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# Advancing Sustainable Energy

## UN-Energy Asia-Pacific



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In early 2012, UN-Energy Asia-Pacific was formed under the Thematic Working Group (TWG) on Environment Disaster Risk Management within the framework of the Asia-Pacific Regional Coordination Mechanism (RCM).

UN-Energy Asia-Pacific – composed of members of the TWG active in the field of energy and open to other non-UN organizations working on energy in the region – is the principal interagency mechanism to help ensure:

(1) coherence in the UN system's multi-disciplinary response to global mandates from, inter alia, the World Summit on Sustainable Development (WSSD) and the Rio+20 Conference, and

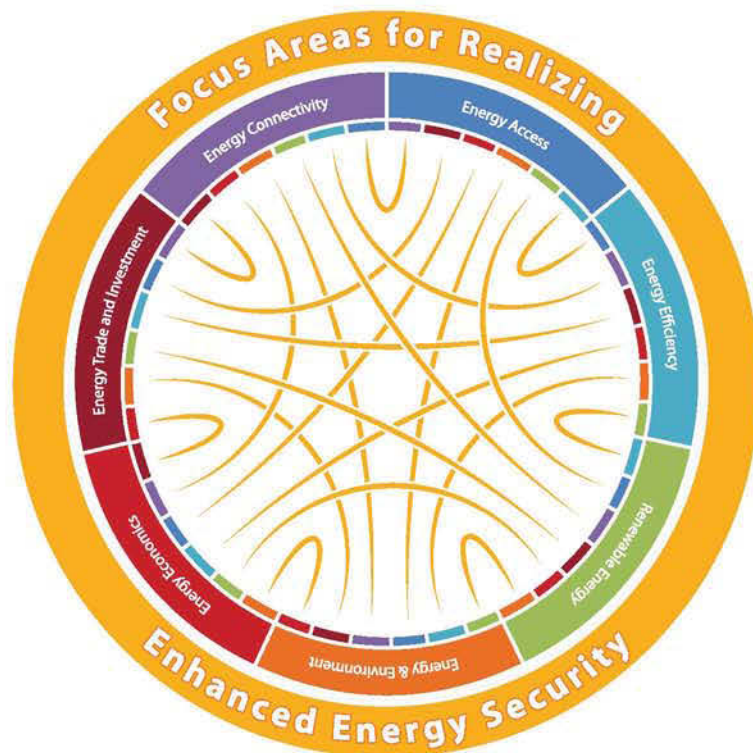
(2) collective engagement of non-UN energy stakeholders in the Asia-Pacific region.

UN-Energy Asia-Pacific is a part of UN-Energy.

Current members include ADB, ESCAP, FAO, UNCCD, UNCDF, UNDP, UNEP, UNESCO, UN-Habitat, UNIDO, WB and WHO.

To join UN-Energy Asia-Pacific, please contact the secretariat at: [escap-esdd-ers@un.org](mailto:escap-esdd-ers@un.org)





## Foreword



Advancing Sustainable Energy: UN-Energy Asia-Pacific is a concise, up-to-date compilation of the vision, strategy and activities on energy, of 10 international organisations in Asia and the Pacific.

UN-Energy Asia-Pacific is a regional group under the global UN-Energy network, created to promote more efficient, coherent and coordinated actions of UN and non-UN organisations, working in Asia and the Pacific on the issues of energy for sustainable development.

The information gathered in this booklet will help all stakeholders in understanding our available resources, and inspire ideas for improving and initiating partnerships between countries, the United Nations, and all development partners, including civil society organisations and businesses.

On behalf of ESCAP, the secretariat for UN-Energy Asia-Pacific, I would like to extend my gratitude to the agencies and focal points who have provided this important information.

The energy future we all want is one of equity, efficiency and resilience. Regional cooperation must be strengthened, and UN-Energy Asia-Pacific is committed to working with all partners to make this future a reality.

**Noeleen Heyzer**  
Under-Secretary-General of the United Nations  
and Executive Secretary of ESCAP

# Regional Presence

## ASIA-PACIFIC REGIONAL PRESENCE

UN ESCAP

UN HABITAT

UNEP

UNDP

UNCDF

FAO

UNCCD

UNIDO

ADB

World Bank

X = regional office/institution location    ● = country office location

### SOUTH-EAST ASIA

Brunei Darussalam	●●●●●●●●●●	Cambodia	X●●●●●●●●●●	Indonesia	●●●●●●●●●●
Lao, People's Democratic Republic of (Lao, DDR)	●●●●●●●●●●	Malaysia	●●●●●●●●●●	Myanmar	●●●●●●●●●●
Philippines	●●●●●●●●●●	Singapore	X●●●●●●●●●●	Thailand	●●●●●●●●●●
Timor-Leste	●●●●●●●●●●	Viet Nam	●●●●●●●●●●		

### EAST AND NORTH-EAST ASIA

China	X●●●●●●●●●●	Democratic People's Republic of Korea (DPRK)	●●	Japan	X●●●●●●●●●●
Mongolia	●●●●●●●●●●	Republic of Korea	X●●●●●●●●●●		

### NORTH AND CENTRAL ASIA

Armenia	●●●●●●●●●●	Azerbaijan	●●●●●●●●●●	Georgia	●●●●●●●●●●
Kazakhstan	X●●●●●●●●●●	Kyrgyzstan	●●●●●●●●●●	Russian Federation	●●●●●●●●●●
Tajikistan	●●●●●●●●●●	Turkmenistan	●●●●●●●●●●	Uzbekistan	●●●●●●●●●●

### SOUTH AND SOUTH-WEST ASIA

Afghanistan	●●●●●●●●●●	Bangladesh	●●●●●●●●●●	Bhutan	●●●●●●●●●●
India	X●●●●●●●●●●	Islamic Republic of Iran	●●●●●●●●●●	Maldives	●●●●●●●●●●
Nepal	●●●●●●●●●●	Pakistan	●●●●●●●●●●	Sri Lanka	●●●●●●●●●●
Turkey	●●●●●●●●●●				

## THE PACIFIC

Australia	●●●●●●●●●●	Fiji	X●●●●●●●●●●	Kiribati	●●●●●●●●●●
Marshall Islands	●●●●●●●●●●	Micronesia, Federated State of (FS)	●●●●●●●●●●	Nauru	●●●●●●●●●●
New Zealand	●●●●●●●●●●	Palau	●●●●●●●●●●	Papua New Guinea	●●●●●●●●●●
Samoa	●●●●●●●●●●	Solomon Islands	●●●●●●●●●●	Tonga	●●●●●●●●●●
Tuvalu	●●●●●●●●●●	Vanuatu	●●●●●●●●●●		

## ENERGY FOCUS AREAS

Access	●●●●●●●●●●	Economics	●●●●●●●●●●
Efficiency	●●●●●●●●●●	Trade and Investment	●●●●●●●●●●
Renewable Energy	●●●●●●●●●●	Connectivity	●●●●●●●●●●
Environment	●●●●●●●●●●	Governance	●●●●●●●●●●

## IMPLEMENTATION APPROACHES

Policy Development	●●●●●●●●●●	Capacity Building	●●●●●●●●●●
Technology Development	●●●●●●●●●●	Demonstration / Pilot Projects	●●●●●●●●●●

Other implementation approaches listed by member agencies include mobilizing finance, intergovernmental dialogue, knowledge sharing and scaling up, coordination and promoting partnerships and working with the private sector on market solutions.



## Challenges and Opportunities in Realizing Enhanced Energy Security

**NOTE:** This section is a compilation of member agencies' responses to the question of "what are the top challenges and opportunities for realizing enhanced energy security, in the following focus areas: energy access, renewable energy, energy efficiency, energy and environment, energy economics, energy trade and investment, and energy connectivity." The content is an indication of general views and the intention is to support coordination and action, rather than to provide a research analysis or prescribe specific policies and technologies.

### ENERGY ACCESS

#### Challenges

Economic growth in countries of the Asia-Pacific region has not necessarily translated into expanded access to modern energy services. Although access has improved greatly in many areas, it remains a serious challenge, especially for least developed countries. In the region, 628 million people lack access to electricity and 1.8 billion do not have clean, modern cooking solutions. Large numbers of people suffer from a "vicious cycle" of energy poverty where they cannot afford improved energy services, even when access is provided. To achieve universal access to modern energy services, **both grid and off-grid programmes need to be accelerated**, and access to clean fuels and advanced cooking stoves must be expanded.

Greater support is needed for a **shared vision of expanding access to sustainable modern energy services for all**. At the same time, more attention needs to be given to the development of context-specific solutions. The application of broad one-size-fits-all policy interventions fail to account for the socioeconomic profiles of various areas and leads to lower levels of success. Ensuring government commitments for rural energy access policies and programs is a particular challenge, especially for remote and isolated areas. In addition to limited awareness and know-how regarding strategies for expanding access, institutional capacity, political instability, and resistance to change present additional barriers.

Affordability and financial viability of modern energy supply and services in remote and isolated areas remains a serious obstacle. The private sector is not adequately engaged in providing access solutions and faces difficult business environments and the inability to recover costs. **Financing, capital and credit is limited as is capacity** and expertise to manufacture, install, operate and maintain high-quality systems. Currently, the scaling up of successful examples in expanding energy access is limited.

#### Opportunities

The International Decade of Sustainable Energy for All provides momentum for policy actions for increasing access to modern energy services. The **development of national energy strategies and effective policy interventions** enhances the opportunity for investors, entrepreneurs and development partners to intervene in a coherent and efficient manner. At the national level, regional and inter-regional energy cooperation and trade offers opportunity to eliminate energy deficits.

A high level of **commitment and support from national and local government** is needed along with broadened stakeholder involvement. Coordinated efforts can ensure existing needs are met in a more efficient manner and enable improvements upon existing experience. Particularly for rural areas, involvement of local communities is likely to increase the sustainability of any intervention.

**Knowledge sharing** is a key to expanding access. Many Asian countries have been successful in implementing sustainable energy technologies, including decentralized energy systems in rural areas. Local capacity-building, including the indigenous production of maintenance parts/components and equipment can multiply the benefits of decentralized systems.

**Appropriate financing arrangements** – combined with quality assurance measures – are important for overcoming the market failure of limited access. In countries with mature microfinance markets, microfinance institutions are already well-placed to supply financial products. The further development of small credit options, rural banking systems, and microfinance solutions lowers the barrier of affordability. Several countries have pioneered financing mechanisms and pro-poor delivery of decentralized technologies on scale and can offer valuable experience.

Energy access projects should adopt an **integrated sector-wide approach**, which would include strengthening conducive policies, institutional capacity development, private sector support, entrepreneurial skills development, productive uses of energy for income generation and the facilitation of access to finance and markets.

### ENERGY EFFICIENCY

#### Challenges

Across sectors and on various scales and levels, energy efficiency represents a major challenge in Asia. More developed countries are challenged **by reducing energy intensity and carbon emissions**. Less developed countries with fast growing economies are challenged to leapfrog technologies and choose the right strategies for a sustainable development path. Growing attention is being given to transmission losses, waste and embodied energy.

**Obtaining external financing** for energy efficiency projects is difficult due to their non-asset based and non-recourse nature. Feasible financial and economic models and mechanisms are limited. Smaller size and dispersed energy efficiency projects involve multiple stakeholders and experience upfront incremental cost barriers.

