

The World Bank  
Asia Sustainable and  
Alternative Energy Program

# ASTAE



Annual Status Report FY 2013



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The World Bank

The World Bank Group  
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## ASTAE MISSION

The mandate of the Asia Sustainable and Alternative Energy Program (ASTAE) is to scale up the use of sustainable energy in Asia to reduce energy poverty and protect the environment. Achieving this objective rests on promoting ASTAE's three pillars for sustainable development: renewable energy, energy efficiency, and access to energy.



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*In all, ASTAE allocated funding to 12 new activities in eight countries and to three regional-level activities.*

# ASTAE

## FOREWORD

Fiscal year 2013 (FY13) marked the second year of ASTAE's FY2012-15 Business Plan and the consolidation of our wide-ranging activities in support of the global Sustainable Energy for All (SE4ALL) initiative.

Launched by United Nations (UN) Secretary General Ban Ki-Moon in late 2011, SE4ALL is a multi-stakeholder partnership between governments, the private sector, and civil society. Co-chaired by World Bank President Jim Yong Kim, SE4ALL aims to achieve three interlinked objectives by 2030: ensuring universal access to modern energy services, doubling the rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix.

SE4ALL's objectives dovetail perfectly with ASTAE's three pillars (Box 1.1), which affirm the importance of our groundbreaking past work and underscore our continued relevance in the critical years to come. As home to two-thirds of the world's population, the success of the Asia and the Pacific region in moving onto a sustainable energy path will determine the success—or failure—of the SE4ALL agenda. With its wide range of experience and deep base of knowledge, ASTAE can be at the forefront of the attainment of SE4ALL's ambitious global objectives.

In FY13 ASTAE continued to help countries in the East Asia and the Pacific Region (EAP) and the South Asia Region (SAR) transition onto sustainable, inclusive, and low-carbon green growth paths. We have informed major World Bank programs and leveraged investment across the region, exerting active influence that is helping to reduce poverty and protect the environment.

ASTAE's influence is especially important in times such as these, where the increasing challenges experienced by the EAP and SAR regions require exactly the type of innovative solutions that we champion. The availability of ASTAE

funding—whether to conduct a study, hire a consultant, or test a promising “first of its kind” concept—can help nudge the World Bank decision-making process across the finish line.

In this regard, FY13 was a very active year, with the World Bank's Board of Executive Directors (“the Board”) approving four ASTAE-supported Bank projects—totaling US\$681 million. In all, ASTAE allocated funding to 12 new activities in eight countries and to three regional-level activities.

FY13 also saw the World Bank's operationalization of the World Development Report (WDR) 2012 on Gender, which complements ASTAE's long-standing focus on the gender-energy dimension and ensures further advancement in this critical area.

Last, but not least, FY13 marked another important benchmark, with ASTAE's multi-donor trust fund (MDTF), created in 2011 as the preferred funding instrument for the current business plan, now exceeding its initial US\$20 million target. With a current endowment of US\$24 million, ASTAE is better equipped than at any time in our history to champion projects that both reduce energy poverty and protect the environment.

This unprecedented donor support has been made possible by the Netherlands, Sweden, and the United Kingdom, to each of whom I express my deepest appreciation.

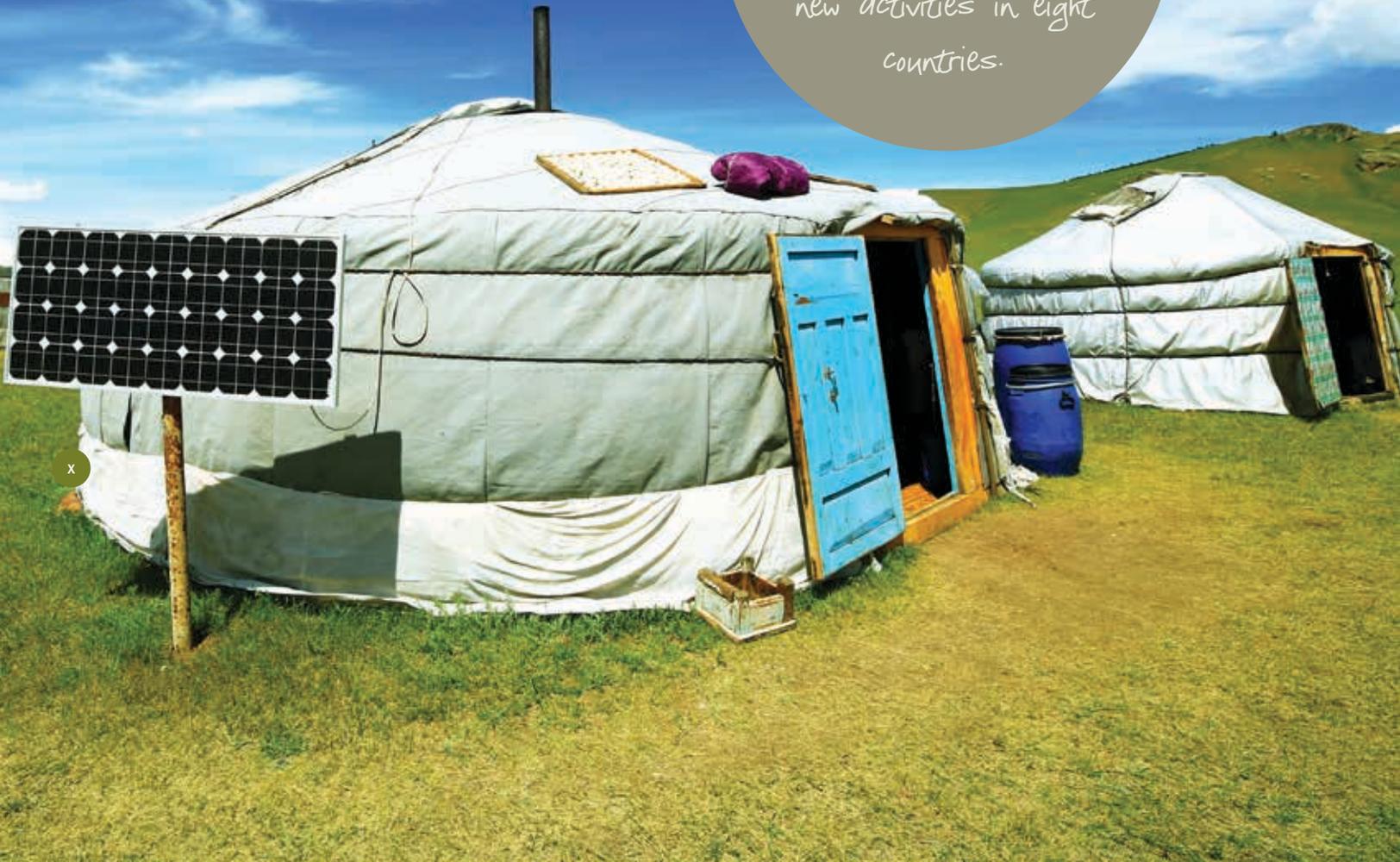
Charles Feinstein  
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 Sector Manager, Water and Energy Unit (EASWE)  
 Sustainable Development Department  
 East Asia and the Pacific Region, The World Bank

## ABBREVIATIONS

ASTAE	Asia Sustainable and Alternative Energy Program
CTF	Clean Technology Fund
DFID	Department for International Development (United Kingdom)
EAP	East Asia and the Pacific
EC	Electric Cooperatives
ESMAP	Energy Sector Management Assistance Program
EVN	Electricity of Vietnam
FY	Fiscal Year
GBP	Pound Sterling (United Kingdom currency)
GEF	Global Environment Facility
GHG	Green House Gas
IBRD	International Bank for Reconstruction and Development
ICCC	Independent Consumer and Competition Commission
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
KfW	<i>Kreditanstalt für Wiederaufbau</i>
LED	Light-Emitting Diode
LPG	Liquefied Petroleum Gas
M&E	Monitoring and Evaluation
MDTF	Multi-Donor Trust Fund
PGE	Pertamina Geothermal Energy (Indonesia)
PHRED	Philippines Renewable Energy Development (program)
PICs	Pacific Island Countries
PLN	<i>Perusahaan Listrik Negara (Indonesia)</i>
PNG	Papua New Guinea
RE	Renewable Energy
REAP	Renewable Energy for Rural Access Project (Mongolia)
RERED-II	Rural Electrification and Renewable Energy Development II project (Bangladesh)
RETF	Recipient-Executed Trust Fund
ROADEO	Road Emissions Optimization (tool)
SAR	South Asia Region
SDN	Sustainable Development Network

SE4ALL	Sustainable Energy for All
SHS	Solar Home Systems
SIDA	Swedish International Development Agency
SIDS	Small Island Developing States
SLCP	Short-Lived Climate Pollutants
TA	Technical Assistance
TERI	The Energy Resources Institute (India)
TERM(-IU)	Tonga Energy Road Map (- Implementation Unit)
TLS	Tracking Light from the Sky project
TPA	Third Party Access
UFG	Unaccounted-for Gas
UK	United Kingdom
UN	United Nations
US\$	United States Dollar (currency)
WBG	World Bank Group
WDR	World Development Report

*In FY13,  
ASTAE supported  
activities in 12 of its 31  
client countries, including 12  
new activities in eight  
countries.*



**ASTAE**

## EXECUTIVE SUMMARY

Created in 1992 as a global partnership program, ASTAE continues to deliver on its mandate to scale-up the use of sustainable energy options in Asia to reduce poverty and protect the environment. It does so by promoting three pillars for sustainable development: renewable energy, energy efficiency, and access to modern energy services.

Fiscal Year 2013 was the second year of the four-year FY2012-2015 Business Plan for the Multi-Donor Trust Fund (MDTF), which now exceeds US\$24 million. ASTAE continues to use this endowment to fund World Bank-executed activities and has now added recipient-executed trust fund activities to its growing regional portfolio. In FY13, ASTAE supported activities in 12 of its 31 client countries, including 12 new activities in eight countries and three new regional-level activities.

The total FY13 allocation was about US\$3.8 million, of which 40 percent went towards renewable energy initiatives; 37 percent supported improving access to energy; and the remaining 23 percent helped to improved energy efficiency. Indonesia was the largest beneficiary of ASTAE funding (16 percent) in FY13 with Small Island Developing States also well represented. ASTAE's client countries in the East Asia and the Pacific region received 80 percent of allocations, with the remainder (20 percent) going to countries in the South Asia Region (see Chapter 1 for more details).

### Renewable Energy

ASTAE activities lead to increased renewable energy capacity and generation through support to projects that directly facilitate investments. In FY13, ASTAE allocated 40 percent of its funds to renewable energy activities, increasing renewable energy capacity by 205 MW and generation capacity by 1,208 GWh over the FY2012-15 business plan period. Chapter 2 provides highlights of new country and regional renewable energy programs and activities as well as updating developments on ongoing activities.

### Energy Efficiency

In FY13, ASTAE allocated 23 percent of its funds to energy efficiency activities. By supporting energy efficiency programs, ASTAE is helping EAP and SAR countries improve their energy security, cut greenhouse gas emissions, and extend saved energy into off-grid communities. Over the course of the FY2012–15 Business Plan period, these programs have resulted in cumulative electricity generation savings of 2,980 GWh and quantity savings of 350 MW. Chapter 3 provides highlights of new and ongoing country and regional energy efficiency programs and activities.

### Energy Access

In FY13 ASTAE dedicated 37 percent of its allocations to energy access programs. Over the FY2012-15 period, ASTAE initiatives have resulted in nearly 1.2 million households gaining access to improved cooking or heat sources, and 558,000 households gaining access to new sources of electricity. By supporting projects that directly facilitate investments in energy access programs, ASTAE is contributing toward life-changing impacts. Chapter 4 provides highlights of new and ongoing country and regional endeavors supporting improved access to energy.

## ASTAE'S 6 PERFORMANCE INDICATORS

ASTAE tracks a set of six performance indicators that shed light on its impact in supporting sustainable energy development. The indicators have been chosen to help illustrate predominant trends within each pillar. The indicators track aggregated results over the FY2012-15 Business Plan period.

TOTAL WORLD BANK LENDING  
CATALYZED BY ASTAE ACTIVITIES

1

Added to FY12's leverage of US\$1,301 million, the cumulative FY2012-15 total is US\$1,982 millions measure of ASTAE's influence in channeling funds toward sustainable energy.

NEW CAPACITY AND INCREASED  
GENERATION OF RENEWABLE  
ELECTRICITY

2

Additional renewable energy capacity of 205 MW and generation of 1,208 GWh<sup>1</sup>.

ELECTRICITY SAVINGS RESULTING  
FROM EFFICIENCY IMPROVEMENTS

3

Once implemented, cumulative annual electricity savings that derive from ASTAE-supported World Bank project are estimated to amount to 350 MW of capacity and 2,980 GWh of generation.

HOUSEHOLDS WITH ACCESS TO  
MODERN ENERGY SERVICES

4

New electricity access has been achieved for 558,000 households and 1,195,000 households have improved cooking and heating access. (Improved electricity access is also captured, but impacts are expected from forthcoming projects).

AVOIDED GREENHOUSE GAS  
EMISSIONS

5

CO<sub>2</sub> emissions that are estimated to be avoided over 20 years amount to about 280.3 million tons.

COUNTRIES BENEFITING FROM  
ASTAE SUPPORT

6

ASTAE financed activities in 12 countries out of the 15 targeted, in addition to regional activities.

<sup>1</sup>Figures represent capacity and generation added during the first year of the FY2012-15 business plan period. Not all activities supported in FY13 have yet resulted in an approved project or other progress on the related indicators.

## Supplementary Themes

The FY2012–15 Business Plan formalizes ASTAE's contribution to “supplementary themes” that are now implemented and tracked by ASTAE in addition to its regular impact indicators. These themes relate to support and implementation of work that: (a) facilitates cross-sector interactions; (b) contributes to the integration of the energy-water-food security nexus; (c) enhances gender awareness and inclusion in projects; and (d) leverages private sector involvement. ASTAE provides funding that can be used to add a component or a study related to these supplementary themes. Alternatively, funding can also be used to test a new idea or methodology that does not yet have a project application but that may be mainstreamed later. In FY13, ASTAE funded three cross-sector activities with a combined total allocation of US \$823,190. ASTAE's continued attention to energy-related cross-sector collaboration will grow in coming years and is likely to be extended to other sectors, such as health, water, and agriculture. Chapter 5 provides more information on work related to the supplementary themes.

## Tracking Performance

ASTAE tracks a set of six performance indicators that shed light on its impact in supporting sustainable energy development. The indicators have been chosen to help illustrate predominant trends within each pillar. The indicators track aggregated results over the FY2012-15 Business Plan period. Highlights are provided to the left and more detailed information on the indicators and progress tracking is available in Chapter 6 and Appendix 3. The six performance Indicators are shown on the left.

## Looking ahead

In the remaining two years of the current business plan, ASTAE is expected to continue to pursue its goals by providing the combination of operational focus and flexible “just in time” financing that gives it comparative advantage and complements the work of other trust funds.

## Information and Knowledge Sharing

During FY13, ASTAE published six reports (see Chapter 7 for details) as part of its efforts to share – within and among countries in the region and beyond – the knowledge and experience it has gained through its activities. ASTAE has also conducted seminars, workshops, and study tours and has produced knowledge outputs such as technical guides, methodologies, atlases, and toolkits. ASTAE has also played an important role in facilitating donor coordination and dialogue with various stakeholders and donor coordination. And, efforts are in progress to improve the ASTAE website to make it even more responsive to donor needs.

ASTAE's  
Multi-Donor Trust Fund  
(MDTF), now exceeds  
US\$24 million

# OVERVIEW OF ASTAE IN FY13

**US\$24  
MILLION**

THE AMOUNT IN THE  
MULTI-DONOR TRUST FUND  
(MDTF)

**12**

THE NUMBER OF NEW  
ACTIVITIES IN EIGHT  
COUNTRIES  
AND  
THE NUMBER OF CLIENT  
COUNTRIES WITH ASTAE  
SUPPORTED ACTIVITIES

**28**

THE NUMBER OF ACTIVITIES  
FUNDED SINCE THE START  
OF THE 2012-15 BUSINESS  
PLAN

4

**40%**

THE AMOUNT ALLOCATED TO  
RENEWABLE ENERGY  
INITIATIVES

**37%**

THE AMOUNT ALLOCATED TO  
SUPPORT IMPROVING  
ACCESS TO ENERGY

**23%**

THE AMOUNT ALLOCATED TO  
SUPPORT ENERGY  
EFFICIENCY

**16%**

THE AMOUNT OF ASTAE  
FUNDING TO INDONESIA

**80%**

THE AMOUNT OF ASTAE  
FUNDING TO EAST ASIA AND  
THE PACIFIC REGION

**20%**

THE AMOUNT OF ASTAE  
FUNDING TO COUNTRIES IN  
THE SOUTH ASIA REGION

<p><b>40%</b></p> <p>THE AMOUNT OF FUNDS ALLOCATED TO ACTIVITIES IN RENEWABLE ENERGY</p>	<p><b>23%</b></p> <p>THE AMOUNT OF FUNDS ALLOCATED TO ACTIVITIES FOR ENERGY EFFICIENCY</p>	<p><b>37%</b></p> <p>THE AMOUNT OF FUNDS ALLOCATED TO ACTIVITIES FOR ENERGY ACCESS</p>
<p><b>1.2 MILLION</b></p> <p>THE NUMBER OF HOUSEHOLDS GAINING ACCESS TO IMPROVED COOKING OR HEAT SOURCES</p>	<p><b>558,000</b></p> <p>THE NUMBER OF HOUSEHOLDS GAINING ACCESS TO NEW SOURCES OF ELECTRICITY</p>	<p><b>US\$823,190</b></p> <p>THE AMOUNT ALLOCATED FOR THREE CROSS-SECTOR ACTIVITIES</p>

IN FY13, ASTAE FUNDED THREE CROSS-SECTOR ACTIVITIES WITH A COMBINED TOTAL ALLOCATION OF US\$823,190.

The Rural Electrification and Renewable Energy Development II project in **Bangladesh**

A World Bank project to rehabilitate the Kali Gandaki Hydropower Plant project in **Nepal**

The Energy Sector Development Project in **Papua New Guinea**



6

ASTAE  
provides depth of  
knowledge and flexible, just-  
in-time funding.

# ASTAE

## ONE

## OVERVIEW OF ASTAE AND FY13 ACTIVITIES

**About ASTAE**

ASTAE was established by international donors in 1992 as a three-year pilot program to “mainstream” alternative energy in the World Bank’s lending and technical assistance operations in the SAR and EAP regions. Today, ASTAE has eight SAR client countries and 23 EAP client countries.

The MDTF now exceeds US\$24 million, an endowment that enables ASTAE to accelerate and intensify the transformational process by which early-stage energy sector innovations are piloted, scaled-up or made commercially feasible. Donor countries in FY13 (July 1, 2012 – June 30, 2013) were the Netherlands, Sweden, and the United Kingdom. Prior donors have included Australia, Canada, Finland, Japan, Switzerland, and the United States.

ASTAE funds World Bank-executed activities and, in response to donor requests, in this current Business Plan for FY2012-15 added recipient-executed trust fund (RETF) activities to its growing regional portfolio. Embedded in the EAP regional unit to maximize its leverage and operational influence, ASTAE provides depth of knowledge and flexible, “just-in-time” funding to shape the design of large World Bank investment projects, helping adapt them to, or implement them in, rapidly evolving conditions. ASTAE also shares best practices to improve the institutional, policy, financial, legal, and regulatory frameworks in recipient countries and create an enabling environment for private sector investment.

