



Unlocking Public-Private Partnerships: A Toolkit for Local Governments



Supported by



Acknowledgements

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About the 100% Renewables Cities and Regions Roadmap project

The 100% Renewables Cities and Regions Roadmap project supports nine cities and regions across Argentina, Indonesia and Kenya to develop bankable renewable energy projects and in-depth local strategy and action plans to achieve one hundred percent renewable energy.



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About the Transformative Actions Program

The Transformative Actions Program (TAP), led by ICLEI and supported by its 16 partners, is a global initiative that aims to increase climate finance accessibility for the local governments. First launched in 2015, TAP seeks to catalyze and improve capital flows to cities, towns, and regions by strengthening their capacity, while supporting them with access to climate finance and attracting investment. TAP's purpose is to connect subnational governments to diversified sources of technical and financial support, helping them in overcoming the main obstacles of accessing climate finance.



TAP

Transformative
Actions
Program

About

About the Benin Energy Plus project

The Benin Energy Plus project is delivered as a partnership between ICLEI - Local Governments for Sustainability and the Association Nationale des Communes du Bénin (ANCB). The project is part of the GIZ Green People's Energy program, which aims to provide conditions for supplying regions in rural Africa with decentralized renewable energy, assisted by the involvement of citizens and the private sector.

The project aims to bridge capacity and financing gaps identified in Benin in order to tackle the challenge of improving energy access through renewable energy while simultaneously dealing with inadequate financial and technical resources at the local level. To facilitate this, it provides a Toolkit for local governments to enable them to develop public-private partnerships (PPPs) and use carbon financing as a potential implementation mechanism of solar photovoltaic (PV) projects.

About ICLEI - Local Governments for sustainability

ICLEI - Local Governments for Sustainability is a global network working with more than 2,500 local and regional governments committed to sustainable urban development. Active in 125+ countries, ICLEI influences sustainability policy and drives local action for low emission, nature-based, equitable, resilient and circular development. ICLEI's Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

About the Association Nationale des Communes du Bénin (ANCB)

The Association Nationale des Communes du Bénin is the structural organization of Beninese communities. Since its creation in November 2003, one of its objectives has been to serve as an interface between communes and public authorities on the one hand, and between communes and partners on the other, in order to represent and defend the interests of its members. The ANCB has positioned itself as a key player in the relations between communes and decentralization actors in Benin, in the promotion of local development and grassroots democracy. In cooperation with development partners, it supports solidarity between Beninese local authorities and decentralized cooperation.

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List of abbreviations

BLOT	Build-Lease-Operate-Transfer
BOO	Build-Own-Operate
BOLT	Build-Operate-Lease-Transfer
BOOT	Build-Own-Operate-Transfer
BOT	Build-Operate-Transfer
CBO	Community-based organizations
CSO	Civil society organizations
DBF	Design-Build-Finance
DBFM	Design-Build-Finance-Maintain
DBFMO	Design-Build-Finance-Maintain-Operate
DBM	Design-Build-Maintain
DBO	Design-Build-Operate
DOT	Develop-Operate-Transfer
EPC	Engineering, procurement and construction
EU	European Union
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LDO	Lease-Develop-Operate
LLC	Limited liability company
LRGs	Local and regional governments
MOU	Memorandum of Understanding
NDC	Nationally Determined Contributions
NGO	Non-governmental organizations
O&M	Operation and maintenance
PPA	Power purchase agreement
PPP	Public-private partnerships
PV	Photovoltaics
RE	Renewable energy
SDGs	Sustainable Development Goals
SEP	Stakeholder engagement plan
SEA	Strategic environmental assessment
SHS	Solar home system
SPE	Special purpose entities
SPV	Special purpose vehicle
TFP	Technical and financial partner
UNFCCC	United Nations Framework Convention on Climate Change
VFM	Value for money

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Introduction

Background and context

Addressing the current climate emergency and avoiding the worsening impacts of climate change require urgent action to limit the rise in global temperatures to 2°C over pre-industrial levels (IPCC, 2021). With the signing of the Paris Agreement in 2015, nations pledged to reduce carbon dioxide (CO₂) and other greenhouse gas (GHG) emissions, as well as accelerate adaptation measures. Transitioning to a largely renewables-based energy system is a cornerstone of meaningful climate action, which can also at the same time offer affordable, reliable, and sustainable energy to those that still lack access, along with other co-benefits such as decent jobs, on the way to achieving the Sustainable Development Goals (SDGs) by 2030. Timely and innovative approaches are needed to spur and scale up such a just and inclusive energy transition.

Urban areas contribute to over 70 percent of CO₂ emissions from final energy use (UN Habitat, n.d.). Cities also harbor many groups that are vulnerable to worsening climate change impacts. Local and regional governments (LRGs) are in a critical position to take decisive action towards a more sustainable urban future. In spite of their critical role, cities and regions are still hindered from contributing to these goals mainly due to their financial, regulatory and technical limitations, especially in the Global South.

A massive amount of investment is needed to realize this transformation— around USD 1 trillion of renewable energy investment annually by 2030. Historically, from 2013–2018, 85 percent of renewable energy (RE) investments came from the private sector (Tracking SDG7, 2022). In Africa, for example, there is a huge and untackled potential to develop solar energy solutions. The renewable generation capacity has been growing at a rate of 6 percent annually since 2011. Despite this growth and the considerable amount of solar irradiation during the year, solar power has been limited to a few countries (IRENA 2022).

Innovative financing schemes for LRGs to decarbonize the energy system with the support of private companies could be game changers. Through cooperation with the private sector, local governments can bridge existing gaps by securing technical know-how, expertise and resources that would not be otherwise available, including tapping into sources of carbon finance. However, the requisite technical capacity and access to resources to capitalize on such opportunities are not always at the disposal of LRGs. This Toolkit is meant to address this need.

About the Toolkit

This Toolkit aims to serve as a one-stop-shop for local and regional governments (LRGs) to enable the identification, design and implementation of renewable energy projects within a public-private partnership framework. Through a structured collection of tools and resources, this Toolkit guides LRGs to interact with the private sector, from improving existing frameworks to ensuring implementation, operation and maintenance of projects. With a focus on expanding access to sustainable energy, the Toolkit also offers resources and tools for carbon credit assessments to augment financing.

Though this Toolkit has been developed with a focus on the Beninese context for solar photovoltaics (PV), it also provides a generic content and approach, so that it is useful and applicable for LRGs globally, but particularly in other countries in the Global South.

Structured across five 'building blocks', the Toolkit gives LRGs practical guidance on:

- (i) the decision-making process that leads to establishment of a PPP,
- (ii) division of tasks, goals and risk management between the partners engaged in the PPP, as well as the financial models recommended for PPPs, zooming in carbon markets, and
- (iii) the necessary steps to effectively implement such a model in climate and energy projects.

After navigating through the Toolkit, it is expected that LRGs will have a better understanding of the concepts, opportunities and challenges related to employing PPPs and in considering carbon market options, and decide whether these are suitable options for their climate projects.

Note: The Toolkit, excepting the energy sector and the context of Benin, provides general guidance, and specific features of other sectors and local aspects are not covered.

Toolkit Navigation and Structure

Fundamentals of PPPs

1

Tools Creating a Special Purpose Vehicle

Resources What is a PPP? Types of PPPs

An Enabling Landscape

2

Tools Enabling Conditions Checklist PPP Readiness Assessment

Resources PPP Enablers

Ensuring Successful Partnerships

3

Tools Stakeholder Mapping Feasibility Checklist FAQs on PPP Contracts

Resources Project Development Stakeholder Engagement

Accessing Finance

4

Tools Bankability Decision Tree Risk Mitigation PPP Fiscal Risk

Resources Project Finance SPV Financing Carbon Markets

Partnerships for Solar Energy

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Tools Solar PV Potential Avoided GHG Emissions Calculator PPP Models for Solar

Resources PPP Considerations for Solar Energy Best Practices

The Case of Benin

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Building Block 1: Fundamentals of PPPs

Prior to establishing a public-private partnership (PPP), it is important to understand what a PPP is, both as a financing and implementation mechanism. Building Block 1 serves to familiarize local and regional governments (LRGs) with the fundamental elements and considerations that are critical in creating a win-win partnership for all involved parties in a PPP.

Resource 1.1: Introduction to Public-Private Partnerships provides the definition of a PPP and its principles, and an overview of the roles and responsibilities that public and private partners might assume.

Resource 1.2: Types of Public-Private Partnerships presents the multiple contractual arrangements possible under a PPP, with varying levels of ownership and control by each of the partners involved.

Tool 1.1: Creating a Special Purpose Vehicle provides an overview of the process of setting up a special purpose vehicle, an entity that is pivotal for many types of PPPs.

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Further reading (external links):

-  **Guidelines for Successful Public-Private Partnerships**
Developed by: The European Commission, 2007
-  **Public Private Partnerships Reference Guide**
Developed by: The World Bank Group, 2017
-  **The APMG Public-Private Partnership (PPP) Certification Guide**
Developed by: ADB, EBRD, IDB, IsDB, and WBG, 2016.

Resource 1.1: Introduction to PPPs

1. PPP definition and key principles

A public-private partnership can be broadly defined as a **contractual agreement between the government or a government-owned entity and a private firm** with the main objective of financing, designing, implementing, or operating infrastructure facilities and services that are traditionally provided by the public sector. The World Bank defines it as “a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance” (World Bank 2022). In practice, a PPP is based on two main principles:

- (i) **both parties invest financially in the project**, whether through materials acquisition or manpower allocation, and in an expertise-related sense, exchanging knowledge and networks; and
- (ii) **parties contribute to a societal and often also commercial purpose**. The partnership embodies optimal risk allocation between the parties, allowing investments that the public partner would not be able to afford on its own while also realizing developmental objectives.

Therefore, PPPs present a framework that, while engaging the private sector, acknowledge the role of the government in ensuring that social obligations are met and necessary public investments are realized. Private sector engagement usually requires a reasonable rate of return on its investment as a prerequisite of PPP projects (World Bank 2022b).

2. Roles and participation

In a PPP structure, tasks, **obligations and risks are distributed among the public and private sector in an optimal way**, corresponding to their expertise and the benefits they can bring to the project. The public partners are typically government entities, including ministries, departments, municipalities, or state-owned enterprises. Private partners can be local or international businesses, or investors with technical or financial expertise relevant to the intended project. Increasingly, PPPs can also include non-governmental organizations (NGOs)

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and/or community-based organizations (CBOs) who represent the stakeholders directly affected by the project—they are not considered either private or public partners (ADB 2008).

The **public sector** contributes to a PPP through means including the provision of part of the capital for investment (available through tax revenues, among other sources) and the transfer of assets. Local and regional governments can also raise social responsibility, environmental awareness, local knowledge, and mobilize political support.

The **private sector** aims to use its expertise in commerce, management, operations, and innovation to run the business efficiently. The private partner may also contribute investment capital depending on the form of the contract. The level of the private sector’s participation can cover a spectrum from short-term service contracts through to full privatization (disinvestment). **Figure 1** illustrates the roles and influence of the different stakeholders in a PPP.

