scattered throughout the World Bank projects. Both Lighting Africa and ASTAE had weak institutional memory and relied on individuals to mine basic program financial data for documenting projects and grants.
- Grant making process: The grant-making mechanism was an important factor influencing program performance and overall effectiveness. Block grants of ESMAP were found to be more efficient, strategic, and monitorable than ASTAE's just in time transfers of funds. GPOBA's multi-stage grant-making process has high transaction costs for the TTLs.
- Gender: None of the four programs paid systematic attention to gender mainstreaming and monitoring of gender impacts. Among the four, ESMAP has helped to gather and disseminate knowledge on how to integrate gender into the energy sector work. ASTAE also did good work in this area in its early years. The review of 20 knowledge products revealed that only a few of the reports have deepened the knowledge and understanding of gender issues in energy access.

Lessons

- Flaws in program performance —especially those related to M&E and trust fund oversight like those in ASTAE and Lighting Africa—could have been prevented had the Bank adopted a more systematic and unified approach to overseeing its partnerships and other trust-funded programs;
- Periodic evaluation of the learning and scalability potential of pilots and innovations sponsored by programs are critical to maintain programs' relevance and to provide value for money. Such evaluation should be planned upfront and integrated in M&E frameworks;
- Accountability and results-orientation could be strengthened via more effective M&E and results frameworks that depict the underlying theory of change. M&E can also be an important learning tool for pilot programs, helping to document implementation and results;
- Gender equality could be addressed more systematically. A starting point would be considering gender systematically in program and project cycles and integrating gender into M&E frameworks.

- For partnership programs that issue grants, the grant process is an important part of program's performance and a critical factor in effective delivery of results. The design and handling of grant processes strongly determine the accountability for funds and their strategic use.

Challenge of Ensuring Quality of Knowledge Products

Programs' knowledge work undoubtedly supported the sector. While the best knowledge products made significant contributions to global knowledge, fewer than half of sample publications were found to be objective, analytically sound, and fit for purpose. Only a few reports offered in-depth treatment of gender.

The major lesson from the review of the sampled knowledge work is the need for more systematic scoping, quality assurance, and dissemination of knowledge products:

- Guidance on scoping: a clearer strategic vision could guide the design and scoping of knowledge work in the energy sector with an aim to fill outstanding gaps. For example, there is a need for work on how to design subsidies so as to mesh affordability to low-income families with profitability for private suppliers; better documentation of how to make clean cooking programs successful technically and financially; and creation of enabling environments for private investors to deliver energy services to the poor.
- Quality assurance: Some of the sampled reports had common flaws such as absence of a structured analytical framework, insufficient objectivity, and inadequate coverage of gender dimensions. Too often, reports left important issues unaddressed in the conclusions, adopted advocacy, or lacked objectivity and rigor. More effective quality assurance should be considered.
- Gender: Full gender equality remains an aspirational goal, rather than a core feature of the energy sector's analytical work. Many reports covered gender as context rather than striving for a deeper understanding of the barriers to gender participation and empowerment.
- Systematic dissemination of knowledge products: While all of the reports have been presented at least once within the Bank, the dissemination of several did not go beyond a few such presentations. Their impact could often have been enhanced through more systematic outreach and integration with training and project activities inside and outside the Bank.

Nurturing Viable Energy Access Business Models and Keeping Broader Poverty Focus Is the Way to Go

IEG's assessment of the innovative solutions GPOBA and Lighting Africa piloted and the review of knowledge work suggest lessons for pursuing the SE4All goals:

- **Nurture viable business models:** Investments in infrastructure need to be complemented with viable business models that can deliver low-cost energy services to hard-to-reach locations and consumer groups. The proposed goals cannot be achieved by meeting the investment costs alone, but will need to be sustained by continuing technical assistance, capacity building, operational subsidies, and fostering an enabling environment for private investors. This points to the need for flexible design of energy access subsidies that address both demand and supply barriers and does not undermine market-based solutions.
- **Sharpen the focus on the poor:** Evidence that even with sophisticated targeting mechanisms the benefits of energy access tend to flow to the better-off households in poor villages and communities points to the importance of sharpening the focus on the poor through the use of complementary programs such as:

    - Empowering the poor to participate in design and rollout of energy supply infrastructure and subsidy schemes;[1]
    - Improving access to credit to enable the poor to finance the connection charges, internal wiring, solar homes systems, advanced cookstoves, and productive equipment that they may need to take full advantage of modern energy;
    - Training and capacity building to ensure that the poor can operate energy equipment in a safe manner, maintain it for the long term, and take advantage of business opportunities brought about by energy expansion; and
    - Making deliberate and systematic effort to foster gender-informed designs of all interventions facilitating access to modern energy.

[1] *Improving Energy Access to the Urban Poor in Developing Countries*, ESMAP, World Bank, Sep. 2011, 107 pp.

Appendix A. Program Descriptions

Global Partnership for Output-Based Aid

ORIGIN

The "Output-Based Aid" approach was introduced through the Bank's Private Sector Development strategy in 2002 and GPOBA was launched in 2003 to mainstream the OBA approach in the Bank's program, particularly in health, education and infrastructure. OBA is a mechanism for supporting the delivery of basic infrastructure and social services where policy concerns justify the use of explicit, performance-based subsidies. At the core of the OBA approach is the contracting out of service provision to a third party — usually a private operator but also possibly a community-based organization (CBO), a non-governmental organization (NGO), or even a public service provider — with payments made after the delivery of specified outputs. The purpose of GPOBA was to help the World Bank Group develop expertise in output-based aid by developing pilot projects and disseminating results. GPOBA was established by the United Kingdom's Department for International Development (DFID) as a multi-donor trust fund administered by the World Bank.

OBJECTIVES

The goals of GPOBA are to facilitate increased access to reliable infrastructure and social services by the poor in developing countries, by developing best practice techniques for, and encouraging the broader use of, OBA approaches for the provision of these services, and to facilitate the sharing of best practice and experience among the broader stakeholder community.

The objective of the Partnership is to learn how OBA approaches can deliver basic services by: (1) supporting the design, implementation and evaluation of a program of individual pilot OBA schemes; (2) facilitating the identification and dissemination of knowledge on issues relating to the role and application of OBA; and (3) contributing to the financing of output-based payments for services under OBA schemes.

To achieve its objectives the program supports a range of activities funded through three windows:

- Window 1: Financing studies and other inputs to assist in the design, implementation and evaluation of projects piloting the OBA approach.

- Window 2: Financing activities to help identify and disseminate emerging knowledge on issues relating to the role and application of OBA services.
- Window 3: Contributing to the financing or co-financing of individual pilot OBA schemes and national or sub-national OBA facilities.

GOVERNANCE AND MANAGEMENT

GPOBA is governed by a Program Council and has a typical shareholder model of governance. The Program Council is comprised of representatives of each donor (called Partners), including a representative of the World Bank. The Partnership is open to participation by official donors or international organizations agreeing to make the prescribed minimum contribution to the Partnership ($250,000 annually). The World Bank Group may meet the required minimum annual contribution to the Core Fund through a combination of administrative budget and in-kind contributions. Current members of the Program Council included the United Kingdom's Department for International Development (DFID), IFC, Netherlands (DGIS), Australian Department of Foreign Affairs and Trade (DFAT, formerly AusAID) and Swedish International Development Agency (SIDA).

The Program Council is responsible for setting GPOBA policies and strategies, approving its annual work plan and financial plan, overseeing the Program Management Unit and reviewing GPOBA's performance.