To synergize its activities and share best practices, ASTAE works in close cooperation with the Energy Sector Management Assistance Program (ESMAP) and other World Bank Trust Funds.

**ASTAE’s FY2012–15 Business Plan**

ASTAE introduced the practice of multi-year business plans in 2003. Business plans provide the strategic complement to ASTAE’s annual reports and the basis for ASTAE’s donor engagement. In addition, they outline ASTAE’s key focus for coming years and set tangible, expected indicators for success.

The FY2012-15 Business Plan is ASTAE’s third since 2003. It responds to the changing needs of the Asia and the Pacific region, devoting special attention to promoting low-carbon, green growth and scaling up access to sustainable energy on an intra- and inter-regional basis.

Promoting **low-carbon, green growth** calls for cross-sectoral work with priority ASTAE activities and includes the development of ecologically and economically sustainable cities and rural development initiatives in which the delicate energy, food, and water nexus is factored into national and regional policies and development plans.

While country level intervention remains ASTAE’s core focus, increasing attention is being paid to **Scaling up Supply of and Access to Sustainable Energy on a Regional Basis**. In addition to supporting regional projects as defined under International Development Association (IDA) guidelines, ASTAE encourages South-South cooperation and knowledge sharing. It also supports work to overcome many of the regional, cross-border, and other common challenges faced by countries in the region.

ASTAE’s core mandate and pillars remain the same in FY2012-15 as in previous business plans, as does its emphasis on seeking synergies—whenever possible—across ASTAE’s three pillars. Cumulatively, ASTAE has funded 28 activities since the beginning of the current business plan.

## BOX 1.1

ASTAE's mandate is to scale up the use of sustainable energy in the East Asia and the Pacific region to reduce energy poverty and protect the environment. Achieving this objective rests on promoting ASTAE's three pillars for sustainable development:

### ASTAE'S THREE PILLARS:

#### RENEWABLE ENERGY

1



Supporting energy generation growth by means of renewable-energy technologies slows the depletion of natural resources, limits environmental damage, and can contribute to the substitution of domestic resources for imported ones. Renewable energy resources include hydroelectric, biomass, wind, geothermal, and solar energy.

#### ENERGY EFFICIENCY

2



Given that most energy is generated from finite fossil fuels, using less energy to reach the same desired outcome is an effective way to contribute to sustainable development. Energy intensity per unit of GDP is high in most Asian countries, indicating that there is room for efficiency improvement in all sectors of the economy. Although efficiency in the energy sector is the primary target of this pillar, ASTAE also reaches across other sectors—such as water, buildings, and transport—to promote this agenda.

#### ACCESS TO MODERN ENERGY SERVICES

3



Energy Access encompasses new access (such as connecting a previously un-electrified household) and improved access (such as designing or building a biogas cook stove to replace a charcoal-burning one). Access to modern energy can significantly improve the quality of life for end-users, providing benefits such as light, heat, and power for electrical appliances and tools in a much more efficient and less polluting fashion than the displaced resources, often at a fraction of the cost.

## How ASTAE Works

ASTAE provides a wide range of support mechanisms, such as early program and project identification solutions, quick response and troubleshooting, project-related capacity building, and funds mobilization (Box 1.2). These support mechanisms are provided by ASTAE staff and World Bank Task Team Leaders, whose constant interaction forms the backbone of ASTAE's operational structure. Other important elements of the structure include the Consultative Group on World Bank Energy Trust Funds, which represents donor countries, and a Technical Advisory Group that evaluates ASTAE activities annually and reports to the donor community by way of the Consultative Group.

## The ASTAE Approaches

ASTAE implements its overall strategy through four approaches:

- supporting innovative financing and delivery mechanisms;
- enhancing policy and regulatory frameworks;
- building capacity and sharing knowledge; and
- promoting regional and cross-sectoral collaboration.

These approaches are described in detail below:

ASTAE helps introduce **innovative financing and delivery mechanisms** by supporting the design, build-up, and testing of new financing mechanisms or by tailoring existing mechanisms to the specific needs of a host country. Recent examples of innovative or improved financing delivery mechanisms include the design of innovative result-based financing to promote clean, healthy cooking solutions in Lao PDR; developing an investment prospectus for private sector investments for greener diesel-based grids in Indonesia; structuring on-lending funds for renewable energy in Vietnam; and transferring energy efficiency business models among neighboring countries, for example from China to Vietnam.

ASTAE supports the **development of institutional and regulatory frameworks**, providing an enabling environment with which to help attract capital from international financial institutions, export credit agencies,

and the private sector. Recent work includes high-level policy dialogue and advisory support (e.g., market, technology, standards, etc.) for clean stove initiatives in Indonesia and Lao PDR; and pricing, regulation and technical support to the Maldives and Papua New Guinea.

**Capacity building and knowledge sharing** are at the core of ASTAE's mission, as these activities underpin the success of the two approaches listed above. ASTAE achieves this by drawing upon its pool of expertise and consolidating its knowledge base to provide "just-in-time" advice to other groups engaging in the same activities across the region. This knowledge-sharing approach can operate as a stand-alone activity or become an integral part of a project if the need for capacity building or knowledge sharing goes beyond normal project-related expectations. Recent knowledge-sharing work includes training seminars for officials and policy makers in Bangladesh, Indonesia, Mongolia, and Vietnam; producing knowledge products and documenting lessons learned related to projects in Mongolia and Small Island Developing States (SIDS), and developing technical guides on greenhouse gas (GHG) mitigation in road construction and coconut oil production in the Pacific. Other initiatives include promoting satellite imagery to monitor rural electrification efforts and collaborating with the Bank's Africa Region on the successful Lighting Africa program.

ASTAE **promotes regional and cross-sector collaboration** by encouraging South-South cooperation and knowledge sharing and supporting regional, cross-border and common responses to challenges faced by countries in the region. It supports ecologically and economically sustainable cities and rural development schemes and programs that address the energy-water-food security nexus. Examples of recent regional work include cross-region cooperation in developing means to use satellite imagery to extend electrification into rural areas. Recent cross-sector work includes supporting SAR countries in finding ways to mitigate the impacts of short-lived climate pollutants (SLCPs).

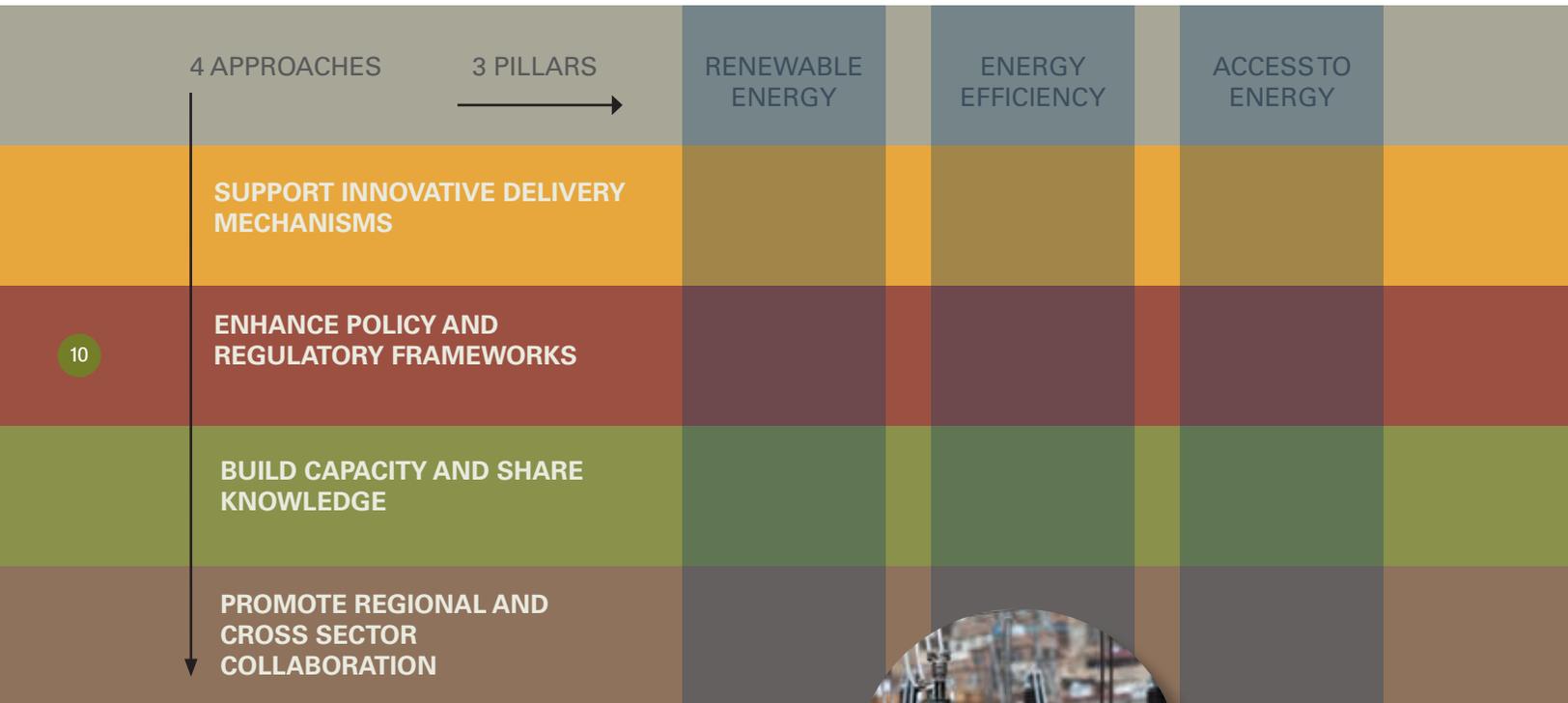
The connections among ASTAE's objective, pillars, and approaches are shown in Figure 1.1.

FIGURE 1.1

Interlinking Objective, Pillars, and Approaches

**ASTAE OBJECTIVE:**

TO SCALE -UP THE USE OF SUSTAINABLE ENERGY SOLUTIONS IN ASIA IN ORDER TO PROTECT THE ENVIRONMENT AND REDUCE POVERY



10

*Its mandate is to scale up the use of sustainable energy options in Asia.*



## BOX 1.2

## THE ASTAE SUPPORT MECHANISMS

ASTAE provides depth of knowledge and flexible “just-in-time” funding to shape the design of new projects and to help implement or adapt them to rapidly evolving conditions. ASTAE’s presence in most countries of the Asia and Pacific region has helped enable cross-fertilization among different operations and develop a strategic, programmatic approach to broadening the impacts of investment projects. This cross-cutting position, in turn, has helped create an enabling environment in which ASTAE shares best practices and various options to improve institutional, policy, financial, and regulatory conditions in recipient countries. The seven support mechanisms described below are often provided in conjunction with other partners, so each activity benefits from the comparative advantages brought by each partner.

#### EARLY PROGRAM AND PROJECT IDENTIFICATION WORK

While technically feasible, many renewable and alternative energy options are still being established. ASTAE supports World Bank task teams in conducting due diligence, developing best practices for deployment, and testing new business models so that innovative energy solutions can be integrated into World Bank operations.

#### PROGRAM AND PROJECT DEVELOPMENT AND IMPLEMENTATION WORK

For especially complex or innovative projects and programs, ASTAE can provide planned or unplanned support during the identification and implementation phase. This support is generally provided only when circumstances require budget or expertise above and beyond normal project funding levels.

#### QUICK RESPONSE AND TROUBLE SHOOTING

ASTAE provides “just-in-time” quick response and troubleshooting support to Task Team Leaders during project development phase (for example, responding to stakeholders’ specific issues or troubleshooting when unexpected regulatory barriers are encountered). ASTAE’s flexibility in taking on such issues at short notice has proven indispensable in devising and delivering solutions that realize unanticipated opportunities or prevent projects from being halted.

#### GLOBAL KNOWLEDGE INTERFACE

In cases where practitioners implementing sustainable energy projects experience barriers, ASTAE can help provide Task Team Leaders with alternative options or introduce new technologies to them. This support is generally provided during the early stage of the project cycle—when expertise is made available through ASTAE’s network of subject-matter consultants—and at the later stages of a project, when new information generated during the early stages has been analyzed and packaged for dissemination.

#### PROJECT-RELATED CAPACITY BUILDING

The need for capacity-building can often go beyond the reasonable expectations of routine project preparation or implementation, especially in cases where government officials are unfamiliar with new technologies, advanced management practices and the implementation of law and regulations. As such, ASTAE provides assistance including training programs, workshops, consensus-building conferences, twinning, study tours, and access to subject matter advisers.

#### FUND MOBILIZATION

ASTAE assists Task Team Leaders in mobilizing additional funds by helping identify and clarify the requirements that may result in donor or government financing or pledges. Relatively small levels of ASTAE support can persuade new partners to join initiatives and leverage additional new financing to magnify the impacts of a project. Task Team Leaders can often combine ESMAP’s “upstream” funding and tools with ASTAE funding into World Bank lending projects.

#### IMPACT MONITORING AND EVALUATION

ASTAE’s monitoring and evaluation of project and program impacts are increasingly necessary to ensure that new information generated by projects or ASTAE activities is analyzed and packaged to be imparted to others. Its long experience in supporting sustainable energy projects has positioned ASTAE to commission studies and analyses of its past projects to capture and share lessons learned that may be of great value to other countries. ASTAE also plays an important role in comparing successful models delivered through ASTAE’s three pillars. For example, ASTAE contributed to the promotion of SHS projects in Bangladesh and Mongolia, both of which were designed—based on ASTAE experience—along completely different lines.

## BOX 1.3

### ASTAE'S 6 IMPACT INDICATORS

ASTAE tracks a set of six performance indicators that shed light on its impact in supporting sustainable energy development. The indicators have been chosen to help illustrate predominant trends within each pillar. The indicators track aggregated results over the FY2012-15 Business Plan period.

#### TOTAL WORLD BANK LENDING CATALYZED BY ASTAE ACTIVITIES

1

By providing advisory services and technical assistance, ASTAE informs the preparation and execution of major World Bank energy projects. Although the ASTAE Trust Fund covers only a small portion of the costs of project preparation or technical assistance to client countries, the strategic use of ASTAE funds enables a far greater impact than would otherwise be possible through its influence on which projects enter the World Bank pipeline and on the dissemination of operational experience. This indicator measures the number of Bank projects that are influenced by ASTAE activities and the related lending amounts. This leverage can be seen as a good indicator of ASTAE funding's reach into Bank operations, thus providing a measure of ASTAE's influence in channeling funds toward sustainable energy.

#### HOUSEHOLDS WITH ACCESS TO MODERN ENERGY SERVICES

4

This indicator reflects ASTAE's success in extending access to modern energy services by measuring the number of households reached. It is derived by measuring the improvement in quality of life as households transition from traditional fuels (such as charcoal, wood, and dung) or inadequate modern fuels (such as kerosene for lighting) to modern, clean, and sustainable energy sources. When switching fuels is not possible or desirable, the indicator measures the improvement in delivery of energy services resulting from a project, such as improved quality or reliability of an electricity connection.

#### NEW CAPACITY AND INCREASED GENERATION OF RENEWABLE ELECTRICITY

2

By supporting projects that directly facilitate investments, ASTAE activities lead to increased capacity and generation from renewable sources. This indicator measures ASTAE's contribution to increasing the use of renewable energy in client countries. New renewable-energy generation capacity is expressed both in terms installed capacity—to reflect the actual investments made—and in terms of actual energy generated (in gigawatt-hours), to reflect use of the installed capacity.

#### AVOIDED GREENHOUSE GAS EMISSIONS

5

This indicator estimates the quantity of carbon dioxide (CO<sub>2</sub>) emissions avoided over 20 years (the conventional lifespan of projects or equipment) through the renewable-energy generation and energy efficiency improvements measured under indicators 2 and 3.

#### ELECTRICITY SAVINGS RESULTING FROM EFFICIENCY IMPROVEMENTS

3

ASTAE helps embed energy efficiency measures into World Bank programs and assists governments in taking energy efficiency into account as part of the policy planning process. This indicator determines the estimated annual direct savings resulting from World Bank energy sector loans in EAP and SAR countries. The impact is assessed by integrating two sub-indicators: (a) avoided energy-production capacity (in megawatts) resulting from efficiency improvements; and (b) estimated annual equivalent quantity of electricity (in gigawatt-hours) saved by energy-efficiency measures.

#### COUNTRIES BENEFITING FROM ASTAE SUPPORT

6

This indicator ensures that ASTAE resources are deployed in a balanced manner across all ASTAE countries, providing equal funding opportunities to large countries (such as Indonesia, Pakistan, and Vietnam) as well as to smaller countries, such as SIDS. This is necessary because targets for achieving the five indicators listed above could be met most simply by concentrating on interventions in larger countries.

### ASTAE'S Indicators of Success

ASTAE pledges to achieve specific targets by the end of each business plan period. Target achievement is measured both as a direct result of related World Bank loans and as indirect impacts of World Bank and ASTAE technical assistance to stakeholders in client countries.

Six output-based indicators (Box 1.3) track the influence of ASTAE-supported activities in advancing the development of the sustainable energy agenda. Three of these are related specifically to ASTAE's renewable energy, energy efficiency, and access to modern energy services pillars.

### ASTAE'S Leverage

With its focus on downstream and operations-oriented activities, ASTAE directly informs and enhances World Bank lending projects that are instrumental in helping the EAP and SAR regions overcome the energy security challenge. ASTAE's ability to leverage World Bank lending and grant operations significantly increases a program's quantitative impacts.