Figure 1: Stakeholder roles in public-private partnerships

Stakeholder	Role
Political decisionmakers (national or local government)	<ul style="list-style-type: none"> - Establish and prioritize goals of the PPP and communicate these to the public - Approve criteria for selecting the preferred PPP option - Approve the recommended PPP option - Approve regulatory and legal frameworks
Company management and staff	<ul style="list-style-type: none"> - Identify company-specific needs and goals of the PPP - Provide company-specific data - Assist in marketing and due diligence process - Implement change
Consumers	<ul style="list-style-type: none"> - Communicate their ability and willingness to pay for services - Express priorities for the quality and level of service - Identify existing strengths and weaknesses of the service
Investors	<ul style="list-style-type: none"> - Provide feedback on the attractiveness of various PPP options - Follow rules and procedures of the competitive bidding process - Perform thorough due diligence resulting in competitive and realistic bidding
Strategic consultants	<ul style="list-style-type: none"> - Provide unbiased evaluation of options for the PPP - Review the existing framework and propose reforms - Act as a facilitator for cooperation among stakeholders

Source: Skilling and Booth, 2007

3. Operation

Regarding operation, PPPs change the typical governmental framework and flows to manage projects. In traditional public procurement, the public sector party must fully take care of the implementation of the project. In a PPP, **the government commissions a private partner**, who is then responsible for further actions, and the responsibility, liability and ownership between the government and private entity is defined by the terms and conditions of the PPP agreement.

In a public-private partnership, the government or public entity awards a contract to the private sector partner, which then creates a company to operate the contract. This company is a so-called '**special purpose vehicle**' (SPV) or 'special purpose entity' (SPE). This is a key feature in the implementation of many PPP models and it is the element that differentiates PPPs from traditional public procedures.

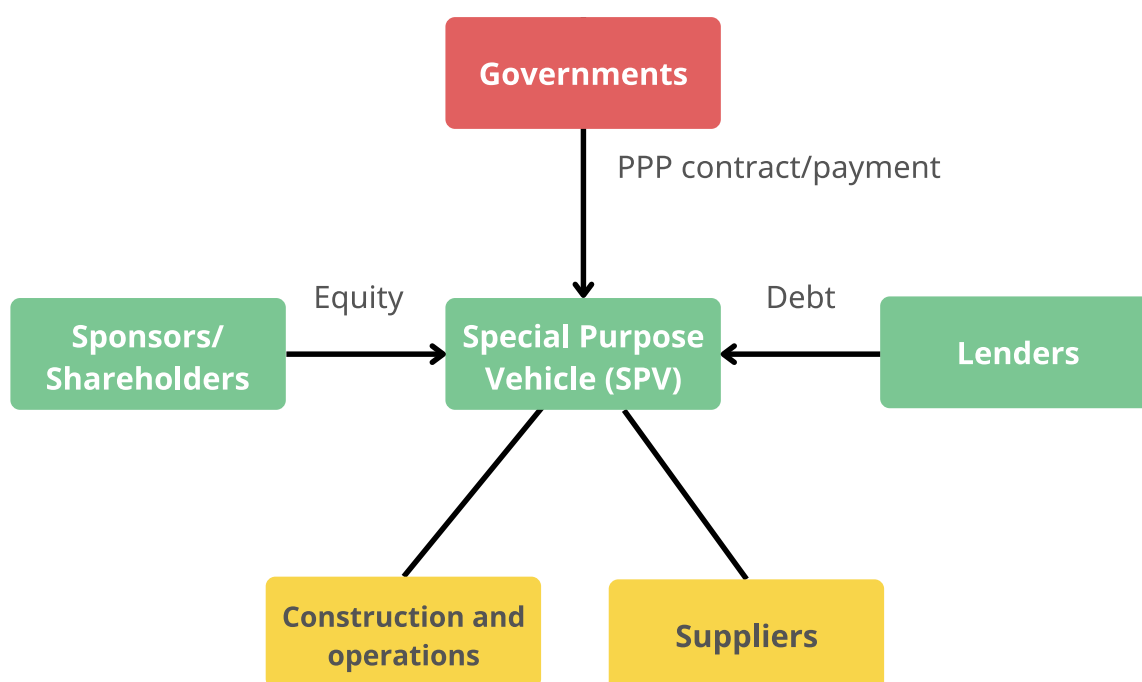
The SPV is the legal entity that undertakes a project, working as a managing and operating company. It is usually established as a mechanism through which funds are channeled, the financial model implemented, and sub-contracts managed, ensuring that risks are essentially 'ring-fenced' from the parent company. The SPV signs a contract with the government and negotiates all contractual agreements between the various parties. It manages the sub-contracts of the construction and the maintenance of the asset and operation of the service.

The choice of an SPV's design and its main responsibilities will depend on the applicable legal and tax regulations of the host country, as well as the PPP contractual arrangements between the parties. The ownership structure of the SPV can be shared among public and private partners, depending on the percentage that each of the sides will cover.

The members of a PPP will normally be the shareholders, together with additional shareholders such as external investors. SPVs do not have independent management or employees and are instead administered by a trustee that follows defined rules to manage the asset. The SPV raises finance through a combination of equity—provided by the aforementioned shareholders—and debt, provided by banks, or through bonds or other financial instruments. The finance structure is the combination of equity and debt, and contractual relationships between the equity holders and lenders (World Bank 2021).

Revenue can be collected in two primary ways. The public entity can offer a **unitary payment** to the SPV, which can be related to the performance of the private party's obligations included in the project deliverables. Another alternative is the establishment of **charges or fees** for customers or end-users. The private partner uses this fee to repay any loans and pay dividends to its shareholders. This payment can take the form of an interest by the entity that can result in an investment. **Figure 2** shows a simplified SPV structure and its relationship with the parties.

Figure 2: Special purpose vehicle structure



Source: Adapted from Infrastructure Asia n.d.

The benefits of an SPV are as follows:

- **Risk mitigation:** Assets held in an SPV are funded by debt and equity investments, spreading the risk of the assets among many investors and limiting the risk to each investor. Besides, corporations can isolate risks from the parent company. For example, if the assets experience a substantial loss in value, it wouldn't directly affect the parent company.
- **Expert capacity:** SPVs can bring the necessary technical capacity to perform the tasks through well-trained employees that are driven by the SPV's objective.

- 🔴 **Special tax benefits:** Some assets of SPVs can be exempt from direct taxes depending on their geographical location.
- 🔴 **Easy to set up:** SPVs usually require very little cost and little to no governmental authorization to be established (Williams, 2021).

Special purpose vehicles also pose risks that should be taken into account, such as:

- 🔴 **Lack of transparency:** Some SPVs can be very complex, making it very difficult for the public sector to monitor and track the level of risk involved.
- 🔴 **Lack of regulation:** The SPV may not be regulated by the same regulatory standards as public agencies or parent companies, which can represent an indirect risk.
- 🔴 **Reputation and liquidity:** The SPV's performance may compromise the reputation of the parent company, which indirectly affects the whole PPP. Besides, a bad performance can also undermine the parent company's capacity to sell the assets back on the open market, creating a risk to the liquidity of the assets, also compromising the willingness of the private and the public sector to continue to engage in the partnership.

Box 1: Best practices in special purpose vehicle implementation

Large scale grid connected power generation in India

Partners: Oil and Natural Gas Corporation (ONGC) (lead); Oil India Limited (OIL), GAIL India Limited and Engineers India Limited (EIL), Solar Energy Corporation of India; India Renewable Energy Development Agency (IREDA)

Time frame: 2014

Objective: Promoting the deployment of technologies to supplement conventional fossil fuel-based power generation that will boost the development of large-scale grid-connected renewable energy projects and the implementation of off-grid applications. The SPV functions independently while utilizing various promotional schemes of the state government.

Source: The Times of India 2014

Middle East Renewables Corporate Investment Vehicle (Infundi)

Partners: Nafath Renewable Energy and National Sustainable Energy Development Company

Time frame: 2019

Objective: The SPV aims to provide \$100 million to support the development of solar PV schemes in Oman and the wider Middle East. It will invest in solar PV projects of capacities ranging from 200 kW to 50 MW solar PV projects. The SPV will benefit from strategic and technology partnerships with well-established players in the global energy industry, notably Hanyang, Posco Energy, Solar Reserve, British Solar Renewables and Tremayne Solar.

Source: Prabhu 2019.

Brighter Life Kenya 2 Limited (BLK2)

Partners: Solar Frontier Capital Limited (SFC), African Frontier Capital (Mauritius) LLC (AFC), and d.light design Inc. (d.light)

Time frame: 2021–2023



Objective: The main objective is to provide funding to purchase account receivables of d.light's pay-as-you-go solar home systems in Kenya. The SPV will provide continued access to sustainable and affordable receivables financing for solar home system business in Kenya as well as enabling its expansion into other African countries.

Source: Global Chronicle 2022

4. Advantages and challenges of a PPP

The implementation of public-private partnerships presents advantages as well as challenges for local and regional governments. PPPs provide a useful framework under which the public and private sectors can pool and coordinate their financial and technological resources more efficiently, given the massive capital requirements for projects and need for innovation (both in terms of technological solutions and funding structures). They present the following **advantages**:

- 🌍 **Efficient use of resources and capabilities:** PPPs can guarantee the provision of quality infrastructure services to more people due to the greater efficiency and stability they can provide in sectors such as energy, transport and healthcare. Within this model, the public sector focuses on functions such as regulation and supervision, while the private partner manages performance.
- 🌍 **Capital and risk allocation:** one of the main advantages of PPPs for the public sector is the private partner engagement in the needed initial investment. This allows public institutions to distribute expenses over a longer period, and to get the sought financing and unlock additional external sources that otherwise would not be possible or accessible. When implemented in a balanced regulatory environment, PPPs can also lead to a better allocation of risk between public and private entities.
- 🌍 **Increased public sector investment in priority sectors:** as PPPs include an initial investment that is usually undertaken by the private sector, this alleviates the public budget, which allows the LRG to make investments in infrastructure which would not otherwise have been possible. This can lead to a better budget allocation, enhancing the quality of services the government can provide. Besides improving the delivery of public services, PPPs can also support the government's investment priorities, promoting strategic projects to the private sector which attracts finance with reduced risk to the public sector.
- 🌍 **Innovative potential:** PPPs can bring innovation to public administration. The know-how shared by the private sector partner is disseminated among the public employees, who can then use this knowledge working with other sectors and projects. Besides, the public sector has the opportunity to access different types of technologies that companies bring, enhancing the employment of such technologies in the delivery of public services.

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Economic and social growth: as PPPs allow direct investment from the private sector, it opens room for economic and social growth. Through robust projects, these arrangements can generate co-benefits such as job creation, improved life quality of citizens. This can help to address issues such as social inequality, climate change and, in some cases, gender disparities.
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Faster implementation: Financing a project through a public-private partnership can also allow a project to be implemented faster than it would be relying only on public sources and efforts.

However, PPPs can also encounter some **challenges** as well, such as:

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High costs and risk allocation: As PPPs are usually designed for large scale projects and include a higher interest cost of private firms, it involves higher costs when compared to traditional procurement solutions. In practice, these higher costs are translated into higher risks. Besides, risk allocation can also be a challenge, since both public and private sectors define and are impacted by risk in a different manner. On the public sector side, risks are related to the financial part, including the budget allocation. On the other hand, the private sector tends to give emphasis to operational and commercial risks.
- 
Lack of appropriate regulations: In some countries, additional challenges can emerge due to the lack of specific legislation and regulations on PPPs, including laws that affect PPP contracts, decision processes, and implementation procedures.
- 
Uncertainty: PPPs can lead to uncertainty in different forms. If one partner feels they are losing some of the control they may work on adopting more rules to retake such control instead of working together. As governments are heavily influenced by elections, a change in the political framework might establish different priorities than the previous one, risking the realization of the PPP project. Also, PPPs usually cover a long-term period of service provision and any agreement covering such a long period into the future is naturally subject to uncertainty.
- 
Technical and capacity constraints: when dealing with the private sector, local and regional governments have to design projects that are ready to receive investments and that are attractive to the business sector. This involves creating innovative concepts that guarantee the delivery of services and the return of investment. However, LRGs usually lack technical expertise to develop such initiatives, which undermine their engagement in PPPs.