Both policies and incentives (e.g. appliance standards, building codes, etc.) are required to help scale up energy efficiency and catalyse private sector involvement. However, energy efficiency is **often regarded as an environmental issue rather than a means to improve economic competitiveness**. In many countries there are no systematic, long-term energy efficiency programs supported by appropriate policies, governance, financing and capacity building. In other words, **lack of expertise and weak institutional capacity for implementation**, ranging from energy auditing to savings monitoring and verification is a limiting factor. Furthermore, irrational energy prices and limited government financial incentives in many cases make energy efficiency unattractive to the end user.



## Opportunities

A wide range of economic, social and environmental benefits can be realised through better understanding energy intensity reduction potential and the implementation of responsive policy measures. **Economic benefits in particular can be substantial at all levels**, from households to national economies. Consumer awareness regarding energy efficiency strategies can help end-users significantly lower energy costs across sectors, including industry, building, agriculture, and transport. This in turn supports demand side management and resource efficiency efforts.

Significant energy savings make efficiency measures **some of the lowest-cost and most sustainable** ways to decrease emissions of greenhouse gases and other pollutants, in turn benefiting other sectors such as water and health. Numerous, **mature energy efficiency technologies exist** and their potential can be fully exploited to realise these benefits.

On the supply side, **opportunities to reduce transmission and distribution losses and increase efficiency in power generation** are numerous. For example, combined heat and power, cogeneration and smart grid technologies have proven energy savings. Also, efficiency measures in agri-food production chains such as improved post-harvest management systems and infrastructure can yield multiple benefits.

Integrating energy efficiency into energy roadmaps helps address access needs more effectively by **filling a considerable portion of the energy demand gap**. Especially in developing Asia, energy efficiency is a means to leapfrog over a high-cost situation and land on a more sustainable development path. During the rapid urbanisation of the Asia-Pacific region, built-in and design-based energy-efficient cities, neighbourhoods and buildings offer a strategic opportunity.

Energy efficiency **increases productivity and economic competitiveness**. Institutional strengthening, especially of the legislative and regulatory arms of government is needed. Resource pricing, transparent energy prices and policy, fiscal policy reform, pragmatic legislation, standards and labels, monitoring of compliance and enforcement strategies are all part of the package of measures.

## RENEWABLE ENERGY

### Challenges

**Government subsidies and support for research and development in fossil fuels outweigh those for renewable energy**, making the current markets inefficient and discouraging for active private sector involvement in developing renewable energy solutions. There is a pressing need for appropriate and effectively-implemented renewable energy policies and regulations that are capable of stimulating the transfer of technologies and capabilities, as well as generating available capital and greater investment incentives. The **lack of private sector involvement** is a major reason why successful pilot projects and renewable energy technologies are not scaled up and delivered more widely.

Such economic challenges result in market limitations and inadequate financing arrangements for renewable energy. The development of institutional capacity, whether policy training or manufacturing, is hindered, leading to problems in product quality, system operation and maintenance and, ultimately, the sustainability of renewable energy projects.

The existing energy infrastructure for generation, transmission and distribution is not well suited to integrating variable or distributed energy such as those from renewable sources. This is particularly a problem where the **energy supply and distribution system remains fragmented within the region**, not allowing countries to benefit from integrated infrastructure and policy systems that facilitate trade, investment and development.

**Non-economic hurdles** are also present, ranging from insufficient stakeholder coordination and lack of social and environmental benefits' valuation to communication gaps that lead to opposition based on group interests as well as theft, vandalism and corruption.

## Opportunities

The region is **well-endowed with biomass, geothermal, hydro, ocean, solar and wind resources**. However, renewable resources are not developed to their full technical and economic potential. With the high price volatility of fossil fuels and the growing acceptance of anthropogenic climate change, **public opinion is calling for actions on increasing the use of renewable energy**.

Consumer demand can have an impact on political priorities, especially where civil society is dynamic and knowledgeable. Furthermore, **increasing economic viability** due to falling prices of renewable energy technologies can further propel the integration of renewables into the energy mix. The generation of **employment opportunities** is another significant co-benefit that is growing in recognition.

**Many pilots have taken place, providing a rich source of information**, lessons and expertise on how to improve, scale-up, replicate/adapt and expand renewable energy solutions. A proliferation of projects and initiatives on off-grid energy access, especially for the rural poor, demonstrate opportunity for applying renewable energy for productive, including industrial, use to decisively enable income generation and poverty reduction.

**Regional renewable energy targets developed through intergovernmental dialogue** can spur political commitment at this stage when technologies and policies, such as for smart grids, are developing and maturing quickly, providing mechanisms for widespread integration of renewable energy and other variable or distributed sources. Development partners are increasingly interested in assisting in the development of regulations, feed-in tariffs, framework conditions and sector reforms, as well as establishing appropriate market mechanisms, providing grants to fund pre-investment activities, and supporting capacity building for planning and implementation of renewable energy projects.



## ENERGY AND ENVIRONMENT

### Challenges

The region is largely dependent on fossil fuels and has a rapidly increasing demand for energy. Many traditional energy sources are inefficient and result in higher carbon dioxide (CO<sub>2</sub>) emissions than modern energy alternatives. Fossil fuel use, particularly within the power generation and transport sectors, has led to **high levels of air pollution in Asia**, especially in urban areas. Many rural areas are experiencing an increasing demand for fuelwood leading to deforestation that is not only ecologically detrimental at local levels but also further increases **CO<sub>2</sub> emissions that have global ramifications**.

Better knowledge and acceptance of the interlinkages between energy use and local to global environmental impacts are needed to inform decisions and policy on energy production and consumption. Recognition of the linkages and potential trade-offs between energy and other development priorities, including water and food security, is emerging but requires greater understanding. One of the primary hindering factors is the **lack of sufficient communication, coordination and support between ministries and institutions** involved in providing energy services and those involved in protecting the environment. Additionally, the political and financial power among stakeholders is unevenly distributed.

### Opportunities

The region has large variations in the resource base across countries and **largely untapped potential in renewable energy**. Thus, by increasing energy cooperation and linking systems and trade, more efficient, clean and environmentally optimum solutions can be found.

Integrated, cross-disciplinary approaches with longer-term benefits can be achieved through initiatives, laws and regulations developed through intergovernmental and cross-ministerial dialogue that supports evidence-based policymaking. **Recognition of the interlinkages between energy and other domains, especially environment, food and water**, is especially important for realizing shared benefits across multiple development interests.

The **advancement of new and clean technologies** carries increasing potential for expanding energy access, reducing CO<sub>2</sub> emissions and **creating green jobs**. The dramatic scaling up of technologies can further reduce their costs, thereby increasing their adoption. For financial service providers offering energy lending, carbon financing can supply an additional revenue stream. While annual revenues are small compared to revenue from financial services, carbon revenues are in certain cases renewable for periods up to 20 years, offering a natural incentive for suppliers to monitor the quality of the technology chosen for lending.

## ENERGY ECONOMICS

### Challenges

A high regional dependence on fossil fuel imports results in **exposure to fuel price volatility**. At the

Appropriate pricing and tax incentives conducive to sustainable energy development are lacking despite the fact that the region as a whole is energy-deficit. **Regulations and subsidies distort energy prices** and effectively prohibit energy saving initiatives and leave renewable options out of competition.

Unsustainable tariff levels, losses and theft in the power sector are major contributors to the poor financial health of utilities and many governments in the region. With **multiple resource constraints**, the natural resources used in energy production can compete with food systems, leading to price impacts.

In mature microfinance markets, clean energy financing offers financial service providers the potential to improve the viability and prospects of financial service providers' core loans and savings services, and add a new product-line in a high-growth and lucrative market segment. However, **financial service providers may be reluctant** to enter this market due to lack of familiarity and perceived high risk. Such an economic environment means limited availability of capital and capacity to expand sustainable energy.

### Opportunities

We need to better understand the impacts of fiscal policy on promoting sustainable and inclusive socio-economic development in order to shift expenditures accordingly and set clear policy targets to promote sustainable energy. There is an opportunity to **rationalize tariffs, bring in greater de-regulation, better governance, and improve efficiencies** in delivery of energy services through improved implementation of fiscal policies and the involvement of the private sector.

Rapid development of **innovative financing solutions** such as microfinance credit options, green/energy funds and "pay-as-you-go" has enabled the growth of a market in energy financing. Financial service providers can use their large-scale active client network to deliver energy loans without additional cost increases and loan officers can use existing credit history of active clients to assess and manage credit risk. Energy loans with productive end-use are a challenging but also highly appealing market segment.

Energy efficiency and renewable energy initiatives have direct economic impacts. Their development and use can mitigate financial, environmental and social risks. The **economic case can be made**. Once the political and institutional awareness and willingness is present, a set of co-benefits can be utilised.

## ENERGY TRADE AND INVESTMENT

### Challenges

The trade and investment environment needs to be further enhanced in order to meet growing energy demand and balance the uneven distribution of energy resources. Underdeveloped power grid systems and lack of a regional framework for power trade through integrated cross-border grids are major obstacles in rationalizing use of built capacity, as well as developing generation potential. Progress and assistance in the formulation of regional grid codes, performance standards



Unfavourable power purchase agreements further impact the financial viability of current connections and projects. Resource mobilisation for identifying trade and investment barriers in the region is critical. In addition to the financing needs, obstacles to cooperation can stem from complicated **historical and political contexts**.

### Opportunities

A more predictable, transparent and efficient regional energy market can be developed through measures such as **harmonising investment and regulatory policies for cross-border infrastructure**. Several efforts are already being made to promote regional and inter-regional integration and energy trade. Development partners are helping strengthen the financial viability of the energy sector through policy advice, institutional capacity development and monetary grants and loans, especially in fragile and post-conflict countries.

**Opportunities to invest in regional power and energy trade abound.** Energy Service Companies, green investments into sustainable energy solutions, as well as savings from energy efficiency measure are significant investment opportunities.

## ENERGY CONNECTIVITY

### Challenges

Energy supply and distribution remains **fragmented within the region**, not allowing countries to benefit from integrated infrastructure and policy systems that facilitate trade, investment and development. Incompatible trade and energy policies make inter-country energy trading difficult and the growth in demand and supply are not well matched to avoid power shortages. **Where cross-border interconnections exist, actual performance has large gaps**, leading to widespread disappointment with service levels and quality of power.

**Limited communication** between development partners, private sector, governments and civil society has led to the duplication of efforts and insufficient learning and improvement from lessons and best practices. The lack of coordinated policies in bioenergy has led to food security impacts.

### Opportunities

The Sustainable Energy for All initiative is providing **renewed impetus to form a regional energy hub** to improve communication, cooperation and coordination between different stakeholders at national, regional and institutional levels.

Significant opportunities exist to strengthen institutions, improve governance, and increase performance in power distribution. For example, cross-border physical connectivity can be promoted through the development of an **"Asian Energy Highway", an electricity transmission grid** sourced from both conventional and renewable resources. This initiative would build on and link ongoing projects, especially those multilateral initiatives that have made progress on cost-sharing and standards. Such a regional grid would help **lay the foundation for economic integration and increase efficiency and access** to sustainable, reliable and clean energy.

## Regional Cooperation

Regional cooperation is fundamental to achieving enhanced energy security and sustainable energy for all. **Building a shared vision for a sustainable energy future is the first step towards successful regional cooperation.** To further progress towards a shared vision, the current situation in Asia and the Pacific requires increased dialogue and alignment of divergent objectives among and between development agencies, countries and ministries.