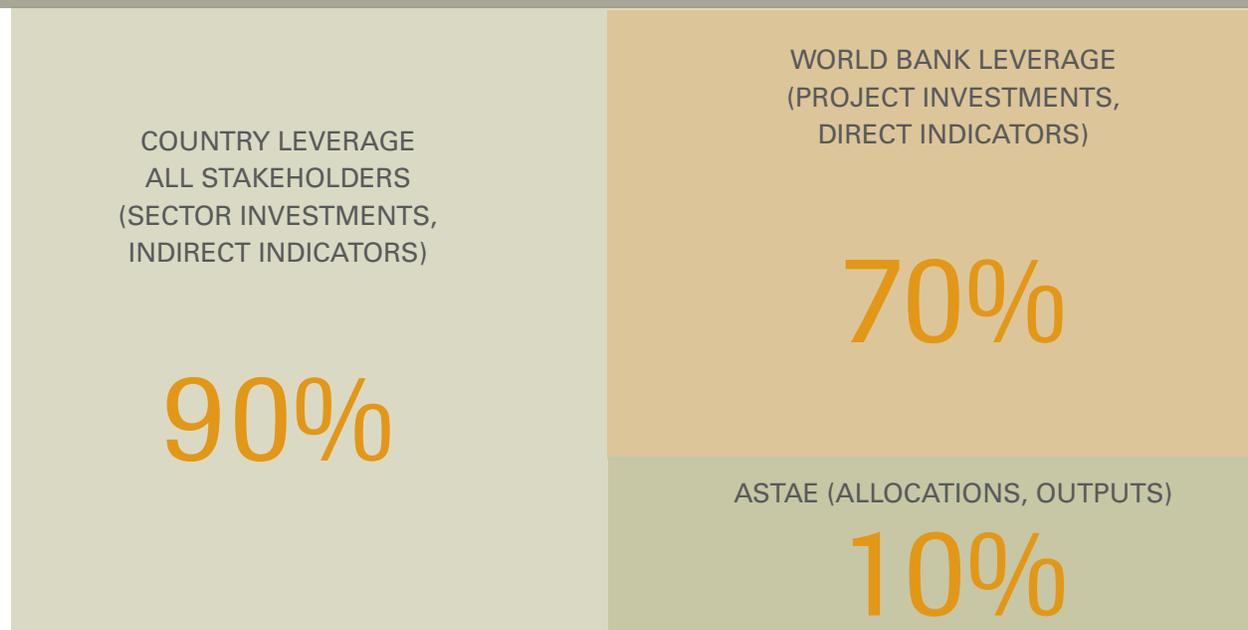
Over the course of the FY2007–10 Business Plan, ASTAE funded 63 activities for a total of US\$9.3 million (US\$8.1 million disbursed to date) that directly contributed to Bank projects totaling US\$2.2 billion (US\$1.2 billion of which was in grants and lending of the International Bank for Reconstruction and Development (IBRD), the IDA, and/or the Global Environment Facility (GEF)). **Overall, between 2004 and 2010, every donor-provided dollar leveraged about US\$200 in World Bank sustainable energy lending and grants.**

### ASTAE'S Tools for Leverage

Budget, allocations, and outputs are the elements over which ASTAE has direct control and with which it measures its administrative effectiveness. See Figure 1.2

FIGURE 1.2

### ASTAE Influence and Impacts at Different Levels



## BOX 1.4

### ASTAE SUPPORT TO WORLD BANK PROGRAMS UNDER IMPLEMENTATION

#### BANGLADESH



Only 60 percent of the people in Bangladesh have access to electricity, and even those with it experience frequent supply disruptions. In FY13, ASTAE financed a video of a World Bank program that distributed solar home systems as part of the government's nation-wide Rural Electrification and Renewable Energy Development II project. The video was designed to help attract additional development partner funding for the scheme, highlight the initiative's gender and poverty impacts, and encourage replication of the program in other countries. The video has been aired at a number of internal and external World Bank events as well as featured at a national exposition in Bangladesh that celebrated the installation of two million SHSs nationwide. The Bangladesh SHS program, for which ASTAE provided market assessment and program-design support in 2001, has successfully provided access to electricity to more than a million households in remote rural areas—an achievement far exceeding the initial target of 50,000 SHS systems over a five-year period. In part thanks to the ASTAE initiative, the SHS initiative continues to grow and receive new support from the donor community. Recent new assistance includes a grant of nearly US\$30 million from the United Kingdom's Department for International Development (DFID) and close to US\$ 14 million in assistance from Germany's KfW.

#### CHINA



China is experiencing rapid urbanization, with a projected 300 million people migrating to cities in the next 20 years. As a result, China's energy demand for buildings and transport is expected to triple over the same period. With China's cities accounting for some 85 percent of the country's commercial energy use, the government has placed a strong emphasis on lowering carbon-emission rates in urban areas. To assist in this effort, the World Bank approved a Green Energy for Low-Carbon City in Shanghai project in February 2013. The program, which builds upon ASTAE's past work in helping China improve its energy efficiency, takes a comprehensive multi-sector approach that integrates demand-side energy efficiency measures in buildings; clean energy supply from renewable energy and natural gas; and sustainable transport such as promotion of clean efficient vehicles and public transport.

#### NEPAL



In Nepal, an ongoing ASTAE project in FY13 funded a wide range of capacity building and advisory services for the ongoing planning and developing of sustainable hydropower projects. Only 46 percent of Nepal's population has access to electricity, and increasing access to reliable electricity is one of the country's most significant development challenges. The Support to Sustainable Hydropower Development project built capacity related to the World Bank-financed Rehabilitation of Kali Gandaki A Hydropower Plant Project. Commissioned in 2002, the Kali Gandaki plant is the largest hydroelectric power station in Nepal, generating some 750 GWh—or roughly 40 percent—of the country's annual electric energy needs.

Measuring ASTAE's leverage of Bank operations consists of quantifying actual influences in addition to lending amounts. The influence on Bank lending is considered direct, because ASTAE's support to Task Team Leaders in project design and implementation directly results in improved operations and, therefore, influence. These direct influences are represented by the middle ring in Figure 1.2.

Broader leverage (at the sector level in a country) is far more difficult to measure, and, as such, direct attribution to one activity or player should be made cautiously. However, once a decision to acknowledge ASTAE's contribution is made, some formal assessment of related influence in the field is necessary to gauge whether funds have been used efficiently. The influences and indicators used to inform this assessment are derived from activities and programs that support enabling legislation, decrees, or behavior modification of key stakeholders that could result in large-scale effects on the three ASTAE pillars. This leverage is represented by the largest ring of influence in Figure 1.2.



over the course  
of FY13, ASTAE  
supported activities in  
12 of its 31 client  
countries.

## FY13 ASTAE Activities

In FY13, the second year of ASTAE's FY2012-15 Business Plan, ASTAE provided support to 12 new activities in eight countries and to three new regional-level activities, allocating US\$3,778,190 in funding to new country-specific and regional programs and disbursing a further US\$1,778,741 in grants. Over the course of FY13, ASTAE supported activities in 12 of its 31 client countries. ASTAE outlays by pillar in FY13 saw comparable levels of allocation to renewable energy (40 percent) and access to energy (37 percent), with the remaining (23 percent) allocated to energy efficiency activities. Since the start of the current business plan, renewable energy has remained ASTAE's main area of allocation, representing close to 50 percent of activities, followed by access to energy (34 percent) and energy efficiency (19 percent).

By region, in FY13, EAP countries received 80 percent of ASTAE allocations, with the remaining 20 percent allocated to SAR countries. Since the beginning of the current business plan, 75 percent of cumulative allocations have gone to EAP countries and 25 percent to SAR countries. Regional activities have continued their cumulative growth trend across FY12 and FY13 and now represent close to one-quarter of all ASTAE allocations.

Indonesia was the largest beneficiary of ASTAE funding in FY13 (16 percent), with Small Island Developing States (SIDS) also well represented. The Maldives, the Solomon Islands, and Tonga received a combined 12 percent of ASTAE allocations over the FY13 period. Further details related to allocations in FY13 are provided in Chapter 2.

In FY13, ASTAE supported a range of World Bank investment projects under implementation (see Box 1.4), including:

- The Rural Electrification and Renewable Energy Development II project in **Bangladesh**;
- A World Bank project to rehabilitate the Kali Gandaki Hydropower Plant project in **Nepal**; and
- The Energy Sector Development Project in **Papua New Guinea**.

## ASTAE Allocations by Pillars

Figure 1.3a shows allocation proportions by ASTAE pillars in FY13. The outer ring depicts distribution by amounts allocated while the inner ring shows allocation based on the number of ASTAE activities related to an intervention pillar. In FY13, allocations by amount were at a comparable level for renewable energy (40 percent) and access to energy (37 percent).

Since the start of the current business plan, renewable energy has remained ASTAE's main area of allocation, representing close to 50 percent of activities, followed by access to energy, with one-third of allocations, with the remainder dedicated to energy efficiency.

Figure 1.3b shows cumulative allocations by ASTAE pillars since the beginning of the current business plan. The outer ring depicts the amount allocated; the inner ring shows the number of ASTAE activities related to an intervention pillar.

Renewable  
Energy has  
remained ASTAE's  
main area of  
allocation.



FIGURE 1.3a

Allocations by ASTAE pillars in FY13

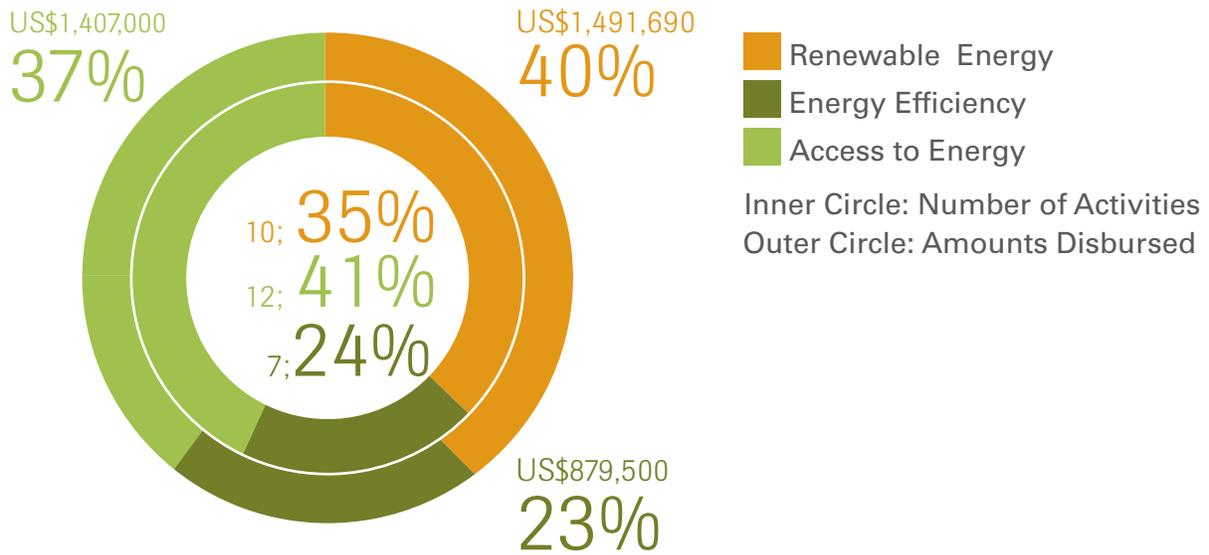
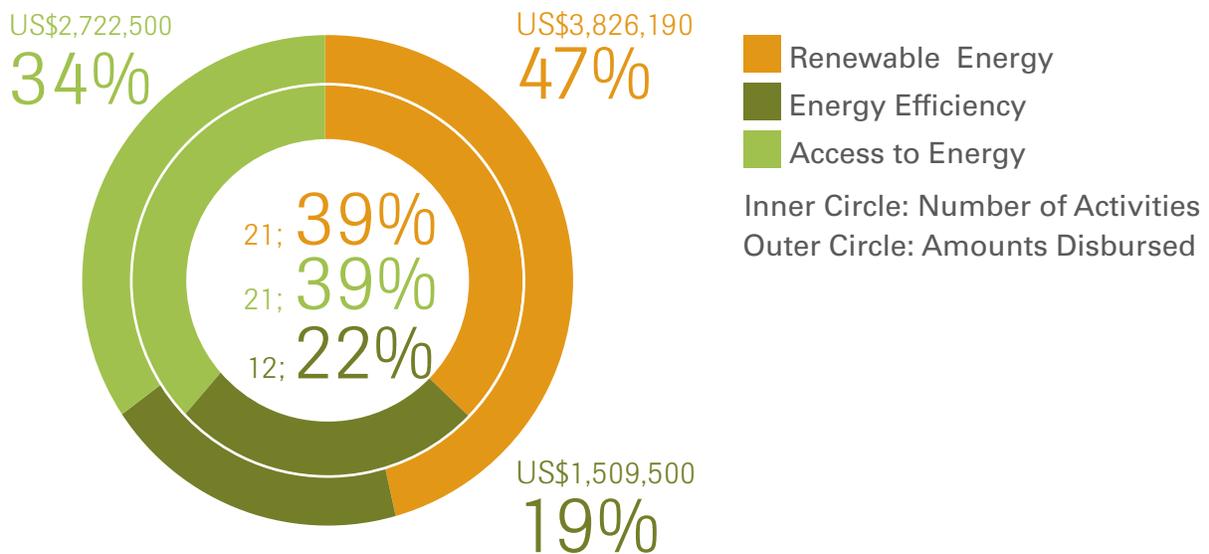


FIGURE 1.3b

Cumulative allocations by ASTAE pillars



## ASTAE Allocations by Country/Region

In FY13, ASTAE's EAP client countries received 80 percent of allocations and the SAR client countries received the remaining 20 percent. Indonesia was the largest beneficiary of ASTAE funding in FY13 (16 percent; see Figure 1.4a), with SIDS also well represented. The Maldives, the Solomon Islands, and Tonga received a combined 12 percent of ASTAE allocations over the FY13 period (see Figure 1.4b).

Cumulatively, since the beginning of the current Business Plan, 75 percent of allocations have been directed to EAP countries and 25 percent have been directed to SAR countries (Figure 1.4b provides details by country). Regional activities continue the growth trend of previous business plans and now represent close to one-quarter of all ASTAE allocations.

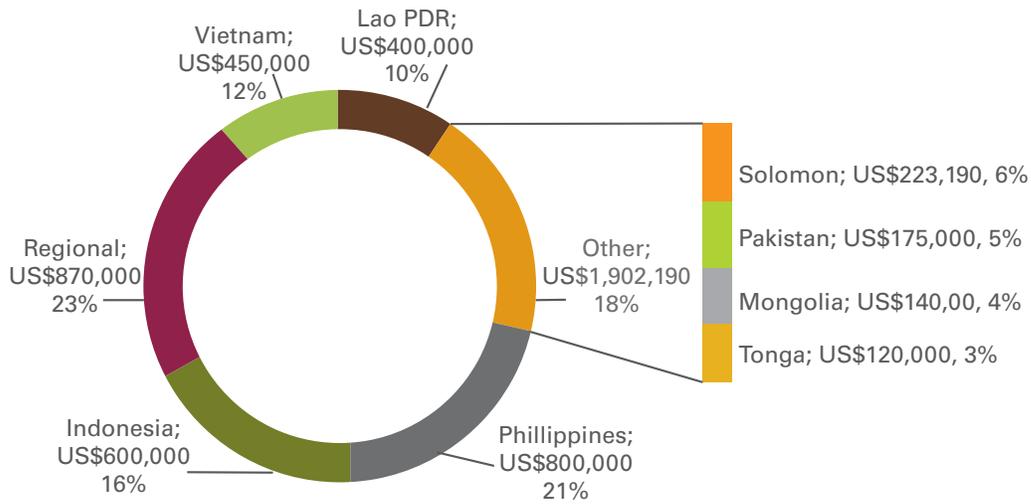
Twelve ASTAE activities totaling some US\$3 million—37 percent of ASTAE allocations—brought levels of support to IDA countries (nearly reaching the target of 40 percent for the FY2012-15 Business Plan).

18

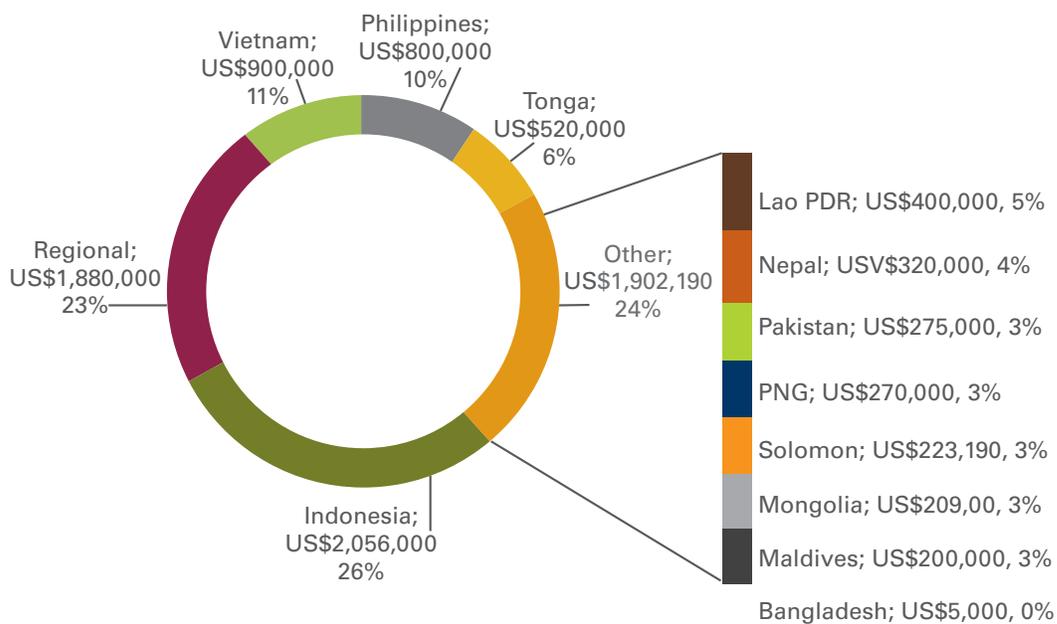
*Indonesia was the largest beneficiary of ASTAE funding in FY13 (16 percent).*



**FIGURE 1.4a**  
**Allocations by country in FY13**



**FIGURE 1.4b**  
**The cumulative allocations by country over the course of the current business plan.**



## Energy Challenges in the EAP Region

The EAP region is now the engine of the global economy. Its spectacular growth over the past two decades has lifted hundreds of millions of people out of poverty. Sixty-one percent of the world's slum dwellers live in the Asia and Pacific region, as do an estimated 828 million people who struggle to live on less than US\$1.25 a day.<sup>2</sup> Meanwhile, many of the drivers of the region's economic success have exacted serious environmental tolls. Environmental degradation has become so widespread that half a million Asians die each year as a result of pollution.<sup>3</sup> The intensive use of abundant, but harmful, fossil fuels has made the region the fastest-growing source of new atmospheric greenhouse gas emissions on earth. And hundreds of millions of people in the region still lack access to electricity and therefore have yet to enjoy the health, social, and economic benefits afforded by modern energy services.

The EAP region is also particularly vulnerable to the impacts of climate change associated with storm surges, cyclones and coastal flooding from rising sea levels. Such impacts pose threats to the region's small island states as well as to major population and economic centers in countries such as China, India, Pakistan, and Vietnam.

The challenges noted above underscore the importance of expanding the use of renewable energies and promoting a more efficient utilization of energy in pursuit of SE4ALL's ultimate goals: ensuring universal access to modern energy services, doubling the rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix by 2030.

Tapping new energy sources and technology and aggressively exploring all options to curb burgeoning energy demand are critical to achieving energy security as well as inclusive growth and shared prosperity.

The way in which the EAP region tackles its mounting energy challenges will determine whether or not it can both enjoy continued economic growth and achieve its unmet development goals. ASTAE stands at the forefront of helping the region achieve energy security without sacrificing growth and falling short of other important development goals. As outlined earlier, ASTAE's mandate is to scale up the use of sustainable energy by promoting the three pillars of renewable energy, energy efficiency, and access to energy. ASTAE's current donors have indicated a particular interest in ASTAE also incorporating, as feasible, the following supplementary dimensions into its activities: climate change mitigation and adaptation; a focus on gender, human rights, and poverty; regional integration and cooperation; cross-sectoral collaboration; and the energy-water-food security nexus.

Cross-sectoral work is also a key dimension promoted by ASTAE, in part through its commitment to supporting low carbon, green growth that requires thinking beyond traditional sector boundaries. Activities leading to ecologically and economically sustainable cities (e.g., integrated land use planning, transport, building, other infrastructure services, and urban agriculture) as well as rural development are supported. This also includes creating synergies between renewable energy, food security and water management.

The following chapters outline ASTAE's work in promoting renewable energy, energy efficiency, and access to energy, and, where feasible, integrating the supplemental dimensions that are listed above. It should be noted that although the following chapters are divided into distinct pillars or thematic activities, much of ASTAE's work is cross-sectoral and provides positive development outcomes across a wide spectrum of areas. For example, in FY13 only seven of ASTAE's 28 activities focused only on a single thematic area, with the majority combining more than one pillar—the most common combination being Energy Access and Renewable Energy.