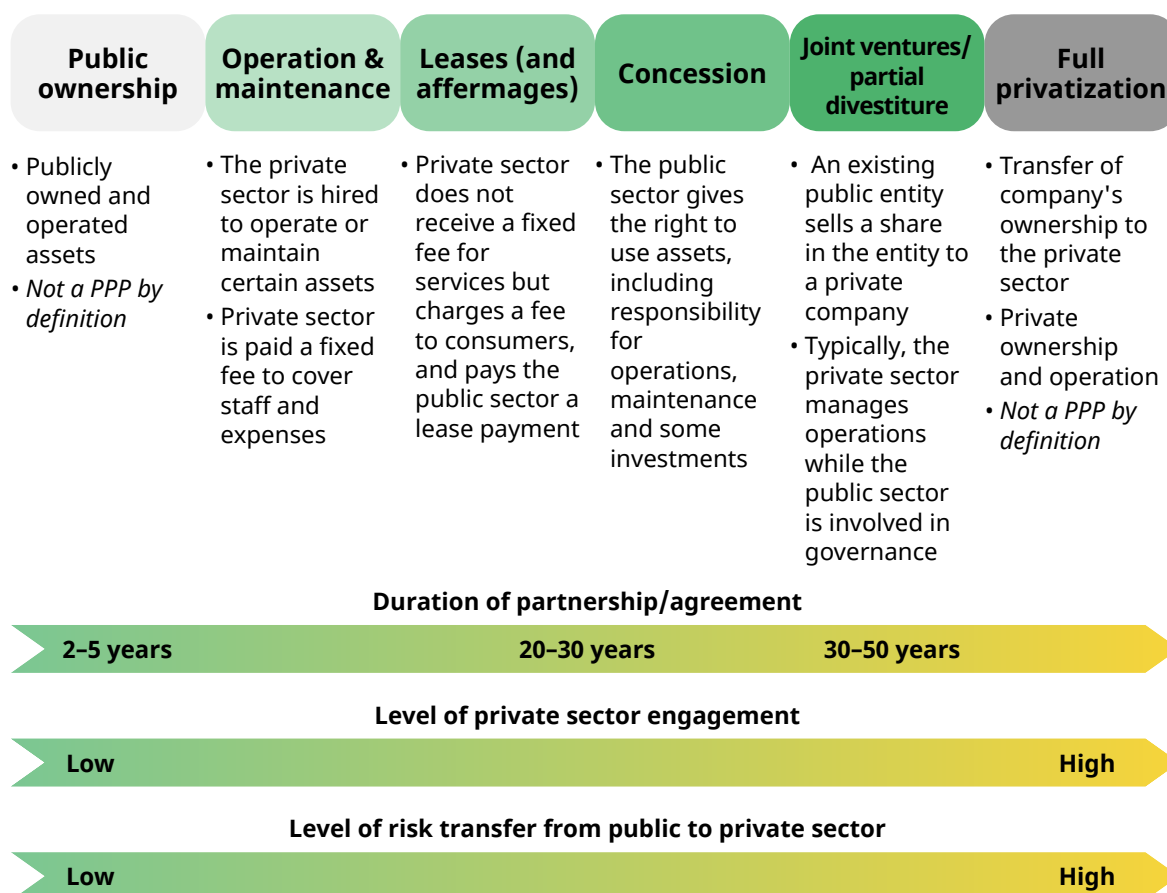
Resource 1.2: PPP models

The term ‘public-private partnership’ represents multiple types of contractual arrangements between the public and private sector partners. For example, private sector engagement can vary from the operation of certain services until a complete ownership of a company or project. It is important to trace a differentiation between PPPs contracts and full privatization.

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In PPPs, the public sector keeps some of its role in partnership with the private sector, while in a privatization scenario, the private sector assumes complete ownership of an asset that previously belonged to the government. **Figure 3** summarizes how the PPPs can vary across various parameters and the main characteristics of each variation.

Figure 3: Types of PPPs and their typical characteristics



Source: Adapted from World Bank 2022c

1. Operation and maintenance (O&M)

Such contracts exemplify the lowest level of the private sector engagement. These are typically short term agreements. Here, companies are responsible for specific tasks related to the operation and/or maintenance of the defined equipment or installations, and are usually compensated by a fixed fee. The agreements can include a performance-based clause. O&M contracts can be implemented through four different contractual arrangements as outlined below, indicating the varying levels of engagement of the private sector (Global Trade Funding 2022):

- 🔴 **Full-coverage service contract:** Covers the total costs of workforce, parts and materials, as well as emergencies. Such contracts usually include preventive maintenance for the covered equipment and systems. The fact that all the risks are carried by the private contractor allow for ease of budgeting.
- 🔴 **Full-labor service contract:** Covers all the costs to repair, replace, and maintain most mechanical equipment. Some preventive maintenance may be included in this type of contract. The private sector is responsible only for providing labor, which significantly reduces the assumed risk compared to a full-coverage contract.
- 🔴 **Preventive-maintenance contract:** Generally involves a fixed fee and includes a number of scheduled and rigorous activities. Usually, the private sector provides the materials. It is initially less expensive than full-coverage service and full-labor service contracts, however the public sector takes on most of the risks.
- 🔴 **Inspection contract:** Also known as a ‘fly-by’ contract, this is entered into by the facility owner for a fixed annual fee and includes a fixed number of periodic inspections. This contract is limited to inspecting whether some equipment is broken and needs replacement or repair.

Box 2: O&M as a waste management tool in Europe

In 2021, the company Acciona was awarded three O&M contracts to operate and manage 300 wastewater treatment plants and 600 pumping stations in Italy by a government owned enterprise in Sardinia. Due to the focus on the circular economy, the sludge produced would be used in the agriculture sector.

Source: Smart Water Magazine 2021

2. Leases & affermages

These types of PPP structures consist of conceding to an operator—typically the private sector—the responsibility for operating and maintaining an existing infrastructure facility and providing related services for an agreed period of time. Generally, the operator is not required to make any large investments. The government assumes responsibility for the investment and its associated risks, while the private sector assumes the operational risks associated with the performance of the asset(s).

Leases and affermages are very similar arrangements. The only difference lies in the revenue mechanism. In leases, the public sector is the owner of the assets and contracts a private company as the operator, typically for 8 to 15 years. The operator does not receive a fixed fee for their services but charges a fee to consumers. A portion of the receipts goes to the awarding authority as a lease payment, with the remainder being retained by the operator.

In the case of an affermage, the operator retains an operator fee from the receipts, and pays an additional surcharge. This expense is then charged to customers and is converted into investments that the awarding authority makes/has made in the infrastructure (UNESCAP 2022).


There are several forms leases can take, including:


- 📍 **Build-Operate-Lease-Transfer (BOLT):** In this approach, the government gives a concession to a private entity to build a facility (and possibly design it as well). Here, a private contractor builds a project on leased public land and operates the facility for the duration of the lease. Once the lease is completed, ownership is transferred back to the public entity or client. The BOLT model is commonly employed on infrastructure projects.

Box 3: New India, New Railways

The initiative, created in 2020 by the Indian government, aims to modernize and increase the efficiency in Indian public transport. Through a BOLT model, the private entity is responsible for financing, procuring, operating and maintaining the trains, with the option of procuring trains through a leasing model. Indian Railways, a state-owned company, provides the infrastructure, such as access to tracks, stations, watering and cleaning lines. The private entity pays Indian Railways fixed haulage and energy charges, as well as a share in gross revenue.

Source: Jain 2020

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Lease-Develop-Operate (LDO): In this type of investment model, either the government or the public sector entity retains ownership of the newly created infrastructure facility and receives payments in terms of a lease agreement with the private promoter. It is mostly followed in the development of airport facilities.

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Build-Lease-Operate-Transfer (BLOT): Under this type of PPP, a facility which already exists and is under operation is entrusted to the private sector partner for efficient operation, subject to the terms and conditions decided by mutual agreement. The contract period is usually sufficiently long and the asset is usually transferred back to the government at the end of the contract. Leasing a school building or a hospital to the private sector along with the staff and all facilities by entrusting the management and control, subject to predetermined conditions, could come under this category.

Box 4: BLOT in Turkey’s public healthcare system

The BLOT model was employed in Turkey in the reform of the country’s healthcare system. Under the scheme launched in 2006, investors financed, constructed (or renovated, when necessary), operated and maintained the hospitals. The Ministry of Health remained responsible for providing medical services.

Source: UNECE, 2012

3. Concessions

These types of contracts are usually applied for infrastructure services. Here, the public sector gives a private “concessionaire” the right to use all utility assets, including responsibility for operations, maintenance and some investments. Asset ownership remains with the public authority who is typically also responsible for replacement of larger assets. The private sector pays a concession fee to the public authority, which is usually ring-fenced and put towards asset replacement and expansion. Here, the private sector takes a substantial part of the risk, including the condition of assets and income collection. Concessions are long-term commitments (25 to 30 years) and include the possibility to amortize major initial investments.

At the local level, a concession gives a concessionaire the long-term right to use specified local government-owned asset(s) and operate the asset(s) over the contract period. The concessionaire is also responsible for making specific investments over the contract period. Asset ownership remains with the LG and the LG is typically responsible for replacement of larger assets. Assets revert to the LG at the end of the concession period, including assets purchased by the

concessionaire (PPP Knowledge Lab 2021a). Concessions can take different forms, with each presenting some of the same advantages and disadvantages:

- Build-Operate-Transfer (BOT):** This is the most common form of a concession. The public sector grants to a private company the right to develop and operate a facility or system for a certain period (the "project period"), in what would otherwise be a public sector project. The operator finances, owns and constructs the facility or system and operates it commercially for the project period, after which the facility is transferred to the LG or public authority. Depending on the ownership structure, the LRG may also be required to raise its share of equity. Given that the asset ultimately reverts to the LRG, it is often constructed on LRG-owned land under a lease arrangement with the SPV. The project company or operator generally obtains its revenues through a fee charged to the government rather than tariffs charged to consumers. The private sector partner has to bring finance for the project and take the responsibility to construct and maintain it. There are several variations, some of which are illustrated below:
- Build-Own-Operate (BOO):** the difference here is that the ownership of the newly-built facility will rest with the private party during the period of contract. This will result in the transfer of most of the risks related to planning, design, construction and operation of the project to the private partner. The public sector partner will however contract to 'purchase' the goods and services produced by the project on mutually agreed terms and conditions or provide other benefits such as tax incentives.
- Build, Own, Operate and Transfer (BOOT):** in this case, the facility/project is transferred back to the government department or agency at the end of the contract period, generally at the residual value and after the private partner recovers its investment and reasonable return agreed to as per the contract.

Box 5: BOT in the Philippines water treatment sector

The Bulacan Bulk Water Supply Project, initiated in 2014 for a period of 30 years, aims to provide treated bulk water to the various water districts (WDs) of Bulacan to help meet the increasing water demand of its consumers, expand its current service area coverage and increase the households served. The private partner, Luzon Clean Water Development Corporation, will undertake the financing, detailed design and construction, and maintenance of conveyance facilities, treatment facilities and water source.

