FABRIC Asia

KNOWLEDGE PRODUCT SERIES

On-site solar regulation and policy framework

Cambodia

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On-site solar regulation and policy framework

CAMBODIA

Who is this for?

Factory owners in the textile and garment industry.

In this note, you will learn about:

1. On-site solar system configurations
2. Requirements for grid-synchronised systems
3. The authorisation procedure for grid-synchronised systems

Value proposition

It is important to get to know the policies and regulations that govern the installation of on-site solar PV in your country to ensure that your investment in a solar system is the most suitable one for your factory and to make sure that it is legally permitted.

Cambodia

The opportunity for solar photovoltaic (PV) in Cambodia is high. This is the result of the fast-growing demand for power, the country's good solar irradiance and high electricity prices.

This document will provide insights into the policy and regulatory framework around factory owners implementing on-site solar PV in Cambodia.

Practical context – electricity tariff trends are one of the key drivers of on-site solar PV implementation in Cambodia

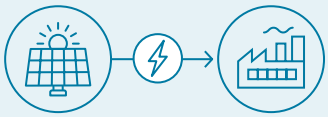
High electricity costs are the key drivers of on-site solar PV implementation in Cambodia. Historically, Cambodia has one of the highest electricity tariffs in South and Southeast Asia.

- Cambodia is expecting a rapid increase in electricity demand: the Cambodia Energy Outlook estimates an increase of 7.5 times from 2015 to 2040.
- Electricity generation in the country is dominated by hydro power (48%) and coal power (35%) plants. The dry season typically induces power outages, which makes the commercial and industrial sector dependent on diesel back-up systems to guarantee a stable electricity supply.
- On-site solar PV systems are an interesting alternative to diesel back-up systems since they do not require fuel to operate and offer lower overall costs per unit of electricity consumed. The proportionally higher cost of energy from diesel generators with higher capacity adds to the cost-saving potential of solar PV generation.

The basics: on-site solar system configurations

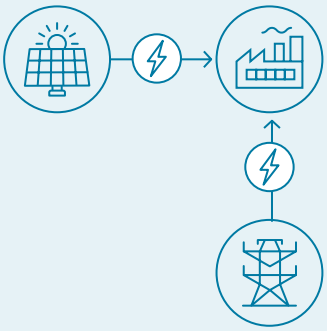
To identify which regulations need to be applied, first understand what types of on-site solar PV configurations are available.

There are two configurations for installing on-site solar systems in Cambodia.



1. Off-grid system.

- An off-grid system is not connected to the electricity grid and would require the installation of typical energy storage (batteries) to store excess generated power, which would be available for consumption when the solar system is not generating power.
- Off-grid solar systems are not currently subject to any regulation.
- You may require more power than the system can generate to run your factory.



2. Grid-connected (grid-synchronised)

- The on-site system is connected to and synchronised with the grid.
- Under current regulation, the Electricité du Cambodge (EDC) prohibits grid-connected systems from exporting excess power to the grid and imposes a zero-power export feature on the on-site solar PV systems.
- Only in exceptional cases may electricity be injected or sold back to the grid, which requires a power purchase agreement (PPA) with EDC and approval from the Electricity Authority of Cambodia (EAC).
- Compared to the off-grid configuration, additional permits and specific technical system criteria apply to on-grid systems, as detailed in the next section.

Practical insights – the economics of on- versus off-grid systems

Based on the **Tariff Prakas** in Cambodia, customers with grid-connected solar systems are charged under the **solar tariff.** This means that, for factories with grid- connected systems, the preferential night-time (off-peak) rate is not available, and the customer is charged the peak tariff throughout the day.

Therefore, **the overall business case for grid-connected on-site solar systems** would need to consider both the **savings from the avoided use of grid electricity** and the **higher electricity tariffs/costs** compared to the business-as-usual case if your operations continue throughout the night-time hours.

Discuss this with an experienced solar service provider to evaluate which type of on-site solar PV system configuration (on-grid or off-grid) would present the better business case for your factory.

Requirements for grid-synchronised systems

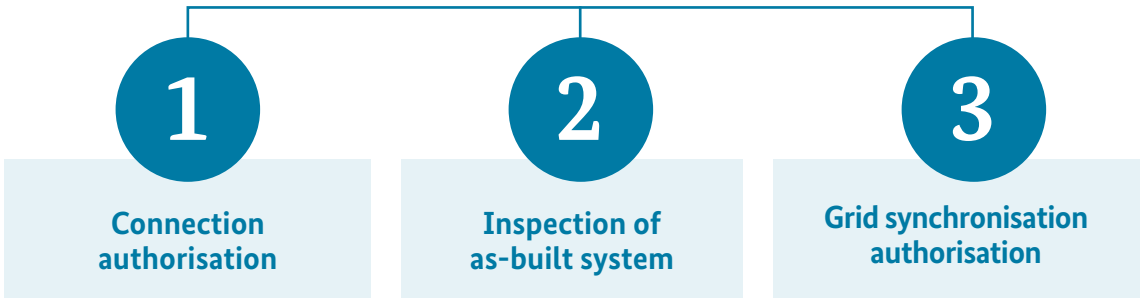
General conditions for grid-connected solar systems in Cambodia, based on the Solar Prakas.