The Bank's representative serves as Chair of the Program Council, hosts GPOBA's Program Management Unit (PMU) and administers the trust funds. GPOBA's Management Unit reports to the Program Council and the Bank's Finance, Economics and Urban development Department. The head of the Program Management Unit is designated by the same department and is not selected by the Program Council, which is often the case with other partnerships hosted in the Bank. The program is managed by Management unit housed in the Bank.

FINANCING AND DISBURSEMENT

GPOBA funding is comprised of a Multi-Donor Trust Fund called the Core fund, and not-core funds which are single trust funds earmarked for eligible activities in particular regions, sectors or themes. Currently, the DFID Challenge Fund, the IFC performance-based Grant Initiative Fund, the Dutch GPOBA Water and Sanitation fund, and the DFID Phase 2 Fund are established as non-Core funds.[1]

Table A.1. Annual Receipt of Donor Contributions to GPOBA, FY 2007–2013 (US$ millions)

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total Received
Australia	0.25	4.20	24.60			8.30		*37.35*

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total Received
European Union			1.00				0.80	1.80
IFC		25.50			37.30			62.80
Netherlands	11.00	8.00	9.30					28.30
Sweden		6.90		8.90	2.20		20.80	38.80
United Kingdom	21.70	13.30	10.20	19.20	14.40	11.20	6.80	96.80
Total	**32.95**	**57.90**	**45.10**	**28.10**	**53.90**	**19.50**	**28.40**	**328.65**

Source: GPOBA Annual Reports.

Table A.2. Annual GPOBA Expenditures/Disbursements (US$millions)

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total
Subsidies	1.15	6.52	1.46	4.73	15.87	13.00	16.60	59.34
Other Program Activities	2.79	3.15	4.44	6.67	11.57	11.08	12.24	56.90
Mgmt. & Admin Costs	1.00	1.10	1.90	2.30	3.35	1.77	1.80	13.22
Total	**4.93**	**10.77**	**7.80**	**13.70**	**30.80**	**25.85**	**30.65**	**129.47**
Percent Administration	20 percent	10 percent	24 percent	17 percent	11 percent	7 percent	6 percent	

Source: Total amounts and subsidy amounts from Concessional Finance and Global Partnership (CFP) Database; Mgmt. & Admin. Costs from Annual Reports.
Note: This table represents all GPOBA programs, not just energy access.

GRANT PROCESS

Application for GPOBA funding is open to international financial institutions, bilateral donors, NGOs, public and private operators, and national and local governments. Proposals are submitted by a Bank team, and for Recipient Executed Trust Funds (RETFs), an endorsement letter from the client government is required.

The project selection and approval process for each of the "windows" is different. The program's operation manual sets outs how activities under each window will be selected, supervised, monitored and reported on. Besides the general eligibility criteria set out in the Operations Manual2, each of the partners/donors that set up non-core funds has its own eligibility and approval criteria. These donors also have different criteria for evaluating and selecting Window 3 (i.e., Subsidy) projects. For example, DFID and IFC have restricted their allocations under Window 3 for the World Bank Group only, while the Dutch did not put place such a limitation. DFID and IFC and the MDTF donors review all concept notes for each Window 3 activity, while the Dutch left it at discretion of the GPOBA program Manager. For Window 3, a panel of three experts in the field of a particular service will assess projects recommended by the GPOBA Program Manager, and endorse them or otherwise, prior to those projects being submitted for approval in accordance with the approval mechanisms specified by the Donors. It is a two-stage approval process comprised

of initial assessment of project eligibility and a final review to determine its readiness for implementation. Approval of a Window 3 subsidy project can take about 6 months. According to the Program the reviews of all RETF projects started to follow a Small RETF Grants Directive which was adopted by OPCS in 2012, making the process unified across the Bank. Some donors provide "No Objections" to the GPOBA projects based on the Administration Agreements with the Bank. No separate "evaluation criteria" exist. Furthermore, the donor agreed to increase the threshold for the need for No Objection from $75,000 to $500,000 in 2014. This however, is not reflected in the program's Operational Manual.

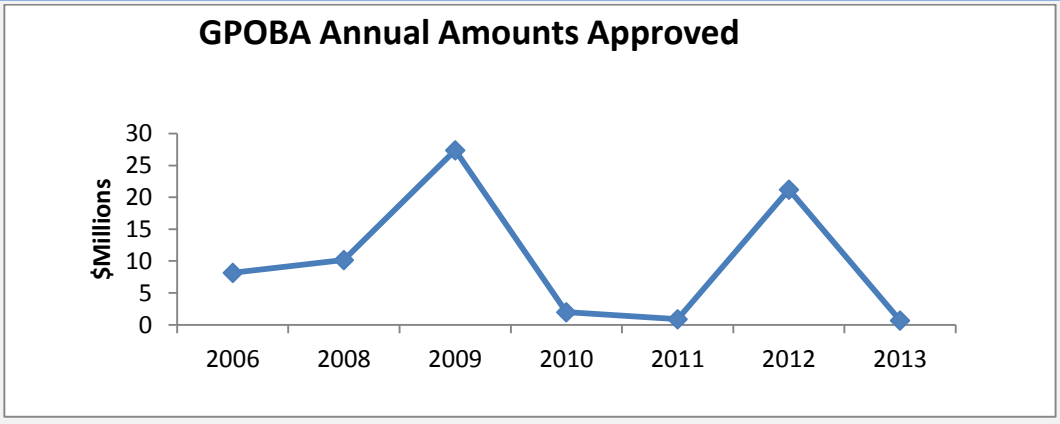
REPORTING

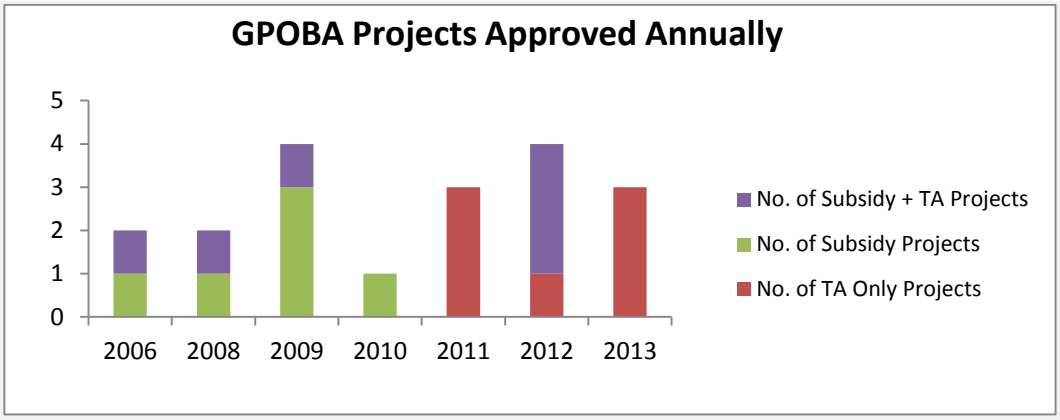
The PMU reports to the Program Council. The operating principles provide a quite detailed list of reporting and auditing arrangements for all GPOBA activities that should be submitted to the Program Council. The PMU prepares semi-annual progress reports for all activities as well as prepares annual report to the Program Council. At the activity level, the Bank Team prepares GRM reports as well as contributes to the semi-annual monitoring report. GPOBA has not undergone independent evaluation since 2007. It is undergoing annual reviews by DFID that are more tailored to the needs of one donor (although major) and cannot substitute for a comprehensive external evaluation. These reports are also not disclosed.

ENERGY ACCESS PORTFOLIO

Since the first projects were approved in 2006, there have been 19 GPOBA projects approved and in implementation, representing $70.54 million of which the lion share, $68.77 went to subsidy investment projects.

