

Institutional and Financial Considerations for Rooftop Solar PV

C40 Cities Finance Facility



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The C40 Cities Finance Facility (CFF) is a collaboration of the C40 Cities Climate Leadership Group and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The CFF supports cities in developing and emerging economies to develop finance-ready projects to reduce emissions to limit global temperature rise to 1.5°C and strengthen resilience against the impacts of a warming climate. The CFF is funded by the German Federal Ministry for Economic Development and Cooperation (BMZ), the Children’s Investment Fund Foundation (CIFF), the Government of the United Kingdom and the United States Agency for International Development (USAID).

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Registered offices
Bonn and Eschborn, Germany

Potsdamer Platz 10
10785 Berlin, Germany

E contact@c40cff.org
W c40cff.org

Author
Agafer Creative Research and Development Services
27 Sgt. J. Catolos St., Brgy. Pinagkaisahan, Quezon City
E: acrdsconsultancy@gmail.com

Content Editors:
Ferdinand Larona, CFF
Lyan Baybay Villacorta, CFF

Contributors:
Aris Moro, CFF
Milag San Jose-Ballesteros, C40 Cities
Jacqueline Lam, C40 Cities

Design & layout:
Opalyn A. Agulay



Key Insights

- An enabling legal and policy framework is already in place to support city-level energy projects in the Philippines. The Department of the Interior and Local Government and the Department of Energy have provided guidelines for local governments to facilitate the implementation of energy projects. The Joint Memorandum Circular 2020–01 instructs cities and municipalities to incorporate in their comprehensive development plan policies and programmes on conventional and renewable energy sources.
- When planning a rooftop solar photovoltaic project, institutionalising a city project team, particularly, a technical working group, will significantly increase the likelihood of the project being successful. A technical working group would typically be composed of technical staff and heads from various city offices and departments such as planning and development, engineering, environment, social welfare, and public information, among others.
- The Manual on Project Evaluation published by the National Economic Development Authority is a valuable resource for local governments that are ready to undertake feasibility studies for a rooftop solar photovoltaic project. It outlines the ideal elements to be included, such as market, engineering, environmental, social and gender, human resource, financial, and economic studies, among others.
- There are five primary options for financing the project: 1) national government support; 2) internal revenue allotment and local revenues; 3) official development assistance; 4) public-private partnership and; 5) borrowing, i.e. public or private loans.

- The procurement activities of local governments relevant to the project are also governed by the Republic Act 9184 or the Government Procurement Reform Act. Another procurement modality that can be explored by the local government to fast track the project procurement activities is to enter into an agreement with international development organisation/s to utilise the latter's procurement and administrative system.
- The active involvement of key project stakeholders during project implementation is critical in the success and sustainability of the initiative. A stakeholder engagement plan with corresponding information, education, and communication plan must be developed. These documents will aid in establishing effective lines of communication and working relationships between and among project stakeholders.

About this Knowledge Product

The C40 Cities Finance Facility (CFF) and Agafer Creative Research and Development Services have prepared two reader-friendly knowledge products (Part 1 on Institutional and Financial Considerations and Part 2 on Technical Considerations) to contribute to the empowerment of local governments to plan and implement their own rooftop solar photovoltaic (PV) projects.

A wide array of stakeholders from the national and local level were engaged to collect primary information and ensure inclusiveness in the resulting product. Select cities were further engaged to gather views and contextualise their local renewable energy conditions. The knowledge product also benefits from a review of existing initiatives, policies, laws, and literature related to distributed renewable energy in the Philippines.

The knowledge products can be accessed at www.c40cff.org

Objectives

Upon completing this knowledge product, readers will be familiar with the following:

- The policy and regulatory landscape concerning renewable energy at the local government level.
- Institutional requisites and major steps for the effective planning and implementation of rooftop solar PV projects.
- Various financing modalities accessible to local governments for rooftop solar PV projects.

