

CAMBODIA



COUNTRY OVERVIEW

Cambodia occupies the southern part of the Indochina peninsula, sharing its borders with Thailand, Lao PDR and Viet Nam. While per capita income remains low, and the country is classified by the United Nations as a lower middle-income country, in the last decade Cambodia has consistently been one of the fastest growing economies in Asia – reputedly the fastest growing in the ASEAN region in 2019. Although agriculture dominates the economy, the strong GDP growth was driven by textiles, construction and tourism industries and services. There is a significant foreign direct investment flowing into the Cambodian economy, mainly from China.

The rapid economic growth has brought a series of environmental problems to the country, which include significant degradation of inland waterways from industrial waste, and inadequate waste management, depletion of biodiversity and damage to coastal and marine resources due to urbanisation and uncontrolled construction. The government is paying increasing attention to these topics by instigating basic legislation to protect the environment. Cambodia has adopted a power development plan 2020–2040, the key objectives of which are accessibility, reliability, affordability and security as well as a contribution to address climate change.



SECTOR OVERVIEW

Renewable energy

Cambodia's electricity sector is undergoing a major transformation, and high on the government's agenda is increasing access and improving grid reliability. As of 2021, 86% of households have access to power according to the report by the Electricity Authority of Cambodia (EAC), though the country's electricity still lacks stability. At present, Cambodia is partly dependent on importing electricity from neighbouring countries, but plans are in place to make the country energy independent. Utilisation of renewable energy sources should play a major role in the transformation of Cambodia's economy, bringing power to industry, and to currently unserved rural areas.

According to the EAC's 2021 report in 2021, Cambodia has approximately 9.3 GW of installed power, of which 51% came from renewable sources - hydropower, solar, and biomass, while non-renewable energy, such as coal and oil provided another 48% of total energy used, with large imports coming mostly from Laos PDR. Renewable energy sources accounted for 50% of the country's domestic energy, and an additional 495 MW of electricity generation from seven solar power plants will be available by 2023. By 2030, Cambodia is expected to reach 1,815 MW of solar energy on its grid¹.

Solar

Due to its location in Southeast Asia, Cambodia has good potential to develop solar power, which has several advantages. Prices for solar power installation and running costs have plummeted over the past decade and solar energy costs are now very competitive compared with fossil fuels.

As of 2022, solar energy shares 9% of the country's installed capacity², with a few obstacles still to overcome in order to increase this number. A recent success story has been the construction of the large scale National Solar Park which is a 60MW plant with a generation cost of less than US\$ 0.0387 per kilowatt hour, the lowest rate in Southeast Asia, according to the Climate Investment Fund. Both the CIF and Asian Development Bank were involved in the project, which was tendered, leading to the extremely competitive and effective plant. Further contracts are being auctioned in the park, supported by a new national power plan calling for 1.8 GW of solar capacity by 2030. A battery energy storage system is being piloted at the National Solar Park.

While large scale solar initiatives receive much attention, there are many opportunities in the country for small scale units. During the dry season, solar PV is an interesting and highly competitive supplement to hydroelectric power, replacing diesel back-up generators. By 2023, seven solar PV power plants with a total capacity of 495 MW are expected to be put into operation, representing 20% of the total energy supply. Solar PV systems have considerable potential in industries with high power demands, including hotel and catering sectors, construction industries, particularly in the production of concrete, and the large textile and garment sector, and can also benefit the SME communities.

¹ Renewable Energy to Enhance Economic Benefits (UNDP- Cambodia)

² <https://www.khmertimeskh.com/50960312/cambodia-to-achieve-20-percent-of-energy-supplies-from-solar/>

Hydropower

Having access to large amounts of water resources including the Mekong River, hydropower is Cambodia's main source of electricity, providing nearly 50% of total power consumption. Despite this, hydropower is using only around 20% of its total potential, according to the International Hydropower Association, and there are several new plants planned for the future.

In 2003, the Cambodia National Mekong Committee carried out a large-scale study identifying 60 possible sites for hydropower development in the country with total generation potential of 10,000 MW, 50% on mainstream Mekong River, and 40% on its tributaries, plus some in the southwest region, outside the Mekong basin. Over the next nearly two decades, the number of hydropower plants has increased significantly, with dams on the major tributaries – yet until recently, none on the Mekong itself. Most of the dams are joint ventures between Chinese and Cambodian companies, operating on a long-term Build-Operate-Transfer (BOT) contract with the government. Electricity sales are guaranteed via an agreement with the state-owned utility company Electricité du Cambodge. The government is open to potential investments in this sector.