Figure A.1. GPOBA Projects





Source: Annual reports.

GPOBA has been most active in the Africa region, with eight projects there, followed by South Asia with five projects.

Figure A.2. GPOBA Projects By Region 2006-2013

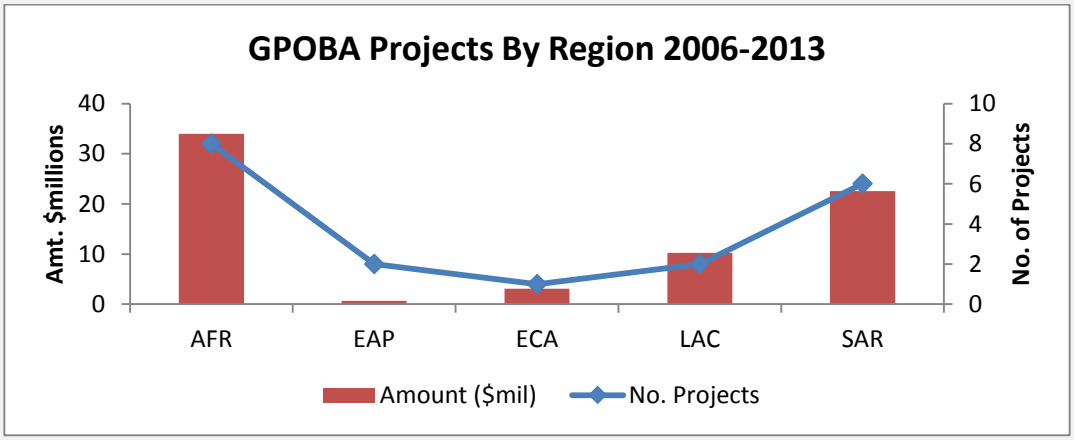


Table A.3. List of GPOBA Energy Access Projects

Country	Region	Project Name	Grant Amount (US$mil)	Start year/FY	End/FY	GPOBA type
Armenia	ECA	Access to Gas & Heat supply for poor	3.10	2006	Closed	Subsidy + TA
Bangladesh	SAR	Rural Electrification and Renewable Energy Development – Mini Grid Project	1.10	2009	Active	Subsidy
Bangladesh	SAR	Rural Electrification and Renewable Energy Development – Solar Home Systems Project	13.95	2009	Active	Subsidy

Country	Region	Project Name	Grant Amount (US$mil)	Start year/FY	End/FY	GPOBA type
Bolivia	LAC	Decentralized Electricity for Universal Access	5.18	2008	Closed	Subsidy + TA
Colombia	LAC	Natural Gas Distribution for Low Income Families in the Caribbean Coast	5.09	2006	Closed	Subsidy
Ethiopia	SSA	Ethiopia Electrification Access Rural Expansion Project	8.00	2009	Closed	Subsidy
Ghana	SSA	Solar PV Systems to increase access to electricity	4.35	2009	Active	Subsidy + TA
India	SAR	Mumbai Improved Electricity Access to Indian Slum Dwellers Project	2.00	2010	Closed	Subsidy
Kenya	SSA	Kenya Electricity Expansion Project	5.00	2012	Active	Subsidy + TA
Liberia	SSA	Monrovia Improved Electricity Access Project	10.00	2012	Active	Subsidy + TA
Nepal	SAR	Nepal- Biogas support Program	5.00	2008	Closed	Subsidy
Uganda	SSA	Uganda Grid-Based OBA Facility Project	6.00	2012	Active	Subsidy + TA
Sub-total for Subsidy projects			**68.77**			
Bangladesh	SAR	Impact evaluation of Solar home Systems (SHS) (w2)	0.25	2013		TA -KP
Nepal	SAR	Household Renewable Energy Access (W1 support W3)	0.23	2013		Non-lending TA-KP
Philippines	EAP	Philippines Power Sector Strategy Advice (w1 support of RBF)	0.30	2011		TA to support mainstreaming RBF
Regional	AFR	Lighting Africa Market development and Quality Assurance (w1 support of RBF)	0.25	2011		TA to support mainstreaming RBF
Regional	AFR	Africa Electrification Initiative (w1 support RBF)	0.20	2012		TA to support RBF mainstreaming
Regional	AFR	Clean Cooking initiative for Africa (w1 support RBF)	0.20	2013		TA to support mainstreaming RBF

Country	Region	Project Name	Grant Amount (US$mil)	Start year/FY	End/FY	GPOBA type
Vanuatu	EAP	Vanuatu Electricity (W1 in support of W3)	0.35	2011		TA to support RBF mainstreaming
Subtotal TA only			1.78			
Total			**70.55**			

Energy Sector Management Assistance Program

ORIGIN

The Energy Sector Management Assistance Program (ESMAP) was established in 1983 as a global, multi-donor technical assistance trust fund administered by the World Bank and cosponsored by 13 official bilateral donors. Since its inception, the program has supported more than 800 energy-sector activities that promote poverty reduction, economic growth and low carbon development in over 100 countries.

OBJECTIVES

ESMAP's mission is to assist low- and middle-income countries to increase know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth.

The program's activities are clustered around three focus areas: energy access, energy security, climate change

Energy Access Activities: For more than 30 years, ESMAP has assisted low and middle-income countries to scale up access to modern energy. This assistance has included advice on legal, regulatory and policy frameworks; training to strengthen capacities of energy institutions; dissemination of best practices; and support to pave the way for World Bank investments.

ESMAP's energy access activities are focused around four programs:

- Africa Renewable Energy and Access (AFREA) Program: AFREA was originally set up as ESMAP's Energy Access program for Sub-Saharan Africa, with delegated management authority to the World Bank's Africa Energy Unit. AFREA aims to support the scale up of energy access and clean energy solutions in Sub-Saharan Africa.
- Support to the Sustainable Energy for All (SE4All) Initiative: ESMAP provided early contributions that helped shape the Sustainable Energy for

All Global Action Agenda, and is setting up a Technical Assistance Facility to support selected opt-in countries in their quest for universal energy access

- Urban Poor Energy Access: Building on past efforts to address the unmet demand for adequate and reliable energy services by fast-growing urban informal settlements and peri-urban populations, ESMAP has set up a program to help increase/improve energy access for the urban poor. The Urban Poor Energy Access Program includes a component that is implemented in partnership with the Cities Alliance.
- Support on Household Cooking Energy and Off-Grid Electricity Access: ESMAP has supported the World Bank regional energy units in the design, implementation, and supervision of initiatives and lending project components on household cooking and off-grid energy access.

In addition, ESMAP's programs on energy access are supplemented by broader programs focused on strengthening policy and institutional frameworks, as well as gender empowerment in the energy sector.

In the Energy Assessments and Strategy Program, ESMAP has helped governments review, design, and implement energy policies, develop and strengthen institutional capacity, and improve the performance of their energy sectors. ESMAP's work in these areas is designed to take good practices and policies from around the world and adapt them so they can be applied to specific national and regional contexts. This program also develops modeling tools and toolkits that can be used by energy planners to support decision making in sometimes highly complex environments. Most ESMAP activities in this program are implemented by the World Bank's regional energy units through Annual Block Grant funding.

ESMAP is launching a new program on social inclusion in the energy sector, with a specific initial focus on gender. The primary objective of the program is to establish a core body of evidence to demonstrate that promoting improved gender equality in energy projects improves development outcomes, and to demonstrate state-of-the-art approaches for improving gender equality in energy projects.

