FABRIC Asia

KNOWLEDGE PRODUCT SERIES

Different investment models for rooftop solar projects in Bangladesh

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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

Different investment models for projects in Bangladesh

Who this is for

Factory owners in the textile and garment industry

This note introduces the various investment models that factory owners can choose from when implementing a solar system.

More specifically, you will find information about

- CAPEX vs OPEX investment model
- Decision-tree for selecting the suitable investment model
- In detail: investment models available in your country
- Recommended steps to identify the right solar partner

Value proposition

Selecting the right investment model is a crucial step towards ensuring the viability of your on-site solar PV system. Knowledge of different investment models can support your decision-making when selecting the right model for your factory's budget and plan.

When you invest in a new on-site solar system, you can either self-finance your investment upfront (CAPEX) or make incremental payments to a third party over multiple years (OPEX)

The Capex Model

Directly investing in a rooftop solar plant by commissioning a renewable energy developer or an engineering, procurement and construction (EPC) company. This is known either as a **"CAPEX model" or "self-financed model"**.

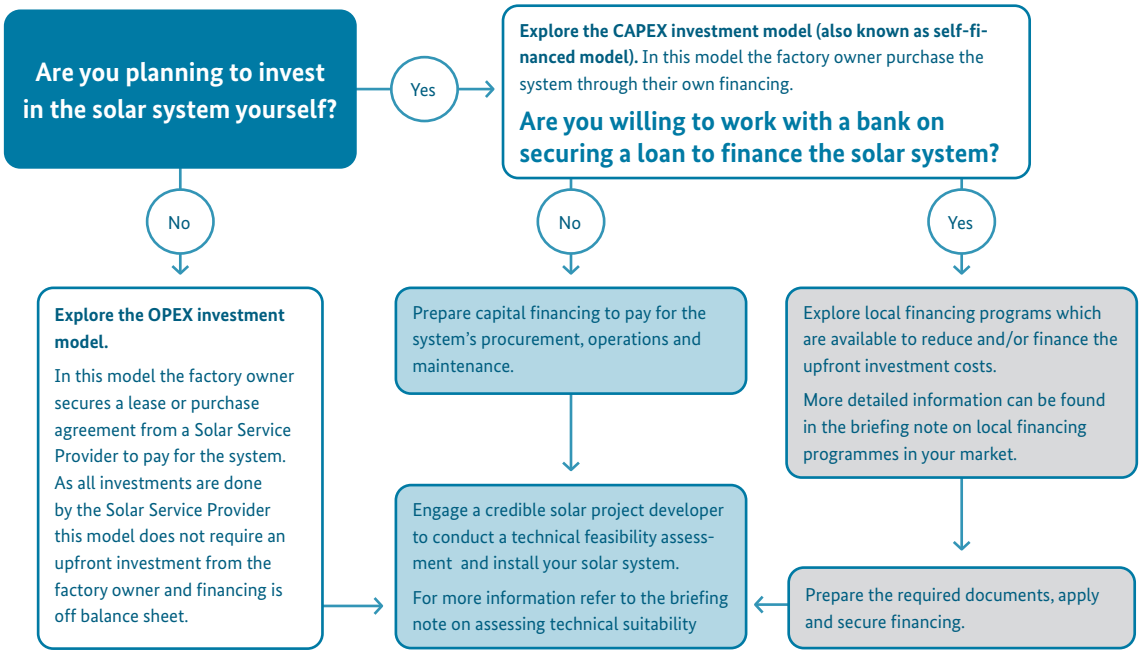
- The system is fully financed, owned and operated by the factory owner.
- The main benefit of this model is that the factory owner has full control over the installation and performance of the system.
- The factory owner is also responsible for operations and maintenance (O&M).

The Opex Model

Buying solar power under a long-term agreement with a Renewable Energy Service Company (RESCO). This is known as an **"OPEX model" or a "third-party financed model"**.

- The advantage of the OPEX model is that factory owners do not have to invest in the solar PV system.
- The electricity generated from on-site solar PV systems is bought at a price lower than the market retail rates.
- The owner also has limited to no responsibility for the O&M of the system for the duration of the contract. Once the system ownership is transferred to the factory, the responsibility for the O&M is also transferred.
- However, the OPEX model typically presents lower overall cost savings (since part of the revenues are shared with the RESCO) than the CAPEX model.
- Under the OPEX model, RESCOs normally conduct due-diligence on factories and would only offer service to factories with stable business and good financial health.

The decision-tree below provides a quick assessment of the two models and indicates which could be best for you.