<sup>2</sup> Asian Development Bank (ADB) 2013. ADB Annual Report 2012.

<sup>3</sup> Asian Development Bank (ADB) 2013. ADB Annual Report 2012.



The intensive use of abundant but harmful fossil fuels has made the region the fastest-growing source of new atmospheric greenhouse gas emissions on earth.



In FY13  
ASTAE allocated 40  
percent of its funds to  
renewable energy activities.

# ASTAE

## TWO

## RENEWABLE ENERGY

Renewable resources such as hydroelectric, biomass, wind, geothermal, and solar energy provide environmental as well as energy security benefits. By incorporating renewable energy into their power generation mix, countries can extend electricity into off-grid areas, slow the depletion of natural resources, and lessen their dependence on imported fuel sources. Renewable energy can also reduce air and water pollution, contribute to reduced GHG emissions, and help rural communities benefit from improved cooking solutions and enjoy better health and education outcomes.

By supporting projects that directly facilitate investments, ASTAE activities lead to increased renewable energy capacity and generation. In FY13 ASTAE allocated 40 percent of its funds to renewable energy activities, increasing renewable energy capacity by 205 MW and generation capacity by 1,208 GWh over the 2012-15 business plan period.

#### FY13 New Renewable Energy Program Highlights

In **Mongolia**, ASTAE funded a wide-ranging evaluation of a program that provided SHSs and renewable energy through hybrid off-grid systems. Customer surveys and rapid impact assessments carried out among 800 herder families resulted in important lessons learned related to income generation and improved standards of living. The Social Impacts of the Mongolia Renewable Energy and Rural Electricity Access project also outlined steps to further extend the reach of renewable energy resources into Mongolia's vast rural areas. ASTAE supported the early implementation of the first project of its kind in Mongolia, bringing together public and private support in a vast country, and financed impact assessment and dissemination.

In the **Philippines**, ASTAE initiated programs in FY13 to help improve the creditworthiness and governance of the Electric Cooperatives (ECs) that serve over nine million customers nationwide. The second phase of the Philippines Electric Cooperatives Reform and Restructuring Program helped encourage the ECs to expand their purchases of indigenous renewable energy resources. It also helped develop a market for the trading of Renewable Energy certificates. At the same time, the Philippines Renewable Energy Policy Implementation Support program helped build the capacity of ECs to invest in distribution networks under the IBRD/Clean Technology Fund (CTF) Philippines Renewable Energy Development (PHRED) program.

#### FY13 New Regional Renewable Energy Activities

In FY13, ASTAE supported an initiation of a joint World Bank-IFC program to develop a commercial market for the manufacture and sale of quality solar lanterns in **Afghanistan** and **Pakistan**. Building on the success of the World Bank/IFC Lighting Africa program, the Solar Market Development for Off-grid Access in Pakistan and Afghanistan program works to increase the uptake of quality, safe, clean, affordable and modern off-grid lighting solutions for low-income households. Both Afghanistan and Pakistan have low rates of electrification (14.4 percent and 56 percent, respectively), with off-grid populations in each relying predominantly on kerosene to meet their lighting needs. This program is linked with ASTAE's past cross support to the LED (light-emitting diode) screening methodology for Lighting Africa, as this methodology could be used for Asian countries.

## BOX 2.1

### FY13 NEW RENEWABLE ENERGY PROGRAM

#### SOLOMON ISLANDS



24

In the Solomon Islands, ASTAE-supported activities helped strengthen benefit-sharing arrangements and enhance the technical design of the planned Tina River Hydropower Development project. The Solomon Islands Electricity Authority—the national electricity utility—currently derives all of its power from diesel sources. According to feasibility studies, when commissioned, the Tina River plant could provide at least half of the country’s power-generation requirements.

This is a critical moment for the development of the hydropower plant. While the government has already received extensive support on social and environmental safeguard-related issues, the high level of risk involved warrants further technical assistance to ensure that all critical areas are properly addressed. ASTAE’s support has helped the government advance the project development process by funding consultants to work with the affected communities in the vicinity of the plant and advise them and the government on the most appropriate model for a benefit-sharing agreement. In particular, the benefit-sharing arrangements under discussion identify both the specific needs of women as well as the most appropriate means of engaging women in the decision-making process. Other potential benefits include providing free or subsidized electricity to affected communities.

ASTAE assistance in FY13 also funded a hydropower engineer to support a World Bank review and advise the government in their preparation of the project. This assistance was designed to help ensure that the technical specifications and designs chosen by government meet with the highest quality standards and that the plant’s design is the most effective for the purpose. ASTAE has been supporting the preparation of this challenging and high reward project for the past several years.

**Pacific Island Countries (PICs)** are highly dependent on imported oil to meet their energy needs. As such, they are particularly vulnerable to oil price shocks, which contribute to volatility in the food, fuel and transport sectors. While there has been increased focus on introducing renewables into the energy supply mix over the past few years, less attention has been paid to the costs of such technologies; their effectiveness in delivering secure, reliable energy; or their role in delivering crucial health and education services in remote, sparsely populated islands. In FY13 ASTAE funded a report to address these themes and to further discussion among PICs and their development partners. Box 2.1 illustrates the renewable energy program in the Solomon Islands.

### Ongoing Renewable Energy Programs in the FY2012-15 Business Plan Period

In FY13, ASTAE continued to support a wide range of renewable energy programs in Indonesia. ASTAE technical assistance to the Geothermal Power Development Program II helped mobilize private sector investment, review and design policy reforms, and share best-practice experience on steam drilling concepts, financial analysis, the handling of safeguards, and procurement issues.

Through its Renewable Energy Access Improvement program, ASTAE helped Indonesia's national power utility, the *Perusahaan Listrik Negara* (PLN), prepare and implement the government's 1,000 islands electrification program, which is improving electricity access in Indonesia's Eastern Islands region through the provision of renewable energy generation. The program is part of the government's stated commitment to reduce its carbon emissions by 26 percent by 2020. ASTAE-funded activities included the preparation of geospatial mapping reports that were shared with the PLN and capacity building workshops on least-cost electrification.

Another ongoing ASTAE renewable energy initiative in **Indonesia** is helping support the emergence of clean energy entrepreneurs. A component of the Leveraging Global Knowledge Networks for Innovation Capacity in Clean Energy program, the Building Innovation Capacity in Clean Energy initiative helped mentor and train a group

of clean energy start-ups. The objective is to demonstrate how Indonesia and other countries can build the domestic capacity to accelerate innovations in green and inclusive growth technologies. The pilot program centered on the concept of innovation tournaments in which a large pool of entrepreneurs competed to win support for products such as low-cost, robust solar-powered lights, cook stoves, and water filters.

In **Vietnam**, the Cumulative Impact Assessment on Small Hydropower Projects on River Cascades project helped the government ensure that the country's major expansion in hydropower development succeeds in maximizing generation output and mitigating negative impacts on environment and natural resources, including water-energy-food security nexus. There are currently no provisions to assess the cumulative—rather than individual—environmental impacts of hydropower development in Vietnam. ASTAE assistance in FY13 helped conduct Cumulative Impact Assessments on some 30 small hydropower developments.

An interesting example of an ongoing program in **Mongolia** is presented in Box 2.2 and Table 2.1 summarizes the current state of progress in the renewable energy sector.

## BOX 2.2

### ONGOING RENEWABLE ENERGY PROGRAMS

#### MONGOLIA:

#### ENHANCE RURAL HERDERS' AWARENESS OF ELECTRIFICATION USING SOLAR HOME SYSTEMS



26

The aim of this ASTAE activity was to raise awareness in Mongolia of the impact and benefits of the 100,000 Solar Ger Electrification Program that provided electricity access using SHSs to 100,000 mobile herders living in Mongolia's vast and sparsely populated rural areas. The ASTAE assistance was also designed to inform the global development community about how internationally proven practices were modified to fit Mongolia's unique geography.

Given their nomadic nature, SHSs are the most effective means with which herders can gain access to electricity. With the advent of electricity, nomadic communities can benefit from a wide range of associated benefits, such as television or radio programs providing health and nutrition information or weather updates.

The ASTAE program consisted of an information campaign including print and video material. A paper entitled "Capturing the Sun in the Land of the Blue Sky: Providing Portable Solar Power to Nomadic Herders in Mongolia" described how the government program reached nomadic communities in all 21 provinces, in many cases extending access to herders for the very first time. Two videos illustrated how the program had changed people's lives.

The ASTAE material was widely disseminated across Mongolia through the World Bank's internal and external distribution channels. A video was also presented at the World Bank's Sustainable Development Network (SDN) week in 2013. The story attracted great interest across the Bank and was presented by the SDN Vice President at the 2012 Annual Meetings of the World Bank Group (WBG) and the International Monetary Fund (IMF). The dissemination activities contributed to the Bank's Renewable Energy for Rural Access Project (REAP) team winning two awards: The East Asia and Pacific Regional Vice Presidency Unit Team Award of 2013 and the Sustainable Development Network Vice Presidency Unit Team Award of 2013. The program was also featured on the main World Bank website.<sup>[1]</sup>

The SHS program itself garnered widespread media attention. It was the subject of an article by the President of the World Bank for a Bloomberg Op-Ed.<sup>[2]</sup> The program was covered by Al-Jazeera<sup>[3]</sup> and was featured by Renewable Energy World.<sup>[4]</sup>

Notes:

- [1] <http://www.worldbank.org/en/news/feature/2012/09/20/solar-power-lights-up-future-for-mongolian-herders>; <http://www.worldbank.org/en/results/2013/04/08/portable-solar-power-for-nomadic-herders>
- [2] web link: <http://www.bloomberg.com/news/2013-10-14/how-mongolia-brought-nomads-tv-and-mobile-phones.html>
- [3] <http://www.aljazeera.com/indepth/features/2013/12/mongolia-nomads-warm-solar-power-201312813468350849.html>
- [4] <http://www.renewableenergyworld.com/rea/home>

TABLE 2.1: SUMMARY OF PROGRESS IN THE RENEWABLE ENERGY SECTOR

ASTAE ACTIVITY		TYPE AND DETAILS OF ACTIVITY
<b>BANGLADESH</b>		
1	Showcasing Results in World Bank Supported Intervention in Bangladesh Electrification	A video highlighting beneficiaries of a rural electrification scheme was produced and showcased at a number of World Bank events and at a national exposition in Bangladesh that celebrated the installation of two million SHSs across the country.
<b>INDONESIA</b>		
2	Geothermal Power Development Program II	Technical assistance provided Indonesia's Pertamina Geothermal Energy (PGE) with best-practice experience on investment preparation and policy reform including steam drilling concepts, financial analysis and handling of safeguards and procurement issues. PGE also received training on geothermal investment preparation and project planning.
3	Building Innovation Capacity in Clean Energy in Indonesia	Several new approaches have been identified to help support the emergence of clean energy entrepreneurs and design an identification process that favors pro-poor and gender-sensitive clean energy market solutions in Indonesia. Lessons have been disseminated through website postings ( <a href="http://greeninnovation.or.id/">http://greeninnovation.or.id/</a> ) and at a workshop held in Jakarta in April 2013.
4	Renewable Energy Access Improvement	An inception report was presented to the government in February 2013 and two workshops have supported capacity building in least-cost electrification planning and geospatial mapping. An investment plan and funding prospectus were also prepared for renewable access projects in Flores (Nusa Tenggara Timur (NTT) province), NTT, and are currently being finalized in discussions with the PLN.
<b>MONGOLIA</b>		
5	Enhance Awareness of Electrification of Rural Herders through Solar Home Systems	A paper entitled " <i>Capturing the Sun in the Land of the Blue Sky: Providing Portable Solar Power to Nomadic Herders in Mongolia</i> " was published and two documentaries were produced showing how electricity has changed the lives of nomadic herders in Mongolia. The material was successfully circulated through internal and external World Bank distribution channels as well as among the project's key stakeholders. One of the films was shown at the Sustainable Development Network event in Washington, DC, in early 2013. It was the subject of an article by the President of the World Bank for a Bloomberg Op-Ed (web link: <a href="http://www.bloomberg.com/news/2013-10-14/how-mongolia-brought-nomads-tv-and-mobile-phones.html">http://www.bloomberg.com/news/2013-10-14/how-mongolia-brought-nomads-tv-and-mobile-phones.html</a> ).
6	Evaluation of Social Impacts of Mongolia Renewable Energy and Rural Electricity Access Project	Mongolia's Renewable Energy and Rural Electricity project was evaluated by surveying 800 nomadic herders who have benefited from the project. The study resulted in clear findings on the social impacts of the scheme and important lessons learned relating to income generation and improved standards of living.
<b>NEPAL</b>		
7	Sustainable Hydropower Development	Training workshops were conducted and consultants selected whose services have been made available to Nepal's Electricity Authority. Valuable assistance included advice on selecting the most cost-efficient and technically suitable turbine equipment for the Kali Gandaki hydropower project and ways to reach consensus on the scheme amongst Nepal's major political parties.
<b>PHILIPPINES</b>		
8	Electric Cooperatives Reform and Restructuring Phase II	The project has progressed well, with consultants selected who have helped Electric Cooperatives in the Philippines expand their purchases of indigenous renewable resources.
9	Renewable Energy policy Implementation Support	The activity supported implementation of critical elements of the policy and regulatory framework for renewable energy investment in the Philippines, including a portfolio of projects to be developed through the IBRD/Clean Technology Fund (CTF) Philippines Renewable Energy Development (PHRED) project.

Table 2.1 continued on page 29.



*ASTAE is working with consultants to help Electric Cooperatives in the Philippines expand their purchases of indigenous renewable resources.*

TABLE 2.1: SUMMARY OF PROGRESS IN THE RENEWABLE ENERGY SECTOR (CONTINUED)

ASTAE ACTIVITY		TYPE AND DETAILS OF ACTIVITY
<b>SOLOMON ISLANDS</b>		
10	Tina River Hydropower Development Project—Benefit Sharing and Technical Quality Assurance	Tina River Hydropower Development Project—Benefit Sharing and Technical Quality Assurance
<b>VIETNAM</b>		
11	Cumulative Impact Assessment on Small Hydropower Projects on River Cascades	A kick off workshop was held in August 2012 with all relevant Government and other stakeholders. World Bank e-procurement guidelines were subsequently applied to hire a qualified consultant firm to carry out an Inception and Screening Report that was submitted to the World Bank and Vietnam's Ministry of Industry and Trade (MOIT) in May 2013. The Government of Vietnam is reviewing the submission and a consultation workshop to discuss its findings is planned for late July.
<b>TONGA</b>		
12	Fundamentals of an Energy Roadmap in Small Island Developing States.	The implementation of this grant progressed well with the holding of an Energy Leaders' Summit in Tonga and a Pacific Energy Summit in New Zealand, both in March 2013. The events were well attended and succeeded in raising awareness about the ways in which renewable energy and energy efficiency can help address the energy challenges in the Pacific. One of the outcomes of the Summit was that Pacific island nations have secured pledges of 635 million NZ dollars (530.27 million U.S. dollars) in funding for renewable energy projects aimed at breaking their dependence on imported fossil fuels.
13	Fundamentals of an Energy Roadmap in Small Island Developing States.	The grant ensured the effective implementation of the TERM Implementation Unit (TERM-IU), a project that has improved the efficiency of electricity supply and use, developed grid-connected electricity using renewable energy resources, and expanded access to quality electricity services into remote areas.



An ASTAE-funded program in Vietnam helped operationalize the ROADCo.

# ASTAE

## THREE

## ENERGY EFFICIENCY

Energy-efficiency improvements can cut peak load demand, decrease energy consumption, and reduce the need to build new power plants. By making power generation, buildings, and vehicles more efficient, countries can lessen their reliance on imported fuel sources, free up government funds for spending elsewhere, and pass generation savings onto businesses and consumers.

Energy-efficiency improvements can be achieved through means such as improved electricity generation, energy demand management, or the use of clean, efficient cook stoves. By supporting energy efficiency programs, ASTAE is helping EAP and SAR countries improve their energy security, cut GHG emissions, and extend saved energy into off-grid communities.

In FY13, ASTAE allocated 23 percent of its funds to energy efficiency activities. Over the course of the FY2012–15 Business Plan period, these programs have resulted in cumulative electricity generation savings of 2,980 GWh and quantity savings of 350 MW.

### FY13 New Regional Energy Efficiency Program Highlights

An ASTAE-funded initiative in the World Bank's SAR region provided technical assistance to help SAR countries identify cost-effective measures to mitigate short-lived climate pollutants (SLCPs). Black carbon emissions from South Asia arise mainly from transport, industrial sources, biomass combustion for cooking and open burning, and inefficient diesel generators and brick kilns. A dedicated strategy to mitigate SLCPs is important as the emission of particulates in SAR countries is beyond safe levels. In FY13 ASTAE financed the initial phase of the program focused on **Bangladesh, India, and Nepal**. In India, ASTAE's activities centered on the transport sector, while in **Bangladesh and Nepal**, ASTAE assisted programs that focus on advancing energy efficiency in rural agriculture and clean cook stoves.

### Ongoing Energy Efficiency Programs in the FY 2012-15 Business Plan Period

The **Maldives** is one of the world's countries that is most vulnerable to climate change. In FY13, an ASTAE-funded Clean Energy Development and Regulatory Support project helped the country move towards its goal of becoming the world's first carbon-neutral country by 2020. The ASTAE activity supported two projects. The Clean Energy for Climate Mitigation scheme helped the country reduce its dependence on imported fossil fuels by promoting the use of renewable energy resources and introducing energy efficiency measures in an island community. A second ASTAE-funded initiative assisted the government in developing a regulatory framework to strengthen the monitoring of the Maldivian utilities' performance and to ensure that an adequate, reliable, and affordable supply power is delivered to customers.



*In Bangladesh and Nepal, ASTAE assisted programs that focus on advancing energy efficiency in clean cook stoves.*

In Pakistan, ASTAE supported a Natural Gas Efficiency Project to reduce the high rate of gas losses (unaccounted-for gas – UFG) at one of the country’s two gas transmission/distribution utilities. Losses at Pakistan’s Southern Gas Company have traditionally run at about nine percent, as compared to one-to-two percent at better functioning gas plants. It has been estimated that at least 75 percent of the lost methane was leaked into the atmosphere. The ASTAE-funded project was designed to bring the utility’s UFG losses to about five percent. This will help reduce methane emissions, improve service delivery, and make natural gas more affordable. Specific ASTAE activities included producing an analysis of UFG data, facilitating discussions on organizational requirements for successful execution, and piloting residential consumer meter tests to better understand the nature and size of the problem of slowing meters. The ASTAE initiative also provided support to IBRD and IDA pilot projects that focus on energy efficient consumer appliances.

### Ongoing Regional Energy Efficiency Activities

An ASTAE-funded program in Vietnam helped operationalize the ROADEO I (Road Emissions Optimization) tool for integration into the country’s Road Asset Management Program and the next phase will be focused on a regional study with regional dissemination. Designed by the World Bank with support from ASTAE, the ROADEO tool helps planners, road designers, and construction managers manage and mitigate GHG emissions. In FY13, the toolkit was field tested to determine user friendliness and readiness for full-scale operation. Designed to be easily adaptable, the ASTAE-funded pilot study in Vietnam is generating important lessons that will be shared in other countries.