GOVERNANCE AND MANAGEMENT

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

A Technical Advisory Group of international experts provides independent opinions to the CG about the purpose, strategic direction, and priorities of ESMAP.[3] The TAG also provides advice and suggestions to the CG on current and emerging global issues in the energy sector that are likely to impact ESMAP's client countries.

As a major part of ESMAP's accountability mechanism, management prepares an annual Portfolio Review to present the results and outcomes of the program's activities and, every five years commissions an external evaluation to review the outcomes and achievements of the program.

FINANCING AND DISBURSEMENT

Table A.4.Donor Contributions to ESMAP FY2007–2013 (US$ millions)

Donor	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total
Australia		2.68		0.45	1.07	3.03		7.23
Austria		0.66	0.59	0.42	2.68			4.35
Canada			0.40	0.10				0.50
Denmark		1.96	1.76	1.85	3.91	9.11	8.74	27.33
Finland				0.74			0.79	1.53
France	0.86	1.05	0.89			0.84		3.64
Germany	1.771	2.81	4.80	2.19	1.99	3.35	1.34	18.24
Iceland	0.3	0.20	0.30	0.20		0.30	0.30	1.60
Lithuania					0.03		0.03	0.06
Netherlands	9.78		3.19		11.29	2.90	5.80	32.96
Norway	0.75	0.75	0.75	0.75	0.84	0.85	3.75	8.44
Sweden		1.59				2.31	0.78	4.68
United Kingdom	3.061	1.18	0.96	1.96	0.00	0.00	6.42	13.59
World Bank	0.678	0.45	0.28	0.44	0.27	0.65	0.31	3.07
Total	**17.2**	**13.33**	**13.92**	**9.10**	**22.08**	**23.34**	**28.26**	**127.23**

Source: Annual reports.
Note: This table covers receipts for three MDTFs: ESMAP MDTF, the Clean Energy Investment Framework, and the Small Island Developing States DOCK. It reflects all programs, not just Energy Access activities.

Table A.5. ESMAP Expenditures and Disbursements (US$ millions)

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total
Program Activities	9.58	10.76	13.43	18.45	15.29	13.71	13.96	95.18

	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total
Program Mgmt. & Administration[a]	1.10	1.67	1.50	2.04	2.04	2.13	2.27	12.75
Total	**10.68**	**12.43**	**14.93**	**20.49**	**17.33**	**15.84**	**16.24**	**107.93**
Percent Administration	10	13	10	10	12	13	14	

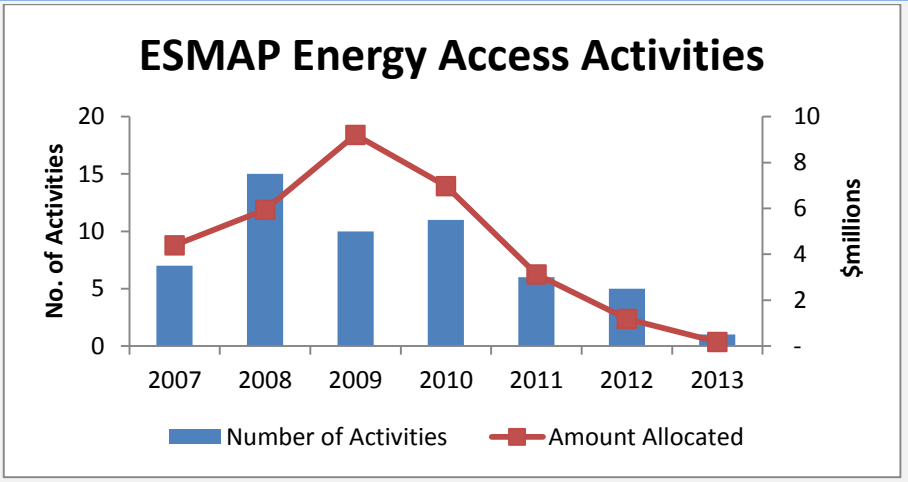
Source: Baaestel Report for 2007 to 2010; CFP for 2011 TO 2013 totals, and annual report for Administration costs.
Note: Reflects all programs, not just Energy Access activities.
a. Includes M&E, Communications, and Governance.

Energy Access Portfolio

The ESMAP Portfolio Review 2013 (PR-2013) is the latest in an annual series to present the program's results and outcomes.4 With reference to energy access programs, PR-2013 reports that they accounted for 37 percent of ESMAP's total disbursements during the FY2009–2012 period (for completed and ongoing projects).

During the study period analyzed in this study, that is, between 2007 and 2013, 55 energy access activities were approved for implementation, comprising $31.03 million in allocations, according to the ESMAP database. This has been trending downward since 2010.

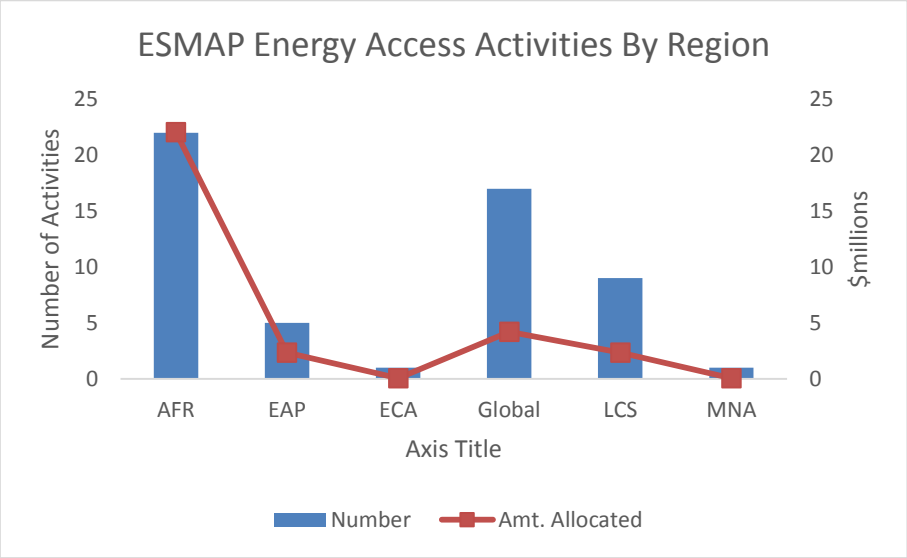
Figure A.4. ESMAP Energy Access Activities



Source: Annual reports.

Most of ESMAP's activities during this period have focused on Africa or on global initiatives.

Figure A.5 ESMAP Energy Access Activities By Region



Source: Annual reports.

The table A.6 shows the countries that have had energy access activities implemented by ESMAP, in order of amount allocated.

Table A.6. Countries with ESMAP Energy Access Activities

Country	Number of Activities	Amount Allocated (US$ millions)
Albania, Armenia, Bosnia and Herzegovina	1	0.05
Angola, Benin, Burkina Faso, Cameroon, Central African Republic	1	1.92
Benin	1	2.20
Bolivia	1	0.40
Brazil, Chile, Dominican Republic, Ecuador	1	0.11
Brazil, Costa Rica, Dominican Republic	1	0.12
Burkina Faso	2	0.23
Cambodia	1	1.50
Cameroon	1	0.11
Cameroon, Chad	1	0.03
Costa Rica, Guatemala	1	0.18
Ethiopia, Ghana, Kenya	1	0.50
Ghana	1	0.08
Ghana, Kenya, Nigeria	1	2.86
Ghana, Liberia	1	0.20
Global	17	4.20
Guinea	1	0.12

Country	Number of Activities	Amount Allocated (US$ millions)
Haiti	2	0.70
Kenya, Rwanda	1	2.00
Lao PDR	2	0.44
Lebanon	1	0.05
Liberia	2	3.48
Mali	2	3.50
Nepal	1	0.21
Nicaragua	1	0.22
Papua New Guinea	1	0.18
Peru	2	0.60
Regional	2	1.21
Senegal	1	0.26
Tanzania	2	1.24
Tanzania, Uganda	1	2.12
Total	**55**	**31.03**

Source: Annual reports.