The establishment of a strategy for international cooperation in the region is a crucial driver of enhancing energy security. The organisation of the Asian and Pacific Energy Forum (APEF) is an initial effort. APEF 2013 follows an inter-governmental process and aims at **reaching regional consensus on a ministerial declaration and plan of action** that can set the path towards a more equitable, efficient and resilient energy future (see case study on page 22). In order to overcome tensions stemming from history and politics, especially in emerging economies and fragile countries, subregional efforts are also needed to overcome challenges and build trust in a shared vision.

Within countries, **improved communication and coordination** is needed across ministries and between various levels of governance. For example, institutionalised and regular dialogue between ministries responsible for energy and those responsible for areas such as finance, infrastructure, agriculture and water is important for identifying solutions to energy access issues and to addressing sustainability concerns with energy sources whose development interlinks with other concerns such as water and food security.

Dialogue between development partners themselves and between development partners and countries must also advance. **UN-Energy Asia-Pacific** is a valuable effort at bringing together the region's development partners under a common facility to share perspectives and better coordinate efforts. Development partners, founded on principles of partnership and collaboration, have an integral role in increasing awareness, facilitating dialogue, and supporting countries in the formation of cohesive policy actions. The networking capacity of this group should be strengthened towards more tangible, joint initiatives.

Opportunities for promoting regional cooperation in substantive areas are numerous. For example, the **United Nations Convention to Combat Desertification (UNCCD)** collaborates closely with the other two Rio Conventions – the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) – to address the complex, connected dynamics of land, climate and biodiversity. **The World Bank**, with its expertise in large-scale infrastructure projects, promotes the significant hydropower potential in some Asia-Pacific subregions such as South Asia, while supporting regional integration and energy trade in all regions. The **Food and Agriculture Organization of the United Nations (FAO)** specialises in bioenergy and encourages more attention on the specific energy needs of rural populations and agricultural industries. The United Nations Human Settlements Programme (**UN-Habitat**) focuses on the urban context and champions the voice of the urban poor in particular. **The United Nations Capital Development Fund (UNCDF)** directs its efforts towards viable end-user financing schemes tailored to the needs of the poor, addressing a major challenge in scaling up access to modern energy among low-income communities. The **United Nations Industrial Development Organization (UNIDO)** leverages their expertise in industrial development to facilitate efficiency standards, technology transfer and structural change.



Some agencies like the **Asian Development Bank (ADB)**, **UN Development Programme (UNDP)**, **UN Environment Programme (UNEP)** and **Economic and Social Commission for Asia and the Pacific (ESCAP)** have focal point offices working on energy, covering a broad range of issues.



The mechanisms employed to address energy challenges within Asia and the Pacific are also diverse. Overall, regional cooperation efforts include **exchange and dissemination of best practices and technologies, awareness creation, advocacy, tools development, knowledge management and capacity building**. The scale of efforts can range from global to subregional and from national to ecosystem level, as in the case of the Mekong River Basin. Some agencies have specific initiatives and funds on regional cooperation and integration, either focused on an overarching issue or specifically targeted at energy concerns. For example, UNEP is leading the Climate Technology Centre and Network, established by the UNFCCC Cancun Agreements. This consortium of 13 partners is designed to facilitate access by developing countries to technical support and advice on climate change mitigation and adaptation.

Given the reality of discrepancies in natural endowments and geography, **cooperation in the form of regional trade and connectivity is a priority area** for many stakeholders. Economic integration can be advanced through common energy infrastructure, harmonised policies and information sharing. Indeed, smart grids drawing on both fossil fuels and renewable resources will be critical to the Asia-Pacific region's ability to address the challenges in access as well as to achieve greater efficiency. Regional dialogue on energy aiming to enhance cooperation among energy-producing, transit and energy-consuming countries can support the identification of possible options and the development of an integrated regional power network – an electricity transmission grid termed the “Asian Energy Highway,” for instance, as included in the draft Plan of Action for APEF 2013.



### Asian Development Bank (ADB)

#### HEADQUARTERS

Manila, Philippines

#### COUNTRY OFFICES

26 throughout region

[www.adb.org](http://www.adb.org)

#### MISSION

To help ADB's developing members reduce poverty and improve their living conditions and quality of life.

#### VISION

An Asia and Pacific Region Free of Poverty.

### Energy Strategy within Asia and the Pacific

Asian Development Bank's strategy focuses on improving energy security, increasing energy access, and reducing the rate of climate change through promotion of cleaner, more efficient and less polluting energy sources and technologies, and greater use of indigenous forms of renewable energy. Energy sector reforms, capacity building and governance are emphasized to increase clean energy investment and to efficiently use available energy resources. Effective regional cooperation in the energy sector is promoted to strengthen energy security. Private sector participation (and public-private partnerships) is encouraged to enhance energy sector efficiency through competition and to increase investable resources.



ADB

## Sustainable Power Sector Support Project

**LOCATION** Sri Lanka

**DURATION** 4 years, ongoing

**PARTNERS** Ministry of Power and Energy, Government of Sri Lanka

**FINANCING SOURCE** ADB, Government, Asian Clean Energy Fund/Clean Energy Financing Partnership Facility

**PRIMARY OBJECTIVE** Improved coverage, efficiency and reliability in service delivery

### KEY OUTPUTS

Strengthened transmission network

Expanded and improved distribution network in rural areas of Eastern and Uva provinces

Energy efficiency improved and additional renewable energy developed

Sri Lanka's power sector struggles to meet the growing demand for electricity at sufficiently low cost and acceptable reliability. The share of thermal energy in the generation mix has increased from 6% in 1995 to 61% in 2010 as demand growth has been generally met by oil-fired thermal generation. This type of power generation makes electricity expensive because of high fuel prices, and poses a serious threat to the country's energy security and the environment. The transmission system is too weak to meet the growing demand in the regions. Substantial investments are required to strengthen the transmission network and improve its reliability. About 15% of households—primarily those in rural areas—do not have access to electricity despite the government's intensive investment program to expand the rural distribution network. The electrification ratio of 67.3% in Eastern Province is the lowest among all of Sri Lanka's provinces and is well below the average national electrification of 85.4% in 2009. There is an urgent need to develop clean energy and indigenous renewable energy sources, reduce losses, and improve energy efficiency.

The project has following components:

- (i) transmission system strengthening to further improve its energy efficiency and reliability and enable rural electrification in the Eastern, North Central, Southern and Uva provinces of Sri Lanka;
- (ii) rural electrification and distribution system improvement in the Eastern and Uva provinces of the country to expand access for the poor and rural households; and
- (iii) energy efficiency and renewable energy.

ADB

## Promoting Energy Efficiency in the Pacific (PEEP, Phase 2)

**LOCATION** Cook Islands, Papua New Guinea, Samoa, Tonga, Vanuatu

**DURATION** 3 years, 2012-2015

**PARTNERS** Global Environment (GEF), Government of Australia, Asian Clean Energy Fund (ACEF) / Clean Energy Financing Partnership (CEFPF)

**FINANCING SOURCE** Same as partners

**PRIMARY OBJECTIVE** End consumers use power efficiently, reducing fossil fuel use by the power sector without a corresponding reduction in energy services

### KEY OUTPUTS

Stakeholder access to comprehensive information on energy use

Energy efficiency practices mainstreamed into government policies & procedures

Energy efficiency programs in residential, commercial and government sectors

Financial and economic analyses on least-cost measures

In response to strong interest from five Pacific developing member countries (DMCs) – the Cook Islands, Papua New Guinea, Samoa, Tonga, and Vanuatu – ADB approved regional technical assistance (TA) for Promoting Energy Efficiency in the Pacific to provide preliminary assistance to reduce fossil fuel consumption through demand-side energy efficiency assessments.

Pacific DMCs are extremely vulnerable to the cost of imported fossil fuels. The Cook Islands, Tonga, and Vanuatu have electricity generation systems that rely almost exclusively on fossil fuel (diesel) power generation, and electricity tariffs across the region are very high, with actual residential tariffs ranging from \$0.22 per kilowatt-hour in PNG to \$0.46 per kilowatt-hour in the Cook Islands. Paying for imported fossil fuels places a major strain on local economies and trade balances. Fossil fuels are a major cost that Pacific DMCs have little control over, and the volatility and high level of oil-based fossil fuel prices is a threat to the ongoing sustainable development of these countries.

Through energy efficiency improvements in the residential, commercial, and government sectors of each country, the project will improve the efficiency with which consumers use power.

The project will develop and implement (i) a comprehensive database on energy use by sector and appliance; (ii) energy efficiency policies and capacity building for the government and private sector; and (iii) national energy efficiency programs and interventions in the public lighting; residential lighting; and residential, private, and public buildings. Results and knowledge products will be disseminated across the region to encourage replication in other Pacific DMCs. To ensure that least-cost energy efficiency initiatives are selected, financial and economic analysis will be undertaken to compare the chosen solution to alternative renewable energy options and supply-side efficiency improvements, as well as to the short-run marginal cost of diesel power generation.





## Power System Efficiency Improvement Project

**LOCATION** Bangladesh

**DURATION** 4 years, ongoing

**PARTNERS** Ministry of Power, Energy & Mineral Resources, Ashuganj Power Station Company, Bangladesh Power Development Board

**FINANCING SOURCE** ADB, Government, Islamic Development Bank

**PRIMARY OBJECTIVE** Increase power generating capacity

### KEY OUTPUTS

Improved energy efficiency in power plants

Increased renewable energy use, both grid-connected and off-grid

Capacity developed in Executing Agencies and surrounding communities

Energy shortage is the most critical infrastructure constraint on Bangladesh's economic growth. In 2011, the maximum demand for electricity was 6,000 MW, which is expected to rise to 7,000 MW by 2013. But the maximum available generation is 4,500–4,750 MW (from an installed capacity of 5,719 MW), leaving a significant supply gap.

The main causes for the supply shortage are (i) the poor operational efficiency of thermal power plants and inefficient use of energy; (ii) inadequate supplies of natural gas, which is the primary source of energy for electricity generation; (iii) slow progress on cross-border energy cooperation; and (iv) lack of diversification in energy supply, including inadequate exploitation of renewable energy. These issues were highlighted in the Asian Development Bank (ADB) 2009 Bangladesh energy sector assistance program evaluation (SAPE).

The Project consists of the following components:

#### Part A: Generation Efficiency Improvement

1. Replacement of old steam and gas turbine power plants with a total capacity of 260 MW at the Ashuganj Power Station Company Ltd. (APSCL) complex with an efficient combined-cycle power plant of 450 MW capacity

#### Part B: Increased Renewable Energy Use

1. Installation of a 5MW solar PV based grid-connected power generation plant at Kaptai Hydropower Plant site

2. Installation of an off-grid wind-solar-diesel hybrid system in Hatiya Island (1 MW solar PV, 1 MW wind energy, and 5.5 MW existing diesel generator)

3. Installation and retrofitting of about 1,000 km of street lighting based on solar PV and LED-based technology in six cities across the country.



UNITED NATIONS  
**ESCAP**  
Economic and Social Commission for Asia and the Pacific

### United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

#### HEADQUARTERS

Bangkok, Thailand

#### SUBREGIONAL OFFICES

4 throughout region

[www.unescap.org](http://www.unescap.org)

#### MISSION

ESCAP's mandate is to promote regional cooperation and collective action for economic and social development in Asia and the Pacific.

#### VISION

ESCAP is committed to a resilient Asia and the Pacific founded on shared prosperity, social equity and sustainability. Our vision is to be the most comprehensive multilateral platform for promoting cooperation among member States to achieve inclusive and sustainable economic and social development in Asia and the Pacific.