TABLE 3.1: SUMMARY OF PROGRESS IN THE ENERGY EFFICIENCY SECTOR

ASTAE ACTIVITY		TYPE AND DETAILS OF ACTIVITY
<b>BANGLADESH</b>		
1	Household Energy in South Asia Region	Activities resulted in the adoption of a household energy component in the World Bank's Rural Electrification and Renewable Energy Development II (RERED II). The grant supported consultants who placed a particular focus on a gender-responsive household fuel component, identified and suggested activities to address capacity gaps in the implementing agency, and supported development of a technical standards committee to ensure cook stoves are of optimal quality.
<b>MALDIVES</b>		
2	Clean Energy Development and Regulatory Support	The grant helped develop a regulatory framework to strengthen the monitoring of the Maldivian utilities' performance that was completed and presented in June 2012. Feedback was very positive. The reporting period has also been procurement-heavy, with the signing of a grid-connected solar Photovoltaic (PV) system contract and consultancies created in the areas of energy conservation and efficiency improvement and technology assessments.
<b>PAKISTAN</b>		
3	Natural Gas Loss Reduction	The Natural Gas Loss Reduction project supported by this grant became effective in October 2012, and, despite organizational challenges faced by the implementing agency, is progressing in helping to reduce the unaccounted-for natural gas losses down to about 5 percent from the current rate of 9 percent. A new Project Director and a new Project Manager for the project assumed their posts in June 2013.
<b>REGIONAL/EAST ASIA:</b>		
4	Greenhouse Gas Emission Mitigation in Road Transport: Toolkit Implementation and Life-Cycle Analysis	This grant was activated at end of FY12 and is scheduled to conclude in December 2014. Task teams have theoretically agreed on two project sites at which to demonstrate the ROADEO I (Road Emissions Optimization) tool that was developed with ASTAE previous finance which helps planners, road designers, and construction managers manage and mitigate GHG emissions.
<b>REGIONAL/SOUTH ASIA</b>		
5	Mitigation Options for Short-Lived Climate Pollutants in South Asia	The contracting of the first activity (Transport in India) is under preparation with discussions taking place with the University of California San Diego and The Energy and Resources Institute (TERI) of India. The objective of this activity is to convene stakeholders and experts concerned with public health, environmental damage, climate change, environmental justice, economic development, and transport industry competitiveness; and to develop an action agenda of scientific research, technology development, policy intervention, and innovative pilot programs to reduce black carbon and ozone precursor emissions from India's transportation sector.



In FY13  
ASTAE dedicated 37  
percent of its allocations  
to energy access  
programs.

# ASTAE

## FOUR

## ENERGY ACCESS

Lack of access to quality energy services entrenches poverty, constrains the delivery of social services, limits opportunities for women and girls, and erodes environmental sustainability at the local, national, and global levels. By improving electricity supply and distribution, governments can boost economic growth, create jobs, and expand the reach of health and educational services to communities that still live off the grid. Energy access programs can also catalyze markets for clean, effective cook stoves, thereby reducing the negative health impacts caused by indoor pollution. By supporting projects that directly facilitate investments in energy access programs (such as the example in Box 4.1) ASTAE is contributing toward life-changing impacts, whether because of new opportunities opened by access to electricity or improved efficiency in daily tasks made possible by the use of powered tools and appliances.

In FY13 ASTAE dedicated 37 percent of its allocations to energy access programs. Over the FY2012-15 period, ASTAE initiatives have resulted in nearly 1.2 million households gaining access to improved cooking or heat sources, and 558,000 households gaining access to new sources of electricity.

## FY13 New Energy Access Program Highlights

In **Bangladesh**, ASTAE helped develop a strategy and action plan for implementation of the improved cook stove component of the country's second Rural Electrification and Renewable Energy Development project (RERED II). Assistance provided by ASTAE included the financing of consultants who helped define the eligibility criteria for partner organizations, identified implementing agency capacity gaps, and suggested ways to harmonize quality standards for cook stoves. The ASTAE assistance is designed to protect poor households, and in particular the women and children who live in them, from the negative health impacts caused by emissions from traditional cook stoves.

In **Indonesia**, ASTAE financed a Clean Stove Initiative (CSI) that helped develop a scalable market for clean, energy efficient biomass stoves. Launched with the EAP's Infrastructure for Growth Trust Fund of Australian Government, the program focused on capacity building, policy development, piloting result based financing (RBF), and providing support to selected government action plans. In **Lao PDR**, where 96 percent of the population uses solid fuels for cooking, ASTAE financed the Lao Clean Stove Initiative which helped build local capacity to scale up the supply and use of improved cook stoves. The initiative included training government staff and cook stove producers and working with the private sector, academic institutions and non-governmental organizations to develop mechanisms to market clean-burning cook stoves. The Lao CSI, with other partners, also explores innovative health impact RBF based on market mechanisms.

## BOX 4.1

### ASTAE SUPPORT TO WORLD BANK PROGRAMS UNDER IMPLEMENTATION

#### PAPUA NEW GUINEA



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Access to electricity in Papua New Guinea (PNG) is essentially limited to major urban areas. The vast majority of the population that live in rural areas has very limited or no access to electricity. Papua New Guinea's government is tackling this problem by opening up competition in the country's electricity sector. In FY13 ASTAE continued to help develop a Third Party Access (TPA) code that will enable new electricity providers to connect to the country's existing transmission facilities. The national private sector participation scheme—which is being carried out with PNG's Independent Consumer and Competition Commission—is expected to increase household electricity access from current 10–12 percent rate to 70 percent by 2030. In FY13, at the PNG government's request, ASTAE provided additional financing to support the Department of Petroleum and Energy in developing a technical code as well as rules governing connection and access, including metering requirements.

An ASTAE-funded activity in **Indonesia** has helped ensure that social dimensions—such as gender equality and equity—are taken into consideration when designing energy access projects, including the above-mentioned cook stove activities and promotion of sustainable energy access in remote islands.

In **Vietnam**, an ASTAE initiative helped develop a comprehensive strategy to address the current financial performance constraints facing the country's power companies. Despite the impressive rate of electrification in Vietnam in recent years—96.3 percent of households had electricity access in 2008, up from 50.7 percent in 1996—there is growing concern of the ability of Vietnam Electric (EVN), the country's largest power company, and its subsidiaries to finance the large investment requirements required to meet growing demand, repay debt, and make timely payments for third party power purchases. ASTAE support is crucial for a sustainable power sector and ongoing power sector reform so that the impressive success in electrification will be maintained to provide reliable and high quality of power at affordable rate.

In **Tonga**, an ASTAE activity in FY13 provided quick, “just in time” technical assistance and other support to ensure the smooth implementation of a program to improve the efficiency of electricity supply and use, develop grid-connected electricity using renewable energy resources, and improve access to quality electricity services in remote areas. The major outcome of ASTAE support to the TERM Implementation Unit (TERM-IU) of the Tonga Energy Roadmap Institutional and Regulatory Strengthening (The TERM-IRFS) Project—will be an established framework for the Tonga project and toolkit for SIDS in other parts of the world to develop similar roadmaps for themselves. The project is the first ASTAE's RETF project, co-financed with Pacific Regional Infrastructure Facility (PRIF) of the Australian government. In the past, ASTAE supported the development of “Tonga Energy Road Map 2010–2020: Ten Year Road Map to Reduce Tonga's Vulnerability to Oil Price shocks and Achieve an Increase in Quality Access to Modern Energy Services in an Environmentally Sustainable Manner”, or “Tonga Energy Road Map (TERM)”. TERM employs a “whole-of-sector” approach as opposed

to isolated and disconnected interventions addresses improvements in petroleum supply chain and consideration of price hedging instruments, increased efficiency both in electricity supply and use, development of grid-connected renewable energy resources, improved access to quality electricity services in remote areas, reduced environmental impacts both locally and globally, enhanced energy security, and overall sector financial viability. Following the success of TERM, Vanuatu has recently developed a Vanuatu National Energy Road Map for 2013-2020 in March 2013.

### ASTAE Ongoing Regional Energy Access Activities

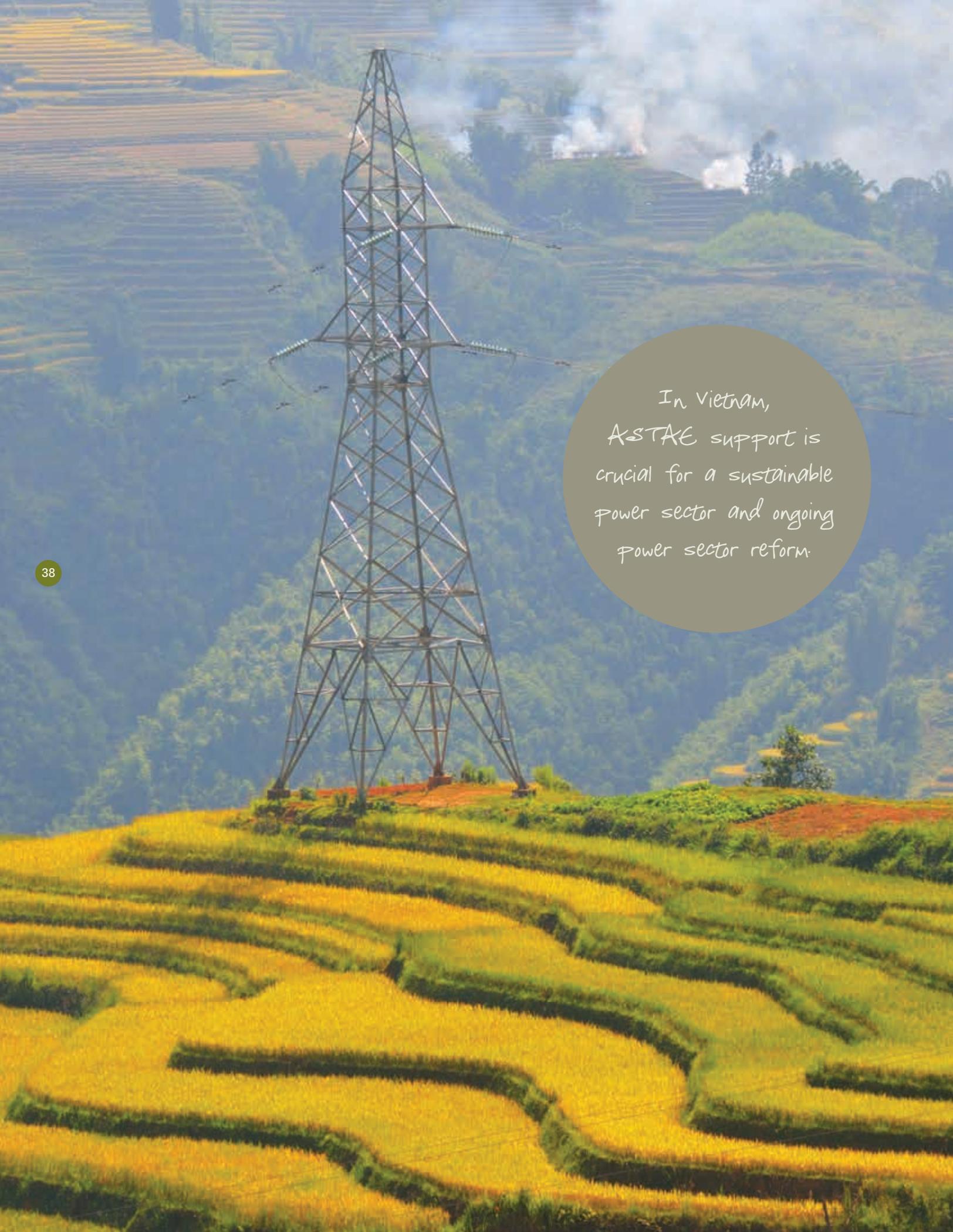
The SAR region recently launched an Umbrella Initiative on Access to Electricity that supports the UN's SE4ALL program. Given that India accounts for more than one-third of the 1.4 billion people worldwide without electricity, any progress toward electrification in the SAR region will be key to attaining the SE4ALL goals. In FY13 ASTAE support financed consultant inputs for the preparation of two World Bank papers. Power for All: Electricity Access Challenge in India examines the impressive advances India has made since 2002 toward its goal of universal access, and looks at the barriers that remain to be overcome. The Elite Capture: Domestic Tariff Subsidies in India paper analyzes the electricity consumption subsidies given to India's domestic consumers. Together, the papers constitute a knowledge foundation for the Umbrella Initiative, which will build upon and extend their findings to other countries in the region such as **Bangladesh** and **Nepal**.

In **India** and **Vietnam**, ASTAE is helping introduce a monitoring methodology with which to use satellite technology to monitor rural electrification efforts.

Table 4.1 on the next page provides a country-by-country summary of progress in achieving energy access in the countries with ASTAE activities.

In  
Indonesia,  
ASTAE financed a  
Clean Stove Initiative (CSI)  
that helped develop a scalable  
market for clean, energy  
efficient biomass stoves.





*In Vietnam,  
ASTAE support is  
crucial for a sustainable  
power sector and ongoing  
power sector reform.*

TABLE 4.1: SUMMARY OF PROGRESS IN THE ENERGY ACCESS SECTOR

ASTAE ACTIVITY		TYPE AND DETAILS OF ACTIVITY
<b>INDONESIA</b>		
1	Clean Stove Initiative, Support to the emergence of scalable biomass stoves markets	The Indonesia Clean Stove Initiative (Indonesia-CSI) was launched in early 2012 to help scale up access to clean and efficient cook stoves across Indonesia. The program has made significant progress toward the grant objectives over the course of FY13. Achievements include the holding of a second national consultation workshop and a technical committee meeting. The initiative also helped develop a roadmap that was endorsed by the client to achieve universal access to clean cooking. The roadmap will start with a pilot program and then envisions two consecutive national programs to eventually achieve universal access to clean cooking by 2030.
<b>LAO PDR</b>		
2	Clean Stove Initiative Phase 2	The grant helped establish the Inter-Ministerial Clean Stove Initiative (CSI) taskforce with the goal of increase the capacity of the government to scale up the use and supply of improved cook stoves, clean cook stove standards and labeling, and explore a potential of innovative health impact RBF.
<b>INDIA</b>		
3	Access to electricity solutions in South Asia	The grant has financed papers that have shed light on the Indian government's experience in implementing a rural electrification program and tackling inefficient domestic power subsidies. The papers have been well received by the government.
<b>PAPUA NEW GUINEA</b>		
4	Assessing the Key Elements for the Development of a Third Party Access Code for the Transmission and Distribution Networks in Papua New Guinea	This grant supported the PNG's Independent Consumer and Competition Commission (ICCC) in the development of a Third Party Access Code that will enable new electricity providers to connect to the country's existing transmission facilities. Consultants were hired to support the ICCC and reports were finalized. ASTAE provided additional financing to support the Department of Petroleum and Energy (DPE) in developing a complementary Grid Code.
<b>VIETNAM</b>		
5	Strategic Options for Enhanced Financial Performance of Vietnam's Electricity Companies	This grant supported the efforts of Vietnam Electricity (EVN) in developing a comprehensive strategy to address the current financial performance constraints facing the country's power companies. A project launch workshop attended by a broad range of stakeholders was held in June 2013, and work on the financial study progressed well.
<b>REGIONAL</b>		
6	Using Satellite Imagery to Monitor Progress of Rural Electrification	This activity followed-up on the Tracking Light from the Sky (TLS) Project that—focusing on Mali and Senegal—demonstrated that Satellite Imagery is a valid and efficient tool with which to track and monitor the progress of rural electrification projects. The ASTAE grant helped refine the TLS concept for pilot testing in India and Vietnam.

*Cross-sector activities are usually those that relate to energy but are handled, supervised, and implemented by teams from other sectors or units.*

# ASTAE

## FIVE

# ASTAE ACTIVITIES THAT CONTRIBUTE TO SUPPLEMENTARY THEMES

The FY2012–15 Business Plan formalizes ASTAE's contribution to supplementary themes that are now implemented and tracked by ASTAE in addition to its regular indicators.

These supplementary themes relate to the support and implementation of work that: (a) facilitates cross-sector interactions; (b) contributes to the integration of the energy-water-food security nexus; (c) enhances gender awareness and inclusion in projects; and (d) leverages private sector involvement.

Working on and including these supplementary themes is sometimes complex under regular World Bank operations, and teams that have to focus on time-bound and energy-related outputs and impacts have difficulty finding the time and resources to explore alternative ways to deliver beyond their core stakeholders, even when they are interested in trying new approaches.

Building on methods that have proven successful in mainstreaming alternative energies, ASTAE provides funding that can be used to add a component or a study related to these supplementary themes. Alternatively, funding can also be used to test a new idea or methodology that does not yet have a project application but that may be mainstreamed later. The latter option provides a chance for teams to take a risk that would not be possible under tight World Bank budgets but that could provide high rewards in future Bank operations.

## Facilitation of Cross-Sector Interactions

Cross-sector activities are usually those that relate in one manner or another to energy but are handled, supervised, and implemented by teams from other sectors or units than the energy sector.

In FY13, ASTAE funded three cross-sector activities with a combined total allocation of US \$823,190. A social sector initiative in Indonesia to promote renewable electricity access through the Renewable Energy for Electrification Project, support to the strengthening of a community benefit-sharing scheme related to the Tina Hydropower Project in the Solomon Islands, and a project to identify cost-effective measures to mitigate short-lived climate pollutants (SLCP) emissions in South Asia. ASTAE's continued attention to energy-related cross-sector collaboration will grow in coming years and is likely to be extended to other sectors, such as health, water, and agriculture.

## Energy-Water-Food Security Nexus

ASTAE funds activities that enhance the understanding and integration of the energy-water-food security nexus in World Bank programs. Activities under this nexus can be handled by energy teams or by teams from other sectors, in which case they are also considered to be cross-sector. For example, in FY 2013, ASTAE began working with the Social, Environment and Rural Sector of the EAP to explore the "greening" of export agriculture in the region. Subsequent scoping work has been carried out that focuses on various strategies and approaches to reduce the environmental footprint of export-oriented agriculture and to make policy instruments available to governments that will bring about more sustainable practices among farmers and agro-enterprises. ASTAE is also looking to integrate energy-water-food security considerations into benefit-sharing activities related to Tina River Hydropower Development Project in the Solomon Islands.

## Enhance Gender Awareness and Inclusion in Projects

The Operationalization of the World Development Report (WDR) 2012 on Gender validated ASTAE's traditional focus

## BOX 5.1 SOLAR HOME SYSTEM IMPROVES GENDER EQUALITY

### MONGOLIA



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The widespread adoption of SHSs and the subsequent improvements in access to electricity services have positively impacted intra-household dynamics, particularly in the area of gender inequality-related issues. The majority of the women interviewed in an ASTAE-funded survey indicated that their newly-gained access to stable electricity has translated into significant time-savings, which in turn, allow for increased time spent on personal care, parenting, learning and work diversification. Following the installation of SHSs, women indicated they have enjoyed a greater degree of freedom in making household-related decisions and that male herders are putting higher value on a woman's contribution towards the overall level of household income.

on gender-energy and led to ASTAE support to EAP Energy Gender Action Plan. Systematic engagement with the social teams in EAP began in FY12, with a contribution to the region's gender action plan that led to specific gender-related activities in the following fiscal year. With ASTAE's active encouragement, the task teams incorporate gender dimensions in ASTAE activities if appropriate (e.g., hand-held lighting products with solar power, clean cook stoves, gender aspects of service provision and expansion with Electric Cooperatives, etc.). An example of an initiative's success can be found in Indonesia, where the Leveraging Global Knowledge Networks for Innovation Capacity in Clean Energy Program has had a number of gender impacts. The program's Building Innovation Capacity in Clean Energy initiative featured a contest for entrepreneurs and two of the five companies that made it to the final round of the program were founded or co-founded by women entrepreneurs. Box 5.1 illustrates how the solar home systems used by nomadic herders in Mongolia have improved gender equality.