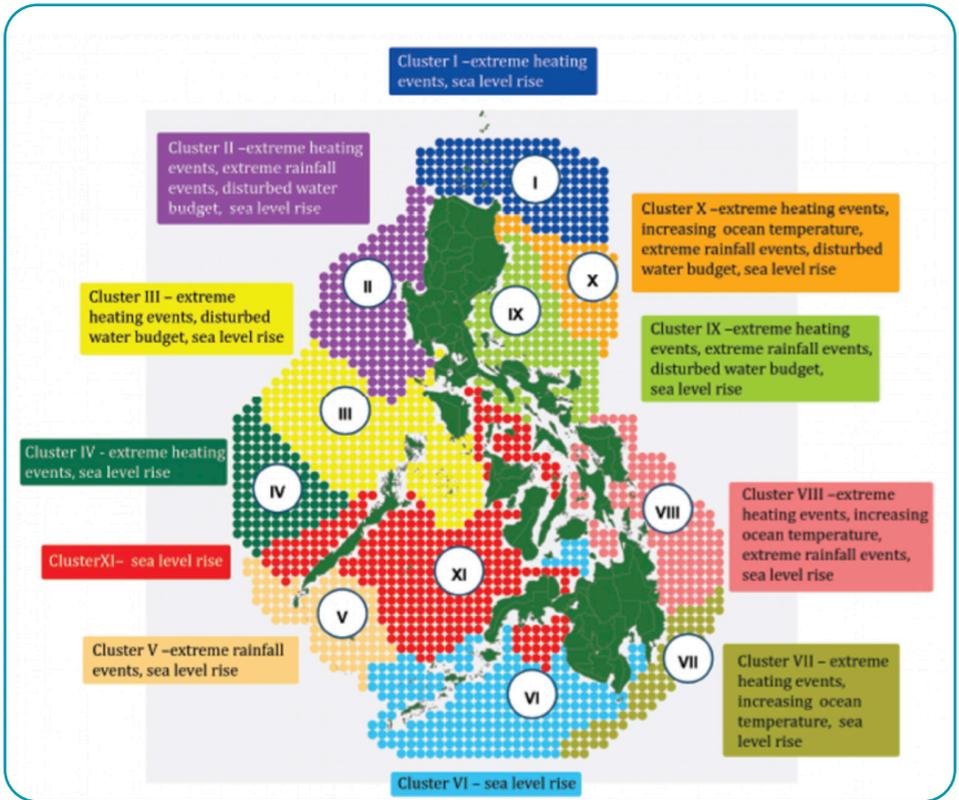
Overview

This knowledge product is structured into four segments. The first section provides a brief context for climate and energy consumption in the Philippines and the intention of the national government to reduce its reliance on fossil fuels. It briefly discusses the link between renewable energy deployment and climate change mitigation. The second identifies relevant national laws and policies on renewable energy, particularly for cities and municipalities, and provides the rationale for the passage of enabling legislations at the local level. The third section discusses the basic planning process, including the establishment of a dedicated project team, the conduct of feasibility studies, financing modalities and selecting the most appropriate option. It also provides key information on public-private partnership (PPP) as a promising approach to rooftop solar PV projects. The last section emphasises the importance of and the need to sustain the engagement with stakeholders throughout the project, and offers key recommendations.

The Philippine Context

The Philippines is among the countries in the world most vulnerable to climate change. On average, its temperature increases by 0.10C per decade and is projected to further increase by as much as of 0.90C to 2.30C by 2050.ⁱ This could result to drastic changes in weather patterns that may increase the intensity of storms and extreme rainfall events.ⁱⁱ The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) has projected the sea level to rise by as much as 20 centimetres. At risk are 64 provinces, 822 municipalities, and 25 major cities that comprise 60% of the country's local government units.¹

Figure 1. Laws and Issuances for the Implementation of the Net-Metering Program



Source: *climaterealityproject.org*

Figure 1 shows the exposure of the Philippines to climate change by cluster as published by the Climate Reality Project. It shows eleven color-coded zones and identifies specific vulnerabilities such as extreme heating events, extreme rainfall events, disturbed water budget, sea level rise, and increasing ocean temperature.