A newly approved project is the very large 2.6 GW project at Sambor, on the Mekong River itself, which will enable Cambodia to not only be energy independent, but also to have sufficient capacity to export power to Viet Nam and Thailand. As the project raised concerns about environmental and social concerns including fish migration patterns and the relocation of villages along the river, the government announced in 2020 that the country would not build any new hydropower dams on the mainstream Mekong River for the next decade³.

While hydropower is by its scale mostly for larger companies, there are opportunities for SMEs in the entire process from environmental impact assessments and monitoring, related technologies, and support services.

Biomass

Like in much of Southeast Asia, biomass is the most common source of energy in Cambodian households, where firewood is used for cooking. An interesting development in Cambodia has been the Gold Standard Cambodian National Biogas Programme, which enables individual households with livestock animals to reduce their dependence on firewood, with its air pollution and health problems, and expensive fossil fuels for cooking and lighting. The programme developed and distributed over 28,000 fixed-dome digesters in the country, enabling the supply of home-made biogas in rural areas.

There is also increasing use of larger biogas units, often in connection with industries with available biomass side streams. A recent example is the joint Japanese-Cambodian combined solar and biomass facility in Kandal province, generating 1.5 GW of power for a local rice producer. Surplus power will be sold to the national grid, or a local power company directly. Cambodia has a large supply of biomass available for gasification from its largely agricultural economy, most of which is unutilised.

Biofuel crops also have significant potential for contributing to future energy requirements in Cambodia, which has large quantities of sugarcane, cassava and jatropha. A study for the Asian Development Bank estimated that the country had the potential to produce 182 million litres of biodiesel around and 257 million litres of bioethanol. There are several biorefineries in the country, including many joint ventures with Korean, Japanese and Hong Kong companies, much of which is exported, partly to neighbouring countries, but increasingly also to Europe. These include MH Bio-Energy Group, Mong Reththy Group, North Asia Resources and Aura Green Energy. A concern is that much of the current capacity in Cambodia is based on first-generation feedstocks, which can lead to competition with food and animal feed, as well as promoting deforestation. SMEs with relevant second-generation technologies using waste side streams may therefore be relevant in this market.

³ <https://www.theguardian.com/world/2020/mar/20/cambodia-scrap-plans-for-mekong-hydropower-dams>

Environmental technologies Air quality improvement

In urban areas, infrastructure developments along with a 14% annual increase in vehicle numbers has contributed to the country's poor air quality. Cambodia ranked 139th out of 180 countries in the Environmental Performance Index in 2020. While many of the problems require governmental involvement, there are business opportunities for experienced environmental companies. This includes systems for monitoring and platforms for storing air quality data, laboratory facilities for evaluations, staff training, technical guidelines, and technologies and methods for air pollution management.

Water supply and water treatment

Universal access to drinking safe water, sanitation and hygiene can provide benefits to health, well-being, the economy and the environment. However, Cambodia faces a number of challenges, including financing the water infrastructure needed to meet the demands of the fast-growing economy and population.

In 2020, World Health Organization and UNICEF Joint Monitoring Programme statistics showed that a little over a fifth of people in Cambodia do not have access to safe drinking water, while just over 10% rely on surface water from lakes, springs and rivers. In other words, around 3.4 million people in the country still need basic access to safe drinking water.

In the water sector, common issues include limited access to water supply and improved sanitation, high arsenic content in water sources in some areas, sludge treatment systems, and recurring droughts and floods. A social enterprise in Phnom Penh, Teuk Saat 1001, has been building solar-powered water treatment kiosks to deliver drinkable water to rural communities. While the company has had great success in rural areas, monitoring water quality is still an issue and the company is looking for innovative solutions to connect their water filter devices with GPRS signals to enable remote water quality monitoring, which would ensure safe water supply. The entire water treatment sector has good potential for SMEs, including systems which are not reliant on grid access.

Cambodia is also undertaking an "Innovation Project" under the National Council for Sustainable Development, which focuses on wastewater treatment in industrial and SMEs sectors, supporting the government in developing an innovative approach to reduce GHG emissions from wastewater in the food and beverage industry.