Source: PPP Center 2021

- Design-Build-Operate (DBO):** In this model, the entire responsibility for the design, construction, finance, and operation of the project for the period of concession lies with the private party. For example, if parts need to be replaced during the operations period prior to its assumed life span the operator is likely to be responsible for replacement. However, the public sector owns and finances the construction of new assets. Other variations include:
- Design-Build-Maintain (DBM):** In this model, the design and construction of the project is the private sector's responsibility. Once the private sector has designed and constructed the project, the public sector takes ownership, but the private sector entity continues to maintain the constructed facility under an ongoing maintenance agreement (Tzanakakis 2019).
- Design-Build-Finance (DBF):** In addition to designing and building the project, the private partner is also responsible for raising finance for the project, whether fully or partially. This can be done in cases where the project owner i.e. the public sector might have cash-flow constraints (Center for Innovative Finance Support 2022).
- Design-Build-Finance-Maintain (DBFM):** In this case, the private sector is responsible for designing, building and financing a project and handling facilities maintenance services under a long-term agreement. The private sector can also be engaged to maintain the facility for a longer-term period, providing a steady long-term source of revenue for them (Designing Buildings 2022).
- Design-Build-Finance-Maintain-Operate (DBFMO):** The private sector is responsible for designing, constructing and raising finance for the project, as well as operating and maintaining it during the concession period. At the end, ownership reverts to the public sector (Thomson Reuters, n.d.).

4. Joint venture

Joint ventures between entities in a PPP arise when the contracting authority may require to have an equity stake ("shares") in the project with the private company/operator. It can also happen when an existing public entity sells a share in the company or utility to a private company. In the case of an existing company or utility, shares are either divested to the private sector, or a new holding company is created under a joint ownership structure which holds the assets of the company/utility. In the case of a financed project, the project

company will be established with a joint share ownership structure with limited scope (usually focused on delivering the project with limited ability to diversify). The level of share ownership will differ depending on whether the government is seeking to get the project off balance sheet and whether the government wishes to retain management control of the company/utility.

The joint venture can be either a partnership (arrangement with profit sharing between partners) created for specific purpose, or a contractual consortium arrangement in which the parties contract to work together on a specific project. Under joint ventures, the government is both the ultimate regulator, as well as an active shareholder in the operating company, allowing it to maintain a controlling interest in the venture for the sake of safeguarding public needs and interests. The private sector partner often has the primary responsibility, while the public sector continues to be involved in governance and daily management. However, there is no sharing of a pool of profits. In this case, each party is remunerated for specific services provided to the consortium and no separate legal entity is created.

Box 6: Joint venture for energy and water resources in Zimbabwe

In Zimbabwe, public and private sector partners planned to form a joint venture business to buy bulk electricity and manage its distribution within Willowvale Industrial Park. The project was intended to include demand side management and the provision of technical advice and services to customers in the Park. The public sector partners included the providers of power, water and waste disposal services; while private sector partners included the industrial users of these services in Willowvale.

Source: UNDP, 2000

5. Full privatization

In the last stage of the private sector engagement, the public sector contracts privately owned companies to provide services that were previously provided by the government. It involves the transfer of public assets to the private sector. This transfer is a permanent commitment and takes the form of issue and sale or outright distribution of shares to the general public. By definition, full privatization cannot be categorized as a public-private partnership.

Figure 4 provides an overview of the advantages and disadvantages of the aforementioned pathways of private sector engagement.

Figure 4: Advantages and disadvantages of PPP models

Model	Advantages	Disadvantages
Operation and maintenance (O&M)	<p>Contracts are straightforward, easy to develop</p> <p>Private partner takes on operational risks</p> <p>Gains in service efficiency without selling assets</p>	<p>Short term targets, undermining long term planning</p> <p>Upfront costs to maintain equipment</p> <p>Preventive maintenance can require more labor-intensive activities</p>
Leases and affermages	<p>Private sector bears the commercial risk, including the financial risk of managing and maintaining the operation</p> <p>Government receives lease payments</p> <p>Incentive towards efficiency (private contractor's profit depends on sales)</p>	<p>Investment to buy new or replace assets is done by the public sector</p> <p>Incentive towards efficiency may lead to poor maintenance of assets as it can lead to increased costs</p> <p>Public sector should establish the tariff, which might involve complex arrangements</p>
Concessions	<p>Private sector responsible for working capital and all capital investments, reducing costs to public sector</p> <p>The ownership of all assets remains with the government</p> <p>Strong incentives to efficiency since lower costs will lead to higher profits for the contractor</p>	<p>Complex contract where public sector should regulate tariffs and performance standards</p> <p>Risk of lack of investments if costs cannot be recuperated during the term of the concession.</p> <p>Large investments required (limited competition)</p>
Joint ventures	<p>Risks are equally shared between public and private partners</p> <p>Jointly investment in the project, leading to an incentive to cooperate</p>	<p>Conflicts of interests</p> <p>Less rigorous and formal procurement methods can facilitate corruptive practices</p>
Full privatization (not PPP)	<p>Efficiency in resources management</p> <p>Immunity from political influence</p> <p>Governments can raise revenue by selling assets</p>	<p>Higher costs to final users</p> <p>Less transparency</p> <p>Priority is the profit, rather than citizen's wellbeing</p>

Tool 1.1: Creating an SPV

Typically in a PPP, the choice of forming an SPV begins to make sense for longer term and complex projects. Creating an SPV can be a logical one for partners that are interested in ring-fencing the project and its assets in order to protect the parent companies and reduce their risk by creating this legally separate entity. It can also be a way to channel funds and contracts (see [Resource 1.1](#)).

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This Tool provides a step-by-step guide for those interested in forming an SPV for their project, considering actions before and after the establishment of such a company. Specific expertise would be required depending on the country, but this Tool can help familiarize one with the process.

Step 1: Define the project type and potential contracts

This definition will allow further understanding on the technical specificities of the project and the needs to be addressed by the SPV. For example in concessions, especially BOT contracts as well as BOO contracts, where the private sector retains ownership of the project assets, an SPV owns and operates the facility and collects revenue which is used to repay the finance and investment costs, maintain and operate the facility and to make marginal profits (Merna and Smith 1996).

Step 2: Plan project finance

For an SPV to be viable, the cash flows from the project itself would need to be sufficient to cover its costs including debt-servicing requirements. In some cases, such as power generation, these cash flows can be guaranteed by a power-purchase agreement (PPA) or another offtake agreement. Since the SPV is a separate entity, shareholders are typically only liable for the level of their investment, and the parent company cannot be pursued in case of default on loans by the SPV ('non-recourse').

Step 3: Define the type of corporation

Once the SPV has been opted for, it is important to determine the type of corporation. In most cases, private partners choose whether a limited liability company (LLC) or a limited partnership (LP).

A limited partnership arrangement has two 'tiers' of partners, a general and a limited partner. The former has more management control for day-to-day functioning of the entity, but is also liable for debts of the SPV itself. The limited partner does not have any personal liability for defaults, and this is also the case for all partners in an LLC.

The specifics of these arrangements would differ by jurisdiction. Setting up a corporation can take as little as one day to as much as several months depending on the country and city and the size.

Step 4: Finalize the operating agreement

The operating agreement is an important step of the establishment of an SPV since it outlines the main sponsors i.e. the public or private sector actor(s) and other consortium members including construction contractors, as well as their roles and responsibilities.

This is the foundation of the SPV's governance structure, its risk and responsibility allocation and the eventual shareholder's agreement, defining who will have equity in the project and to what degree (primarily this is the main sponsor). Other documents that are important include a document containing relevant information for prospective investors, and an agreement for investors that do wish to commit resources.

Step 5: Prepare fiscal documentation

All necessary documentation should be prepared and a bank account should be opened for the SPV. The SPV would likely be liable to pay all applicable taxes levied on corporations, and so it is important for there to be a favorable regulatory and fiscal environment for partners to choose to establish an SPV in a certain location (SPV Hub 2022).

Building Block 2: An Enabling Landscape

A well-designed, strong and rational institutional framework can help attract the private sector to engage and invest in PPPs, help in determining the right PPP model and ensuring the project's overall success. Building Block 2 presents recommendations on the main institutional and regulatory features necessary to build a such an enabling regulatory environment.

Resource 2.1: Public-Private Partnership Enabling Conditions provides an overview of the key factors LRGs have to consider to create an enabling environment for PPPs.

Tool 2.1: Enabling Conditions Checklist guides LRGs to understand the relevant information and actions to be considered when engaging in a PPP agreement.

Tool 2.2: Public-Private Partnership Readiness Self Assessment Form, an external tool developed by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), provides a detailed list of factors local and regional governments should assess to understand their strengths and weaknesses regarding the structures and capacities needed for the formation and effective operation of a PPP.



Further reading (external links):



Enabling Environment for PPP

Developed by: Public-Private Infrastructure Advisory Facility, 2009



Diagnosis of Enabling Environment for PPP

Developed by: Public-Private Infrastructure Advisory Facility, 2009



Leading Practices in Governmental Processes Facilitating Infrastructure Project Preparation

Developed by: Global Infrastructure Hub, 2018

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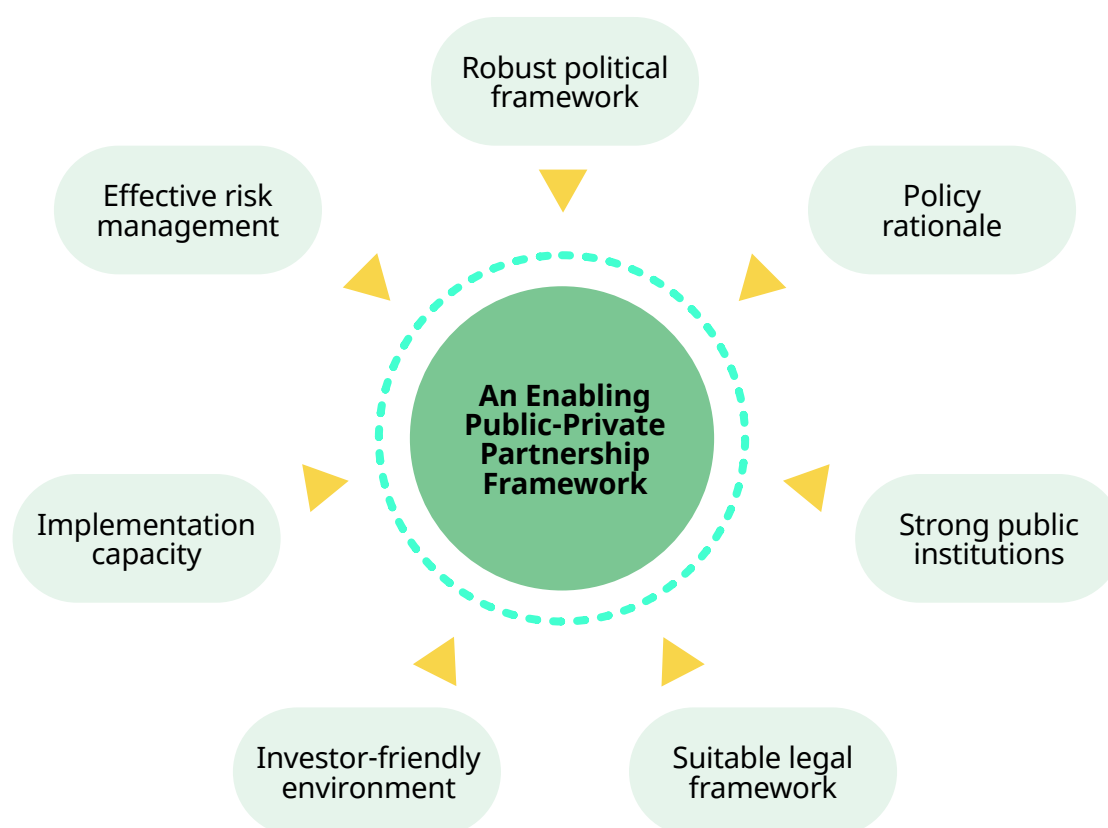
Resource 2.1: PPP enabling conditions

An enabling environment involves a number of factors that are needed before a public-private partnership can be designed and set up, in order to allow its smooth implementation. As defined by UNDP (2008), “the enabling environment describes the broader system within which individuals and organizations function and one that facilitates or hampers their existence and performance”. Constructing this conducive environment is the responsibility of governments, at both the national or local level.