### Leverage Private Sector Involvement

The impact of ASTAE-funded activities on private sector development and involvement is only partially captured by the current monitoring system, which focuses on leverage of World Bank projects that, by definition, are primarily implemented with and often by governments or their state-owned utilities. From inception through the end of the previous Business Plan, ASTAE-supported Bank projects registered contributions of about US\$1.2 billion from the private sector; or roughly 22 percent of the total US\$5.2 billion leveraged, an amount equivalent to that provided by the governments. Indonesia's Leveraging Global Knowledge Networks for Innovation Capacity in Clean Energy Program has been promoting pro-poor private sector development (Box 5.2). Vietnam's strategic financial recovery of the electricity sector and PNG's third party access and grid codes as well as the Solar Market Development for Off-grid Access in Pakistan and Afghanistan and clean cook stoves activities in EAP and SAR will provide an enabling environment for private sector involvement.

**BOX 5.2****LEVERAGING GLOBAL KNOWLEDGE NETWORKS FOR INNOVATION CAPACITY IN CLEAN ENERGY****INDONESIA**

This pilot program was supported by the Green Growth Knowledge Platform of the World Bank. The main objective was to develop local capacity to support clean energy innovation in Indonesia by harnessing global knowledge networks. The three sub-objectives of the pilot were to create a new approach to supporting clean energy entrepreneurs; create a new approach to identifying clean energy opportunities, and designing and deploying pro-poor market solutions; and disseminate lessons learned on new approaches to clean energy innovation promotion in Indonesia and globally. In 2012, 20 clean energy startups were mentored and trained as a result of activities organized by the Ministry of Research and Technology.

**Low Carbon Growth**

ASTAE is at the forefront of promoting sustainable, inclusive green growth among its EAP and SAR client countries. ASTAE activities cover the entire green growth spectrum, and include helping governments devise strategies to avoid locking in unsustainable practices, access the finance with which to fund energy efficiency activities, and take advantage of promising new technologies. Salient examples include **Indonesia's** Leveraging Global Knowledge Networks for Innovation Capacity in Clean Energy Program and the Solar Market Development for Off-grid Access in **Pakistan** and **Afghanistan**, which focuses on promoting inclusive low carbon growth in poor communities. ASTAE also finances low carbon growth initiatives in SIDS such as the Maldives, PNG, and Tonga.



# ASTAE

## SIX

## PROGRESS ON FY 2012–15 PERFORMANCE INDICATORS

In addition to reporting on its activity disbursements and reporting on World Bank–related investment projects (see Appendix 4), ASTAE tracks a set of indicators showing the trajectory of its influence in supporting sustainable energy development.

The indicators were chosen to illustrate each pillar. Although they may not cover the pillar's entire spectrum—for example, there is more to renewable energy than generating electricity using renewable sources—the indicators convey the predominant trend. The indicators are usually available from World Bank project documentation and are therefore easily referenced from published sources. Appendix 2 provides a table linking all ASTAE activities disbursed in FY13 to the related World Bank projects, and shows their contributions to ASTAE indicators.

A project's achievements are measured as *direct* when they result from World Bank loans and grants and as *indirect* when the impacts are derived from country stakeholder actions supported by World Bank and ASTAE technical assistance. Indirect impacts are tracked when relevant, but no pledge is made on these because little influence may be claimed by ASTAE.

Contributions from all projects approved during the FY2012–15 Business Plan period are compiled to derive the indicators described below. Cumulative progress of all indicators against business plan targets is provided in Table 3.5 at the end of this chapter.

### Indicator 1: Total World Bank lending catalyzed by ASTAE activities

By providing advisory services and technical assistance, ASTAE informs the preparation and execution of major World Bank energy projects. Four ASTAE-supported projects were approved in FY13 by the Board for a total of US\$ 681 million. Some of these projects are linked to activities under ASTAE's prior business plans, others were approved during the current business plan. Added to FY12's leverage of US\$1,301 million, the cumulative FY2012–15 total is US\$ 1,982 million.

In FY12–FY13 ASTAE provided project preparation support for the cookstove component and support to solar mini-grid options of the World Bank-financed Rural Electrification and Renewable Energy Development II project (RERED II) in **Bangladesh**. As a result of RERED II, 558,000 households have gained access to new sources of electricity, and more than one million clean cook stoves were disseminated.

### Indicator 2: New capacity and increased generation of renewable electricity

By supporting projects that directly facilitate investments, ASTAE activities lead to increased capacity and generation from renewable sources. Table 6.1 provides the renewable electricity capacity and generation added during the first year of the FY2012–15 Business Plan period, both directly through World Bank loans and indirectly from investments facilitated by World Bank projects and ASTAE activities. While countries listed in the table are those in which ASTAE supported renewable-energy activities in FY13, not all ASTAE activities have yet resulted in an approved project or other progress on the related indicators.

**TABLE 6.1: RENEWABLE ELECTRICITY CAPACITY ADDED, BY COUNTRY (FY2012–15 BUSINESS PLAN PERIOD)**

COUNTRIES WITH ASTAE ACTIVITY IN RENEWABLE ENERGY	RENEWABLE ENERGY	
	CAPACITY (MW)	GENERATION (GWH)
BANGLADESH	61	N.A.
INDONESIA	-	1,208
MALDIVES	N.A.	N.A.
MONGOLIA	-	-
NEPAL	144	N.A.
PAPUA NEW GUINEA	N.A.	N.A.
PHILIPPINES	N.A.	N.A.
SOLOMON ISLANDS	N.A.	N.A.
TONGA	-	-
VIETNAM	N.A.	N.A.
REGIONALACTIVITIES	-	-
TOTAL	205	1,208

N.A.: Not available yet, project to go to Board in future years.  
 - : Not applicable—activity not expected to contribute to this indicator, or indicator not measurable.

In **Indonesia**, from FY08-FY11 ASTAE helped identify and prepare geothermal projects to be financed by the World Bank's FY12 Geothermal Clean Energy Investment Project. The World Bank scheme has contributed to ASTAE's renewable energy and CO2 mitigation indicators: Renewable energy generation capacity has increased by 1,208 GWh/y, and direct CO2 emissions of 22 million tons over 20 years have been avoided.

**Indicator 3: Electricity savings resulting from efficiency improvements**

ASTAE helps embed energy efficiency measures into World Bank programs and assists governments in taking energy efficiency into account as part of the policy planning process. Table 6.2 provides a summary of cumulative annual electricity savings that derive from ASTAE-supported World Bank projects once fully implemented. These estimates are calculated based on direct savings through World Bank loans or on indirect support by way of investments facilitated by World Bank and ASTAE technical support.

**TABLE 6.2: CUMULATIVE ELECTRICITY SAVINGS, BY COUNTRY, FY2012–15 BUSINESS PLAN PERIOD**

COUNTRIES WITH ASTAE ACTIVITY IN ENERGY EFFICIENCY	ENERGY EFFICIENCY (AVOIDED ELECTRICITY)	
	CAPACITY (MW EQUIVALENT)	GENERATION (GWH SAVED)
BANGLADESH	-	160
CHINA	-	0.00619
INDONESIA	N.A.	N.A.
LAO PDR	-	-
MALDIVES	-	-
PAKISTAN	350	2,820
PAPUA NEW GUINEA	N.A.	N.A.
PAKISTAN	-	-
PHILIPPINES	N.A.	N.A.
TONGA	N.A.	N.A.
VIETNAM	-	-
REGIONALACTIVITIES	N.A.	N.A.
TOTAL	350	2,980

N.A.: Not available yet, project to go to Board in future years.  
 - : Not applicable—activity not expected to contribute to this indicator, or indicator not measurable.

In **Pakistan**, ASTAE in FY12 provided assistance to the gas utility in the start-up phase of the World Bank-financed Natural Gas Efficiency Project. The World Bank project has since contributed toward success in ASTAE's third indicator: Electricity savings resulting from efficiency improvements. To date, the project has brought cumulative energy savings equal to 2,820 GWh/y.

#### Indicator 4: Households with access to modern energy services

This indicator reflects ASTAE's success in extending access to modern energy services by measuring the number of households reached. The indicator comprises three sub-indicators: (a) the number of households receiving new access to electricity, (b) the number of households receiving improved electricity, (c) the number of households receiving improved access to efficient stoves for heating and cooking. Table 6.3 provides the available data on this indicator.

In addition to ASTAE's success in helping extend clean cooking solutions to more than one million people/households in Bangladesh (described in detail under the section on Indicator 1), an ASTAE program in Mongolia helped achieve success toward ASTAE's fourth indicator: Households with access to modern energy services. From FY08-09 ASTAE provided technical assistance to the government to analyze the sources of air pollution and provide suggestions for a program to improve heating in poor, per-urban areas of the capital, Ulaanbaatar. The government's subsequent Ulaanbaatar Clean Air Project has provided 175,000 households with improved heating solutions.

**TABLE 6.3: HOUSEHOLDS WITH ACCESS TO MODERN ENERGY SERVICES, BY COUNTRY, FY2012–15 BUSINESS PLAN PERIOD**

COUNTRIES WITH ASTAE ACTIVITY IN ACCESS TO ENERGY	HOUSEHOLDS WITH NEW OR IMPROVED ACCESS TO MODERN ENERGY SERVICES (NUMBER OF HOUSEHOLDS)		
	NEW ELECTRICITY ACCESS	IMPROVED ELECTRICITY ACCESS	IMPROVED COOKING AND HEATING ACCESS
BANGLADESH	558,000	N.A.	1,020,000
INDONESIA	N.A.	N.A.	N.A.
LAO PDR	N.A.	N.A.	N.A.
MONGOLIA	-	-	175,000
PAPUA NEW GUINEA	-	-	-
TONGA	N.A.	N.A.	N.A.
VIETNAM	-	-	-
REGIONAL ACTIVITIES	N.A.	N.A.	N.A.
TOTAL	558,000	0	1,195,000

N.A.: Not available yet, project to go to Board in future years.  
 - : Not applicable—activity not expected to contribute to this indicator, or indicator not measurable.

#### Indicator 5: Avoided greenhouse gas emissions

This indicator estimates the quantity of CO<sub>2</sub> emissions that would be avoided over 20 years (the conventional lifespan of projects or equipment) through ASTAE-supported World Bank projects. It determines the CO<sub>2</sub> equivalent saved directly and indirectly through the replacement of conventional thermal power plants with renewable energy and realizing the potential energy savings. Table 6.4 provides the available information on progress regarding this indicator.

TABLE 6.4: CO<sub>2</sub> MITIGATED, BY COUNTRY, FY2012–15 BUSINESS PLAN PERIOD

COUNTRIES WITH ASTAE ACTIVITY THAT MAY REDUCE GHG	CO <sub>2</sub> MITIGATED
	(MILLION TONS OVER 20 YEARS)
BANGLADESH	-
CHINA	32.1
INDONESIA	N.A.
MALDIVES	N.A.
MONGOLIA	-
NEPAL	N.A.
PAKISTAN	240.0
PAPUA NEW GUINEA	-
TONGA	N.A.
VIETNAM	8.2
REGIONAL ACTIVITIES	-
TOTAL	280.3

N.A.: Not available yet, project to go to Board in future years.  
 - : Not applicable—activity not expected to contribute to this indicator, or indicator not measurable.

### Indicator 6: Countries benefiting from ASTAE support

This indicator ensures that ASTAE resources are used in a balanced manner across all ASTAE countries, providing equal funding opportunities to large countries (for example, Pakistan, Indonesia, and Vietnam) and to smaller countries (such as Pacific Islands and Maldives). ASTAE financed activities in 12 countries out of the 15 targeted, in addition to regional activities. With four countries in South Asia and 8 in East Asia, the difference reflects the difference in number of countries between the two regions.

### Summary of ASTAE Progress towards the FY2012–15 Business Plan Targets

All ASTAE activities are designed to adapt to the wide variety of issues throughout the region, as well as to the country context. Table 6.5 provides a summary of all indicators discussed in this chapter.

### Looking Ahead

This second year of ASTAE's MDTF has provided targeted support in a number of key areas, ranging from the household level to the financial sustainability of entire power sectors. ASTAE activities spanned the entire project cycle, from early stage exploration to identify potential World Bank lending to critical support for project implementation and project evaluation. ASTAE also demonstrated its critical role in support of the UN SE4ALL objectives and the operationalization of WDR 2012 on Gender. This trend of ASTAE's operational focus and flexible just-in-time financing—a comparative advantage that complements the work of other trust funds that focused on more upstream program—will continue for the next years of the ASTAE MDTF.

TABLE 6.5: SUMMARY OF FISCAL 2012–15 BUSINESS PLAN TARGETS PLEDGED AND ACHIEVED

DIRECT INDICATORS	UNIT	VALUE PLEDGED	VALUE ACHIEVED	PROGRESS %
<b>1. TOTAL WORLD BANK LENDING CATALYZED BY ASTAE ACTIVITIES</b>				
PROJECTS AND PROGRAM LENDING	MILLION US\$	3,200	1,982	62
<b>2. NEW CAPACITY AND INCREASED GENERATION OF RENEWABLE ELECTRICITY</b>				
RENEWABLE ENERGY - CAPACITY	MW	1,500	205	14
RENEWABLE ENERGY - GENERATION	GWH/YEAR	3,000	1,208	40
<b>3. ELECTRICITY SAVINGS RESULTING FROM EFFICIENCY IMPROVEMENTS</b>				
ENERGY SAVINGS - CAPACITY	MW EQVT	1,000	350	35
ENERGY SAVINGS - GENERATION	GWH/YEAR	2,000	2,980	149
<b>4. HOUSEHOLDS WITH ACCESS TO MODERN ENERGY SERVICES</b>				
ACCESS TO ELECTRICITY (NEW)	HOUSEHOLD	2,000,000	558,000	28
ACCESS TO ELECTRICITY (IMPROVED)	HOUSEHOLD	1,000,000	0	0
IMPROVED STOVES FOR HEATING (COOKING AND SPACE)	HOUSEHOLD	5,000,000	1,195,000	24
<b>5. AVOIDED GREENHOUSE GAS EMISSIONS</b>				
DIRECT CO <sub>2</sub> AVOIDED OVER 20 YEARS	MILLION TONS	200	280	140
<b>6. COUNTRIES BENEFITING FROM ASTAE SUPPORT</b>				
NUMBER OF COUNTRIES	COUNTRIES	15	12	80
Note: <i>Direct</i> refers to values achieved, or expected to be achieved, in the course of World Bank–funded projects that benefited from ASTAE support.				



# ASTAE

## SEVEN

# ASTAE PUBLICATIONS, KNOWLEDGE SHARING AND WEBSITE

## Publications

ASTAE activities produce a number of outputs in various formats, depending on the target audience and the best way to deliver information to each audience. Most reports are by-products of activities funded by ASTAE, although some are the end products. When suitable, the products are published, printed, and widely distributed to a broader audience, including through ASTAE's website. Many reports are not published, mostly because they are confidential outputs delivered to partner countries. The purpose of each publication is to share—within and among countries in the region and beyond—the knowledge and experiences, especially innovative ones, generated by ASTAE activities.

During FY13, ASTAE published the six reports listed below:



*Capturing the Sun in the Land of the Blue Sky, Providing Portable Solar Power to Nomadic Herders in Mongolia (December 2012).* For centuries, Mongolian herders have lived a simple, nomadic lifestyle. Until recently, it was also a life without electricity. The Renewable Energy and Rural Electricity Access Project helped them transform their lives. REAP was an important factor of the Mongolian government's National 100,000 Solar Ger Electrification Program. The Program provided a vast, dispersed community of over half a million herders with access to modern forms of electricity through portable solar home systems. REAP was funded by the World Bank (including grants from IDA and GEF) and the Government of the Netherlands.



*Clean Stove Initiative Forum Proceedings, Phnom Penh, Cambodia (March, 2013)*

The clean stove initiative (CSI) forum is part of the World Bank's EAP CSI regional program. It focuses on achieving access to modern cooking and heating solutions in the EAP region, particularly through scaled-up access to advanced cooking and heating stoves for poor rural households. The vast majority of these households will likely continue using solid fuels to meet their cooking and heating needs beyond 2030. One of the objectives of the EAP CSI forum was to share results from implementing the first phase of the CSI. These included reports on initial stocktaking activities in the four participating countries (Indonesia, China, Lao PDR, and Mongolia) along with the intervention strategies used in each of them. Another objective was to promote collaboration, learning, and knowledge-sharing as the country initiatives move into their second phase. In each case, striking the right balance between market-based solutions with appropriately targeted subsidies was discussed at length.

*Lighting Rural India: Experience of Rural Load Segregation Schemes in States - Overview (May 2013)*

Irrigated agriculture has always been at the heart of India's Green Revolution. Therefore, traditionally, the power supply to agriculture has been heavily subsidized. This paper is an overview of the experience of different Indian states (such as Gujarat and Rajasthan) in improving the levels of their rural electrification efforts. It is based on the findings of a study in rural load segregation for lighting rural India.

The study focused on analyzing differences in approach to rural feeder segregation across Indian states and assessed the financial viability of each scheme. Due to the enormous costs involved, several states have undertaken programs of rural feeder segregation which involve separation of rural non-agricultural and agricultural consumers by connecting them to separate feeders (i.e., physically separating paid and nominally-paid loads).

According to the results of the study, in order to design the most optimal rural power supply system in India, a strategic framework should be outlined at the national level. In other words, it was evident that a “one size fits all” approach will not work across all Indian states due to the differences in local conditions and contexts of each state. These findings were presented to the Ministry of Power, the Ministry of Finance, the Central Electricity Authority, and the states of Gujarat, Rajasthan, Madhya Pradesh, Bihar, and Tamil Nadu.



*Lao PDR: Pathways to Cleaner Household Cooking in Lao PDR, An Intervention Strategy (May 2013).*

The Lao People’s Democratic Republic (PDR) has witnessed a steady rise in electricity service coverage over the past two decades. However, most households in Lao PDR still rely on firewood and charcoal as their main source of cooking energy. Available sources of alternative household cooking energy remain limited. These factors combine to pose health risks from exposure to indoor air pollution, especially among women and children. This report takes a closer look at the issue, and discusses cleaner, safer, and affordable sources of alternative household cooking energy.

The structure of this report reflects the directional organization of the study. Chapter two offers a detailed descriptive analysis of national- and regional-level household fuel-wood use, supplemented by a detailed analysis of fuel-wood consumption and expenditure among rural and peri-urban households. Chapter three discusses the health and gender-related issues linked to Indoor Air Pollution exposure resulting from use of energy-inefficient cook stoves. A detailed analysis of potential exposure and risk factors is given as an example, using data from the case study. Chapter four analyzes household demand for cook stoves and the supply chain in the case study area, while chapter five presents the intervention strategy to promote improved cook stoves. Chapter six proposes a complementary pilot project for promoting the use of household biogas systems utilizing an alternative financing approach. Finally, chapter seven provides conclusions.