Waste management

Urbanisation and industrialisation have had a significant impact on waste generation in Cambodia, particularly in the major cities of Phnom Penh, Battambang, Siem Reap and Sihanoukville. Besides the obvious increases in municipal solid waste, there is a large increase in industrial waste, hazardous material, and rubble from the construction sector, where the current systems are totally inadequate. There has also been a process of decentralisation of power in the waste sector from the provincial and district levels, leaving many local authorities responsible for waste treatment, but without sufficient funding or training.

However, there still several challenges across every aspect of waste management, including collection, disposal, and recycling, and while legislation does exist in some areas, there is limited enforcement.

These needs open up business opportunities for specialised companies and there are cooperation initiatives in the country, supported by major development banks such as World Bank and Asian Development Bank.



Renewable energy

Solar

In January 2018 the Electricity Authority of Cambodia (EAC) enacted for the first time a solar generation regulation, which includes several core directives for stakeholders. The first directive covers the principles to set solar PV supply tariffs, which at present is based on the aggregate cost of all electricity sources in the national grid. Electricité du Cambodge must in future buy the solar PV plants if they want to connect them to the national grid system.

The second directive relates to grid connections from stand-alone systems. The government now allows lower-voltage consumers to develop standalone solar PV systems without requiring permits. Permit procedures are considered to be a major hindrance, which has slowed the roll-out of solar PV units. The solar PV units allow the generation of power much below the current level in rural areas, making it a far more attractive economic proposition. This is expected to drive Cambodia forward to achieve 100% household electrification by 2030, allowing the creation of many individual solar units or mini-grids across the country.

Hydropower

There is currently no specific law on hydropower in Cambodia, although there are a number of laws relating to the development and running of power plants, including investment, electricity, land, forests, water resources and the environment. Developing a hydropower plant in Cambodia requires an initial Memorandum of Understanding with the Ministry of Mines and Energy (MME), for a feasibility study, which can typically take one to two years to complete.

All projects with investment of over US\$ 50 million and all BOT projects must be approved by the Council for the Development of Cambodia (CDC), which is the highest decision-making body for private and public sector investment in the country. In addition, under the Law on Water Resource Management, all hydropower projects require a water use license from the Ministry of Water Resources and Meteorology, as well as an impact assessment report.

Biomass

There are no specific laws in Cambodia supporting biofuel development. As a participant of the Kyoto Protocol and a proponent of its associated international environmental laws, Cambodia indirectly supports biofuel development, poverty reduction, and environmental protection strategies that play a backup role in biofuel development. Government policy regarding biofuels is under two ministries, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Mines and Energy (MME).

Environmental technologies from waste to water treatment

For many years, Cambodia has enacted very general environmental legislation, including the Law on Environmental Protection and Natural Resource Management (1996), or Sub-Decree No.27. on Water Pollution Control (1999). In recent years, there is a growing recognition that these are not sufficient and more detailed legislation is required. This has led to e.g., Measure to Prevent and Reduce the Ambient Air Pollution (2020), Technical Guideline on Noise Disturbance and Vibration Monitoring from Explosive Activities (2019) etc.

Companies dealing with polluting products such as textiles, cement, rubber, need to obtain a wastewater discharge license from the Ministry of Environment.

There is recent legislation on hazardous waste and safe treatment, which covers substances which are radioactive, inflammable, infected, lead to oxidation, toxic or contain other chemical materials. The new sub-decree on Management of Garbage and Solid Waste of Downtowns 113 from 2015 classifies and regulates the following hazardous wastes from households, public institutions, commercial companies, industrial and tourist sites:

- Battery waste
- WEEE/e-waste
- Bottle glass waste or cans spoiled with chemical or agricultural pesticides
- Old vehicle tires
- Used oil
- Waste from paint, dye, printing ink and their respective containers
- Asbestos waste



MARKET ENTRY

First contact points

Having a local partner is always advised to enter the Cambodian cleantech sector, and there are several state-owned and private consultancies and institutions that can help finding them. The General Directorate of Trade Promotion under the Ministry of Commerce, is the source of trade promotion schemes, offering some business development services to local and foreign companies, including business matching events, support for making appointments with companies in Cambodia, as well as providing service provider lists.