Given that PPPs are typically long-term commitments and are based on complex financial, legal and contractual relationships between the public and private sectors, there are a number of factors that need to be in place to increase the confidence of the private sector and guarantee its effective engagement in the process (World Bank 2022). **Figure 5** below shows the main factors that help create an enabling environment for PPPs.

Figure 5: Factors for an enabling PPP environment



- Robust political framework:** It is important that the public partner defines their priorities, objectives and expectations according to the socio-economic scenario in their city or region, as well as the agencies and sectors of the government that will be involved and/or impacted by the PPP. It is critical for the public sector participants in PPPs to ensure high transparency in terms of processes, objectives, timelines and consequences, presenting consistent and clear regulations (World Bank 2017).
- Strong public institutions:** Solid and stable public institutions facilitate the identification of capacities, guarantee continuation and enable a smooth operation and maintenance of the project in the long term.
- Policy rationale:** For the establishment of PPPs, it is imperative for the private and public sectors to have a clear understanding of the policy rationale for the identified PPP project, as well as the processes that accompany the PPP, to allow for a suitable preparation and execution. This involves providing access to detailed information about the actors, processes of project selection, procurement, preparation and implementation, as well as contract monitoring and mechanisms of resolving conflict.
- Investor-friendly environment:** A favorable investor climate ensures a solid understanding of the project and investment rationale, facilitating private funding under optimal conditions for the public sector. This involves having a jointly agreed and clear investment plan, where the public sector demonstrates its priorities and targeted sectors, project pipelines, the amount of investment needed and the desired split between public and private finance.
- Effective risk management:** Risk management is at the core of PPPs, due to its impact in the delivery of services. It involves risk identification, assessment, allocation and mitigation. As the ultimate manager of assets and regulations, the public sector should ensure that risks are identified and mitigated, which would guarantee the efficiency in the delivery of the services and attract private investors. This can be achieved through a risk assessment or feasibility study, complemented by a mitigation strategy. An effective risk management strategy shows the government's commitment and transparency, allowing better planning and enhancing confidence in the process.

- Legal framework:** Legislation that defines the financial viability of PPPs—for instance, stating if the private sector can charge fees or if the public sector will offer subsidies—is a critical enabling condition for the establishment and implementation of PPPs. Sector-specific policies are also necessary to define such a framework to support the development of projects in priority areas. A well-defined legal framework needs to be determined with certainty to enable the parties to understand the boundaries of their interaction, thereby increasing the private sector’s confidence in the public counterpart. In some cases, the establishment of PPP may require reforms in the current legislation, which should reflect international best practices and the public sector priorities and objectives (World Bank 2017). In practice, the legal framework will be enforced by solid political institutions and operationalized through guidelines, regulations, standards and enforcement capacity, increasing the public sector’s capacity to not only regulate, but also monitor the implementation of PPP models.
- Implementation capacity:** When engaging in PPPs, the private sector needs assurances that the government has capacity to plan, manage the agreement, coordinate key stakeholders and implement the proposed project. Besides, a clear understanding of the complex processes of a PPP, the partners ability to clearly understand their roles, necessary skills, and resources to deliver them are also crucial to the project implementation. On the other hand, public authorities need to have full confidence in their private partner’s capacity, since the latter assumes considerable risks in terms of services of general economic interest. This will ensure an effective partnership and the protection of the public interest (World Bank 2017). Implementation capacity can be managed in different ways, depending on the government’s profile and organizational structure. It can be in a centralized form, which usually includes the creation of a central agency or secretariat to manage the project, facilitating the harmonization of policies, or the distribution of roles and responsibilities through the existing agencies and organizations inside the governmental structure. In case of large scale projects that are focused on the provision of high quality services over a long period of time, there might be a need to create or engage sector-specific agencies.

Box 7: South African PPP legislation

South Africa’s Public Finance Management Act, signed in 1999, consists of a regulation that explains how it applies to the distinct phases of the PPP project cycle, from inception to the management of the PPP agreement and is complemented by a PPP Manual. This legal and policy framework has helped to leverage significant levels of private investment with South Africa planning and executing projects exceeding ZAR 300 billion (US \$22 billion) annually.

Source: Global Infrastructure Hub, 2019

Tool 2.1: Enabling conditions checklist

Following on from **Resource 2.1**, local and regional governments are able to understand the necessary conditions to create an environment that enables the design, establishment and operation of PPPs. This checklist aims to guide local governments through the essential steps to guarantee such conditions.

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1. Policy rationale

- Map key stakeholders, including both private and public sector and community-based organizations (see **Tool 3.2**)
- Key stakeholders are informed, understand the project's objectives, impacts and relevance, and are agreed on their engagement
- Work flows, activities and reporting processes, including mechanisms of resolving conflicts are defined
- A communication strategy that ensures regular communication with the groups that will be impacted by the project is developed (see **Tool 3.3**)

2. Legal framework

- Existing legislation on PPPs is mapped and assessed
- Potential bottlenecks that could hinder successful implementation are identified
- Necessary regulatory reforms to further develop PPPs and trace a strategy on the procedures are defined

3. Investment-friendly environment

- An investment plan is prepared
- The project is aligned with government priorities, budget and plans
- A work plan with roles and capacities of respective partners is designed
- The desired split between public and private finance is agreed by parties
- The project's revenue generation potential is evaluated

Implementation capacity

- Data needed for the project rationale and development is collected
- Essential technical studies are conducted and made available
- Any data is made transparent and available to enhance investor confidence
- Required technical expertise and skills from both the public and private partners are clearly defined
- Existing skill set assessed and the need for external partners defined
- Necessary training is conducted based on a needs assessment

Risk management

- Risks that may jeopardize the project in its conception, implementation and maintenance are identified
- Negative impacts on different stakeholders and/or possibilities of conflict between them are assessed and a mitigation plan developed
- Design mitigation strategies are formulated

Tool 2.2: PPP readiness assessment

To create an enabling environment for the establishment of PPPs, local and regional governments have to trace a diagnosis of the current situation, regulations, capacity and stakeholders in order to define well-informed actions. This will allow for proper planning and engagement of the various relevant stakeholders.



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The PPP-Readiness Self-Assessment tool, developed by the United Nations' Economic and Social Commission for Asia and the Pacific (2005) complements **Tool 2.1** and provides a questionnaire to assist LRGs in understanding their capacities before engaging in PPPs.

Divided into key areas such as the background environment, the PPP policy framework, the broader legal and regulatory framework, institutional capacity and process, the assessment guides the user through relevant information and parameters to be considered when evaluating such an environment.

 [The tool can be accessed here \(external link\).](#)

Building Block 3: Ensuring Successful Partnerships

This Building Block provides a set of useful tools to assist with the effective design and structure of a project, which is key to ensuring a successful PPP, and covers the basics of project development and finance.

Resource 3.1: Project Development serves to familiarize stakeholders with the stages of the project development cycle, explaining the factors to consider from the selection of a project's idea to implementation.

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Resource 3.2: Stakeholder Engagement provides a step-by-step guide on what to consider when planning the stakeholders engagement.

Tool 3.1: Key Stakeholder Mapping aims to assist LRGs in mapping the key actors to be engaged when designing a PPP, providing a template for collecting relevant information per stakeholder and to provide needed transparency in terms of the interest and influence each stakeholder holds in the project.

Tool 3.2: Project Feasibility Checklist provides the basic information needed to design a PPP agreement.

Tool 3.3: FAQ on PPP Contracts addresses some common questions about the contract formulation process for PPPs.

Further reading (external links):

 [An Overview of the PPP Process Cycle](#)
Developed by: APMG International, 2022

 [Public-Private Partnership Cycle](#)
Developed by: The World Bank, 2022

Resource 3.1: Project development

The design of a project is a time consuming and complex process, and consists of several stages. The specifics of the project development cycle each stage can vary depending on the local context, stakeholders, and powers and authorities of the local government, however the steps themselves are broadly the same.



This Resource serves to describe the overarching stages that guide a project from start to finish (see also Figure 6). Stages 1–6 are meant as general indications of what goes into a successful project, including under a PPP structure. Stages 7–8 differ slightly from the perspective of the private sector or the public sector issuing authority in the case of a PPP. **Figure 6** gives a broad overview of this step-by-step process.

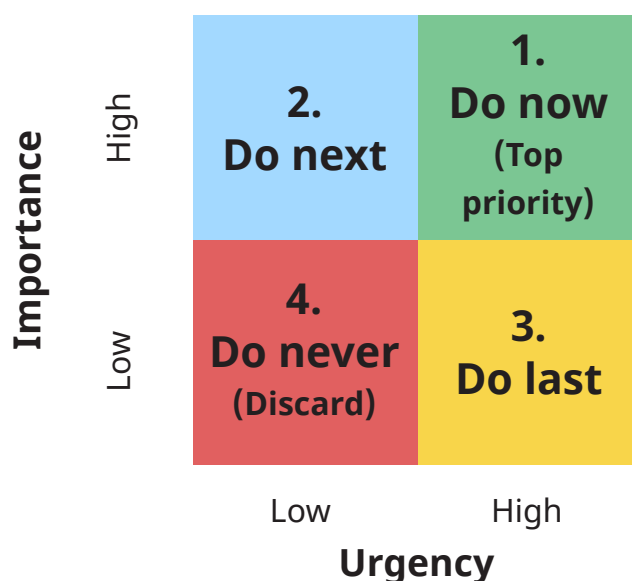
Figure 6: Project development stages



Stage 1: Project identification

Project development at the local level should be based on existing plans and strategies. The selection of investments shall be guided by comprehensive risk and priority assessments, also considering the local governments budgetary constraints and potential. The most basic classification is prioritizing ideas along their importance and urgency, as shown in **Figure 7**.

Figure 7: Prioritization matrix



Once the project idea is defined, LRGs can narrow it further down through assessing the feasibility and risks of the identified interventions, as in **Figure 8**.

Figure 8: Identifying climate-action project feasibility

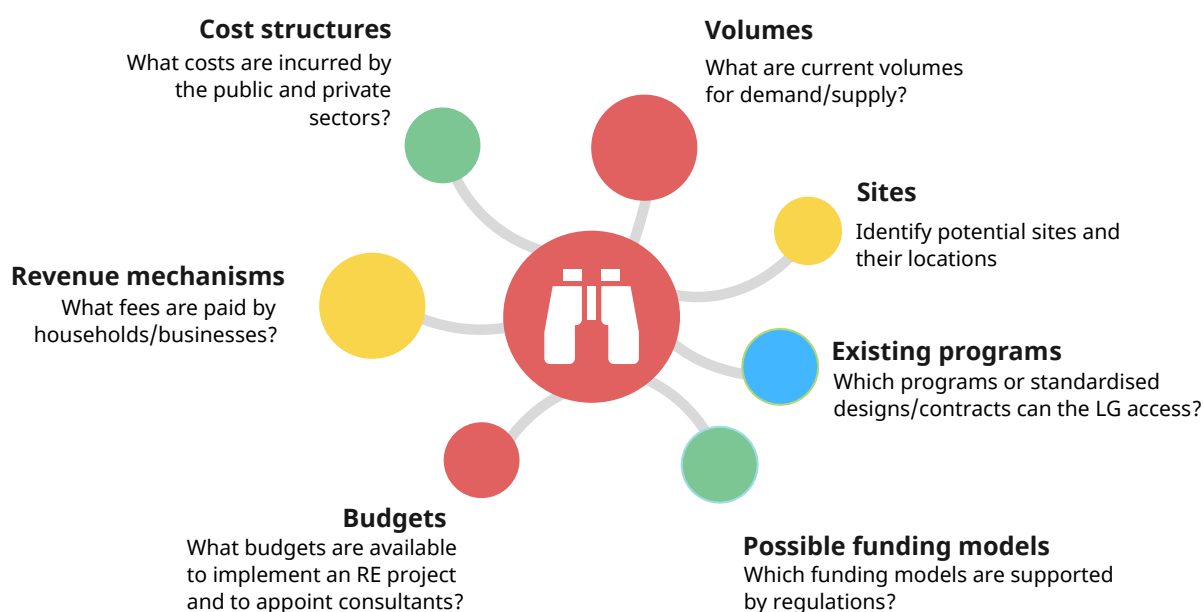
Potential climate action intervention	Feasibility			Time scale for the intervention to show impacts on climate change (Short/medium/long term)	Overall impact
	Technically (high/medium/low)	Politically (high/medium/low)	Financially (high/medium/low)		
E.g.: Rooftop water harvesting made mandatory to deal with increasing climate change-related water stress	High (technology is easily available)	Medium (would require a change in building by-laws and codes)	High (not an expensive option to implement, with substantial results)	Short term	High

Source: ICLEI 2019

To select the intervention, some basic considerations should also be thought over, including (**Figure 9**):

- (i) the costs incurred by the public and private partners,
- (ii) the volumes of supply and demand involved,
- (iii) the potential to generate revenue,
- (iv) potential sites for implementation,
- (v) budget and possible funding models and
- (vi) existing programs or standard contracts that project developers can access.