To help you run through the decision-tree, here are some tips on topics to explore:

The costs of each model

Contact a trusted solar developer in your area to receive an estimate of the expected cost of a solar system at your factory, for both CAPEX and OPEX models, as a comparison exercise.

Your internal business requirements

- What **internal requirements** does your company have in place for financing arrangements from third parties?
- What **internal approval process** is required for implementing and approving solar system financing and which stakeholders should be involved? Getting early buy-in among your decision-making colleagues is crucial.

Your budget

Check the **budget availability/allocation** (with the relevant department) for the procurement of the equipment needed for the on-site PV system.

- Does your company's budget allow for equipment to be purchased with capital budgets (money for the acquisition and maintenance of fixed assets such as land, buildings and equipment)?
- If yes, are there any requirements around the "payback period" ?

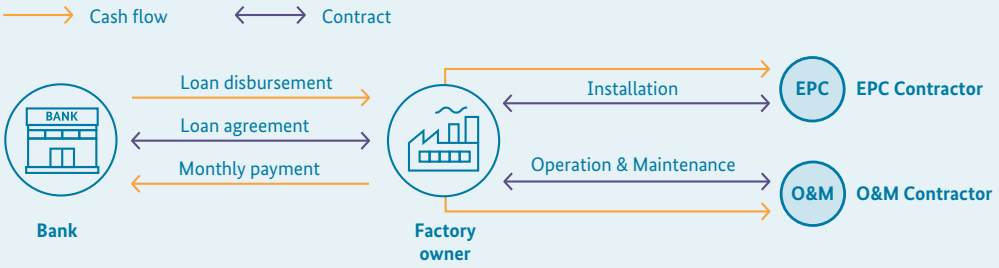
Check whether the company allows the **use of operational budgets** to implement an on-site system via an equipment lease or power purchase agreement (PPA). A PPA is a contractual agreement between a power producer and a power consumer for the sale and purchase of electricity.

- Would it be able to sign a 10–25-year contract?
- Would a capital loan for self-financing the system be preferable to implementing third-party financing?

1. 'Payback period' refers to the time required until the savings from the solar energy system are higher than the initial system's cost and maintenance expenditure.

Under the CAPEX model, the entire investment for the rooftop solar system comes from the power-user/ factory owner. The factory owner generally hires a solar EPC company to provide turnkey installation of the entire solar power system and hand assets over to the user.

Figure 1



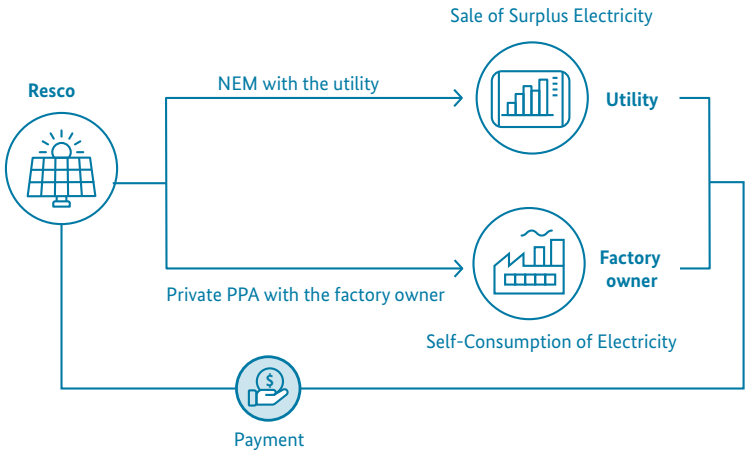
Structure	1. The factory owner owns the solar PV system. 2. The factory owner can apply for financing via a loan from a bank. 3. The installation of the solar system is completed by a trusted EPC contractor, selected through a tender process. 4. The factory owner is responsible for O&M; however, an O&M contractor should be engaged for a fee (typically annual) to ensure high quality.
How do you pay for it?	• You pay for the **(a) capital expenditure** (the solar system parts) and **(b)** for the **O&M support.** **a.** The PV system (CAPEX costs) will be paid for on a balance-sheet basis and can be financed through a bank. In Bangladesh, loans are available with a typical debt to equity ratio of 80:20 at a 6% annual interest rate. **b.** Factory owners can manage the O&M of the solar system (if there are qualified staff available) but companies will typically hire an O&M contractor to manage the O&M, usually for an annual fee.
Incentives	• The factory owner is responsible for taking advantage of the available incentives for solar PV in Bangladesh, including the **net energy metering (NEM) scheme. The NEM** means that if excess power is generated, it can be sold back to the gri
Operations and maintenance	**Factory management (or the system owner) is responsible for O&M.** Typically, the EPC contractor offers an O&M service as part of the contract for a specified number of years (typically one year, but can be two) once the system is commissioned. After this period, O&M service is charged if requested by the factories. Therefore, the facility owner can rely on the EPC contractor during this period for the agreed O&M activities. The facility owner must be aware of the scope of O&M that the EPC contractor agreed to deliver and ensure that the EPC contractor fulfils this responsibility. If the facility owner wants to use its own staff to oversee O&M activities, proper capacity-building (i.e. training) must be carried out.