*Indonesia: Toward Universal Access to Clean Cooking (June 2013)*

Indonesia’s household cooking fuels have undergone a dramatic shift in recent years, owing primarily to the government’s highly successful Kerosene-to-Liquefied Petroleum Gas (LPG) Conversion Program. However, its impact in poorer rural areas has been limited. Switching to LPG, electricity, and other modern fuels would be the most effective way to achieve clean cooking solutions, but these fuels are expensive, requiring costly stoves and delivery infrastructure that are beyond reach of most rural households. By contrast, many types of biomass can be freely collected from the local environment or purchased for significantly less than other fuels. Thus, large-scale fuel switching in rural areas is unlikely to occur until rural economies become substantially more developed. This

means that an estimated 40 percent of households will continue to rely on traditional biomass energy (especially fuel wood) to meet their daily cooking needs for years to come. This report presents an overview of household cooking fuels in Indonesia, including policy changes and other factors that influence fuel choices. It concludes by recommending an implementation strategy (including an innovative financing approach) and the next steps in helping Indonesia move toward universal access to clean cooking solutions by 2030.

## Knowledge Sharing

ASTAE is committed to capacity building and knowledge-sharing. Due to its vast experience, ASTAE has accumulated an impressive knowledge base, and is happy to assist other groups engaged in similar types of activities within the region.

As part of its knowledge-sharing activities, ASTAE has conducted seminars, workshops, and study tours. It has produced knowledge outputs such as technical guides, methodologies, atlases, and toolkits. ASTAE has also played an important role in facilitating dialogue with various stakeholders and donor coordination.

## ASTAE Website Development

The current ASTAE website contains a wealth of information about the program on topics such as its history, donors (past and present), objectives, delivery mechanisms, and leverage of World Bank operations. A complete list of ASTAE publications are also listed and available to be downloaded.

The monitoring and evaluation (M&E) portal contains select ASTAE funded activities which are clearly identified on a map. Hovering the mouse over any of these geo-tags will show the title of the activity. If clicked, information about the activity will be displayed on a webpage. These include the basic information about the activity (e.g., strategic pillar, objectives, status, etc.) as well as financial data, outcomes and outputs.

ASTAE is currently working on revamping its external website. This on-going venture is aimed at addressing

donor concerns as well as fixing internally-identified issues. The new layout of the website will be easier to navigate, and will feature information that is arranged in a logical sequence.

The new homepage will feature the following topical areas:

- Highlights (feature story with rotating photos representing the three pillars);
- Annual Status Report (latest copy);
- Multimedia (available photos and videos from recent activities);
- Upcoming events and activities; and
- Featured publications.

An improved M&E Portal with enhanced search capabilities is another important change in the redesigned website. The activities shown on the portal will be color-coded by pillar, and be searchable by country and/or pillar.

## Composition of ASTAE Team

The ASTAE team comprised the following members in FY13:

- Mr. Charles M. Feinstein, Sector Manager for the East Asia and Pacific Water and Energy Unit (EASWE), who has been the ASTAE Program Manager since July 2012;
- Ms. Jyoti Shukla, Sector Manager, South Asia Energy Unit (SASDE), who oversaw activities in South Asia;
- Ms. Natsuko Toba, Senior Economist in EASWE, who has been the ASTAE Coordinator since May 2010;
- Mr. Dejan Ostojic, Energy Practice leader in EASWE, who provided strategic support to the Program Manager and the coordinator for activities in East Asia and the Pacific;
- Mr. Laurent Durix, Senior Energy consultant, who provided technical support to the Program Manager and the Coordinator and now coordinates activities in South Asia; and
- Mr. Sivalingam Milton, Procurement Assistant, who provided office support.



**ASTAE**

# APPENDICES

FIGURE A1.1

## ASTAE Presence in the South Asia and East Asia and the Pacific Regions

### Appendix 1: ASTAE Countries at a Glance: Region Map

The map in Figure A1.1 shows the partner countries where ASTAE operates in the South Asia and East Asia and Pacific Regions. In this map, the World Bank SAR includes all countries to the west of Myanmar, while the other countries, including Myanmar itself are in the EAP region.



IBRD 38547  
 JANUARY 2011  
 This map was produced by the Map Design Unit of the World Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

APPENDIX 2:  
SUMMARY OF ASTAE ACTIVITIES, ALLOCATIONS AND LEVEL OF EXECUTION BY COUNTRY, FY12  
AND FY13

ASTAE ACTIVITY		TYPE AND DETAILS OF ACTIVITY	FY12 AND FY13 ALLO- CATIONS (US\$)	LEVEL OF EXECUTION (PERCENT OF ALLOCA- TION)
<b>GRAND TOTAL</b>			<b>8,855,154</b>	<b>59</b>
FY12 TOTAL			4,703,297	65
FY13 TOTAL			4,151,857	52
<b>BANGLADESH</b>			<b>125,000</b>	<b>34</b>
1	Household Energy Strategy in South Asia Region (Bangladesh)	<ul style="list-style-type: none"> <li>• Refocused on Bangladesh and decreased in funding</li> <li>• Provides support to RERED-II component on promoting clean and efficient biomass cook stoves</li> </ul>	120,000	31
2	Showcasing Results of World Bank-Supported Intervention in Rural Electrification	<ul style="list-style-type: none"> <li>• Support the production of a movie highlighting the successes of the Bank-funded Solar Home System program in Bangladesh</li> </ul>	5,000	100
<b>INDONESIA</b>			<b>1,945,000</b>	<b>51</b>
3	Building Innovation Capacity in Clean Energy	<ul style="list-style-type: none"> <li>• Support the emergence of clean energy entrepreneurs</li> <li>• Design an identification process that favors pro-poor and gender sensitive clean energy market solutions</li> <li>• Disseminate lessons learned in the process</li> </ul>	500,000	34
4	Geothermal Power Development Program II	<ul style="list-style-type: none"> <li>• Prepare the synthesis of lessons learned and highlight good practices related to investment preparation and policy reforms to be replicated in preparing quality future investments in Indonesia as well as globally.</li> <li>• Assist Pertamina Geothermal Energy (PGE) design and implement the activities within a technical assistance to achieve its ambitious geothermal development target.</li> <li>• Support the development of a new investment that will be financed through a future World Bank loan</li> <li>• Provide technical assistance for policy and regulatory reforms</li> </ul>	506,000	29
5	Renewable Energy Access Improvement	<ul style="list-style-type: none"> <li>• Support technology mapping and least-cost electrification plan</li> <li>• Prepare bankable prospectus for funding the financing gap through syndication</li> </ul>	450,000	80
6	Clean Stove Initiative: Support to the Emergence of Scalable Biomass Stoves Markets	<ul style="list-style-type: none"> <li>• Scale up access to clean and efficient biomass stoves through capacity building, policy development and supporting government action plans. --Prepare Result Based Financing pilot</li> </ul>	400,000	58
7	Integration of Social Dimension in Energy Access Projects	<ul style="list-style-type: none"> <li>• Highlight gender, cultural aspects, social exclusion etc. with regards to access to energy</li> <li>• Influence positive social transformation through inclusive practices</li> </ul>	200,000	68
<b>LAO PDR</b>			<b>400,000</b>	<b>82</b>
8	Clean Stove Initiative Part 2	<ul style="list-style-type: none"> <li>• Help build capacity to scale up use and supply of improved cook stoves through support the Lao Government develop cook stove standards and market development of improved cook stoves</li> </ul>	400,000	82

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<b>GRAND TOTAL</b>			<b>8,855,154</b>	<b>59</b>
FY12 TOTAL			4,703,297	65
FY13 TOTAL			4,151,857	52
<b>MALDIVES</b>			<b>200,000</b>	<b>29</b>
9	Clean Energy Development and Regulatory Support	<ul style="list-style-type: none"> <li>• Support the government for timely achievement of the Clean Energy for Climate Mitigation project</li> <li>• Help design a comprehensive regulatory framework</li> <li>• Build the capacity of the Maldives Energy Authority</li> </ul>	200,000	29
<b>MONGOLIA</b>			<b>209,000</b>	<b>32</b>
10	Enhance Awareness of Electrification of Rural Herders through Solar Home Systems	<ul style="list-style-type: none"> <li>• Raise the awareness in Mongolia of the impact and benefits of the 100,000 Solar Ger Electrification Program</li> <li>• Extract lessons of a successful example of applying internationally proven practices in rural electrification</li> </ul>	69,000	79
11	Evaluation of Social Impacts of Renewable Energy and Rural Electricity Access Project	<p>Study welfare impacts (including gender) of provision of solar home systems and renewable energy hybrid off-grid systems in rural areas.</p> <p>- Document lessons learned for future reference</p>	140,000	9
<b>NEPAL</b>			<b>320,000</b>	<b>87</b>
12	Sustainable Hydropower Development	<ul style="list-style-type: none"> <li>• Build local technical capacity in hydropower on geotechnical, risk management, and environmental issues and sediment management</li> <li>• Provide advisory services to the Bank-financed Rehabilitation of Kali Gandaki A Hydropower Plant</li> </ul>	320,000	87
<b>PAKISTAN</b>			<b>275,000</b>	<b>18</b>
13	Natural Gas Loss Reduction	<ul style="list-style-type: none"> <li>• Reduce the physical and commercial losses of gas in the pipeline system of one of the country's two gas transmission and distribution utilities</li> </ul>	100,000	50
14	Strategy to Scale-up Renewable Energy	<ul style="list-style-type: none"> <li>• Provide technical assistance to federal and provincial governments to develop a strategy to scale up the development of renewable energy resources</li> <li>• Identify priorities for future interventions</li> </ul>	175,000	0
<b>PHILIPPINES</b>			<b>800,000</b>	<b>95</b>
15	Electric Cooperatives Reform and Restructuring – Phase II	<ul style="list-style-type: none"> <li>• Help implement the Renewable Portfolio Standard</li> <li>• Encourage Electric Cooperatives (EC) to expand their purchases of renewable energy</li> <li>• Create of a Renewable Energy (RE) market for the trading of RE certificates to help ECs with above efforts</li> </ul>	300,000	100
16	Renewable Energy Policy Implementation Support	<ul style="list-style-type: none"> <li>• Help Electric Cooperatives (EC) with critical institutional issues related to Philippines Renewable Energy Development Project.</li> </ul>	500,000	92

APPENDIX 2:  
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<b>GRAND TOTAL</b>			<b>8,855,154</b>	<b>59</b>
FY12 TOTAL			4,703,297	65
FY13 TOTAL			4,151,857	52
<b>PAPUA NEW GUINEA</b>			<b>270,000</b>	<b>90</b>
17	Development of a Third-Party Access Code for Transmission and Distribution Networks	<ul style="list-style-type: none"> <li>Assess the key elements necessary for a third-party access code</li> <li>Support the Independent Consumer and Competition Commission in developing a code to facilitate a third party's (potential electricity providers) access to the existing transmission and distribution network</li> <li>At the request by the Government of Papua New Guinea, additional ASTAE support to help them develop Grid Code to complement the Third Party Access Code</li> </ul>	270,000	90
<b>SOLOMON ISLANDS</b>			<b>223,190</b>	<b>40</b>
18	Tina River Hydropower Development Project: Benefit-Sharing and Technical Quality Assurance	<ul style="list-style-type: none"> <li>Strengthen benefit-sharing arrangements negotiated with the affected community, and enhance the quality of technical design of the power generation facility</li> </ul>	223,190	40
<b>TONGA</b>			<b>520,000</b>	<b>82</b>
19	Tonga Energy Road Map Implementation Support for the Tonga Energy Road Map - Implementation Unit (TERM-IU)	<p>Recipient Executed</p> <ul style="list-style-type: none"> <li>Provide international experts for technical advice to the Tonga Energy Road Map Implementation Unit</li> <li>Undertake a feasibility study for tidal power system in Vava'u island</li> </ul>	400,000	100
20	Implementation Support for the Tonga Energy Road Map - Implementation Unit (TERM-IU)	<ul style="list-style-type: none"> <li>Mobilize consultants in the areas of technical knowledge, policy, institutional, and operational support to provide just-in-time support to TERM-IU</li> </ul>	120,000	21
<b>VIETNAM</b>			<b>900,000</b>	<b>97</b>
21	Cumulative Impact Assessment of Small Hydro-power Projects on River Cascades	<ul style="list-style-type: none"> <li>Screen all rivers for potential significant cumulative impacts</li> <li>Prepare detailed Cumulative Impact Assessment for selected rivers</li> <li>Develop joint operation rules for selected river</li> </ul>	450,000	96
22	Strategic Options for Enhanced Financial Performance of Vietnam's Electricity Companies	<ul style="list-style-type: none"> <li>Offer technical assistance to develop a comprehensive strategy for addressing the current financial performance constraints facing government power companies to promote sustainable power sector</li> </ul>	450,000	98
<b>REGIONAL ACTIVITIES</b>			<b>1,810,000</b>	<b>31</b>
23	Greenhouse Gas Emission Mitigation in Road Transport: Toolkit Implementation and Life-Cycle Analysis	<ul style="list-style-type: none"> <li>Extend the existing toolkit (developed by ASTAE) to include the road service phase for operations and maintenance</li> <li>Field test the toolkit to determine user friendliness and full-scale operation at all phases, including planning, design, and construction or rehabilitation</li> </ul>	300,000	84

APPENDIX 2:  
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<b>GRAND TOTAL</b>			<b>8,855,154</b>	<b>59</b>
FY12 TOTAL			4,703,297	65
FY13 TOTAL			4,151,857	52
<b>REGIONAL ACTIVITIES</b>			<b>1,810,000</b>	<b>31</b>
24	Access to Electricity Solutions in South Asia Region	<ul style="list-style-type: none"> <li>Examine the constraining factors to access expansion in lagging states in India and countries in South Asia</li> <li>Support the development of the access pillar of the South Asia energy team strategy and link with the Sustainable Energy for All (SE4ALL) program</li> </ul>	250,000	50
25	Using Satellite Imagery to Monitor Progress of Rural Electrification	<ul style="list-style-type: none"> <li>Validate technology by reviewing past electrification programs</li> <li>Develop a monitoring methodology for ongoing or future Bank-supported electrification programs.</li> </ul>	340,000	19
26	Fundamentals of an Energy Roadmap in Small Island Developing States	<ul style="list-style-type: none"> <li>Assist discussions among Pacific Island Countries (PICs) and development partners on how energy security of island nations can be enhanced by a comprehensive energy sector development approach or roadmap.</li> </ul>	220,000	38
27	Mitigation Options for Short-Lived Climate Pollutants in South Asia	<ul style="list-style-type: none"> <li>Utilize best international best practices to identify cost effective and practical measures to mitigate short-lived climate pollutants (SLCP)</li> <li>Raise awareness and facilitate consensus among policy-makers regarding co-benefits of mitigation of SLCPs within the region</li> </ul>	400,000	0
28	Solar Market Development for Off-grid Access in Pakistan and Afghanistan	<ul style="list-style-type: none"> <li>Increase uptake of quality, safe, clean, affordable and modern off-grid lighting for low income households in include Pakistan and Afghanistan</li> </ul>	250,000	3
<b>ADMINISTRATION, REPORTING AND KNOWLEDGE SHARING ACTIVITIES</b>			<b>796,964</b>	<b>97</b>
29	Fund Administration and Reporting Activities (7%)	<ul style="list-style-type: none"> <li>ASTAE staff</li> <li>Administrative and business development support</li> <li>Technical Advisory Group support</li> <li>Printing and editing services</li> </ul>	619,861	89
30	Central Administration (2%)	<ul style="list-style-type: none"> <li>Central Administration Fee</li> </ul>	177,103	123

## Appendix 3: Link between ASTAE Activities, Bank Projects, and ASTAE Indicators for Fiscal 2012–15

Table A3.1 links the ASTAE activities and the World Bank projects that contributed to the global ASTAE indicators in the FY2012–15 Business Plan period as discussed in Chapter 1.

**TABLE A3.1:**  
LINK BETWEEN ASTAE ACTIVITIES, BANK PROJECTS AND ASTAE FY2012–15 INDICATORS, AS OF FY13

ASTAE Activity (fiscal year when active)	World Bank Project (fiscal year approved)	Indicators					
		Investment leverage (US\$ million)	Renew- able-energy pillar	Energy efficiency pillar	Access pillar	CO <sub>2</sub> mitigation	Source of indicator
<b>BANGLADESH</b>							
<b>Household Energy in South Asia Region (FY12-FY13)</b> Initially aimed at the whole SAR, was refocused on Bangladesh in FY13 <ul style="list-style-type: none"> <li>Project preparation support on Cook stove component</li> <li>Support to solar mini-grids options</li> </ul>	<b>Rural Electrification and Renewable Energy Development II [RERED-II] (FY13)</b>	386	61 MW	160 MWh/year	New electricity: 558,000 Clean cooking 1,020,000		World Bank Project Appraisal Document -Annex 1-Result Framework
<b>CHINA</b>							
<b>Energy Efficiency Financing Promotion (FY09 and FY11)</b> <ul style="list-style-type: none"> <li>Draft an operations manual for IBRD loan on-lending to Chinese banks for energy-efficiency projects</li> <li>Determine eligibility of subprojects for financing, preparation procedures and appraisal, implementation, and general terms of sub loans</li> <li>Develop the monitoring and reporting system</li> </ul>	<b>Energy Efficiency Financing III Project – Additional Financing (FY12)</b>	428		0.59 million tons of coal equivalent annually		28.8 million tons over 20 years	World Bank Project Appraisal Document -Annex 1-Result Framework
<b>Shanghai- Jade Green Electricity Scheme (FY03-FY05)</b> <ul style="list-style-type: none"> <li>Access to international expertise and experience on green electricity scheme s.</li> <li>Technical assistance to setup and launch</li> </ul>							
<b>China Renewable Energy Scale-up Program (CRESP) Phase II and Shanghai Low-Carbon City Preparation (FY10-FY11)</b> <ul style="list-style-type: none"> <li>Support the preparation of CRESP Phase II and Shanghai Low-Carbon City, for project design on policy studies, technology improvements, and capacity building; as well as the planned IBRD project on renewable energy and energy efficiency.</li> </ul>	<b>Green Energy for Low-Carbon City in Shanghai (FY13)</b>	256		0.76 million tons of coal equivalent annually		0.76 million tons of coal equivalent annually	0.76 million tons of coal equivalent annually
<b>INDONESIA</b>							
<b>Geothermal Power Support Program (FY08–11)</b> <ul style="list-style-type: none"> <li>Assist in review, design, and consensus building for policy reforms in the geothermal sector</li> <li>Enhance government's capacity to integrate Clean Development</li> <li>Assist in identifying and preparing geothermal projects to be financed by World Bank loan</li> </ul>	<b>Geothermal Clean Energy Investment Project (FY12)</b>	574.7  Note: Not yet counted, allocated to fiscal 12–15 business plan	150 MW and 1,208 GWh/y  Note: MW already counted under fiscal 2007–11 business plan, but not GWh			22 million tons over 20 years (direct)  Note: Already counted under fiscal 2007–11 business plan	World Bank Project Appraisal Document -Annex 1-Result Framework

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LINK BETWEEN ASTAE ACTIVITIES, BANK PROJECTS AND ASTAE FY2012–15 INDICATORS, AS OF FY13

ASTAE Activity (fiscal year when active)	World Bank Project (fiscal year approved)	Indicators					
		Investment leverage (US\$ million)	Renew- able-energy pillar	Energy efficiency pillar	Access pillar	CO <sub>2</sub> mitigation	Source of indicator
<b>NEPAL</b>							
<b>Support to Sustainable Hydropower Development in Nepal (FY12–13)</b> <ul style="list-style-type: none"> <li>Build local technical capacity in hydropower on geotechnical, risk management, and environmental issues and sediment management</li> <li>Provide advisory services to the Bank-financed Rehabilitation of Kali Gandaki A</li> </ul>	<b>Kali Gandaki A Hydropower Plant Rehabilitation Project (FY13)</b>	30.36	61 MW	160 MWh/year	New electricity: 558,000 Clean cooking 1,020,000		World Bank Project Appraisal Document -Annex 1-Result Framework
<b>MONGOLIA</b>							
<b>Heating in Poor, Peri-Urban Areas of Ulaanbaatar (FY08–09)</b> <ul style="list-style-type: none"> <li>Technical assistance to the government to analyze the sources of air pollution, provide information on how to mitigate through cleaner stoves, and provide suggestions for an intervention strategy</li> <li>The ASTAE-published report was instrumental in gaining government and stakeholder acceptance of diagnostic and recommendations.</li> </ul>	<b>Ulaanbaatar Clean Air Project (FY12)</b>	21.94			175,000 households with improved heating solutions		World Bank Project Appraisal Document -Annex 1-Result Framework
<b>PAPUA NEW GUINEA</b>							
<b>Development of a Third Party Access Code for the Transmission and Distribution Networks (FY13)</b> <ul style="list-style-type: none"> <li>Assess the key elements necessary for a third-party access code and a grid code</li> <li>Support the Government in developing a code to facilitate a third party's (potential electricity providers) access to the network and an associated grid code</li> </ul>	<b>Energy Sector Development Project (FY13)</b>	9.25	No physical indicator, TA and capacity building only				World Bank Project Appraisal Document
<b>VIETNAM</b>							
<b>Support for the Energy Efficiency Demand-Side Management Program (FY10–11)</b> <ul style="list-style-type: none"> <li>Advisory assistance and capacity building to Ministry of Industry</li> <li>Workshops on business collaboration between Vietnamese and international energy services companies</li> <li>Identify opportunities for expansion of commercial energy-efficiency business</li> </ul>	<b>Clean Production and Energy Efficiency Project (FY12)</b>	4.15		0.36 million tons of oil equivalent per year		8.3 million tons over 20 years	World Bank Project Appraisal Document – Annex 1-Result Framework
NOTE: - = NOT APPLICABLE.							