Figure 9: Parameters to identify local projects



Stage 2: Expert engagement

After performing a deep analysis of the main aspects of the project, it is important to start engaging experts that will work on the project. At this stage, LRGs have to assess their internal expertise, which will allow the identification of gaps and the need to hire external capacity.

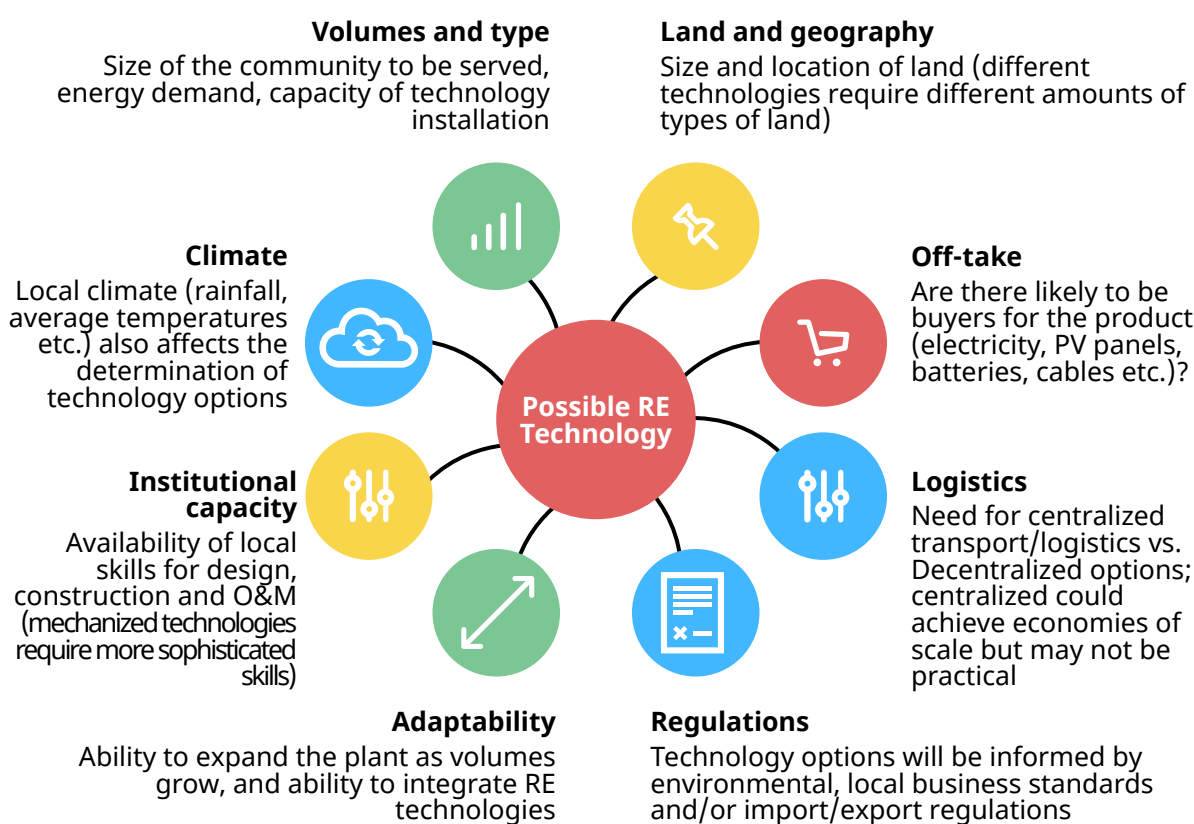
Projects need steady leadership, clear governance structure, and structured project management for effective decision-making, planning, coordination, and implementation of the various workstreams. Defining clear roles and responsibilities helps develop and launch the project as smoothly as possible.

Depending on the project stage, different skills and positions are needed. The staff engaged should be trained early in the process, taking into consideration that different project stages need different skills. At this moment, it is important to consider factors such as the local government’s internal capacity to engage and the complexity of the project. This might lead to an evaluation of the existence of experts at the local level and the budget available to hire such experts, as well as its capacity to develop Terms of Reference.

Stage 3: Assessing options

Once the desired outcomes of the project have been identified, and all the necessary experts and consultants are on board, it is time to assess the technical and financial options available for the project. In terms of technical options and viability, it is important to evaluate the needs of the community, enablers and resources (**Figure 10**).

Figure 10: Technical and financial parameters of the chosen project



In addition to selecting the technology, potential funding sources and instruments should be identified as early as possible based on existing regulatory and policy environments, budget and capital expenditures. An economic cost-benefit analysis might be necessary to assess both financial and non-financial factors. Often external experts are engaged to model the cash flows of the different technical solutions based on different funding models, as well as quantifying the benefits and affordability of each option.

Viable options can be ranked based on multiple criteria, including but not limited to technical complexity, environmental and social benefits, and affordability, which could be a key concern for cash-constrained LRGs.

Stage 4: Early project finance

Early engagement with infrastructure developers and equipment suppliers is key to ensuring that a project will be attractive to the private sector. The PPP model will need to be structured to minimize financial risks for the private sector and its lenders. Some factors that help to increase the interest of private partners in engaging in PPP in financing terms if there is high levels of revenue certainty to guarantee the return of investment.

Funding models may need to be reassessed if the project is seen as too risky. Project aggregation, both geographically, thematically and financially can reduce risk. National governments as well as development finance institutions possess a wide variety of de-risking instruments, which can also increase investors' appetite. Local governments might also have to commit financially to the PPP for OPEX or CAPEX, which can be sourced from their own revenues, fees, taxes and assets. Any funding gaps should be identified as early as possible, possible even during the design phase.

As an additional funding option, local governments, particularly in the Global South, that rely on intergovernmental transfers, should research any grants available at the national level and assess the processes to access them.

Stage 5: Demonstrate feasibility

A project has to demonstrate feasibility. Such requirements could be different for different stakeholders. For the LG, for example, requirements such as the

project's affordability, its impact on the community, and how it aligns with broader development plans and priorities should be considered.

For the private sector, key concerns include whether the risk is allocated appropriately between the public and private sector, as well as the LRG's ability to pay for services, and that the cash flows generated are sufficient.

Additional external financial partners supporting the project could require that political support for the project at the national or local level be shown, and that the demonstrated development (co-)benefits are greater than costs, as well as how social and environmental risks will be mitigated, and whether the business model is sustainable.

It is important to involve a diverse range of experts, including technical, social and financial, early in the assessment of feasibility so that projects are holistically sound, in order to avoid outcomes where for example a technically robust project is not financially viable. A checklist for demonstrating project feasibility can be found in **Tool 3.2**.

Stage 6: Securing funding

Different funding models require different allocations of roles and responsibilities, as well as the risks and rewards of undertaking the project.

These responsibilities span the project development cycle from conceptualizing the project, to construction, performance and operation and maintenance, as well as securing funding and ensuring sales and marketing. Naturally, projects that see greater public ownership would require more involvement (financial, capacity-wise etc.) from LRGs.

In situations where public and private entities collaborate, such as through service contracts or public-private partnerships, the allocations of roles, responsibilities and risks vary.

LRGs may play a greater role in securing funding through guarantees and other risk reduction measures. However this is not exclusive and the private sector may participate as well. For more information, please see **Resource 4.1**.

Stage 7: Procurement process

For the public sector authority, should it have the power and ability to do so, it can issue a tender for a project to be implemented as a PPP with needed requirements.

In PPPs, a technical consultant develops output specifications (materials, technologies used, supervision, construction services etc.) and specific legal expertise would be required to monitor and ensure legal procurement processes are being followed. Different jurisdictions may have different requirements or constraints for issuing tenders as PPPs (World Bank n.d.).

The procurement process can be across multiple stages, including a request for qualifications (RfQ) or a direct request for proposals (RfP). Received bids should be based on clear and explicit criteria, and potential bidders should be provided with all relevant information such as rules and evaluation criteria. Negotiations can be conducted with bidders, however care should be taken that the process is as fair as possible and fundamentals of the tender are not changed, as is mandated in certain jurisdictions (World Bank n.d.2). It is important that the procurement process be as transparent as possible to instill confidence from the private sector, which is an important enabling factor (CoM SSA, 2022).

For the private sector, it is important to form a strong consortium before putting forward a proposal for the bid. This consortium should ideally include the main sponsor, lenders, construction and operation and maintenance contractors (APMG International, n.d.). Agreements and commitments should be sought out among consortium members to define their roles and responsibilities. The SPV structure can be decided at this stage.

In both cases, concluding the bidding process would involve selecting the preferred bidder and then finalizing the project design, governance, legal and financial structure for the consortium, drafting all requisite contracts and initiating relevant procurement processes. The SPV is formed at this stage as well. Agreements may be sought to ensure that the bidder(s) do not back out at this stage (APMG International n.d.2).

Stage 8: Implementation and Monitoring

Monitoring the implementation and operation of the project is the last stage of project development to make sure that the project is continuing as planned and to avoid unnecessary delays, cost overruns or bad management practices.

In some PPPs, the SPV's lender can appoint an independent engineer to monitor the engineering, procurement and construction (EPC) contractor, who in turn would most likely have their own internal verification processes. The local government can also establish internal processes to ensure that the SPV meets its obligations, and can even choose to appoint an independent consultant to monitor the contractor, who must verify performance based on the specified criteria. Payments should be made only when performance is verified.

Penalties must be tracked and applied to the payment. Separate operation and maintenance contracts can be concluded to ensure the project continues to function properly after commissioning (CoM SSA 2022). If circumstances change, the project may need to be renegotiated or refinanced, it would be done at this stage (CoM SSA 2022).

Resource 3.2: Stakeholder engagement

The engagement between different stakeholders, who are directly or indirectly affected by the project, is crucial for a successful PPP. This process should start with the design of a solid stakeholder engagement plan (SEP), which will **identify and prioritize key stakeholder groups**, provide a strategy and timetable for sharing information and consulting with each of these groups, and describe resources and responsibilities for implementing stakeholder engagement activities. The scope and level of detail of the plan will vary according to the project's scope, size and needs.

This will guarantee not only an appropriate use of the private sector's expertise and innovation, but also ensure effective long-term management of public resources. It guarantees that the partnership has the necessary **political and community buy-in**, and can reduce the project's risks and make it more attractive to investors.