Lighting Africa

ORIGIN

The Lighting Africa program was launched in September 2007 with the goal of catalyzing markets for clean, modern, off-grid lighting products in sub-Saharan Africa. A joint initiative of IFC and the World Bank, Lighting Africa seeks to accelerate efforts to light up the homes and businesses of 250 million people by 2030 by mobilizing the private sector to build sustainable markets. The program leverages the comparative advantage of both organizations to support the rapid scale-up and delivery of affordable, quality lighting products, most of which are solar powered.

About 600 million people in Africa have no access to grid electricity, a number expected to rise to about 700 million by 2030. These people rely on polluting and dangerous sources of lighting such as kerosene lamps, candles and battery-powered torches. Fuel-based lighting is generally of low quality and expensive, impeding learning and economic productivity.

Lighting Africa was formed to meet this need following a decade of interventions and research conducted by the IFC's Clean Energy team and the Renewable Energy Group of the World Bank's Energy Unit. These predecessors included IFC's Photovoltaic Market Transformation Initiative (PVMTI), a 1998–2008 $30 million

program focused on the solar home system (SHS) market. Lighting Africa management also drew on the experience of the Efficient Lighting Initiative (ELI), a 1999-2003 $15 million market transformation program focused on promoting the penetration of Compact Fluorescent Lights (CFL) and energy efficient fixtures in seven markets worldwide. More immediately, Lighting Africa inherited the activities and staff of IFC's Lighting the Bottom of the Pyramid (LBOP) program. The LBOP team spent two years consulting over one hundred LED and CFL lighting manufacturers, suppliers, and distributors about market challenges and opportunities for the private sector to increase access to modern off-grid lighting in Africa.

Lighting Africa was approved in 2006 and country pilots in Kenya and Ghana were initially funded by the Global Environment Facility and launched in 2007. The first Lighting Africa laboratory was set up in East Africa at the University of Nairobi in Kenya to test off-grid products for manufacturers and distributors.

OBJECTIVES

Lighting Africa's objectives are to:

- Demonstrate market viability: Lighting Africa supplies companies and investors with intelligence on market size, consumer preferences and behavior, business models and distribution channels.
- Remove market barriers and improve the enabling environment: Lighting Africa has developed a quality assurance program, facilitates business-to-business partnerships through conferences, workshops, and a dedicated website, and works with governments to make the policy environment favorable for off-grid lighting markets.
- Build sustainable off-grid lighting markets: Lighting Africa supports the scale-up and replication of successful businesses and business models. It provides business development services for its associate companies, helps distributors and retailers access finance, supports the Global Off-Grid Lighting Association, and helps governments integrate off-grid lighting into their electrification programs.

FINANCING

LA has been funded by 11 Trust funds, ranging from $34,000 to $2.2 million, which have now either been closed or consolidated into a single LA Expansion Trust Fund ($3.7 million). Total expenditures have been about $19 million since it was started.

Table A.7. Lighting Africa Funding Sources (US$ millions)

	Total through 2007–2010	2011	2012	2013	Total
Global Environment Facility	5.04	1.46	1.043	0.302	7.85
Italy			0.988	3.267	4.26
Africa Renewable Access Program	1.43	1.07	0.48	0.1	3.08
Public-Private Infrastructure Advisory Facility	1.15	0.23	0.025	0.118	1.52
IFC	1.16	0.19			1.35
Norway	0.29	0.21	0.074	0.702	1.28
Luxembourg	0.56		0.133	0.06	0.76
Energy Sector Mgmt. Asst. Program MDTF				0.415	0.42
REEEP	0.40				0.40
Asia Sustainable & Alternative Energy Prog.	0.26				0.26
Energy Sector Mgmt. Asst. Program TF			0.134	0.116	0.25
Global Partnership on Output-Based Aid				0.245	0.25
World Bank	0.20				0.20
Good Energies Inc.	0.08				0.08
Total	**10.58**	**3.16**	**2.88**	**5.33**	**21.94**

Source: 2008-2010 figures from Appendix G of Dalberg's "Mid-term Evaluation of IFC/World Bank Lighting Africa Project"; 2011 figures from 2011 Annual Report; 2012 and 2013 numbers are from the IFC Lighting Africa office and World Bank Project Portal.
Note: Breakdown of expenditures by activity was not available for World Bank projects.

Table A.8. Lighting Africa Expenditures

IFC	2008	2009	2010	2011	2012	2013	Total
Market Intelligence	0.73	0.34	0.09	0.15	0.044	0.301	1.655
Quality Assurance	0.23	0.16	0.88	0.49	0.48	0.938	3.178
Business support		0.03	0.12	0.2	0.209	0.451	1.01
Access to finance	0.19			0.04	0.092	0.164	0.486
Consumer Education			0.07	0.42	0.328	0.635	1.453
Policy			0.13	0.075	0.005	0.012	0.222
LA conferences	0.43	0.1	0.73	0.12			1.38
LA Web portal	0.12	0.16	0.1				0.38
LADM			3.02				3.02
Program support Cost	0.39	0.45	0.47	0.81	0.419	0.868	3.407
IFC Total Expenditures	2.09	1.24	5.61	2.305	1.577	3.369	16.191

IFC	2008	2009	2010	2011	2012	2013	Total
World Bank Expenditures				0.856	0.81	1.22	*2.886*

Source: 2008-2010 figures from Appendix G of Dalberg's "Mid-term Evaluation of IFC/World Bank Lighting Africa Project"; 2011 figures from 2011 Annual Report; 2012 and 2013 numbers are from the IFC Lighting Africa office and World Bank Project Portal;
a. Breakdown of expenditures by activity was not available for World Bank projects.

GOVERNANCE AND MANAGEMENT

The World Bank and IFC each do their own fundraising and have their own separate accounts. They also have taken on different aspects of the program. The IFC works with the private sector to help catalyze the market and develop the supply chain thru market analyses, quality assurance/standards development, and business development. On the World Bank side, IDA works with governments to mainstream LA through policy dialogue and provides financing for consumer awareness raising, diagnostic market analyses, capacity building and piloting of deployment mechanisms and also contributes about a quarter of the funds for the quality assurance activities. All the IDA projects are harmonized with SE4All. As of July 1, 2014, the program is jointly managed by the Africa Energy Practice, mapped to the Energy and Extractives Global Practice and the IFC Advisory Service Africa Regional Management (located in Nairobi, Kenya.)

PORTFOLIO

Shown below are the four IFC projects and five World Bank projects that have been approved for Lighting Africa. In addition there are 3 more projects in the pipeline slated for South Sudan, Uganda, and for general expansion of the program. Three of the IFC projects have been completed.

Table A.9. Lighting Africa Projects

Project ID	World Bank or IFC	Country	Project Name	Amount (US$mil)	App FY
521198	IFC	Global	Lighting Africa Global	4.9	2007
555905	IFC	Kenya	Lighting Africa Kenya	2.7	2007
555906	IFC	Ghana	Lighting Africa Ghana	2.7	2007
557685	IFC	Global	Lighting Africa Web portal	0.5	2007
P119893	World Bank	Ethiopia	Trade Finance Facility	20.0	2012
P124014	World Bank	Liberia	Supply Side Subsidy	2.0	2012

Project ID	World Bank or IFC	Country	Project Name	Amount (US$mil)	App FY
P116289	World Bank	Regional	Lighting Africa Market Development and Quality Assurance	3.04	2014
P128768	World Bank	Burkina Faso	Piloting a "lantern library"	1.5	2014
P131084	World Bank	Mali	Lantern Library and RBF scheme	2.5	2014

Source: World Bank Operations Portal, Lighting Africa team.