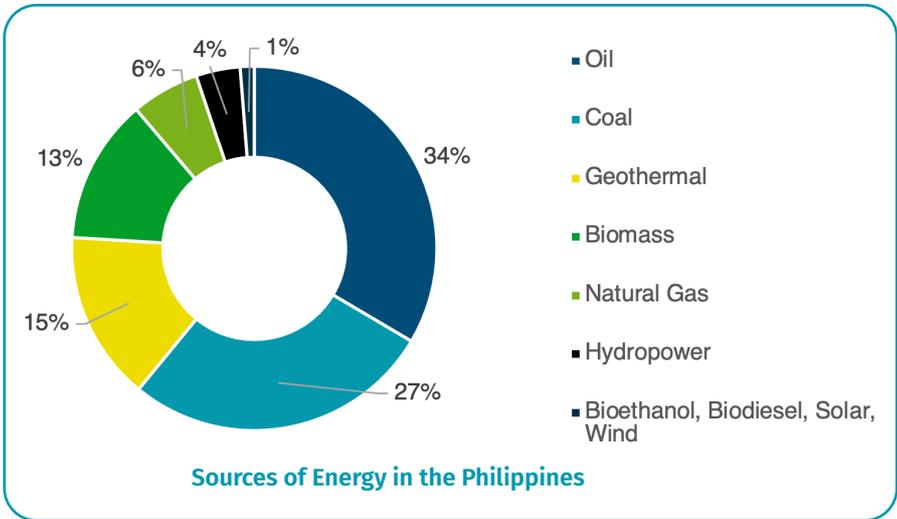
By 2050, it is estimated that 102 million Filipinos will be residing in cities, about double the number of today.² An impending urban influx is expected to challenge energy security in cities. Addressing this challenge with traditional energy sources would only increase greenhouse gas emissions and ultimately increase the vulnerability of cities to climate change and extreme weather.

ⁱ Under a moderate emissions scenario relative to the 1951 level.

ⁱⁱ Based on projections from PAGASA.

This is because, while many countries have begun shifting towards renewable sources of energy, the Philippines continues to rely heavily on fossil fuels, particularly coal. With half of its primary energy supply sourced overseas, the country is a net importer of oil for transport and coal for power generation. The energy mix continues to be carbon intensive, with two-thirds coming from non-renewable sources and only a third from renewable sources. [Figure 2](#) shows a further breakdown of the energy mix from specific sources.³

Figure 2. Philippine energy by source, 2018



The Philippine government introduced several policies and incentives to accelerate the use and commercialisation of renewable energy. Among these is the National Renewable Energy Program 2011–2030, which outlines the plan of action to attain its goals relating to renewable energy (RE).

NATIONAL RENEWABLE ENERGY PROGRAM 2011-2030

The National Renewable Energy Program (NREP) signifies the intention of the government to move away from fragmented renewable energy initiatives and to initiate an orchestrated and sustained one. The NREP is the country's blueprint to attain its renewable energy goal of installing a total of 15,304 megawatts of generation capacity. It sets out a plan of action or sub-programme for each energy source, which serves as a guide for the achievement of the market penetration targets. Realising the renewable energy goal depends on the implementation of the following activities:

- RE industry services, providing assistance and advisory services to private entities to facilitate investments in RE.
- Resource development to intensify the harnessing of the country's huge RE resource potential.
- Research, development and demonstrations to ascertain the feasibility of adapting certain RE systems, technologies or processes in the Philippine setting, particularly in areas where there is no or limited local experience.
- RE technology support to improve the quality, performance, and cost of local RE systems for greater consumer protection and their competitiveness with the conventional forms of energy.