### Energy Strategy within Asia and the Pacific

ESCAP focuses on fostering subregional and regional cooperation in the areas of access to energy services, energy efficiency and renewable energy, all for enhancing energy security. ESCAP works to overcome some of the region's greatest challenges by providing a platform for intergovernmental discussion and cooperation, implementing technical cooperation projects, providing capacity development, conducting research and analysis to promote policy development and participating in various regional and subregional initiatives on energy. ESCAP also enhances coordination and cooperation between the UN bodies working in Asia and the Pacific on energy as the secretariat for UN-Energy Asia-Pacific.





## Leveraging Pro-Poor Public-Private Partnerships (5Ps) for Rural Development

**LOCATION** Lao PDR, Nepal

**DURATION** 3 years, ongoing

**PARTNERS** UN Regional Commissions, UN DESA, UNDP, Lao Rural Electrification Fund Secretariat, Nepal Alternative Energy Promotion Centre

**FINANCING SOURCE** IFAD, United Nations Development Account

**PRIMARY OBJECTIVE** Enhance access to modern energy services in rural areas using locally available renewable sources

### KEY OUTPUTS

Increased access to modern energy services in poor rural communities

Enhanced capacity of policymakers to support private sector participation

Improved knowledge of 5Ps model for energy access and rural development

Provision of rural energy services is often constrained by limited financial resources and investments. Engaging the private sector through Public Private Partnerships (PPPs) is seen as a strategic option for expanding energy access. A regional initiative led by ESCAP, this project aims to widen access to energy services for rural poor in Asia and the Pacific. It is designed to promote innovative partnership models and tap international carbon markets, especially for rural areas.

The initiative aims at increasing access to modern energy services in rural communities in Lao PDR and Nepal through strengthening policy, legal and regulatory frameworks to harness private investment for local renewable energy development. The project builds upon a previous demonstration project in Indonesia, which established a joint venture between the private sector and community to develop, operate and financially manage a 120 kW hydropower plant. Government agencies provided policy support for the development of the demonstration project that, besides serving commercial interests, funded community development.

The major outcomes of this previous demonstration project in Indonesia included electrification of 122 households followed by a significant increase in revenues directed towards education (from 8% to 65%), and a doubling of healthcare expenditures (from 8% to 16%) between 2003 and 2009. The sustainability of the Indonesian experience inspired replication of the 5P model.

In Lao PDR and Nepal, ESCAP continues to explore improved strategies for integrating the 'pro-poor' approach into the architecture of PPP for expanding energy access. Further lessons are also being sought on scaling up relatively small and site-specific partnership models using locally-available renewable sources.

The 5P approach helps to integrate energy with the broader development agenda by leveraging the strengths of governments, the technical and financial advantages of the private sector, and the socio-economic development interests of communities.



## International Forum: Energy for Sustainable Development

**LOCATION** Central Asia and neighbouring regions

**DURATION** Annual event since 2010

**PARTNERS** UNECE, UNDP country offices

**FINANCING SOURCE** Utilises funding of various projects implemented by ESCAP, UNECE and UNDP

**PRIMARY OBJECTIVE** Capacity building for energy efficiency and access to cleaner energy in countries of Central Asia and neighbouring regions

### KEY OUTPUTS

Increased awareness and dialogue among government officials responsible for promoting sustainable energy use

Improved capacity in both human resources and institutions

Resolution of the Third International Forum: Energy for Sustainable Development

Since 2010, ESCAP and UNECE have organised the annual International Forum: Energy for Sustainable Development, formerly called the International Energy Efficiency Forum.

The Forum serves as a capacity building platform for exchanging experiences and good practices in promoting sustainable use of energy between various stakeholders – government, experts, private sector and international financing organizations – from the regions covered by ESCAP and UNECE, e.g. Central Asian and Caucasus countries.

Discussions of the Forum, conducted in the form of round tables, plenary sessions and thematic workshops revolve around key elements needed to support improvement in energy efficiency and access to cleaner energy, including formation of favorable policy, investment and improving market conditions in the countries of Central Asia and neighbouring regions.

Wide geographic coverage of the Forum allows participants to draw upon experiences and good practices from Asia and Europe and to review specific examples of technological advances in energy efficiency, renewable and cleaner energy.

The third Forum in 2012 also included a High-Level Round Table on Policy Reforms and Creating a Favourable Environment for Sustainable Energy with participation of high-level officials of the government bodies responsible for energy and sustainable development from Belarus, Kazakhstan, Kyrgyzstan, Romania, Tajikistan and Uzbekistan. The meeting adopted the Resolution, which among other things underlined that sustainable use of energy, improved energy efficiency and wider access to cleaner energy are critically important for economic and social development.

Currently, preparations are underway to organize the fourth Forum in the end of 2013.





## The Asian and Pacific Energy Forum (APEF) 2013

**LOCATION** Asia-Pacific region

**DURATION** Preparations in 2011-2013, APEF in May 2013

**PARTNERS** Member States, UN-Energy Asia-Pacific, Government of Russian Federation

**FINANCING SOURCE** Government of Russian Federation

**PRIMARY OBJECTIVE** Promote regional cooperation for enhanced energy security and the sustainable use of energy

### KEY OUTPUTS

Strengthened regional consensus built on 5 subregional outcome documents

Strategy on regional cooperation as envisaged in the Ministerial Declaration and Plan of Action (to be finalized at APEF 2013)

The Asian and Pacific Energy Forum (APEF) will be the first inter-governmental ministerial conference on energy in the Asia-Pacific region convened under the auspices of the UN.

APEF was mandated by member States of ESCAP, who, building on years of interest and discussion on energy security, passed Resolution 67/2 in 2011 requesting ESCAP to convene a ministerial conference to discuss the progress achieved in the region in addressing the energy security challenges at the regional, national and household levels, and to facilitate continuous dialogue among member States with a view to enhancing energy security and working towards sustainable development.

The preparatory process for APEF has taken a step-by-step approach, together with the Subregional Offices to build consensus on the theme "regional cooperation for enhanced energy security and the sustainable use of energy." Consultation meetings in each of the five subregions were organized in 2012 (Bangkok, Nadi, Moscow, Delhi, Incheon).

Each subregional consultation resulted in a meeting report adopted by member states. These outcome documents were considered as a whole in the late 2012 Expert Group Meeting where the framework of the Ministerial Declaration and Plan of Action were discussed. The two documents were presented and negotiated at the Regional Preparatory Meeting in March 2013, the final meeting before APEF in May 2013, hosted by the Russian Federation in Vladivostok.

At APEF, it is expected that Energy Ministers will adopt the APEF Ministerial Declaration and the accompanying Plan of Action. Concrete areas for cooperation at both the regional and subregional level are included, such as increasing connectivity for energy security through an integrated regional power grid, currently termed the "Asian Energy Highway." This would be a smart grid for transmitting electricity generated from all types of resources – conventional fossil fuels and new and renewable resources.

<http://www.unescap.org/apef>



## Food and Agriculture Organization of the United Nations (FAO)

### HEADQUARTERS

Rome, Italy

### ASIA-PACIFIC REGIONAL OFFICE

Bangkok, Thailand

### www.fao.org

**MISSION** Over the past 60 years FAO has worked with governments and rural communities in Asia and the Pacific to strengthen regional agriculture systems and food security to ensure that people have regular access to sufficient, high-quality food for active and healthy lives. Its mission is to help member countries halve the number of undernourished people in the region by 2015 by raising agricultural productivity and alleviating poverty while protecting the region's natural resources base.

**VISION** The vision of the FAO Regional Office is a food-secure Asia-Pacific region.

## Energy Strategy within Asia and the Pacific

The United Nations Food and Agricultural Organization (FAO) helps countries promote energy-smart agrifood systems through the identification, planning and implementation of appropriate energy, water, food security and climate-smart strategies that spur agricultural growth and rural development. In Asia-Pacific specifically, FAO has been assisting its member countries implement projects and policy programs to:

1. Balance potential trade-offs between food security and energy security and optimize the use of natural resources in sustainable energy production for agricultural and rural enterprises;
2. Improve the energy efficiency of agricultural and rural enterprises; and
3. Increase the utilization of sustainable renewable energy in the agriculture and rural sectors.





## Bioenergy and Renewable Energy for Rural Development and Poverty Reduction

**LOCATION** Greater Mekong Subregion (GMS)

**DURATION** 3 Years, 2009 – 2011

**PARTNERS** GMS Working Group on Agriculture, ADB, IFAD, Netherlands Development Organization (SNV), LIRE, AITVN, KKS Myanmar, SNEC Cambodia

**FINANCING SOURCE** FAO Technical Cooperation Program

**PRIMARY OBJECTIVE** To facilitate wider uptake of bioenergy & renewable energy for rural development & poverty reduction

### KEY OUTPUTS

Sustainability assessment frameworks for energy systems

Project case studies informing development of new technical assistance programs

Policy planning exercises improving strategy for bioenergy and food security

Access to energy services is a basic requirement for social and economic development. Despite this fact, millions of people in the Greater Mekong Subregion (GMS) live without access to adequate energy services. The vast majority of these people live in rural and remote areas. Delivering energy services to rural and remote communities in the GMS still presents a significant development challenge. These communities are often far from established electricity networks and lack other basic energy-facilitating infrastructure. Traditionally, energy policies have focused on energy supply without properly considering the particular energy needs of rural populations.

Under supervision of regional Ministries of Agriculture through the GMS Working Group on Agriculture and in collaboration with regional partner, SNV, and a number of local counterpart organizations, FAO-RAP implemented national workshops, case studies and strategic planning exercises on using bioenergy and renewable energy for rural development and poverty reduction in the GMS countries. In the project, FAO also organized regional information sharing

events on bioenergy and renewable energy in the region. This initiative was part of a broader partnership between FAO, the Asian Development Bank (ADB) and the International Fund for Agricultural Development (IFAD) in the GMS. The case studies and strategic planning exercises implemented under this programme have led to the development of new ADB and FAO technical assistance programs on climate-friendly bioenergy in the GMS and bioenergy and food security in ASEAN.

[www.fao.org/docrep/016/i3007e/i3007e00.htm](http://www.fao.org/docrep/016/i3007e/i3007e00.htm)



## Bioenergy and Food Security

**LOCATION** Thailand, ASEAN, South Asia

**DURATION** Ongoing

**PARTNERS** Regional Ministers of Agriculture and Energy, ASEAN Secretariat

**FINANCING SOURCE** German Ministry of Food, Agriculture & Consumer Protection, FAO

**PRIMARY OBJECTIVE** Sustainable, food-secure, climate-friendly bioenergy contributes to economic development in Asia and the Pacific

### KEY OUTPUTS

Cross-institutional stakeholder dialogue

Assessment of sustainable bioenergy potential

Risk prevention and management strategies

Capacity building for decision-makers

Despite the overall trend towards fossil energy in the region, high prices of fossil fuels and a growing need for more environmentally sustainable energy sources have encouraged many governments in the region to adopt policies to support the development of modern bioenergy. The effect of these policies could be substantial. According to the International Energy Agency (IEA), over the next 20 years both power generation from biomass and wastes and biofuel consumption in the transport sector are projected to grow at a fast pace in non-OECD Asia.

These policy choices could involve trade-offs. One potential trade-off that has been hotly debated is whether bioenergy will compete for the same natural resources that are used in food production. The FAO Bioenergy and Food Security (BEFS) program helps countries design and implement sustainable bioenergy policies and strategies, by ensuring that bioenergy development fosters both food and energy security, and that it contributes to agricultural and rural development in a climate-smart way.