Asia Sustainable and Alternative Energy Program

ORIGIN

The Asia Sustainable and Alternative Energy Program (ASTAE)was originally established in 1992 by bilateral donors as a three-year pilot program to mainstream alternative energy in the World Bank's lending and technical assistance operations in the South Asia and East Asia regions.

In 2002, ASTAE expanded its reach from within the World Bank to the client countries' stakeholders themselves, and broadened its core business from alternative energy to sustainable energy by adding a third pillar—access to modern energy services—designed to address energy poverty and its impact on the environment. Scaling up meant adopting a more programmatic approach at the scale of a sector or a country. During this period ASTAE focused primarily on the East Asia and the Pacific region. The FY2012–2015 Business plan focuses on promoting green growth while still aiming to scale up supply of and access to sustainable energy on a regional basis. This plan also aims to reintegrate South Asia and strengthen ASTAE's regional impact and to increase the emphasis on cross sectoral dimensions of the energy sector, increase RETFs, and to establish a new MDTF. For the first time the business plan was increased to four years instead of three years to allow more time for implementation.

OBJECTIVES

Over the years, years ASTAE's objectives were modified to better reflect the changing energy needs in the regional and global context. The current objective of the program is to scale up the use of sustainable energy options in Asia to reduce energy poverty and protect the environment.

ASTAE's program is organized around three pillars that reflect ASTAE's definition of "sustainable energy": renewable energy, energy efficiency and access to modern energy.

ASTAE seeks to support innovative financing and delivery mechanisms; enhance policy and regulatory frameworks; build capacity and share knowledge; and promote cross-sectoral and regional collaboration for mitigation of, and adaptation to, climate change.[5]

ASTAE's funding is used to supplement Bank budgets to cover the incremental costs of investing in those three pillars. The Program supports four generic types of activities that cut across its three pillars:

- early program and identification work;
- rapid response support to urgent needs of Bank teams for project development (identification and preparation) assistance and supervision ;
- project –related capacity building in client countries beyond what can be reasonably seen as normal project preparation;
- assistance to Bank teams for the mobilization of additional funds.

GOVERNANCE AND MANAGEMENT

Since its inception, ASTAE has financed Bank-executed activities using separate single-donor trust funds. ASTAE is governed by the same Consultative Group (CG) for energy trust-funded programs as ESMAP. (See ESMAP governance section for further details.)

ASTAE's Manager was the sector manager of the EAP infrastructure unit who delegated day-to-day operations of the program to the ASTAE Coordinator. The Coordinator was the ASTAE Program Manager in the system until July 2014 when the ESMAP took over the ASTAE management. The coordinator managed ASTAE's trust funds, activities and budget. The ASTAE work program is established according to the priorities agreed with the CG donor(s) in general, and especially with those who contribute to ASTAE funding. The Technical Advisory group is to advise the Program Management team on the preparation of business plans. Occasionally it is involved in the review of impact of ASTAE activities as well, especially ASTAE Annual Reports.

The ASTAE program has made some changes in its governance and management as a response to on-going trust fund reforms in the Bank as well as to make its work more efficient. Changes to the governance of ASTAE have been introduced to respond rapidly to client countries' changing needs and donor demands, align with

recent Bank-wide practices of trust fund management, and streamline the process of ASTAE management and financed activities. Major changes include (i) adding a MDTF to the previous single-donor trust fund arrangements, (ii) adding recipient-executed activities to the previous Bank-executed activities to create a hybrid trust fund, and (iii) introducing requirements for grant funding requests(GFRs) and grant monitoring reports (GRMs, ICMs).

FINANCING AND DISBURSEMENT

In the 2007–2011 period the main funding for ASTAE came from Bank-Netherlands Partnership Program, which committed $7.424 million for FY2006–2009 and SIDA, which committed $2.355 million for FY2007–2011.

Table A.10. ASTAE Donor Contributions (US$ millions)

Donor Countries	2007	2008	2009	2010	2011	2012	2013	Total
Netherlands						8	2	10
Sweden	0.56		0.5	0.93		2.92	2.25	7.16
United Kingdom							4.68	4.68
Total	**0.56**		**0.5**	**0.93**		**10.92**	**8.93**	**21.84**

Source: Concessional Finance and Global Partnership (CFP) Database.
Note: Reflects all programs, not just energy access.

Table A.11. ASTAE Annual Disbursements

(US$millions)	2007	2008	2009	2010	2011	2012	2013	Total
Administrative & Reporting Fees	0.27	0.49	0.56	0.40	0.18-	0.23	0.32	2.27
Project Costs	0.94	1.35	1.62	1.73	2.42-	0.74	2.10	8.49
Total Disbursement	1.22	1.85	2.18	2.12	2.60	0.97	2.42	11.88
Percent administration	22	26.4	25.7	18.9	7	23.7	13	

Source: ASTAE Annual reports used primarily for 2007 to 2011 and CFP Database used for 2012 and 2013
Note: Reflects all programs, not just energy access.

GRANT PROCESS AND REPORTING

Calls for proposals for funding are made on a rolling basis, to ensure flexibility to accommodate unexpected needs and new development opportunities. Proposals are submitted by World Bank Teams either for their own Bank-executed activities, or on behalf of the client government or government-authorized NGO for recipient-executed activities. The grants allocated by ASTAE are implemented by Bank teams

(more recently ASTAE started to have recipient executed activities as well) who report on the implemented activities and outputs in the GRM reports.

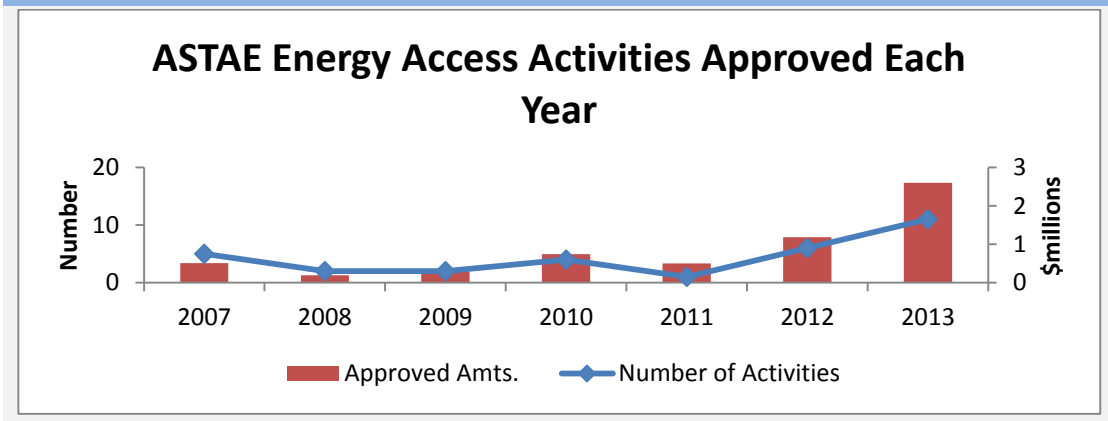
ASTAE provides the following reports to monitor the program and individual grants: Annual Status Report on ASTAE Activities (ASR) by fiscal year, are presented to the Consultative Group of Donors; Semi-Annual reports (those were produced at SIDA's request for July 2011-December 2012 period), Grant Monitoring Reports and; Implementation Completion Memorandum after closing trust funds; and additional reports upon request from donors and management.