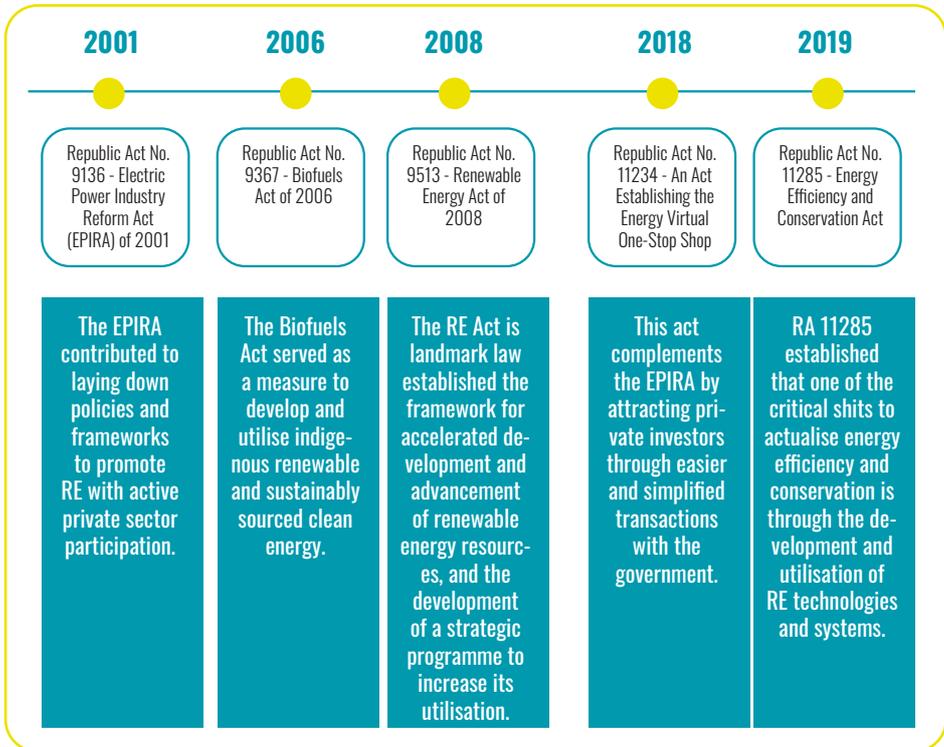
The NREP established targets for each renewable energy source as follows: geothermal (increase capacity by 75%), hydropower (increase by 160%), biomass (deliver additional 277 MW capacity), wind (2,345 MW additional capacity), and ocean (develop the country's first ocean energy facility). For solar, the target total capacity addition is 284 MW. However, the Department of Energy will pursue an aspirational target of 1,528 MW.

Across the globe, various countries have already begun decommissioning traditional power plants and developing clean and sustainable sources of energy. Shifting from traditional sources of energy (i.e. coal and oil-fired powerplants) to renewables is a key strategy to significantly reduce greenhouse gas emissions, and, in the process, help combat the climate crisis. As one of the countries most vulnerable to climate change, the Philippines signed the Paris Agreement, and joined the calls for significant reductions of greenhouse gas emissions. However, it is lagging behind other countries in renewable energy initiatives, and remains heavily reliant on coal.

2015 PARIS AGREEMENT ON CLIMATE CHANGE

The Paris Agreement sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts.

Figure 3. Enabling Laws and Policies on Renewable Energy



Several national laws were enacted and issued to support the shift to renewable energy. Among these are RA 9136 (*Electric Power Industry Reform Act*); RA 9367 (*Biofuels Act*); RA 9513 (*Renewable Energy Act*); RA 11234 (*Act Establishing a Virtual One-Stop Shop or the Purpose of Streamlining the Permitting Process of Power Generation, Transmission, and Distribution Projects*); and RA 11285 (*Energy Efficiency and Conservation Act*). However, these policies have limited coverage and devolved roles for local government units. This led to the issuance of the Department of the Interior and Local Government (DILG) and Department of Energy (DOE) Joint Memorandum Circular (JMC) No. 2020-01.

The *Joint Memorandum Circular (JMC) No. 2020-01*, issued on 30 April 2020, provides guidelines for local governments to implement energy projects. It instructs cities and municipalities, in consultation with concerned stakeholders, to identify upstream conventional and/or renewable energy sources within their territories to be included in their spatial plan or comprehensive land use plan, and post the information on their websites, if available. It also mandates local governments to include all local energy policies, plans, and programmes covering energy safety and best practices, energy conservation, and energy resiliency in their comprehensive development plan. Further, the JMC requires local governments to streamline the processes of issuing permits on energy-related projects in accordance with *Section 14 of RA 11234*.