## Appendix 4: ASTAE Donors, Resource Use, and Funding Events

### ASTAE Donors

ASTAE currently relies on the Netherlands, the United Kingdom and Sweden as donor countries for its budget. Previous ASTAE donors include Australia, Canada, Finland, Japan, Switzerland, and the United States.

#### The Netherlands: Ministry of Foreign Affairs (Development Cooperation)

ASTAE's principal funding source is currently the Netherlands, through its Ministry of Foreign Affairs (Development Cooperation). The Netherlands is a founding donor as well as a core ASTAE donor and since 1993 has contributed reliably to ASTAE's capacity to engage in sustained activities. The funding agreement for the FY2012–15 Business Plan period was signed in 2011 for US\$12 million.

The website for the Ministry of Foreign Affairs is <http://www.minbuza.nl/en>.

#### Sweden: Swedish International Development Agency

Sweden joined ASTAE donors in 2007 and since then has been a regular and welcome contributor to ASTAE. The funding agreement for the 2012-15 business plan period was signed in 2011 with the Bangkok office in charge of Asia for the equivalent of US\$6 million.

The website for the Swedish International Development Agency is <http://www.sida.se/English/>.

#### United Kingdom: Department of for International Development (DFID)

DFID re-joined ASTAE in September 2012 when the Administration Arrangement was signed for GBP 4 million for the ASTAE Business Plan for FY2012-2015.

The website of the DFID is:

<https://www.gov.uk/government/organisations/departement-for-international-development>

### ASTAE Resource Use

ASTAE used donor funds totaling US\$2,235,342 in FY12. Complementary World Bank resources for ASTAE-supported projects totaled US\$1,260,371 in FY13.

ASTAE has used US\$39.8 million in donor funds since 1992, an amount matched by the World Bank with US\$34.5 million during the same period. Table A4.1 provides details of resource use by year.

**TABLE A4.1: RESOURCE USE, WORLD BANK, AND DONORS, FY1992–2013**

YEAR	DONORS		WORLD BANK		TOTAL	
	US\$	%	US\$	%	US\$	%
FY92	108,000	32	226,400	68	334,400	100
FY93	827,087	66	419,100	34	1,246,187	100
FY94	1,399,635	67	688,100	33	2,087,735	100
FY95	1,309,063	56	1,046,000	44	2,355,063	100
FY96	2,057,058	56	1,618,924	44	3,675,982	100
FY97	1,705,817	59	1,197,128	41	2,902,945	100
FY98	1,617,777	59	1,126,683	41	2,744,460	100
FY99	1,782,576	61	1,156,346	39	2,938,922	100
FY00	2,627,480	63	1,524,004	37	4,151,484	100
FY01	955,281	46	1,106,035	54	2,061,316	100
FY02	2,108,541	66	1,106,035	34	3,214,576	100
FY03	2,205,111	64	1,239,633	36	3,444,744	100
FY04	1,014,358	25	3,013,893	75	4,028,251	100
FY05	2,704,306	44	3,450,703	56	6,155,009	100
FY06	1,959,983	38	3,169,070	62	5,129,053	100
FY07	1,216,589	30	2,827,968	70	4,044,557	100
FY08	1,847,757	45	2,258,369	55	4,106,126	100
FY09	2,177,200	53	1,915,042	47	4,092,242	100
FY10	2,123,893	54	1,820,321	46	3,944,214	100
FY11	2,603,947	67	1,301,789	33	3,905,736	100
FY12	960,043	48	1,034,339	52	1,994,382	100
FY13	2,235,342	64	1,260,371	36	3,495,713	100
<b>TOTAL</b>	<b>39,782,186</b>	<b>54</b>	<b>34,506,253</b>	<b>46</b>	<b>74,288,439</b>	<b>100</b>

## FUNDING EVENTS

Details on the principal ASTAE funding events over the past decade are provided in Table A4.2.

TABLE A4.2: PRINCIPAL ASTAE FUNDING EVENTS SINCE 2004

YEAR	MONTH	DONOR	EVENT	AMOUNT (US\$)
2004	March		ASTAE Donors Meeting #13	
	March	United Kingdom	DFID Tranche #6	363,351
	March	Canada	CIDA Tranche #2	563,562
	May	Netherlands	Commitment ASTAE Phase 3 Funding 2004–06 (€ 3.3 million)	
	October	Canada	CIDA Tranche #3	591,871
2005	January	Netherlands	Dutch Partnership Trust Fund Phase 3 Tranche #1	1,454,500
	February	Canada	CIDA Tranche #4	202,544
	March		ASTAE Donors Meeting #14	
	May	Netherlands	Commitment for ASTAE II Funding 2006–08	
2006	March		ASTAE Donors Meeting #15	
	May	Netherlands	BNPP Agreement signed for ASTAE II, 2006–09	
	July	Netherlands	BNPP Tranche #1, ASTAE II	2,598,540
2007	March	Germany	ASTAE Donors Meeting #16	
		Sweden	Commitment by Swedish International Development Agency (SKr 15 million; equivalent to US\$2,355,00)	
	December	Netherlands	BNPP Tranche #2 - ASTAE II	1,113,660
2008	February	United States	ASTAE Donors Meeting #17	
	February	Sweden	First Tranche of Sida Commitment	553,435
	June	Netherlands	BNPP Tranche #3 - ASTAE II	1,856,069
2009	April	United States	ASTAE Donors Meeting #18	
	February	Sweden	Second Tranche of Sida Commitment	436,620
	June	Netherlands	BNPP Tranche #4 - ASTAE II	1,856,069
2010	April	United States	ASTAE Donors Meeting #19	
	January	Sweden	Third Tranche of Sida Commitment	389,414
	June	Sweden	Fourth Tranche of Sida Commitment	489,256
	December	Netherlands	ASTAE-II Trust Fund closing	
2011	February	Sweden	ASTAE Sida Trust Fund closing	
	February	World Bank	ASTAE Multidonor Trust Fund (MDTF) created	
	March	United States	ASTAE Donors Meeting #20	
	March	Netherlands	Ministry of Foreign Affairs commitment to MDTF for \$12 million	
	April	Netherlands	ASTAE-II Trust Fund end of disbursements	
	June	Sweden	ASTAE Sida Trust Fund end of disbursements	
	July	World Bank	ASTAE MDTF Effective	
	August	Netherlands	Netherlands Tranche #1	8,000,000
	December	Sweden	Sida Commitment for SKr 40 million	
	December	Sweden	Sida Tranche #1	2,905,625
	2012	May	United States	ASTAE Donors Meeting #21
August		Netherlands	Netherlands Tranche #2	2,000,000
September		Sweden	SIDA Tranche #2	752,078
November		United Kingdom	DFID Tranche #1	4,650,358
November		Sweden	SIDA Tranche #3	1,504,156

Note: BNPP = Bank-Netherlands Partnership Program; CIDA = Canada International Development Agency; DFID = U.K. Department for International Development; MDTF = multidonor trust fund; Sida = Swedish International Development Agency; SKr = Swedish kronor.

## Appendix 5: ASTAE-Supported World Bank Investment Projects in East Asia and Pacific and South Asia

ASTAE's leveraging of World Bank investments is illustrated by showing the World Bank projects that have benefited from ASTAE support since its inception. These are detailed in Table A5.1 (active projects) and Table A5.2 (closed projects).

**APPENDIX TABLE A5.1: ASTAE-SUPPORTED WORLD BANK INVESTMENT PROJECTS UNDER IMPLEMENTATION**

Country	Projects	Approval-End date (estimated)	Sustainable Energy Project Cost (US\$ million)						Primary Project Component		
			Total cost	Source of financing							
				IBRD/ IDA	GEF	Govt.	Private	Other			
<b>Total for Projects under Implementation</b>			<b>4,654</b>	<b>2,143</b>	<b>116</b>	<b>1,183</b>	<b>821</b>	<b>390</b>			
	Nepal	Kali Gandaki A Hydro-power Plant Rehabilitation	04/13–FY17	30.4	27.3		3.1			Hydropower rehabilitation	
	China	Green Energy for Low-Carbon City in Shanghai	02/13–FY19	256.0	100.0	4.4	151.7			Urban low carbon option, building and electricity generation	
	Papua New Guinea	Energy Sector Development Project	01/13–FY17	9.2	7.3	0.9	1.1			Sector development for increased access to electricity	
	Bangladesh	Rural Electrification and Renewable Energy Development II	08/12–FY19	386.0	155.0		3.5	90.2	137.3	Access to SHS, improved cooking stoves	
<b>TOTAL FY13</b>				<b>681.6</b>	<b>289.6</b>	<b>5.3</b>	<b>159.3</b>	<b>90.2</b>	<b>137.3</b>		
FY12	47	Indonesia	Geothermal Clean Energy Investment Project	07/11–FY16	574.7	175.0		274.7		125.0	Investment in geothermal power generation capacity
	46	Pakistan	Natural Gas Efficiency Project	04/12–FY18	272.0	200.0		72.0			Reduce physical and commercial gas losses
	45	Mongolia	Ulaanbaatar Clean Air Project	04/12–FY17	21.9	15.0		6.9			Access to energy-efficient heating stoves
	44	Vietnam	Clean Production and Energy Efficiency Project	07/11–FY16	4.1		2.3	1.8			Energy efficiency and energy services companies
	43	China	Energy Efficiency Financing III Project	09/11–FY17	428.0	100.0		200.0	128.0		Energy efficiency in medium and large industrial enterprises
FY10	42	Lao PDR	Rural Electrification II	01/10–FY14	37.6	24.4	1.8	4.0	3.4	4.0	Increase rural households' access to electricity
	41	India	Financing Energy Efficiency in SMEs	05/10–FY14	57.6		11.3	0.3	46.0		Increased energy efficiency in small and medium enterprises
	40	China	Energy Efficiency Financing II	06/10–FY15	101.6	100.8		0.8			Catalyze commercial investments in industrial energy efficiency
	39	Vietnam	System Efficiency Improvement, Equitization and Renewables, additional financing	06/10–FY13	3.5	3.5					Renewable energy and demand-side management
FY09	38	Solomon Islands	Solomon Islands Sustainable Energy	07/08–FY13	4.5	4.0		0.5			Electricity loss reduction and increased access
	37	Philippines	Additional Financing for Rural Power	04/09–FY13	48.4	40.0	0.5			7.9	Renewable energy for rural applications

APPENDIX TABLE A5.1: ASTAE-SUPPORTED WORLD BANK INVESTMENT PROJECTS UNDER IMPLEMENTATION

Country	Projects			Approval-End date (estimated)	Sustainable Energy Project Cost (US\$ million)						Primary Project Component
					Total cost	Source of financing					
						IBRD/ IDA	GEF	Govt.	Private	Other	
Total for Projects under Implementation					4,654	2,143	116	1,183	821	390	
FY09	36	Vietnam	Renewable Energy Development	05/09–FY15	318.0	202.0		64.0	49.7	2.3	Increased renewable-energy share in electricity mix, technical assistance, and lending
	35	China	Thermal Power Efficiency	05/09–FY16	109.0		19.7	15.5	73.8		Efficient dispatch and increased thermal plant efficiency
	34	Vietnam	Rural Energy II - Additional Financing	05/09–FY16	250.6	200.0		38.8		11.8	Improved and new electricity access
	33	Indonesia	Geothermal Power Generation Development	05/08–FY13	9.0		4.0	5.0			Geothermal power scaling up, and capacity building
	32	China	Energy Efficiency Financing	05/08–FY13	593.6	200.0	13.5	6.3	373.8		Energy efficiency for industry
	31	China	Liaoning Third Medium Cities Infrastructure	05/08–FY13	375.9	191.0		184.9			Improved efficiency of heating and gas services
	30	Vietnam	Rural Distribution	05/08–FY13	204.2	150.0		54.2		3.0	Electricity network efficiency improvement
FY07	29	Pacific Islands	Sustainable Energy Financing	05/07–FY16	58.5		9.5	20.2	22.1	6.7	Renewable energy scaling up
	28	Vietnam	Rural Energy II	11/04–FY14	329.5	220.0	5.3	70.0		35.0	Renewable energy for remote communities
	27	China	Heat Reform and Building Efficiency	03/05–FY14	52.6		18.0	0.9	33.7		Energy efficiency
FY04	26	Philippines	Rural Power	12/03–FY13	26.7	10.0	9.0	0.2		7.5	Renewable energy for rural applications
	25	Philippines	Power System Loss Reduction	06/04–FY14	62.3		12.0	0.3		50.0	Rural electrification and efficiency
FY02	24	Vietnam	System Efficiency Improvement, Equitization and Renewables	06/02–FY13	24.5	17.2	4.5	2.8			Renewable energy and demand-side management

Note: GEF = Global Environment Facility; IBRD = International Bank for Reconstruction and Development; IDA = International Development Association; PDR = People's Democratic Republic; SME = small and medium enterprises.

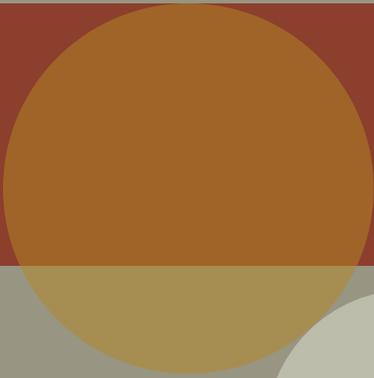
APPENDIX TABLE 5-2: PAST ASTAE-SUPPORTED WORLD BANK INVESTMENT PROJECTS

Country	Projects	Approval-End date (estimated)	Sustainable Energy Project Cost (US\$million)					Primary Project Component	
			Total cost	Source of financing					
				IBRD/IDA	GEF	Govt.	Private		Other
<b>TOTAL FOR CLOSED PROJECTS</b>			1,292	305	142	232	463	145	
Mongolia	Renewable Energy and Rural Electricity	01/07–06/12	23.0	3.5	3.5	10.0		6.0	Renewable energy and rural electricity access
Timor-Leste	Gas Seep Harvesting	03/07–12/11	1.5	0.9	0.6				Gas seep for power generation
Timor-Leste	Energy Service Delivery	06/07–06/12	8.5	4.5		2.0	2.0		Loss reduction, renewable-energy development, and community-based access
China	Renewable Energy Scale-Up Program P1	01/06–12/11	132.4	86.3		30.1	16.0		Wind farm and small hydro
Lao PDR	Lao PDR Rural Electrification (SPRE II)	04/06–03/12	36.3	10.0	3.7	8.2		14.3	Renewable energy for rural application
Cambodia	Rural Electrification and Transmission	12/03–01/12	32.0	16.0	5.8			10.2	Renewable energy for rural applications
Papua New Guinea	Teachers Solar Lighting Project	06/05–08/10	2.9		1.0	0.1	1.7	0.1	Renewable energy (photovoltaic) for teachers in rural areas
China	Renewable Energy Scale-Up Program	06/05–09/10	336.0	87.0	40.2	42.0		67.0	Renewable energy and energy efficiency
Vietnam	Demand-Side Management	06/03–06/10	18.6		5.5	1.2	6.7	5.2	Demand-side management support
China	Energy Conservation II	10/02–06/10	242.5		26.0		216.5		Energy services company market development
China	Hebei Urban Environment	06/00–06/08	5.0	4.0		1.0			Energy efficiency in water utilities
Vietnam	Rural Energy I	05/00–12/06	2.5	1.0				1.5	Renewable energy, technical assistance, and pilot mini hydro
China	Renewable Energy Development	01/98–06/07	205.4	13.0	27.0		165.4		Wind farms, photovoltaic, photovoltaic technology improvement
Vietnam	Transmission, Distribution, and Disaster Reconstruction	01/98–06/07	3.3			0.5		2.8	Demand-side management, capacity building, equipment standards
China	Energy Conservation	03/98–06/06	150.8	63.0	22.0	7.0	54.3	4.5	Energy efficiency, technical assistance
China	Passive Solar Heating for Rural Health Clinics	06/01–06/04	1.5		0.8	0.8			Energy-efficient building design
Lao PDR	Southern Provinces Rural Electrification	03/88–06/04	2.2	1.0	0.7	0.5			Solar battery charging and micro hydro projects
Thailand	Metropolitan Distribution Reinforcement	06/97–06/04	4.0			2.5		1.5	Demand-side management, capacity building
Indonesia	Solar Home Systems	01/97–06/04	3.4	0.1	2.3		1.0		Solar home systems and technical assistance
Vietnam	Power Development	02/96–06/00	1.6	0.5				1.1	Renewable-energy capacity building

APPENDIX TABLE 5-2: PAST ASTAE-SUPPORTED WORLD BANK INVESTMENT PROJECTS

Country	Projects	Approval- End date (estimated)	Sustainable Energy Project Cost (US\$million)					Primary Project Component	
			Total cost	Source of financing					
				IBRD/ IDA	GEF	Govt.	Private		Other
<b>TOTAL FOR CLOSED PROJECTS</b>			1,292	305	142	232	463	145	
Indonesia	Second Rural Electrification	02/95–09/00	19.3	13.3		6.0		Mini hydro, geothermal resource assessment	
Thailand	Distribution System and Energy Efficiency	04/93–06/00	59.3		8.0	20.3	31.0	Demand-side management, capacity building	
Lao PDR	Provincial Grid Integration	10/92–01/00	0.9	0.9				Demand-side management, institution building	
Vietnam	Power Development	02/96–06/00	1.6	0.5			1.1	Renewable-energy capacity building	
Note: GEF = Global Environment Facility; IBRD = International Bank for Reconstruction and Development; IDA = International Development Association; PDR = People's Democratic Republic.									





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