Cambodia Chamber of Commerce

The Cambodia Chamber of Commerce was established in 1995 and is a voluntary membership-based and non-profit organisation, representing all sectors, including cleantech. There are 12 municipal/provincial chambers, making this the widest business network in the country, which can be useful for foreign companies entering the market in Cambodia.

Business networking events

Before the pandemic there were only a few dedicated events for the cleantech sector in Cambodia, and most local organisations attended fairs in Bangkok, Ho Chi Minh City and Singapore. The most prominent events in Phnom Penh are the Camenergy and Camsolar fairs, which are expected to continue post-pandemic. These two fairs are an ideal way to connect with key decision-makers in Cambodia's electric power industry. The events showcase new and innovative products, services and solutions from hundreds of world-class companies.

Public procurement

Cambodia has received technical assistance from the Asian Development Bank, to modernise their procurement processes, resulting in well-drafted legislation, rules and guidelines, designed to create a coordinated, sound procurement framework in line with good international practice. As cleantech sector companies often need to compete in public procurement procedures, it is recommended to have a local company as a partner, or at least a local consultant familiar with local PP rules.

FDI incentives

The government has made it a priority to attract investment from abroad. Foreign direct investment (FDI) incentives available to investors include 100% foreign ownership of companies, corporate tax holidays of up to eight years, a 20 % corporate tax rate after the incentive period ends, duty-free import of capital goods, and no restrictions on capital repatriation. More information can be found on the Invest in Cambodia website.



TRENDS AND RECOMMENDATIONS

Cambodia is struggling with significant environmental issues, as well as the consequences of the COVID-19 pandemic and the need to increase the economic output of its economy and the well-being of its people. However, Cambodia has reiterated its commitment to develop policies and stimulate the use of clean technologies to ensure energy security, and deliver a more affordable and sustainable energy future by reducing carbon emissions and mitigating climate change.

Infrastructural challenges include providing clean and safe water for the rural population and organising effective waste collection and management systems in the growing cities, which can be capital intensive and where foreign technologies and investors are needed. At the same time, Cambodia has to react quickly, as it is one of the most vulnerable countries to the effects of climate change impacts such as floods and droughts.

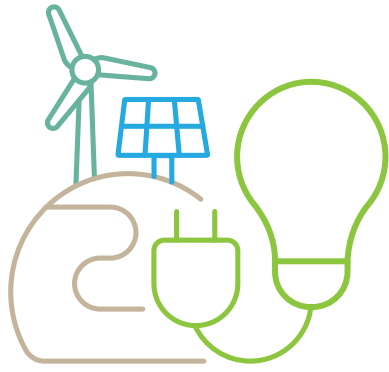
Environmental education efforts in Cambodia have been largely informal, in other words, outside of a classroom setting, and have typically been adopted on a per-project basis at a local scale, such as in support of community forestry or community fishery initiatives.

A 2018 report by Global Green Growth Institute (GGGI) found that investment in resource efficient technologies could foster Cambodia's economic growth, while yielding important social and environmental benefits. An economic modelling exercise asserts that greening the industrial sector will contribute to modernising Cambodia's industrial structure from a labour-intensive industry to a skill-based industry, integrating local businesses into global and regional supply chains.

Some areas where foreign companies could offer their technologies, processes and expertise are:

- From water production to wastewater and sludge treatment systems; rainwater harvesting systems
- Water treatment systems and monitoring and preservation technologies, especially for rural communities for increased water safety
- Technologies to mitigate the effects of floods, and to increase irrigation capacity
- Technologies for controlling energy generation and consumption for increased efficiency
- IOT related to power generation
- More efficient and increased supply of direct current appliances, cost-effective appliances such as DC-based water pumps, post-harvest processing machines, and refrigeration technologies.
- Technologies and processes for improving biodiversity in coastal area and managing mangroves
- Battery and storage technologies
- Rooftop and small-scale solar, and technologies for on-site renewable energy generation for more efficient transmission and access

Overall, while the Cambodian market highly price sensitive, the country is growing fast, and there is an increased recognition of the need for investment into the cleantech sectors, partly for the benefit of the domestic population, but also to ensure that Cambodian industry can compete on global markets, where this is increasingly a requirement. The market is interesting for SMEs, offering many opportunities in a range of sectors, and where foreign companies are very welcome technology providers.



CLEANTECH SECTOR BRIEF