BEFS supports countries in developing evidence-based policies derived from country level information and cross institutional dialogue involving relevant stakeholders. The evidence collected is the result of technical analysis that assesses the interplay between natural resource availability, bioenergy production potential, rural development and food security. During this process, the risks and opportunities are identified and the tradeoffs are defined thus supporting policy makers in the decision making process.

BEFS consists of a number of multidisciplinary and integrated set of tools and guidance that can be implemented as a whole or selectively depending on the specific needs of the country in question and the national context. BEFS has been implemented in Asia at both national and regional levels.

<http://www.fao.org/energy/befs/asia/en/>





## Integrated Food and Energy Systems

**LOCATION** China, Viet Nam, Regional  
**DURATION** Ongoing  
**FINANCING SOURCE** Dutch Ministry of Economic Affairs  
**PRIMARY OBJECTIVE** Wider uptake of sustainable integrated food and energy systems for rural food and energy security  
**TARGET BENEFICIARIES** Rural communities

### KEY OUTPUTS

Project case studies informing policy-makers on IFES for climate-smart agricultural development  
 Policy planning exercises outlining available options  
 Pilot projects on integrating food and energy systems benefiting local smallholder farms and the national economy

Integrated Food and Energy Systems (IFES) are agricultural systems that produce both food and energy. They vary widely in shape, size and composition. Integrating food and energy production is not a new concept. Relatively simple systems that integrate food and energy production, such as biogas, have proven successful on small and large scales. There are many examples of their long-term implementation and uptake. However, more complex, resource-efficient examples, including those that involve biofuel development, are rare.

To address this situation, the IFES Programme assesses different systems for integrating food and energy and identifies factors that hinder the uptake of these systems. Programme findings are intended to inform policy-makers and supporting partners about the importance of IFES for climate-smart agricultural development and to outline the options available for ensuring that these systems bring benefits to local smallholder farmers and to the national economy as a whole.

<http://www.fao.org/energy/78517/en/>



### United Nations Convention to Combat Desertification (UNCCD)

#### HEADQUARTERS

Bonn, Germany

#### ASIA-PACIFIC REGIONAL COORDINATION UNIT

Bangkok, Thailand

[www.unccd.int](http://www.unccd.int)

**MISSION** The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018), Parties to the Convention further specified their goals: to forge a global partnership to reverse and prevent desertification and land degradation and to mitigate the effects of drought in affected areas in order to support sustainable land management, poverty reduction and environmental sustainability

### Energy Strategy within Asia and the Pacific

To combat desertification, control land degradation and mitigate effect of drought in the affected regions, UNCCD encourages countries to take measures for ensuring the development and efficient use of diverse energy sources, the promotion of alternative sources of energy, particularly solar energy, wind energy and bio-gas, and specific arrangements for the transfer, acquisition and adaptation of relevant technology to alleviate the pressures on fragile natural resources in national action programmes. To implement the 10-year strategy, UNCCD works to overcome some of the region's greatest challenges by providing a platform for intergovernmental discussion and cooperation, implementing technical cooperation projects and providing capacity building and awareness raising.





## Desert Oasis Breathes Life into Green Dream

**LOCATION** Ningxia Hui Autonomous Region, China

**DURATION** 2011-2012

**PARTNERS** Hanwha Group, Rep. of Korea, Chinese State Forestry Administration, Forestry Dept. of Ningxia Hui

**FINANCING SOURCE** Hanwha SolarOne

**PRIMARY OBJECTIVE** To support ecology improvement, dust/sand control, sand dune stabilization & reforestation in periphery of Mu Us Sandy Land.

### KEY OUTPUTS

Installation of solar PV generation facility to supply greenhouse for seedlings

Avoided further destruction of vegetation at local level through reforestation

Provided training and technical assistance to local staff

Located at the southwestern edge of the Mu Us Sandy Land, Lingwu City faces challenges of severe land degradation and desertification. In particular, the fragile, arid land ecosystem is under pressure from unsustainable development of the past decades. Under the partnership framework and strategic targets of UNCCD, the Hanwha Group became actively involved in the efforts to combat desertification, rehabilitate land degradation and mitigate drought effects, in order to stabilise shifting sands and mobile dunes and revegetate deforested areas, in collaboration of Ningxia Forestry Department and Lingwu Nature Protection Bureau of the Tianbao Sand Dune Stabilization Corporation.

Starting from March 2011, the Hanwha Group donated and installed an 80kW Solar PV generation facility manufactured by Hanwha Solar One, Ltd., and provided technical training needed to manage and operate the facility.

The completed project provides solar-generated electricity to a 3,200m<sup>2</sup> greenhouse in the Baijitan Nature Reserve. This greenhouse plays a pivotal role in reforestation efforts to rehabilitate degraded land and to combat desertification through providing seedlings. Hanwha Solar One continued to provide volunteer technical assistance and training to local technicians.

This project's successful public-private partnership led to the provision of a continuous supply of clean, sustainable solar energy to a greenhouse in the Baijitan Nature Reserve, and to avoided deforestation caused by firewood and medicine herbs collections in Lingwu City and nearby counties of Ningxia.



### UN Capital Development Fund (UNCDF)

#### HEADQUARTERS

New York, USA

#### ASIA-PACIFIC REGIONAL OFFICE

Bangkok, Thailand

[www.uncdf.org](http://www.uncdf.org)

#### MISSION

UNCDF is the UN's capital investment agency for the world's 49 least developed countries. It creates new opportunities for poor people and their small businesses by increasing access to microfinance and investment capital. UNCDF programmes help to empower women, and are designed to catalyze larger capital flows from the private sector, national governments and development partners, for maximum impact toward the Millennium Development Goals

### Energy Strategy within Asia and the Pacific

CleanStart is UNCDF's innovative approach to poor households' access to sustainable, low-cost clean energy. CleanStart aims to support low-income households and micro-entrepreneurs to have access to modern energy through microfinance. It seeks to support at least 2.5 million people to benefit from cleaner and more efficient energy by 2017. CleanStart will support up to 18 financial service providers in six countries in Asia and Africa to provide microfinance for clean energy solutions at scale. It will also work towards building a sustainable supply chain for energy technologies or services chosen for lending. CleanStart is implemented in close cooperation with the United Nations Development Programme Global Environment Facility (GEF).





## CleanStart

**LOCATION** 6 countries in Asia & Africa, including Nepal and Uganda

**DURATION** 2012-2017

**PARTNERS** UNDP, Nepal Alternative Energy Promotion Centre

**FINANCING SOURCE** UNCDF, Sida, Norad, Austria

**PRIMARY OBJECTIVE** To support low-income households and micro-entrepreneurs to have access to modern energy through microfinance

**BENEFICIARIES** 2.5 million people by 2017

### KEY OUTPUTS

Strengthened capabilities of microfinance institutions through pre-investment technical assistance, risk capital grants and concessional loans

Technical assistance for clean energy value chains and finance

Increased knowledge and skills, including training curricula

Enabling policy and business environment for energy microfinance

In countries with maturing micro-finance markets, financial service providers (FSPs) offering microfinance are well placed to offer energy finance schemes tailored to the needs of poor consumers. Nevertheless FSPs may be reluctant to enter this market due to lack of familiarity and perceived high risk.

CleanStart will support up to 18 financial service providers in six countries in Asia and Africa to provide microfinance for clean energy solutions at scale. It will also work towards building a sustainable supply chain for energy technologies or services chosen for lending.

The direct financing model by financial service providers will operate in the context of broader efforts to support initial risk-taking by the private sector, develop entrepreneurial skills, promote productive uses of energy for income generation, facilitate access to finance and markets and promote enabling policies. A total of USD 60 million will have been lent over the life of the programme, with the potential to reduce over 300,000 tonnes of CO<sub>2</sub>.

The programme is delivered through four mutually reinforcing components:

- 1. FINANCE FOR CLEAN ENERGY** to strengthen capabilities of financial service providers to provide microfinance for clean energy to low-income households and micro-entrepreneurs;
- 2. TECHNICAL ASSISTANCE FOR CLEAN ENERGY** to remove barriers to the successful deployment of those technologies and services for which the selected financial service providers will provide microfinance;
- 3. GLOBAL KNOWLEDGE AND LEARNING** to enhance awareness globally of the potential for microfinance to scale-up access to clean energy and make available the tools needed to scale-up access to clean energy beyond the project; and
- 4. ADVOCACY AND PARTNERSHIPS** to create an enabling policy and business environment to expand microfinance for clean energy.



### United Nations Development Programme (UNDP)

#### HEADQUARTERS

New York, USA

#### ASIA-PACIFIC REGIONAL CENTRE

Bangkok, Thailand

#### www.undp.org

**MISSION** The UNDP Asia Pacific Regional Centre (UNDP APRC) provides UNDP Country Offices in Asia and the Pacific with easy access to knowledge through high quality advisory services based on global, applied research and UNDP lessons learnt. APRC focuses on support to democratic governance, environment & energy, crisis prevention and recovery, and poverty reduction with an overarching effort on HIV/AIDS and achieving the Millennium Development Goals. It also provides support in a number of cross-cutting areas, including capacity development, gender equality and knowledge management.

### Energy Strategy within Asia and the Pacific

The UNDP APRC follows the general lines of the UN Secretary General's Initiative of Sustainable Energy for All (SE4ALL), with focus on increased energy access, energy efficiency and more renewables in the global energy mix.

The UNDP APRC uses its Energy Plus approach, with focus on energy for productive purposes, to strive for increased energy access to the most marginalized. Community and rural electrification is a priority, as well as the poverty reduction element in increased energy access.

Securing funding and access to finance for energy projects is also an important part of UNDP APRC's work. Project financing considers the affordability and maturity of the energy technology market. UNDP wishes to promote different financing options such as grants, energy funds, microfinance and other innovative credit solutions, alone or in combination, to ensure that poor households are able to switch to modern energy services





## Energy Plus

**LOCATION** Asia-Pacific region

**DURATION** Since 2009, ongoing

**PARTNERS** National governments

**FINANCING SOURCE** UNDP APRC

**PRIMARY OBJECTIVE** Increasing access to energy

**TARGET BENEFICIARIES**

Rural households in Asia-Pacific region

### KEY OUTPUTS

Improved access to energy

Increased household income through energy for productive use

Improved knowledge of success factors for rural electrification

Energy Plus is UNDP's approach to ensure energy access to rural and poor areas in Asia-Pacific, based on access to energy for not only "minimalistic" basic purposes such as lighting, cooking and heating, but also for productive purposes. Access to basic energy services is important, but they offer limited opportunities to escape poverty. When households are given access to productive purposes, such as upgrading a manual mill or sowing machine to an electrical, they have a better chance of increasing income and enjoying more affordable energy services.

Between 2009 and 2011, the UNDP Asia-Pacific Regional Centre led a collaborative review of 17 energy access programmes and projects implemented by governments, development agencies and the private sector in Asia-Pacific. The case studies contributed with empirical knowledge to discussion on universal access to energy, and suggested pathways towards achieving it. The review gathered knowledge of policies and practices on low-emission technologies, financing, market development, entrepreneurship, institutional strengthening

and policy development that can help make energy services affordable for the poor in countries throughout the Asia-Pacific region – the Philippines, China, Nepal, Fiji, India, Sri Lanka, Bhutan, Lao PDR, Timor-Leste and Vanuatu.

The study gives weight to the importance of the role of energy for development and in reaching the Millennium Development Goals, by, amongst others, increased household income due to greater access and efficient use of energy, improved lighting for studies, and more time for women to participate in remunerated employment and educate themselves as they are liberated from the very time-consuming activity of searching for fuel wood.