ENERGY ACCESS PORTFOLIO

IEG has identified 34 ASTAE-funded (both completed and on-going) activities in the period of FY2007–2013 that aimed to support energy access. Many of these activities are linked to World Bank projects that range from rural grid and off-grid electrification to renewable energy solutions, clean cooking and heating. Many of the Bank projects linked to ASTAE activities also received support (more often larger) from other trust funds such as ESMAP and Australian Department of Foreign Affairs and Trade (DFAT- formerly AusAid). The total amount allocated for these 34 projects from ASTAE is about $6.5 million.

Up until 2012 (during FY2007–2011 Business plan) ASTAE's work was focused mostly on East Asia and Pacific countries, but has more recently been implementing activities in India, Bangladesh and Timor-Leste.

Figure A.3. ASTAE Energy Access Activities Approved Each Year



Source: IEG's Annual; Reports based on CFP TF database and ASTAE annual reports

Table A.12. Countries with ASTAE Energy Access Activities 2007–2013

Country	Number of Activities	Amt. Approved (US$ millions)
Africa[a]	1	0.08
Bangladesh	2	0.13
Cambodia	2	0.08
Fiji	1	0.08
India	4	1.14
Indonesia	5	1.65
Lao PDR	2	0.47
Mongolia	4	0.49
Pacific Islands	2	0.42
Papua New Guinea	1	0.06
Regional	2	0.27
Timor-Leste	2	0.21
Tonga	2	0.62
Vietnam	4	0.83
Total	**34**	**6.50**

Source: IEG; ASTAE Annual Report and CFPTF database.
a. Lighting Africa program.

[1] According to GPOBA as of October 2013, it is no longer using a distinction into "core" and "non-core", which was reflected in all of GPOBA's administration agreements except "DFID1" (Main TF) that expired in FY2014. This however is not reflected in the program's Operations Manual.

[2] Those criteria include consistency with the GPOBA's threshold eligibility criteria (Eligible Schemes, Eligible Services, Eligible Activities, Eligible Countries, Eligible Expenses); Consistency with Indicative Work Plans approved by the Program Council, or in the case of Non-Core Funds, with criteria specified by relevant Donors; In the case of individual OBA schemes, the commitment of the host government to the proposed scheme; the expected availability of funding for the output-based payments under the scheme; and the desirability of testing a variety of approaches to output-based aid in a variety of sectors and country contexts; Additionally: Funding should not be more readily available from other sources; Co-financing: GPOBA resources may cover up to 100 percent of the costs of an Eligible Activity. However, co-financing from other sources is encouraged; Value for Money: Activities should aim to ensure value for money, including adopting the lowest cost strategies consistent with appropriate standards of quality.

[3] Current TAG members are: Therese Hindman-Persson, Wolfgang Mostert, and Judi Wakhungu
[4] ESMAP Portfolio Review 2013, World Bank report #322503, November 29, 2012.

[5] The climate change approach is new, related to the programs' focus on green growth, although ASTAE has been active in this area for some time. It has been added to emphasize ASTAE's increasing commitment to this approach.

Appendix B. List of Studies Reviewed

Table B.1. List of Reviewed Publications

Publication Title*	Program sponsor	Country Coverage	Target goal	Pub. Year
Modernizing Energy Services for the Poor	ESMAP	World	Lighting, Cooking, Heating	2010
Improving Energy Access to the Urban Poor in Developing Countries	ESMAP	World (India, Bangladesh, Brazil, Colombia)	Lighting, Cooking	2011
Household Energy Access for Cooking and Heating	ESMAP	World	Cooking, Heating	2011
A New Slant on Slopes	ESMAP	World (Yemen)	Lighting	2011
Lessons from OBA for Leveraging Finance for Clean Energy	GPOBA	World	Lighting, Cooking	2012
Integrating Gender Considerations into Energy Operations,	ESMAP	World	Gender	2013
What Have We Learned about Household Biomass Cooking in Central America	ESMAP	Central America	Cooking	2013
One Goal, Two Paths	ASTAE	EAP	Lighting, Cooking	2011
Solar Lighting for the Base of the Pyramid	Lighting Africa	SSA	Lighting	2010
Lighting Africa Policy Study Report Notes	Lighting Africa ESMAP	SSA (Cameroon, DRC, Ethiopia, Ghana, Kenya, Rwanda, Senegal, Tanzania)	Lighting	2012
Lighting Africa Market Trends Report 2012	Lighting Africa	SSA	Lighting	2013
Measuring Impacts of Electrification on Small and Micro-	ESMAP	SSA (Benin, Ghana, Uganda)	Lighting	2013

APPENDIX B
LIST OF STUDIES REVIEWED

Publication Title*	Program sponsor	Country Coverage	Target goal	Pub. Year
Enterprises in Sub-Saharan Africa				
Connection Charges and Electricity Access in Sub-Saharan Africa,	ESMAP, GPOBA	SSA	Lighting	2013
Improving Indoor Air in Rural Bangladesh: Results of Controlled Experiments	ESMAP	Bangladesh	Cooking	2009
Power From the Sun	GPOBA	Bangladesh	Lighting	2014
Cleaner Hearths, Better Homes	ESMAP	India	Cooking	2012
Indonesia – Toward Universal Access to Clean Cooking,	ASTAE	Indonesia	Cooking	2013
Promoting Productive Uses of Electricity in Rural Areas of Peru	ESMAP	Peru	Lighting	2012
Welfare Impacts of Rural Electrification – Evidence from Vietnam,	ASTAE, ESMAP	Vietnam	Lighting	2009
Vietnam: State and People, Central and Local, Working Together	ASTAE, ESMAP	Vietnam	Lighting	2011
*N.B.: These are abridged report titles. Please see References for full titles.				

Appendix C. List of People Interviewed

Table C.1. List of People Interviewed

Name	Title	Affiliation
Arthur Itotia Njagi	Program Manager	Lighting Africa (IFC)
Dan Murphy	Coordinator	Lighting Africa (IDA)
Chris Saunders	Dep. Coordinator	Lighting Africa (IDA)
Juliet Pumpuni	Sr. Infrastructure Specialist	GPOBA
Daniel Coila	Information Specialist	GPOBA
Oleh Khalayim	Monitoring and Evaluation Officer	GPOBA
Raluca Golumbeanu	Infrastructure Specialist	GPOBA
Dana Rysankova	Sr. Operations Officer	OPSRE
Ani Balabanyan	Senior Energy Specialist	ECSEG
Koffi Ekuoevi	Senior Economist	LCSEG
Lucia Spinelli	Senior Energy Specialist	LCSEG (Bolivia)
Migara Jayawardana	Senior Energy Specialist	LCSEG
Mohua Mukherjee	Senior Energy Specialist	SASDE
Natsuko Toba	Senior Economist	EASWE ASTAE coordinator (program manager)
Zubair Sadeque	Senior Energy specialist	SASSD (Bangladesh)
Ky Hung Tran	Senior Energy Specialist	EASWE (Vietnam)
Peter Johansen	Senior Energy Specialist	EASWE
Hung Tien Van	Senior Energy Specialist	EASWE (Vietnam)
Laurent Durix	Infrastructure Specialist	SASSD
Mustafa Hussain	Senior Energy Specialist	AFTG1
Nick Keyes	Communications Officer	SEGES
Andres Londono	Sr. Operations Officer	SEGES
Pierre Audinet	Sr. Energy Economist	SEGES
Venkata Ramana Putti	Senior Energy Specialist	SEGES
Rohit Khanna	Program manager	ESMAP
Alain Ouedraogo	Energy specialist	SEGES
Laurence Carter	Director	PPP Transaction Advisory Services
Vanessa Lopes Janik	Operations Officer	SEGES
Xiaoping Wang	Senior Energy Specialist	SEGES
Yabei Zhang	Sr. Energy Economist	EASWE
Shahidur Khandker	Lead Economist	DECAR
Douglas Barnes	Consultant	ESMAP
Rajesh Advani	Infrastructure Specialist	GPOBA
Richard Hosier	Senior Energy Specialist	AFTG-2