Several cities have already enacted local legislation and included renewable energy projects in their comprehensive development plans, and are covered by some national policies that encourage and support the development of local renewable energy projects. A few examples of local renewable projects are as follows:

- Quezon City, with the support of the C40 Cities Finance Facility, is preparing a project to install rooftop solar PV systems in public schools and health facilities.
- San Carlos City in Negros Occidental hosts several solar farms built and operated by the private sector.

- Naga City, Cebu was the first local government unit in Visayas to have a solar PV installation with a capacity of 100 kWp. The facility was established at the Enan Chiong Activity Centre and will supply 28% of the total power requirements of the Naga City Hall.

The passage of enabling local laws is necessary to help facilitate and ensure the seamless development of RE projects such as rooftop solar PV systems. It also aides in addressing issues and challenges on the development, procurement, implementation, and monitoring and evaluation phases of RE projects, brought about by limited and/or vague provisions of several national laws and policies. City governments that seek to craft legislation on RE projects may seek the assistance of the DILG and the DOE Renewable Energy Management Bureau. The assistance offered ranges from technical assistance and capacity development activities, to information and education campaigns.

Planning for Rooftop Solar PV Projects



A solar photovoltaic system, attached on the roof or incorporated into the façade of a building, is an electrical installation that harnesses solar radiation and converts it to electricity. Rooftop solar PV systems are distributed electricity generation options that help meet a building's energy needs. In addition, this system may also supply electricity within an existing distribution network. Such systems are commonly referred to as 'grid-tied'.

Planning for Rooftop Solar PV Projects

The development of a rooftop solar PV project requires thorough and careful planning. At the outset, it is advantageous to create a technical working group (TWG) that can provide decision makers with updates, lay down options during critical junctions, and carry out the directives to ensure timely project implementation. Having a dedicated team for the solar PV project significantly increases the probability of success. While the project team may be formalised through an executive order, the passage of an enabling local ordinance is recommended. The project team may be composed of heads and/or technical staff of the following offices:

- City Planning and Development Office
- City Engineering Office
- City Environment and Natural Resources Office
- City Social and Welfare Development Office
- City Public Information Office
- Gender Focal Point

The primary functions of the project team generally include: 1) acquiring the necessary knowledge and tools on RE/data and information banking; 2) providing technical inputs during the design, implementation and evaluation phases of the project; 3) facilitating data gathering during the conduct of technical studies; 4) organising public hearings, consultations and workshops with key stakeholders; and 5) leading the presentation of progress, updates, and concerns to the chief executive and the city council.

Undertake technical studies

Following the establishment of a TWG for a rooftop solar PV project and identification of the project site, the city may commence with the conduct of technical studies. At this stage, securing data and tools such as the design software in advance when possible is advantageous for a seamless undertaking of the various studies.

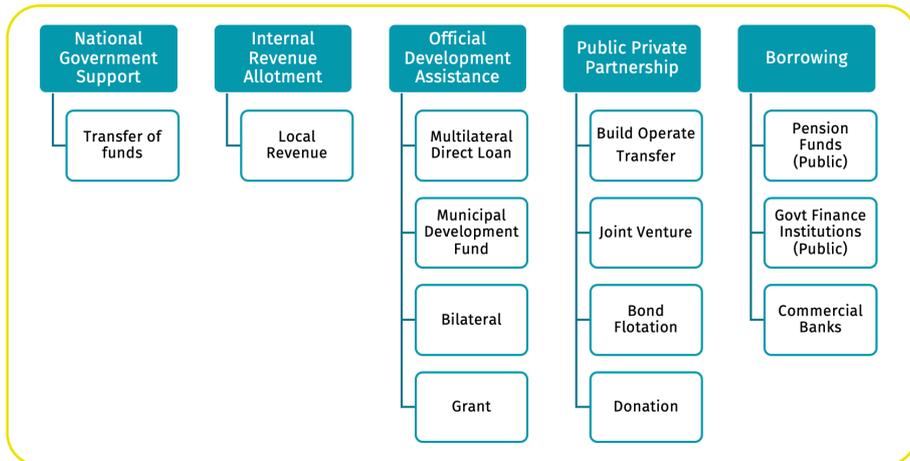
In general, there are two types of technical studies: a) pre-feasibility study; and b) full feasibility study. The former is an initial study relating to topics such as legal and regulatory environment, technical design, costs and benefits, social and environmental impacts, institutional environment, and financial feasibility. This should be done prior to the full feasibility study. The main difference between these two studies is the diversity of data and information and the level of analysis undertaken.