A stakeholder engagement plan creates a platform for **continuous consultation** with different actors, facilitates the achievement of agreements, reduces the risk of unexpected conflict and also raises awareness about the project's objectives and outcomes to increase buy-in. **Greater transparency and communication** can help when dealing with a wide range of actors, especially those looking to ensure accountability.

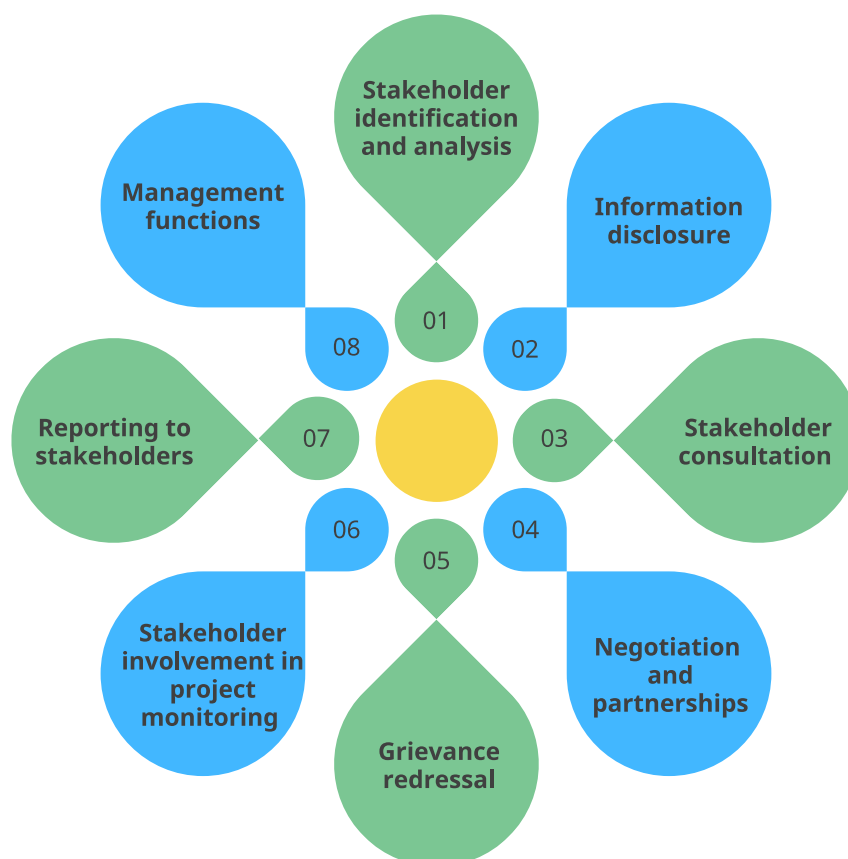
It is important that the plan adapts to possible changes along the project period, guaranteeing communication, alignment and engagement between the partners (World Bank 2011).

A good stakeholder plan should start with an introduction that presents the project, its objectives, impacts and expected outcomes. Then, it should identify and prioritize key stakeholder groups, and provide a strategy and timetable for sharing information and consulting with each of these groups. It should also describe the resources and responsibilities for implementing stakeholder engagement activities and describe how the outcomes from such activities will be incorporated into the implementation of the project.

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Figure 11 provides an overview of the main components that compose a stakeholder engagement plan and that will be detailed in the sections below (IFC 2007).

Figure 11: Key elements of a stakeholder engagement plan



Source: Adapted from International Finance Corporation 2007

1. Stakeholder identification and analysis

A good stakeholder engagement plan starts with the identification of the stakeholders that might be affected or have an interest in the PPP, as well as their respective groups, subdivisions, and representatives. Examples of potential stakeholders vary according to the scope of the PPP and might include national government authorities, local organizations, non-governmental organizations (NGOs), companies, civil society organizations (CSOs) and nearby communities. Besides, vulnerable groups should also be identified as they might not have a voice to express their interests or needs. A detailed analysis of each of the identified stakeholder groups, their interests and how the PPP will impact their activities and vice-versa then follows.

This can be achieved through different methodologies, depending on the type of stakeholders involved, but usually includes meetings, analysis of annual reports and networking events. It is important to understand the specificities and sensitivities in each of the groups. The outcome of this analysis will inform the next steps of the plan, as well as the prioritization of the key groups that should be consulted during the process (see **Tool 3.1**).

2. Information disclosure

Offering accurate information about the project, its impacts, and any other relevant aspects that may have an effect on the stakeholders presents the next stages of a PPP project. Making information accessible and clear to interested parties demonstrates transparency and inspires and maintains stakeholder engagement in the long-term. It is important to minimize any risk of misinformation since this might lead to a disengagement and reduced political support and public trust in the long term.

Hence, partners should agree on the format of the provided information, the level of technical details about the project to be disclosed and the definition of spokespeople that will act in interlocution with the stakeholders. This will allow different stakeholders to evaluate benefits and negative impacts of the project in their activities. At this stage, partners should consider possible sensitive and controversial issues, weighing potential risks in disclosing such information. This is a key step to anticipate conflicts and strategies to minimize opposition to the project.

It is also important to establish how the information will be disclosed, whether through the publication of a report, a “background information disclosure” document, meetings or a summary with key information. This choice will highly depend on the type of stakeholders identified previously (IFC 2007).

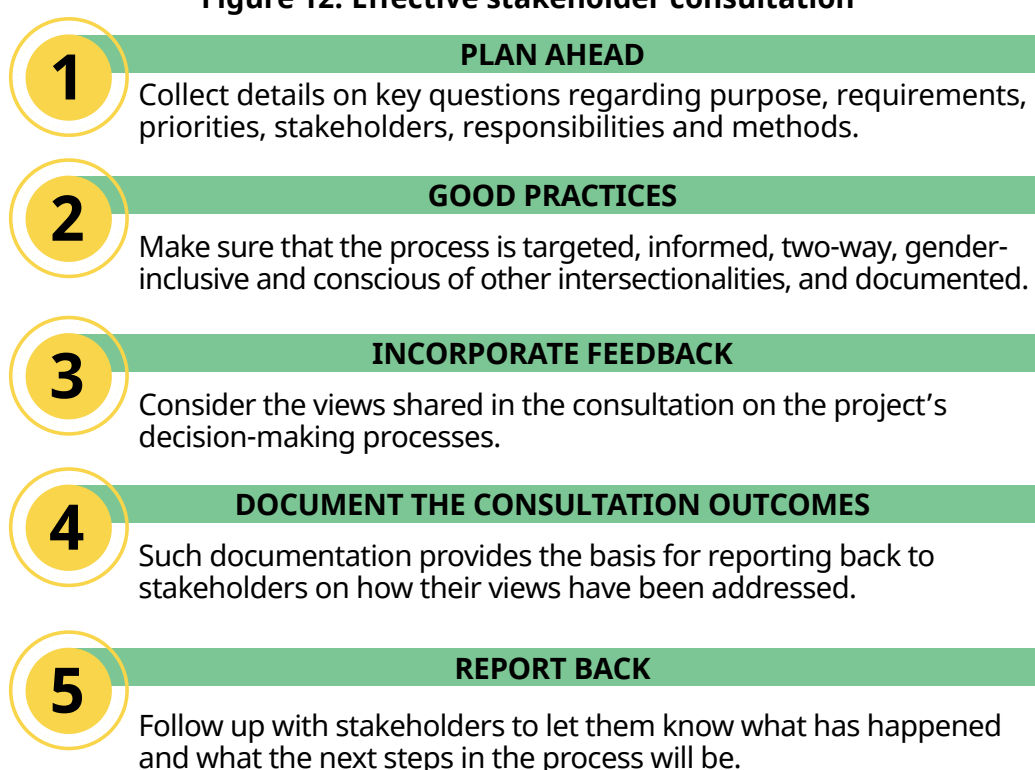
3. Stakeholder consultation

After revealing the information about the PPP, partners need to start building constructive relationships with the identified stakeholders. It is important to deploy interviews, polls, workshops and technical meetings as appropriate to listen to stakeholders’ view of the project and their concerns about risks, impacts and benefits. The format of the consultation process will depend on the

local context and the type of stakeholders previously identified, as well as the nature of expected questions to be posed. It might also involve more than one opportunity to build knowledge on the specificities of the project, as well as the different perceptions from external parties.

Usually, the consultation process generates valuable information that might lead to improvements on the project design and to the identification of risks. At the end of this opportunity, LRGs should evaluate if the feedback provided by the stakeholders can be incorporated and document the result of the process. Keeping a record of the dialogue is relevant to ensure further management of the PPP (IFC 2007). **Figure 12** presents the steps for an effective consultation.

Figure 12: Effective stakeholder consultation



4. Negotiation and partnership

The consultation process might require further negotiation among the stakeholders to reach an agreement on a specific issue raised during the dialogue. Negotiations should be grounded in good faith among the parties, i.e. conducted with an open mind and willingness to contribute to the process. This approach can lead to stronger relationships between the parties, new partnerships and deeper interests and motivation after the end of the negotiation process.

It is important to understand when negotiation becomes necessary. It is usually

recommended in the occurrence of a sensitive situation that might compromise the effective implementation of the PPP project. Negotiation might involve legitimate representatives from the different stakeholder groups who would jointly explore any sensitive issues. This process should be participatory, as it plays a key role in providing clarity and predictability regarding the next steps.

5. Grievance redressal

When designing a PPP, especially in environmental sectors with different stakeholders, a grievance redressal mechanism is necessary to address potential issues that might arise. If the previous steps are put in place successfully, the need for such a mechanism becomes low. However, partners should be prepared to deal with unexpected impacts on communities that might lead to complaints and compromise delivery of the project. Therefore, it is important to define a management process on how the complaint is received, interpreted and solved, considering local context and the affected stakeholders profile. (UNDP 2014)

Dealing with grievances can have positive and negative impacts on the project's outcomes. A good grievance redressal process should be transparent and fair, giving affected stakeholders the feeling that their complaints were considered and heard. Besides, different grievances should be addressed in a proper way, depending on its nature, seriousness and complexity. In some cases, it might be necessary to bring third parties to act as intermediaries between the affected groups and the parties involved in the PPP model. NGOs can also play a decisive role in advocating for these communities and also helping them to understand the importance of the PPP projects.

In situations where the internal mechanisms are not enough to solve such sensitive issues, parties might require legal procedure. Here, parties should agree on the legal channel to resolve disputes. In any case, the complaints should be documented and the outcomes of grievance redressal should be explained and published. This will increase the confidence in the PPP and reinforce the parties' compromise in addressing sensitive issues to the communities.

6. Stakeholder involvement in project monitoring

Involving local stakeholders in project monitoring can assist in increasing the transparency of the PPP, as well as giving a sense of responsibility and empowerment to such actors. A participatory process can also contribute to strengthening the partnership between the public and private sector. In the process, it is important to define methods and indicators that are meaningful to the involved stakeholders. They can also be invited to observe the project implementation and to be engaged in group discussions on how to manage new issues that might arise.

In some cases, public officials can lack the necessary technical expertise to engage in such monitoring, which might require investing time and resources in capacity building activities to explain how different groups can engage in monitoring. An external monitor can also be considered as an option, increasing the credibility of the monitoring results. (IFC, 2007)

7. Reporting to stakeholders

Once the consultation process is over, sensitive issues have been discussed and stakeholders are engaged in monitoring, it is important to inform the stakeholders which of their suggestions have been accepted, how the project impacts are being monitored and the conflict mitigation strategies. This communication step has to involve all the key groups previously identified, which will be nurtured with consistent information. Reports should cover the process of stakeholder engagement as a whole, both to those stakeholders who are directly engaged, and to other interested parties. (IFC 2007)

The type of information has to be carefully selected, shared publicly and might involve translation to local language so it can be accessed by all stakeholders. In some cases, sustainability reporting is also relevant to inform the social and environmental impacts of the project. (APMG International 2022)

8. Management functions

A stakeholder engagement plan has to be managed as any other part of the PPP project, with clear targets, timeline and monitoring. The management strategy should be known by all the parties involved in the project since it would also

include distribution of responsibilities. A clear communication channel between stakeholders is also key to guarantee an effective management.