OPEX model explained

Under the OPEX model, a RESCO invests, builds and maintains an on-site solar plant. The customer pays for the power generated under a long-term agreement.

This choice is best for factory owners who do not have the capital available to install an on-site solar plant, or do not have access to long-term, low-cost capital.

Currently, only the on-site PPA type of OPEX agreement is available in Bangladesh, with a limited number of agreements concluded to date.

Private power purchase agreement (on-site PPA)	
Illustration	
Structure	The RESCO installs and operates the on-site system and sells the power to the factory via a long-term PPA, typically ranging from 10 to 12 years.
Ownership of system	The RESCO owns the system and is responsible for its costs and for acquiring permission to install the solar system on the factory site. The system ownership may be handed over to the factory owner at the end of the PPA tenure or earlier, depending on the agreement.
Investment	**Off-balance sheet** with zero upfront investment cost required from the factory owner. Typically, the RESCO finances the system via a loan from the Infrastructure Development Company Limited (IDCOL).
Incentives	The RESCO will be responsible for taking advantage of any incentives, including the NEM scheme.
How to pay for it?	Payment per kilowatt hour (kWh) of solar energy consumed. The price paid per kWh with the PPA **is typically lower than that charged by the utility.**
Operations and maintenance	The PPA provider is responsible for the system's maintenance throughout the term of the PPA.

Finding the right EPC or project developer is crucial

Although the pricing results of the tender are important, factory owners should also consider other qualitative aspects, such as those listed in the table below.

Table: Sample checklist for solar developer/EPC company due diligence

Parameter	Details	Check box
Technical offer	• Check that all system elements are included • Check that all necessary infrastructure works are included • Check that all relevant quality standards have been addressed More information on key system elements and set-ups is available in the "101 Crash Course: How a solar system works".	
Financial offer	**Ensure sound financial offers:** Offers with unusually low prices might indicate an inexperienced provider; ensure proper due diligence on this type of offer. Undertaking a tender process will ensure that different technical and financial offers are received and compared to find the best option.	
Track record/ credibility of the EPC contractor	**Review the company's past experience** • Research **previously developed projects** (number of years of experience and number of projects). The more similar the projects an EPC contractor has carried out in the past, the better the chances are that they can deliver well on this project. • **Check references** from recent clients (call respective facility owners or visit the sites). • **Check the current and historical financials** of the EPC contractor. • If applicable, check **accreditation** from the national/regional/global certification body for solar system equipment. • Due diligence – assess EPC contractors' own due diligence process. Overall, it is important to have a long-standing and good relationship with the proposed contractors.	
O&M services (if included in the scope)	**Ensure that O&M services are agreed and delivered.** The scope of O&M services should typically include online monitoring of the solar system, together with periodic site inspections to check for faults, clean the system and carry out repairs/replacements in case of any breakdown or malfunction of the solar system. To read more about best practices for O&M refer to: National Renewable Energy Laboratory's report, "Best Practices for Operation and Maintenance of Photovoltaics," linked here.	
Insurance policy and warranties	Check **insurance/warranties coverage and duration.**	

Did you know?

In addition to solar PV rooftop, there is one other solution for sourcing renewable energy in Bangladesh, which is **Energy Attribute Certificates (EACs).** EACs represent 1 MWh of generated renewable electricity and can be purchased to compensate for the factory's electricity purchased from the grid.

List of abbreviations and acronyms

Abbreviation/Acronym	Description	Abbreviation/Acronym	Description
CAPEX	Capital expenditure	**NEM**	Net energy metering
OPEX	Operating expenditure	**O&M**	Operations and maintenance
EPC	Engineering, procurement and construction	**RESCO**	Renewable Energy Service Company
IDCOL	Infrastructure Development Company Limited	**PPA**	Power purchase agreement
kWh	kilowatt hour		

To explore more topics related to solar PV, please review the full set of briefing notes. Topics include:

- ☐ 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)
- ☐ Solar regulations and policy framework
- ☐ 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

GIZ is responsible for the content of this publication.