According to the Manual on Project Evaluation published by the National Economic Development Authority, an ideal feasibility study should include: a) a demand and supply or market module; b) a technical or engineering module (system design); c) a manpower and administrative support module; d) a financial module; e) economic module; f) a social and gender module; g) an institutional module; and h) an environmental module. The result of the technical study should include the appropriate financing option for the rooftop solar PV project.

Identifying financing options

Once the technical studies determine the proposed rooftop solar PV project to be feasible and also identify the best project parameters, the city can move on to mapping the possible financing modalities for the project and identifying the best one according to their preference and circumstances. There are five financing options for projects in the Philippines, namely: 1) national government support; 2) internal revenue allotment and local revenues; 3) official development assistance; 4) public-private partnership; and 5) borrowing as show in Figure 4. Table 1 briefly explains these financing options alongside their advantages and limitations/risks.

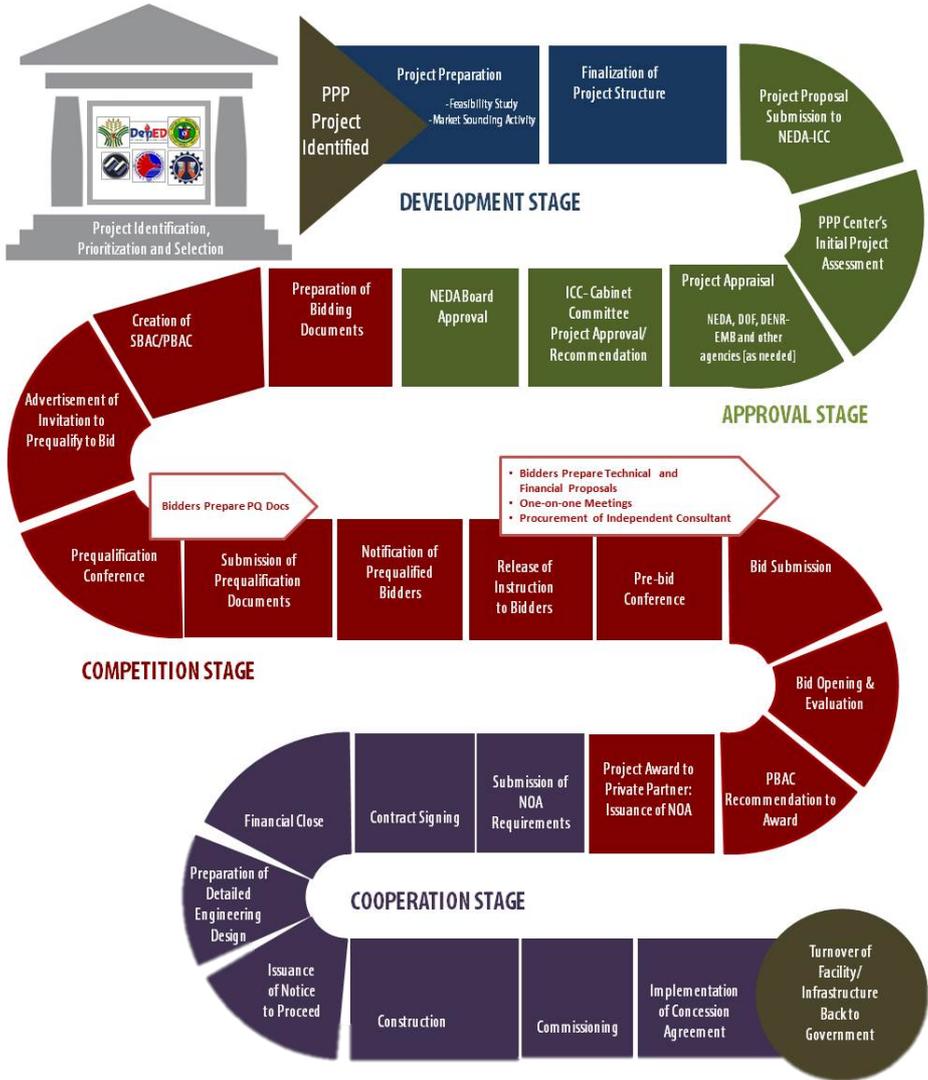
Figure 4. Structure of Financing Options



Among the modalities available, it is worth noting that Build-Operate-Transfer (BOT) and Joint Venture are among the options within PPP as identified in RA 6597 (*BOT Law*) and as amended by RA 7718.