<http://web.undp.org/asia/pdf/EnergyPlus.pdf>



## Achieving Sustainable Energy for All (SE4All) in the Asia-Pacific Region: A Regional Assessment

**LOCATION** Asia-Pacific region

**DURATION** 6 months

**PARTNERS** Partners to SE4All, national governments and stakeholders in 18 Asia-Pacific countries

**FINANCING SOURCE** UNDP APRC

**PRIMARY OBJECTIVE**

Increased knowledge of energy situation in Asia-Pacific

### KEY OUTPUTS

Increased knowledge of the current energy situation in 18 Asia-Pacific countries in line with the three goals of SE4All (universal access, doubling energy efficiency and doubling the share of renewables in the energy mix by 2030)

As a part of the Sustainable Energy for All (SE4ALL) initiative of the Secretary-General of the United Nations, countries across the world are encouraged to join the initiative in order to accelerate the development of energy access, energy efficiency and renewable energy across the world.

A first step for each country that participates in the initiative is to do a so-called Rapid Assessment Gap Analysis to assess the current situation and future needs of each country regarding energy. As of March 2013, 14 countries in Asia have adhered to the initiative, and 8 of them have completed national assessments. These countries are Bangladesh, Bhutan, Indonesia, Lao PDR, Malaysia, Mongolia, Sri Lanka and Viet Nam.

In order to get an overview of the needs in the region as a whole, the UNDP Asia Pacific Regional Centre commissioned a report on the regional situation, assessing the current rate of electrification in each country and their potential to develop renewable energy, off-grid and on-grid solutions, rural energy access and energy efficiency. The report also makes strategic recommendations for the road ahead and how to accelerate efforts in achieving Sustainable Energy for All by 2030.

The report will be launched in mid-2013.





## The Rural Energy Development Programme (REDP)

**LOCATION** Nepal

**DURATION** 2007-2011 (phase III)

**PARTNERS** Gov't of Nepal, Alternative Energy Promotion Center

**FINANCING SOURCE** UNDP, World Bank, Gov't of Nepal, local community

**PRIMARY OBJECTIVE** Improved lives in rural communities in Nepal through decentralised energy systems, including community-managed micro-hydro plants

**BENEFICIARIES** 550,000 people

### KEY OUTPUTS

Installation of more than 300 micro-hydro plants, 3000 solar home systems, 6800 biogas plants and 14,000 improved cook stoves

Improved energy access for about 550,000 people

Benefited more than 250 enterprises by providing energy for productive use

The Rural Energy Development Programme (REDP) was a joint three-phase initiative between the Government of Nepal, UNDP and the World Bank from August 1996 to April 2011. Phase III, described here, ran from 2007 to 2011.

The principal objective of Phase III was improving the capacity of local communities for rural energy service delivery for livelihood improvement and environmental protection. It sought to develop local capacities in 40 districts to increase energy access through a community-managed model, linking improved energy access to poverty reduction through productive uses of energy, particularly among women and vulnerable communities.

REDP promoted installation of micro-hydro plants (generally 10-100 kW) for lighting, powering enterprises such as agro-processing mills, carpentry, battery chargers, cable television network, computer centers, household radios, televisions, computers, refrigerators for medicines and vaccines.

Activities were carried out based on principles of strengthening organisations and institutions, building expertise, making finance available, promoting technology and environmental management, and empowering of vulnerable groups.

The project had a specific focus on Energy Plus, ensuring energy for productive purposes to households. The project in its entirety reached about 550,000 people, of which 275,000 obtained access to electricity. More than 250 enterprises, ranging from milling, poultry farming, carpentry, charging stations and refrigeration services were established as a result of the project.



### United Nations Environment Programme (UNEP)

#### HEADQUARTERS

Nairobi, Kenya

#### ASIA-PACIFIC REGIONAL OFFICE

Bangkok, Thailand

[www.unep.org](http://www.unep.org)

**MISSION** To provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.

**MANDATE** To be the leading global environmental authority that sets the global environmental agenda, that promotes the coherent implementation of the environmental dimensions of sustainable development within the United Nations system and that serves as an authoritative advocate for the global environment.

### Energy Strategy within Asia and the Pacific

UNEP assists governments and institutions in moving from the idea phase to the implementation phase, offering not only tools and resources, but also the skills needed to effectively use those tools and resources. The goal is to enable our partners so they can establish their own programmes and use financial measures that bring renewable energy resources and energy efficiency to their populations.

UNEP provides three types of services:

- **Analysis:** In-depth assessment and analysis of opportunities for reducing greenhouse gas emissions through new technologies, as well as the promotion of global norms and standards for these technologies.
- **Financial innovations** that promote private sector investment: Activities, training and application of financial mechanisms that help expand markets for low-carbon technologies, goods, and services.
- **Policy support:** Training and other institutional support that promotes policy development and planning processes consistent with evolving global norms.





## Southeast Asia Knowledge Network of Climate Change Offices (SEAN-CC phase II)

**LOCATION** ASEAN countries

**DURATION** Phase 2 (2012-2013)

**PARTNERS** Climate change focal points of ASEAN countries

**FINANCING SOURCE**

Ministry of Foreign Affairs, Government of Finland

### KEY OUTPUTS

Provided capacity development for climate change officers from 10 countries

Produced series of regional analyses and reviews

Climate technology trainings, feasibility studies and market assessments for the harmonization of standards

Supported country-led initiatives

The Southeast Asia Knowledge Network of Climate Change Offices (SEAN-CC phase II) project is strengthening the capacities of the Southeast Asian Climate Change offices to (i) contribute to the UNFCCC negotiations and discuss high profile topics such as the Cancun Adaptation Framework, the Technology Mechanism or the Green Climate Fund, and (ii) support their country's integrated responses to climate change challenges with an emphasis on priority sectors of their choice. More specifically, it is providing direct support and capacity building to national climate change offices, helping to develop and manage a regional climate change knowledge platform to serve their needs (and those of their targeted audiences), providing technical assistance to climate change negotiators to address capacity gaps as related to international negotiations and their implications in national contexts, and supporting offices in liaising and coordinating the actions and initiatives of influential climate change stakeholders in key sectors of their countries.

This project is an extension of the initiative entitled 'Supporting Action on Climate Change through a Network of Climate Change Focal Points in Southeast Asia' commonly referred to as SEAN-CC. Building on the results and lessons from phase I (2009-2011), SEAN-CC Phase II is actively pursuing its support to national Climate Change Offices.



## The Pilot Asia-Pacific Climate Technology Network and Finance Center (AP-CTNFC)

**LOCATION** 18 Asia-Pacific partner countries

**DURATION** 30 months, ongoing

**PARTNERS** ADB, Government of Japan, Government of the Republic of Korea, VITO-Flemish Institute of Technological Research NV

**FINANCING SOURCE** GEF

**PRIMARY OBJECTIVE** Facilitate clean technology transfer

### KEY OUTPUTS

Strengthened national and regional institutions and networks that better facilitate climate technology transfer, deployment and national policies to promote climate technologies.

Mobilization of considerable investment in climate technology projects, firms and technologies.

Technology transfer is particularly critical in the developing countries of Asia and the Pacific, whose greenhouse gas (GHG) emissions are rapidly increasing while their large populations are highly vulnerable to the impacts of climate change.

New and advanced technologies, especially in the energy, transport and urban sectors, are important for addressing both climate change causes and effects, and they also offer a broad range of additional benefits. There is an urgent need to ensure these technologies are made available as widely as possible and to build long-term competitiveness.

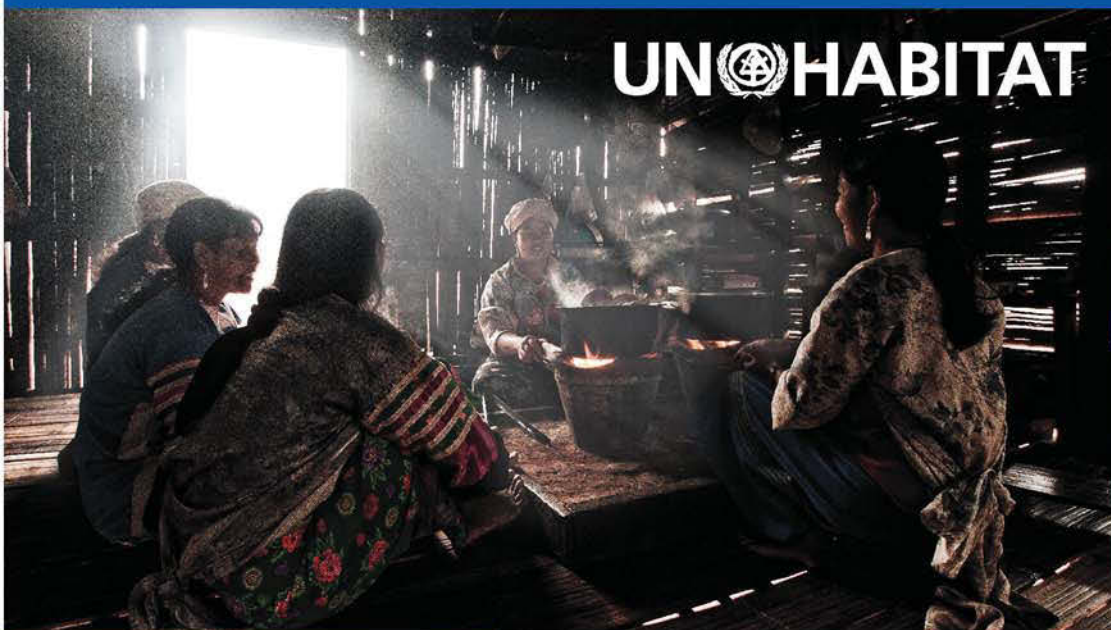
This partnership is piloting a climate technology finance center in Manila, managed by ADB, and a climate technology network secretariat in Bangkok, managed by UNEP.

The UNEP-managed climate technology network will focus on creating capacity readiness and enabling conditions for market transformation interventions in the region through fostering knowledge sharing,

public-private partnerships, and the development of institutional capacity and climate technology policies. The network will facilitate a network of national and regional technology centers, organizations, and initiatives, establish and strengthen national and regional climate technology centers and centers of excellence, and develop and implement country-driven climate technology transfer policies, programs, demonstration projects, and scale-up strategies.

The ADB-managed climate technology finance center will concentrate on assistance for developing investment and economic policy and mobilizing private sector investment for climate technologies. The center will integrate climate technology financing needs into national development strategies, plans, and investment priorities, catalyze climate technology deployment by mobilizing public and private sector financial resources, and establish a pilot "marketplace" of owners and users of low-carbon technologies to facilitate their transfer.





UN-HABITAT

## UN-HABITAT Demonstration of Biogas Attached Community-based Reed Bed Treatment System in Dhulikhel Municipality

**LOCATION** Nepal

**DURATION** 2006-2008

**PARTNERS** Dhulikhel Municipality

**FINANCING SOURCE** Dhulikhel Municipality, UN-Habitat

**PRIMARY OBJECTIVE** Disseminate, demonstrate and promote community managed waste to energy and skills of community wastewater treatment

**BENEFICIARIES** 2,000 direct

### KEY OUTPUTS

Established community-based waste to energy treatment system

5 households and 1 school directly connected to energy produced by the system

More than 125 households are benefitting from the wastewater treatment facility

### United Nations Human Settlements Programme (UN-HABITAT)

#### HEADQUARTERS

Nairobi, Kenya

#### ASIA-PACIFIC REGIONAL OFFICE

Fukuoka, Japan

[www.unhabitat.org](http://www.unhabitat.org)

#### MISSION

To promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all

### Energy Strategy within Asia and the Pacific

The primary responsibility for the implementation and follow-up of the Habitat Agenda rests with individual governments and their national and local partners. UN-HABITAT ROAP-Fukuoka provides support to their efforts, and monitors progress being made in the region. The tasks of the Office cover many aspects of human settlement development and reflect the mandate of UN-HABITAT.