APPENDIX C
LIST OF PEOPLE INTERVIEWED

Oliver Knight	Senior Energy Specialist	ESMAP
Sheoli Pargal	Lead Economist	SASDE
Russell Sturm	Head	CSBO2
Luiz Maurer	Principal Industry Specialist	Energy Efficiency Climate Business Group (IFC)

Appendix D. Review Template

Table D.1. Review Template for Energy Access Publications

Activity Data		Project Id.	
Activity title:		Country:	
Publication date:		TTL:	
Government counterparts:			
Other counterparts:			
Funding source (s)		Cost:	
Objective:			
Outcome:			
Alignment with Strategic Goals	Comment		?
B.1: Is activity aligned with the energy strategy goal of:			
B1.1: access to lighting?			
B1.2: access to clean cooking?			
B1.3: access to clean heating?			
B1.4: empowering women?			
Relevance:	Comment		
C.1: Technical Quality			?
C1.1: *Rationale:* Does the report provide a solid context and rationale for undertaking the study?			
C1.2: *Horizontal Relevance:* Does the report provide a sound analysis of the issues based on international best practice and relevant examples from the global experience?			
C1.3: *Recommendations:* Does the report develop actionable recommendations grounded in the facts and analysis that are presented and in line with its objectives?			
C1.4: *Readability:* Is the report well-articulated and easy to understand?			
C1.5: *Vertical Relevance:* Did the study generate new evidence or data that inform analysis and decision making?			
C1.6: *Design Relevance:* Is the report fit for the purpose of achieving its intended objective?			
C2: Efficacy:			
C2.1: Inform lending?			
C2.2: Inform policy/strategy?			
C2.3: Build client capacity?			
C2.4: Disseminate knowledge?			
C2.5: Enhance knowledge?			
C2.6: Have an impact on poverty and gender?			
Dissemination & Follow-up	Comment		?

D1: Did the activity make use of local expertise in planning, analysis, and dissemination?		
D2: Was the product of the activity discussed with senior policy makers?		
D3: Was the product of the activity presented in a workshop/conference?		
D3: Was the activity followed-up by other World Bank Group or non-Bank Group (government, private sector, CSO) activities?		
Sources of information:		

Appendix E. Response from the ESMAP Program Manager to IEG's Review

The World Bank | 1818 H Street, NW | Washington, DC 20433 | USA
202.458.8145 | fax: 202.522.3018 | www.esmap.org

June 4, 2015

Mr. Alex Foxley
Chair
Committee on Development Effectiveness-CODE

Dear Mr. Foxley,

Together for energy: how partnership programs support energy access, Annex to IEG Evaluation of World Bank Group Support to Electricity Access FY2000-FY2014

I would like to thank the Independent Evaluation Group (IEG) for undertaking this review and appreciate the opportunity to submit this statement to you. This review is timely as ESMAP and ASTAE's donors have commissioned an external evaluation of these programs in the run up to the preparation of the next business plan and associated replenishment of the trust funds.

We are in broad concurrence with the conclusions and lessons of the evaluation of ESMAP and ASTAE, particularly the importance of strong results frameworks; managing "donor push"; effective program oversight; efficient, strategic and monitorable grant-making processes; systematic attention to gender mainstreaming and monitoring of gender impacts; a clearer strategic vision to guide the design and scoping of knowledge work in the energy sector; and, systematic dissemination of knowledge products.

COMMENTS ON ANNEX TO
WORLD BANK GROUP SUPPORT TO ELECTRICITY ACCESS, FY2000-FY2014
"TOGETHER FOR ENERGY: HOW PARTNERSHIP PROGRAMS SUPPORT ENERGY ACCESS"

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAM (ESMAP)

ESMAP has developed a new $1.5 million global program on *Social Inclusion in the Energy Sector*, with an initial focus on gender. The report notes the progress ESMAP has made in addressing gender issues in its programs and M&E system. The primary objective of the ESMAP gender program is to establish a core body of evidence to demonstrate that promoting improved gender considerations in energy projects improves development outcomes.

The program supports quantitative and qualitative research on the gender-specific land and labor impacts of generation, transmission and distribution projects, as well as an e-learning module on specific topics such as energy access, energy infrastructure and energy policy to help promote practitioners' awareness of gender-energy linkages. ESMAP is also continuing to support World Bank teams on integrating gender considerations into energy programs through screening all ESMAP-funded activities and providing direct financial and technical support across various lending and non-lending activities in the energy sector.

Although the report notes ESMAP's AFREA program, it does not make note of ESMAP's support to the AFREA Gender and Energy program. This program started in 2010 supporting energy access operations in the Africa region on integrating gender considerations. Six countries were supported under the first phase (US$1.5 million) and the second phase (US$1.4 million) is now underway. In addition to operational support, the program focuses on knowledge exchange and capacity building of both energy practitioners and government counterparts.

ASIA SUSTAINABLE AND ALTERNATIVE ENERGY PROGRAM (ASTAE)

The quality of knowledge products could be strengthened with ASTAE's management functions, including the grant approval process now, fully integrated into those of ESMAP. The report describes "the relevance and effectiveness of ASTAE-funded stand-alone activities, especially reports as less evident". ASTAE's program management and administration functions (including monitoring and evaluation and communications and dissemination) were merged with those of ESMAP as of July 1, 2014. This is consistent with the trust fund reform process undertaken by the Bank and supported by ASTAE's donors. Proposed ASTAE activities now follow ESMAP processes and procedures, which could help ensure the improved quality and relevance of their knowledge products.

ASTAE's M&E is in the process of being integrated into the ESMAP M&E Portal. The report recommends that ASTAE's results framework be redesigned to focus on the program's own inputs, outputs and intermediate outcomes that can be attributed to the program's interventions rather than to show a commitment to high-level targets that are beyond its scope. Given the downstream nature of assistance, ASTAE's results framework is intentionally focused on IBRD/IDA/GEF indicators, which was endorsed by its donors. Furthermore, as this is last year of the ASTAE business plan, it is not feasible to make such a fundamental change to the results framework. IEG's recommendations will be considered in preparing the next ASTAE business plan and associated results framework. However, as part of the merger of ASTAE and ESMAP management functions, ASTAE activities will be integrated into ESMAP's M&E Portal to more systematically capture outputs and outcomes, and the M&E Portal will now seek to track ASTAE results using the same indicators as ESMAP.

METHODOLOGY

Assessment of the selected reports in terms of their quality and relevance could be made from the targeted audience's point of view. One of the criteria used to make such assessments was "readability". Although the report acknowledges that some reports are for the technical audience and are therefore more technical and dense, it describes these as not "readable". "Readability" could be judged from the targeted audience's point of view. The technical audience might appreciate such technical report rather than the general report for the public which might lack the required precision.

Yours sincerely,

Rohit Khanna
Program Manager
Energy Sector Management Assistance Program (ESMAP)

Cc: Ms. Sanita Bajare, Chair of the CODE Sub-Committee
Mr. Charles Feinstein, Director, Energy and Extractives Global Practice