Parameters	Requirements for grid-connected systems
1. Customer requirements	• Only consumers connected to medium-voltage (between 230 V and 22 kV per phase) and high-voltage (more than 22 kV per phase) lines or sub-stations are allowed to install solar power systems synchronised with the national grid. • Thus, low-voltage (230 V per phase) grid-synchronised systems are prohibited.
2. Project size limitations	• The installed capacity of the system shall not exceed 50% of the EDC contracted capacity, which, by default, is the size of the transformer(s) on the facility.
3. System requirements	The system needs to follow several technical requirements, including: • a limit to the DC current injection, • a restriction on flickering, • having an anti-islanding function, • ensuring zero power is exported to the grid • a limit on harmonic distortion. Please note that these requirements are fulfilled by default by any quality component meeting international standards.

Important note: if your factory is located in a Special Economic Zone (SEZ): If a factory is supplied with electricity by a power producer other than by EDC, the licence holder and EDC must also agree to the installation of the solar PV system.

Authorisation procedure for grid-synchronised systems

In Cambodia, solar PV rooftop systems only require authorisation from EDC's Business and Distribution Department. The EDC authorisation is granted via a three-step approval process: authorisation, inspection and commissioning.



Good practice: the authorisation procedure should be carried out by the Factory Owner, assisted by the Solar Developer selected to install the system, and in correspondence with the Business and Distribution Department of EDC.

1 Connection authorisation

This step involves sending a formal letter to the **Business and Distribution Department** of EDC indicating the wish to construct an on-site solar PV system. The letter should include details about the project and its design:

- location
- system size
- layout
- components
- transformer arrangement
- system single line diagram (SLD)
- electricity bill

If approved, EDC grants the **Connection Authorisation** within one week (minimum) to one month (maximum) of receiving the application. Once the Connection Authorisation has been granted, the construction process can begin.

The EDC's authorisation is valid for one year, during which time the project must commence. There is limited information on whether this validity period can be extended.

Good practice: this step should be initiated following **financial closure** of the project, and before the start of procurement activities.

2 Inspection of an as-built system

The inspection is carried out once construction is almost complete, prior to the commissioning of the project. The process is as follows:

1. Send a formal letter to the Business and Distribution Department of EDC requesting the on-site system inspection. Include all details of the constructed system:
   - as-built drawings,
   - system SLD.
2. Agree on an inspection date with EDC.
3. Inspection by EDC personnel on the system's compliance with regulation and with as-built information.
4. If approved, EDC provides an Inspection Validation Certificate on the completion of the inspection.

❸ Grid-synchronisation authorisation

Once the Inspection Validation Certificate has been obtained, the system is ready to be commissioned. The process is as follows:

1. Send a formal letter to the Business and Distribution Department of EDC requesting the commissioning of the system.
2. Agree on a commissioning date with EDC.
3. Commissioning of the on-site PV system in the presence of EDC personnel, who will test and verify the system's compliance with regulation, including:
   - zero-export function;
   - anti-islanding;
   - compliance with the harmonic distortion thresholds.
4. If approved, EDC provides an Authorisation to Operate on the completion of the verification.

List of acronyms and abbreviations

Abbreviation/Acronym	Description	Abbreviation/Acronym	Description
C&I	Commercial and industrial	**PPA**	Power purchase agreement
DC	Direct current	**PV**	Photovoltaic
EAC	Electricity Authority of Cambodia	**SLD**	Single line diagram
EDC	Electricité du Cambodge	**V**	volt
kV	kilovolt		

To explore more topics related to solar PV in Cambodia, please review the full set of briefing notes.

- ☐ Introduction to commercial and industrial (C&I) RE sourcing
- ☐ 101 Crash Course: How a solar system works
- ☐ Assessing suitability for rooftop solar projects (technical perspective)
- ☐ Assessing the business case for on-site solar (financial perspective)
- ☐ Different investment models for rooftop solar projects
- ☐ Local financing programmes for rooftop solar projects

Image: © GIZ / Sabrina Asche, 2017

ABOUT FABRIC

The project FABRIC (Fostering and Advancing Sustainable Business and Responsible Industrial Practices in the Clothing Industry in Asia) is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, which works on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). To successfully shape the desired economic growth in Asia's textile and garment production in a sustainable way, many parties need to be involved. GIZ's FABRIC project brings together people from the Asian industry, public sectors, NGOs and from international buyers, promoting knowledge transfer and cooperation. FABRIC is working in Bangladesh, Cambodia, Myanmar, Pakistan, Viet Nam and together with China to strengthen an industry that offers quality jobs, protects the environment and contributes to economic growth.

Contact

Mrs. Eike Hellen Feddersen

FABRIC Asia | Coordinator Myanmar and Vietnam & Coordinator Private Sector Cooperation

Fostering and Advancing Sustainable Business and Responsible Industrial Practices in the Clothing Industry in Asia

giz | Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

L2-A , Coco International Flower Village

No. 14 Thuy Khue street, Tay Ho District
Hanoi, Vietnam

E eike.feddersen@giz.de
M + 84 96 2525 415
I www.giz.de

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

FABRIC Asia

Published by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Registered offices Bonn and Eschborn, Germany

FABRIC Asia
No. 27, Street 302,
Boeung Keng Kang 1
Phnom Penh, Cambodia
T +855 23 860 110
E giz-cambodia@giz.de
I www.giz.de/cambodia

Author
South Pole

On behalf of
Federal Ministry for Economic Cooperation and Development (BMZ)

Addresses of the BMZ offices

BMZ Bonn
Dahlmannstraße 4
53113 Bonn, Germany
T +49 228 99 535 - 0
F +49 228 99 535 - 3500

BMZ Berlin
Stresemannstraße 94
10963 Berlin, Germany
T +49 30 18 535 - 0
F +49 30 18 535 - 2501

E poststelle@bmz.bund.de
I www.bmz.de

As at
04.2021