The responsibilities combine operational activities (development projects and programmes) and normative activities (advocacy and policy guidance) and include the Campaigns for Secure Tenure and Good Urban Governance.

Shreekhandapur is a small town located in Dhulikhel Municipality with 200 households. Before the project, most of the households had pit latrines and emptied these pits every year or two. This had created a burden to residents in the absence of safe disposal of the septage and the service provider was charging high service fees. In addition, there was no treatment facility to treat any wastewater and sludge generated from these pit toilets. Hence, all wastewater generated was discharged into a small stream which finally drained into the Punyamati River.

To establish and promote community managed waste to energy and a community wastewater treatment system, Dhulikhel Municipality and UN-Habitat launched a joint initiative to construct a biogas attached community managed facility that can utilize waste from toilets as energy and treat wastewater.

The total cost of the project was about USD 150,000 where UN-Habitat provided USD 92,000 for the project and the municipality provided land to construct the facility. Now all the responsibility and ownership of the system has

been handed over to the Shreekhandapur Users Committee.

The project constructed two 75 cubic meter biogas reactors and a reed bed system to generate energy and treat wastewater. The generated biogas is distributed to 5 households and one primary school, supplying enough for their daily cooking purposes. In return, households are charged USD 7.00 for gas per month. To date, the Users Committee has been successfully managing the system and the operation and maintenance costs are met by the service fee, providing long-term financial viability.

This project demonstrates a smart way of joining energy and wastewater treatment, thereby making the system sustainable. While biogas energy is used for household cooking purposes, the additional benefit is reducing greenhouse gases and protecting water bodies from pollution.



## UN-HABITAT International Urban Training Centre (IUTC)

**LOCATION** Hongcheon, Gangwon Province, Republic of Korea

**DURATION** Since 2007, ongoing

**PARTNERS** Government of Republic of Korea, Government of Gangwon Province

**FINANCING SOURCE** UN-Habitat, Government of Republic of Korea & Gangwon Province

**PRIMARY OBJECTIVE** To provide training and capacity building for local governments in Asia and the Pacific

### KEY OUTPUTS

More than 20 international trainings provided on topics ranging from sustainable urban energy and solid waste management to ecological restoration and climate change

Memorandums of Understanding (MoU) signed with 16 partners worldwide to enhance centre's training capacity

The International Urban Training Centre (IUTC) was established in January 2007 by the Province of Gangwon, Republic of Korea, to build the capacity of cities and towns nationally and in the Asian and Pacific region in support of the goal of sustainable urbanization. IUTC aims to bridge the knowledge gap between academia, local government and central government in the field of sustainable urban development by facilitating communication, professional networking, learning and exchange of information. It seeks to enable dialogue between different stakeholders to create mutual trust and understanding in the realization of sustainable communities at the local, national and international levels.

In this collaboration, curricula for international courses, supporting training material and one toolkit on sustainable urban development have been developed.

A Catalogue of Best Practices in Environmental Restoration and Eco-Technology has also been developed, as well as the Asian Expert and Training Network on Sustainable Urbanization. The regular curriculum of the IUTC includes annual training course on Urban Energy Planning and Management in Asia.

<http://iutc.gwd.go.kr>

## UN-HABITAT Energy Efficient Housing – Improvement of Thermal Performance of Reinforced Concrete (RC) Slab Roofs

**LOCATION** Islamabad, Pakistan

**DURATION** April-June 2010

**PARTNERS** Pakistani Ministry of Environment, Capital Development Authority, National Energy Conservation Centre

**PRIMARY OBJECTIVE** Compilation, testing and comparison of different energy efficiency measures to improve the thermal performance of Reinforced concrete (RC) slab roofs

**BENEFICIARIES** 652 roofs (around 4,433 people)

### KEY OUTPUTS

All solutions documented step by step for possible replication

Costs, performance, weight and durability analysed and presented in simple format so technical staff and households can make better, informed decisions for their home and circumstances

The majority of Pakistan experiences extremely hot summers with temperatures over 40 degrees for several months. Most residential buildings in Pakistani towns and cities are 1-2 storeys with flat roofs. In the case of closely-spaced houses, the roof becomes the most exposed part of the building to the sun during maximum daylight hours. Reinforced cement concrete (RC) slabs absorb a great deal of heat which continues to be emitted through the night time.

Pakistan has been challenged with problems in electricity generation, where increasing demand is outpacing supply and resulting in extended load shedding, especially in the summer. This makes the situation particularly worse for low-income groups in congested living spaces who have limited access to outdoor space and who cannot afford to have electrical solutions.

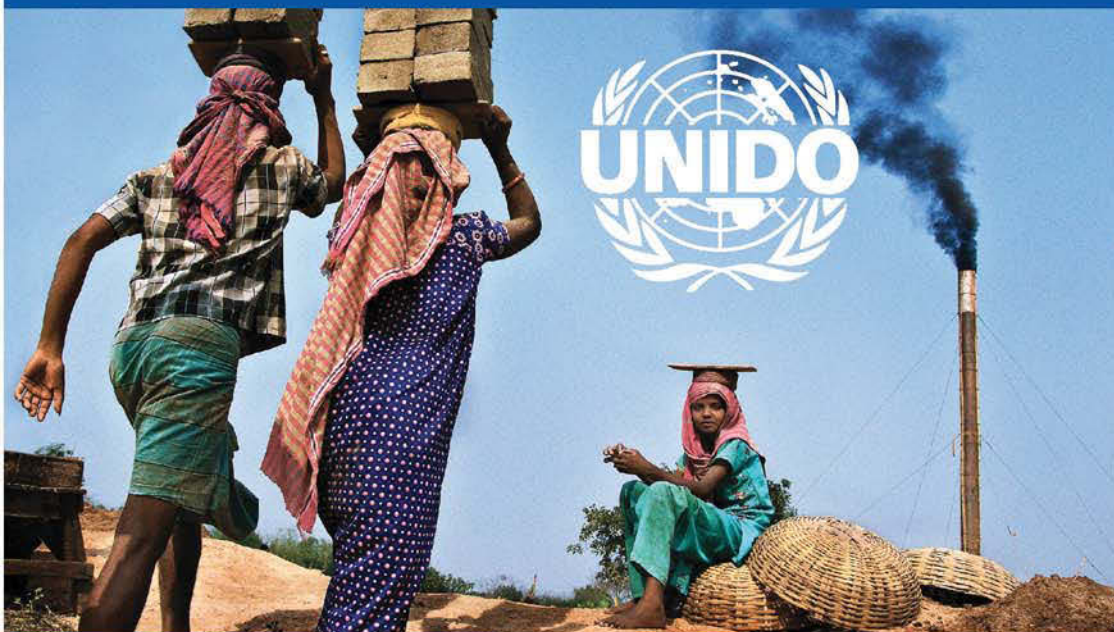
Partners, under the flag of the "Delivering as One UN Pakistan Joint Programme for the Environment, Outcome 5: Green Building," initiated a project to test and demonstrate measures to improve the thermal performance of housing, specifically RC flat roofing.

All houses of the same specification and condition were selected so as to compare the results.

UN-HABITAT carried out desk reviews of best local and international practices, market surveys and meetings with manufacturers. 19 different improvement products and techniques were selected and installed on the roofs in coordination with manufacturing professionals.

All of the solutions improved the indoor temperature in comparison to an unimproved control house. Moreover, 9 of the 19 roofs reduced the indoor temperature to below 34 degrees (selected threshold for comfort without use of AC), decreasing 4 degree on average. This remarkable outcome proves that passive building measures alone can significantly help reduce electricity consumption and promote a more comfortable indoor environment in densely populated cities.





## United Nations Industrial Development Organization (UNIDO)

### HEADQUARTERS

Vienna, Austria

### REGIONAL & COUNTRY OFFICES

More than 43 throughout world

[www.unido.org](http://www.unido.org)

### MISSION

**Partner for prosperity:** UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. UNIDO aspires to reduce poverty through sustainable industrial development. All countries should have the opportunity to grow a flourishing productive sector, to increase their participation in international trade and to safeguard their environment.

### MANDATE

To promote and accelerate sustainable industrial development in developing countries and economies in transition.

## Energy Strategy within Asia and the Pacific

UNIDO takes a holistic approach to energy issues by addressing both supply and demand sides, and by advocating policies aimed at implementing green energy strategies. Its energy strategy aims at helping developing countries to:

- Enhance access of the poor to modern energy services based on renewables
- Increase the competitiveness of their industries by reducing industrial energy intensity
- Reduce their impact on climate change by decreasing the carbon emissions of industries and by promoting renewable energy technologies
- Increase the viability of their enterprises, particularly in rural areas, by augmenting the availability of renewable energy for productive uses



## Promoting Waste Heat Recovery for Power Generation within the Chinese Coal-Gangue Brick Sector

**LOCATION** China

**DURATION** 3 years, 2008-2010

**PARTNERS** Ministry of Agriculture, China

**FINANCING SOURCE** UNDP Spain MDG Achievement Fund (MDG-F)

**PRIMARY OBJECTIVE** To lower the greenhouse gas emissions of the Chinese coal-gangue brick sector through introduction and wide-scale adoption of heat recovery power generation

### KEY OUTPUTS

Demonstrations of clean coal technology in 10 enterprises and results shared with 500 companies across the industry

Technical assistance to invest in pilot plants for waste heat recovery power generation in 2 coal-gangue brick factories

The Chinese brick-making sector is a major industrial sector, producing approximately 1.0 trillion bricks of different types in 2008. As a result, the sector consumes a significant amount of resources including energy, both coal for firing and electricity for other processes.

As part of the "China Climate Change Partnership Framework (CCPF)" programme, UNIDO and partners implemented this project with four main components. First, the project promoted and disseminated a self-assessment package on feasibility and benefits of waste heat recovery for power generation (WHRPG) for brick factory operators/owners. Second, the project successfully implemented demonstration plants on WHRPG in two separate, commercially operating tunnel kilns, using coal-gangue brick factories. Third, the project developed a set of policies and regulations designed to promote replication and sustainability of the WHRPG application throughout the Chinese coal-gangue brick (and general brick) sector. Fourth, the project evaluated and documented the potential role of WHRPG within the Chinese brick sector in terms of the Clean Development Mechanism (CDM).

The project's WHRPG pilot plants proved to be a profitable investment for coal-gangue brick enterprises. The investment of WHRPG plants in a range of 1.0 to 1.5MW generally offered attractive pay-back periods of four to five years and post-tax internal rates of return of 20 to 25%. It was found a WHRPG plant can meet 60 to 100% of the factory's electricity need, depending on the size of the brick enterprise. In terms of the estimated energy saving cost of the project's two pilot plants, they were RMB 2.5 million per year for the 1.5MW plant and RMB 2.01 million per year for the 1.0MW plant, including both operational and maintenance costs.

Furthermore, by reducing electricity use from the grid, which was coal-based, the two pilot plants reduced greenhouse gases emissions by 6,328 and 5,796 tons of CO<sub>2</sub>e respectively.