The revised implementing rules and regulations (IRR) of the BOT law enumerates the list of activities that may be undertaken under any of the recognised and valid BOT contractual arrangements (PPP modalities). One category listed in the IRR that is related to renewable energy is climate change mitigation and adaptation infrastructure projects and related facilities. It should be noted that even if the solar rooftop PV project will be implemented via PPP, the local government must still adhere to RA 9184 (the Government Procurement Reform Act). Should the city opt to develop the rooftop solar PV project via PPP, it must follow the PPP process prescribed by national laws (see [Figure 5](#)).

Figure 5. Public private partnership (PPP) project cycle, source: <https://ppp.gov.ph>



The PPP Center provides technical assistance to national offices and local governments that are interested in undertaking PPP projects. Aside from conducting capacity building activities, the PPP Center also manages the Project Development and Management Facility (PDMF), which is a revolving fund aimed at enhancing the investment climate for PPP in the Philippines. Details about the PDMF and other services offered by the PPP Center can be found on their website at www.ppp.gov.ph

Cities may also explore forging partnerships with international development organisations. This has the advantage of leveraging the latter's procurement and administrative system to accelerate provision of the needed equipment to complete the rooftop solar PV installation.

Implementing rooftop solar PV projects

When implementing the rooftop solar PV project, cities can undertake several strategies to increase its probability of success. Among these are: 1) investing in capacity development of the TWG; 2) undertaking social preparation; and 3) strengthening links with key stakeholders.

Regardless of the preferred financing for the solar rooftop PV project, cities have to ensure that the TWG is equipped with the essential knowledge and skills on renewable energy planning and development, financing, and procurement, including contract preparation. Among the institutions that cities may approach for capacity development are the DOE, DENR, PPP Center, C40 Cities, and GIZ. There are also academic institutions that offer online courses on these. Cities may also undertake learning visits to other local government units that have implemented solar rooftop PV projects.

Through social preparation, cities may be able to mitigate potential issues, particularly public resistance as a result of poor communication. The conduct of information, education, and communication activities will increase public awareness of the importance of the initiative, and address possible misconceptions. Besides capacity development, cities need to strengthen links with national government agencies and other key stakeholders, for policy, information, and possible financial and technical support.

A local special body may be created specifically for renewable energy, to engage these key stakeholders and facilitate formal collaborations.

Moving Forward

To increase the uptake of renewable energy, particularly rooftop solar PVs, it is necessary to establish in practice various enabling institutional and financial considerations. Cities can take the action points below, depending on the level of available human and financial resources and on the priority level it is given by local government:

1. Formalising an institutional structure such as a TWG and developing its competencies creates an enabling environment for renewable energy projects. An institutional structure capable and willing to spearhead and implement the activities leading to the installation of a rooftop solar PV is critical in increasing the uptake of renewable energy. With existing champions within the local government unit, the likelihood of achieving a renewable energy project in the city increases.
2. Once the institutional system is in place, the viability of renewable energy projects must be determined. With the help of technical studies, the feasibility of a certain project to take off will be ascertained. The studies will also serve the city as a basis and guidance for subsequent strategic decisions to meet the energy needs of its constituents.
3. The technical studies conducted will also reveal the investments that the city government needs to make in order to deliver the renewable energy project. Exploring financing options backed up by the results of the technical studies offers an evidence-based approach that will attract potential project investors. Financial resources may be secured at this point.

Institutional and financial considerations can make or break an initiative. Calculated and strategic decisions and actions must be taken in order to achieve the goals of the city towards renewable energy.

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