## Rural Energy for Productive Use and Income Generation in Cambodia

**LOCATION** Cambodia

**DURATION** 2006-2011 (stopped during 2007-2008)

**PARTNERS** Ministry of Industry, Mines and Energy, Ministry of Rural Development

**FINANCING SOURCE** Government of Austria

**PRIMARY OBJECTIVE** To commercialize renewable energy technologies for productive use in rural areas and to build capacity of energy service companies

### KEY OUTPUTS

Enhanced capacity of more than 30 local renewable energy professionals

Installed 6 solar battery charging stations and 183 solar panels

Benefited 1,073 households, saving 36 tons of CO<sub>2</sub>e and 13.5 tons of diesel

UNIDO and partners successfully helped the Cambodian government to fulfill its rural energy policy objectives with this project, following the Public Private Partnership (PPP) framework in promoting business models in rural and remote off-grid areas.

The project, initiated in 2006 and completed in December 2011, facilitated the formation of PPPs to disseminate renewable energy technologies for productive purposes. Pilot schemes demonstrated the technical and commercial viability of photovoltaics (PV), solar drying and biomass gasification. In doing so, they also generated employment and alleviated poverty. There were two main project components including i) institutional capacity building and ii) promotion of renewable energy to provide electricity in rural areas.

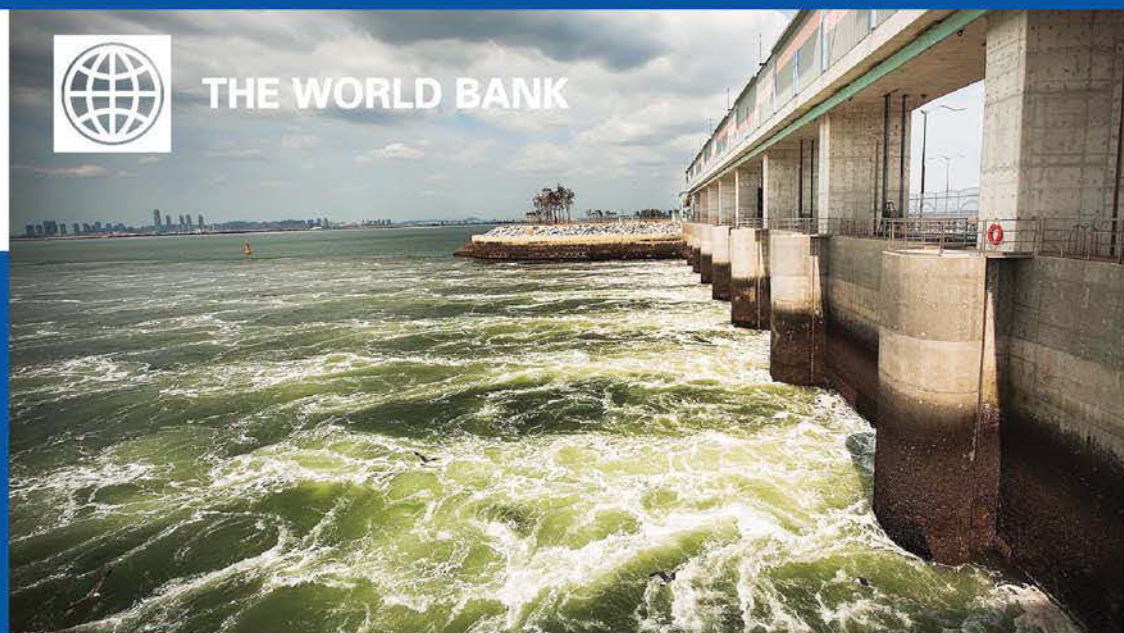
The institutional capacity building component of the project involved trainings in small hydro power and biomass gasification technologies for staff from the Ministry of Industry, Mines and Energy, the Institute of Technology of Cambodia, the University of Battambang and a number of

private sector companies. The trainings were delivered by international and national resource persons. In particular to hydropower technology, the trainings aimed at equipping participants with practical knowledge and know-how on preparation of pre-feasibility and feasibility reports, and financial analysis of hydropower projects. The study also provided the participants with the opportunity to practice their knowledge-based theories through field visits so they could gain more understanding on operation & monitoring and management.

For biomass gasification technology, UNIDO did evaluations and assessments of the effectiveness and efficiency of locally manufactured gasifiers. As a result, a report was produced with recommendations to enhance performance and quality of locally-produced gasifiers to be on a par with imported systems. These included knowledge on safety, water usage, performance parameters, and measurement of operation parameters.



THE WORLD BANK



### The World Bank

#### HEADQUARTERS

Washington, USA

#### COUNTRY OFFICES

More than 100 throughout world

[www.worldbank.org](http://www.worldbank.org)

#### MISSION

To help reduce poverty

### Energy Strategy within Asia and the Pacific

The World Bank has set the following priority areas of focus in the energy sector:

#### East Asia and the Pacific:

- Improving energy efficiency
- Scaling up renewable energy
- Increasing energy access
- Introducing new technologies and low-carbon energy solutions

#### South Asia:

- Alleviating energy shortages through investment lending, technical assistance and development policy lending
- Expanding electricity exchanges and trade through investment lending in national and intra-country transmission networks, and non-lending technical assistance to facilitate trade between Central Asia and South Asia
- Improving electricity distribution services through enhancing accountability and efficiency of target distribution entities, leading to overall better corporate governance and financial recovery
- Expanding rural access to electricity and improving rural services through lending and technical assistance initiatives
- Mitigating knowledge gaps and institutional weaknesses through lending and non-lending activities




**THE WORLD BANK**

## Tarbela 4th Extension Project (1,410 MW)

**LOCATION** Pakistan

**DURATION** 2012-2018

**PARTNERS** Water and Power Development Authority

**FINANCING SOURCE** World Bank (WB)

**PRIMARY OBJECTIVE** To add inexpensive hydro production to Pakistan's liquid fuel heavy energy mix

### KEY OUTPUTS

Strengthened dam's capacity by one-third

Improved management of peak demand at affordable end-user price

Increased share of renewables in overall energy mix

The overall development objective of the Tarbela Fourth Extension Hydropower Project is to facilitate a sustainable expansion in Pakistan's electricity generation capacity. The Project will also strengthen the Water and Power Development Authority's (WAPDA) capacity to develop the country's hydropower resources. There are five components to the project. The first component of the project is construction of the power house and modification to the tunnel. The second component of the project is power units and ancillary equipment. The third component of the project is social action and environmental management plans, dam monitoring and surveillance. The fourth component of the project is construction supervision, monitoring and evaluation of the project impacts and social action and environmental management plans. The fifth component of the project is project management support, capacity building of WAPDA, technical assistance and training.

The project involves the installation of a 1,410 MW hydropower plant on the existing Tarbela dam, which will increase the dam's capacity by a

third. Already, Tarbela dam provides 16% of Pakistan's electricity. This addition of around 4,000 GWh of low-cost renewable energy by June 2018 will be dispatched during the peak summer months at the low incremental cost of 2.5¢/kWh. The extension of Pakistan's largest hydropower project will shift the power mix away from expensive imported fuel needed to run thermal plants towards cleaner, more environmentally-friendly sources of power.

### Key Points:

1. WB technical assistance will be used to transform WAPDA, the implementation agency, into a world class organization
2. The project became effective on April 2012. All staffing requirements are complete including those for the resettlement commission.
3. Bank Funding: \$840 million. Pre-qualifications (PQ) for the civil works contract and electro-mechanical equipment contracts have been launched.


**THE WORLD BANK**

## Super Efficient Equipment Program (SEEP) and Partial Risk Sharing Facility (PRSF)

**LOCATION** India

**PARTNERS** Clean Technology Fund, Global Environment Facility

**FINANCING SOURCE** Same as partners

**PRIMARY OBJECTIVE** To promote and scale-up energy efficiency

**BENEFICIARIES** Consumers, Power Utilities

### KEY OUTPUTS

Introduction of approximately 5 million energy-efficient ceiling fans over 4 years

Energy savings of about 80.2 MW and consumer awareness increased

Enhanced access by ESCOs to commercial credit to aid in scaling up

The Super Energy Efficiency Program (SEEP) taps into the huge potential of the energy efficiency market in India and starts with a pilot phase of introducing approximately 5 million super energy-efficient ceiling fans over four years that is expected to allow India to avoid building about 80.2 MW of generation capacity. To increase the market penetration of super-efficient ceiling fans and kick-start market transformation in this area, component 1 provides competitively discovered incentives to four to six manufacturers, based on verified sales of their qualifying super-efficient products. Component 2 supports the financial incentive with market awareness initiatives to raise consumer interest in super-efficient appliances. Support for market research will be included to receive feedback and fine-tune the program during implementation. The project is leveraging US\$50 million of CTF financing.

The proposed Partial Risk Sharing Facility (PRSF) aims to assist Energy Service Companies (ESCOs) in scaling up their operations by enhancing their access to commercial credit and addressing some of the other barriers, namely, high risk

perception among lenders, high transaction costs, lack of energy performance contracting standards, lack of energy savings monitoring and verification guidelines and inadequate pilots with replicable contracts.

This will follow on current initiatives the government has pursued through its Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE), albeit with some crucial differences to improve performance. This project will focus on lenders who have shown some initiative in lending to the clean energy sector and build upon their experience in creating a risk-sharing facility. The project will incorporate a risk-sharing facility fund as well as technical assistance for partner commercial banks and other agencies to develop low carbon lending tools. The project will be funded by CTF (US\$ 25 million) and GEF (US\$18 million).





THE WORLD BANK

## The East Asia and Pacific (EAP) Clean Stove Initiative (CSI)

**LOCATION** China, Indonesia, Mongolia, Lao PDR

**DURATION** 2012-2014

**FINANCING SOURCE** The Australia Agency for International Development (AusAid), Asia Sustainable and Alternative Energy Program

**PRIMARY OBJECTIVE** To achieve universal access to modern cooking and heating solutions in the EAP region, particularly focusing on poor and rural households

### KEY OUTPUTS

Country-specific sector assessment reports, action plans and phase 1 synthesis report for scaling-up access to modern cooking solutions

Established partnerships with key initiatives and stakeholders

Conducted national consultation workshops and 1st Regional Energy Access Forum

The East Asia and Pacific (EAP) Clean Stove Initiative (CSI) takes a three-pronged approach focusing on: (1) strengthening institutional capacity and creating an enabling policy and regulatory environment for scaling-up access to advanced stoves; (2) supporting supply-side market and business development; and (3) stimulating demand for clean and efficient stoves.

EAP CSI consists of four phases: initial stocktaking and development of intervention strategy; institutional strengthening, capacity building, and piloting of the strategy; scaled-up program implementation; and evaluation and dissemination of lessons learned.

So far in phase 1, in-depth assessments of the existing stove market have been completed, as well as a review of the sector's institutions, policies, and key programs in four countries.

The project also:

- Raised the policy agenda by identifying and strengthening institutional champions and conducting broad national consultations.
- Provided key recommendations/roadmap to

scale up access to clean cooking/heating solutions based on country specific conditions including a new business model: Results-Based Financing Framework.

- Formed a platform for cross-country learning, sharing, and collaboration through frequent communication and active sharing of resources and expertise among four country teams and strengthened engagement with key regional and international players.

Phase 2 will focus on the following areas of activities, to be adjusted to each country's strategy:

- Improving or establishing stove standards, testing, and certification system;
- Strengthening institutions and building the capacity of key market players;
- Implementing pilots including the use of the results-based financing framework; and
- Supporting preparation of national clean stoves programs.