The management should include all the above mentioned steps, namely stakeholder analysis, consultation processes, grievance mechanisms, the involvement of local stakeholders in project monitoring and reporting information to stakeholders. In large scale PPPs, it might be necessary to establish a database with all the stakeholders and the interactions along the process. This will minimize risks regarding changes in the public administration and the private sector's staff.

It is important to define a group that will deal directly with the stakeholders and have direct access to the project management team. This will enhance the communication inside the project, as well as guarantee that the stakeholders' complaints and concerns are addressed.

In some cases, it will be necessary to hire staff with different skills in order to enhance the quality of the stakeholder engagement. For example, if the project affects indigenous communities, the PPP has to consider people that have the proper expertise in dealing with such groups. (IFC 2007)

Tool 3.1: Key stakeholder mapping

The process of identifying and mapping relevant stakeholders is a crucial component of the stakeholder engagement process (see **Resource 3.1**).

The mapping process can be informed by collecting and using detailed information about each stakeholder, in terms of their mandates and organization type, scope of their operations and impact, opportunities and risks their engagement may bring and identifying their main interests in the intended project, among others. This will allow local and regional governments to understand the important actors and obtain their buy-in for the intended project. Some key stakeholders in local government projects can include: inhabitants; small farmers and local businesses; local and regional politicians; social activists; environmental activists; competitors; donors, financiers, funders; professional users; private users; regulatory bodies; employees/unions (ICLEI 2020).

This tool therefore consists of two components for identifying and prioritizing stakeholders, as well as an interactive stakeholder map to allow stakeholders to be categorized according to their influence as well as how they will be impacted by the project.

 [The tool can be accessed here.](#)

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Tool 3.2: Project feasibility checklist

The following checklist provides the number of axes along which a project would need to be thoroughly vetted in order to make sure it is feasible and therefore able to attract financing:

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Location/site feasibility

- Potential site has been identified for its suitability for the specific project
- The ownership has been confirmed
- Rights of access have been assessed
- Any environmental/social impacts have been identified
- Land access mechanisms e.g. leases have been identified
- Preparations for the site are assessed e.g. clearing areas
- Available infrastructure e.g. roads, electrical lines etc.

Technical considerations

- Conduct techno-economic analyses to inform what form the project can take, and what technologies are best suited, having considered various alternatives
- Risks have been identified as well as mitigation measures
- Non-financial impacts and outcomes of the project have been assessed through specialist studies (e.g. social and environmental impact assessments. This can be aided by a robust stakeholder engagement plan as shown in **Resource 3.2**).
- For climate and energy projects, relevant assessments should be conducted e.g. GHG emissions avoided or produced, life cycle assessments etc.

Financial

- Conduct market surveys and assessments if possible to inform revenue assumptions
- Conduct analyses of the competition to see if similar infrastructure/ services are being provided in the locality, to avoid redundancy and make a successful business case for the project itself
- Quantify the project's capital and operational expenditures under different scenarios
- Quantify project revenues
- Engage with offtakers such as for electricity, biogas etc. will ensure the revenue forecasts are realistic.
- Develop a financial model that calculates the return of investments and cost to the LRG and end users
- Conduct economic modeling to quantify the project's economic benefits relative to its costs
- Conduct GHG modeling to help quantify emissions savings and open up access to financing sources such as carbon finance.
- Consolidate the financial model through sensitivity or 'what-if' analyses in order to show the impact of varying assumptions on the model and cash flow e.g. higher interest rates, lower than expected demand growth etc;
- Reassess the model if required based on previous analyses/findings
- Clearly lay out the business model and financial arrangements between the various financiers
- Identify any other income lines

 **Long-term sustainability**

- Secure political commitment if possible
- Define the local beneficial impacts of the project
- Conduct a robust stakeholder analysis and engagement
- Define clear monitoring and evaluation criteria, including timelines, to guarantee accountability. Assistance from external partners can be considered.
- Establish good communication and data transparency practices from the early stages
- Implement robust reporting practices—progress reports should be concise and needed to answer questions from funders, including key findings and technical reports
- Determine the replicability or scalability of the project to other locations

Tool 3.3: FAQ on designing PPP contracts

The agreement that represents mutual assent between the parties involved in a PPP is an integral component. This agreement or contract needs to be well-elaborated and robust, as its purpose is to formalize the relationship between the public and private sector parties, and also outline the various legal obligations each party owes to the other. It usually highlights each party's roles and responsibilities, provides certainty, clarity, and protects parties' interests in the event of conflicts and disputes.

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The specificities of each agreement and language used in the contract may change according to variables such as the timeline of the project, scope and level of private sector engagement (refer to **Resource 1.2**). As PPPs are long term engagements, contracts will potentially need to be adapted or modified according to the activities' development, interactions between stakeholders and any obstacles that arise. The current tool aims to answer the main questions local and regional governments might have when starting to draft a PPP contract.

1. What is the PPP contract?

The contract refers to the contractual documents that govern the relationship between the public and private parties in a PPP, which might include multiple documents with annexes with particular details on requirements, standards and reporting. There are also contracts between the SPV and its suppliers, which have an impact on the PPP main contract and operation (World Bank 2022).

2. What are the key components of a PPP contract?

The core components of a PPP contract usually include:

- (i) **Performance requirements:** the quality and quantity of assets and services; monitoring and enforcement mechanisms, including penalties
- (ii) **Payment mechanisms:** how the private party will be paid, through user charges, government payments based on usage or availability, or a combination, and how bonuses and penalties can be built in

- (iii) **Dispute resolution mechanisms:** how contractual disputes will be resolved, if expert panels or international arbitration will be considered as a last resource
- (iv) **Timeframe:** contract term, handover provisions, and circumstances and implications of early termination (World Bank 2022)

3. Who are the main actors to be considered in a PPP contract?

The main actors of a PPP contract are the public sector, usually referred to as the *contracting authority*, and the private sector, normally called the *party*. The private partner in most PPP contracts is often a project company specifically formed for that purpose i.e. a special purpose vehicle (SPV).

4. How should parties manage the PPP contract?

The management of PPP contracts should be fostered by both parties involved in the partnership and must be flexible in both available resources and skills to meet the whole-life expectations of the contract. The aim is to guarantee the delivery of services in a consistent way, as well as payments and penalties when applicable. Besides, contract management keeps the responsibilities and risk allocations in place, as well as identifies potential changes and opportunities along the process.

5. What are the factors to consider when defining the contract model?

As previously mentioned, the type of contract will depend on multiple variables. However, it is important to establish a balance between the attractiveness of the project for the private sector, guarantees for the public interest and low economic costs. The industry-specific context should also be taken into account, as it might exclude or favor certain contractual arrangements. To design a suitable contract, the PPP partners have to clarify: (i) the type of contract; (ii) the amount of service bundling within the contract; and (iii) the length of the contract (World Economic Forum 2013).

6. What is the ideal timeline of a PPP contract?

The timeline can be very different depending on the projects. However, most PPP projects present a contractual term between 20 and 30 years. It is not common to find projects out of this range. The duration of the contract affects the flexibility to modify the contract terms adapting the service provision to

incoming innovations. A longer term will encourage the private sector to bid for the project and invest in the first place. On the other hand, a shorter term has the advantage of safeguarding public interests (World Economic Forum 2013).

7. What is the difference between establishing a PPP contract in a common law and in a civil law country?

In civil law countries, basic rights and duties are embodied in an overarching constitution under which specific legal codes are promulgated. In practice, generally less importance is placed on expressly setting out all the terms governing contractual parties' relationships because gaps or ambiguities can be remedied or resolved by operation of the civil law.

This type of law can create legal rights and obligations for both the contracting authority and private party in addition to those specified in the contract. In this case, PPP contracts typically fall under the administrative law umbrella and the parties will have to take into account underlying administrative law principles which apply to contractual relationships

Common law systems count with extensive freedom of contract and few provisions are implied into a contract by law. In practice, everything that is not prohibited by law or by contract, is permitted. As an immediate consequence, the terms of any contractual arrangements should be expressly set out in the relevant contract (PPP Knowledge Lab 2021a).

8. Why should PPP contracts include a force majeure clause?

Force majeure essentially refers to events or circumstances which are beyond the control of the parties and make it impossible for one party to completely or partially fulfill its contractual obligations. As none of the parties have control over such events nor is in a place to solve such issues, PPP contracts should include force majeure provisions to allocate the financial and time consequences of such events between the contracting authority and the private partner. It is important to reach a consensus on which type of circumstances will be considered as force majeure, the provision of compensations and potential contract suspension (World Bank 2017).

9. Do countries define general standards to engage in PPP contracts?

Some countries have made efforts to standardize elements of PPP contracts with the aim to reduce the preparation time and cost frequently involved in any given PPP arrangement. Such standards can also serve as a model for local and regional governments to engage in PPPs at the local level. Some examples are shown in **Table 1** below.

Table 1: Example of PPP standard contracts

Country	Standard	Link (external)
Australia	Guidelines on commercial principles for social and economic infrastructure PPPs	Australia National Guidelines for Infrastructure Project Delivery
India	Descriptions of model agreements for PPP in a range of transport sectors	Government of India, Planning Commission
New Zealand	Generic agreement template to guide private sector in engaging in PPPs	Standard Form Public Private Partnership (PPP) Project Agreement
Philippines	The PPP Center develops standardized terms for broader application on PPP in different sectors	Public-Private Partnership Center
South Africa	Standardized PPP provisions	PPP Unit South Africa

Source: World Bank 2022

Building Block 4: Accessing Finance

This Building block is dedicated to addressing the elements related to financing PPP projects from the perspective of LRGs, considering local needs and innovative instruments available.

Resource 4.1: Financing a PPP Project, provides an introduction of project finance for public-private partnerships.

Resource 4.2: Financial Aspects of an SPV, explains how SPVs are typically financed.

Resource 4.3: Carbon Markets Assessment, provides an overview of mandatory and voluntary carbon markets, explaining the key mechanisms and forms to engage at the local level.

Tool 4.1: Bankable Climate Projects, provides tools to structure and design investment-ready projects that include climate criteria.

Tool 4.2: Climate Finance Decision-Making Tree, guides local and regional governments to help them to select the most suitable financing instruments.

Tool 4.3, Minimizing PPP Financial Risks, provides a simplified checklist on the key factors that should be considered to avoid or mitigate financial risks in PPPs.

Tool 4.4, PPPs Fiscal Risk Assessment Model, provides a detailed methodology to assess fiscal costs and risks arising from PPP projects.

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Further reading (external links)

Securing Climate Benefit: A Guide to Using Carbon Offsets

Developed by: Stockholm Environment Institute and GHG Management Institute

Finance Structures for PPPs

Developed by: World Bank Group

Finance and Public-Private Partnerships

Developed by: Eduardo Engel, Ronald Fischer & Alexander Galetovic

Resource 4.1: Financing a PPP project

Financing is a crucial consideration for LRGs interested in engaging in PPP projects, especially taking into account that climate intervention projects often do not generate sufficient income to be financially attractive, nor to maintain their operation. Furthermore, the ability to develop viable successful financing proposals for climate projects is limited by LRG's lack of technical capacity and ability to secure credible project developers (CoM SSA 2020).

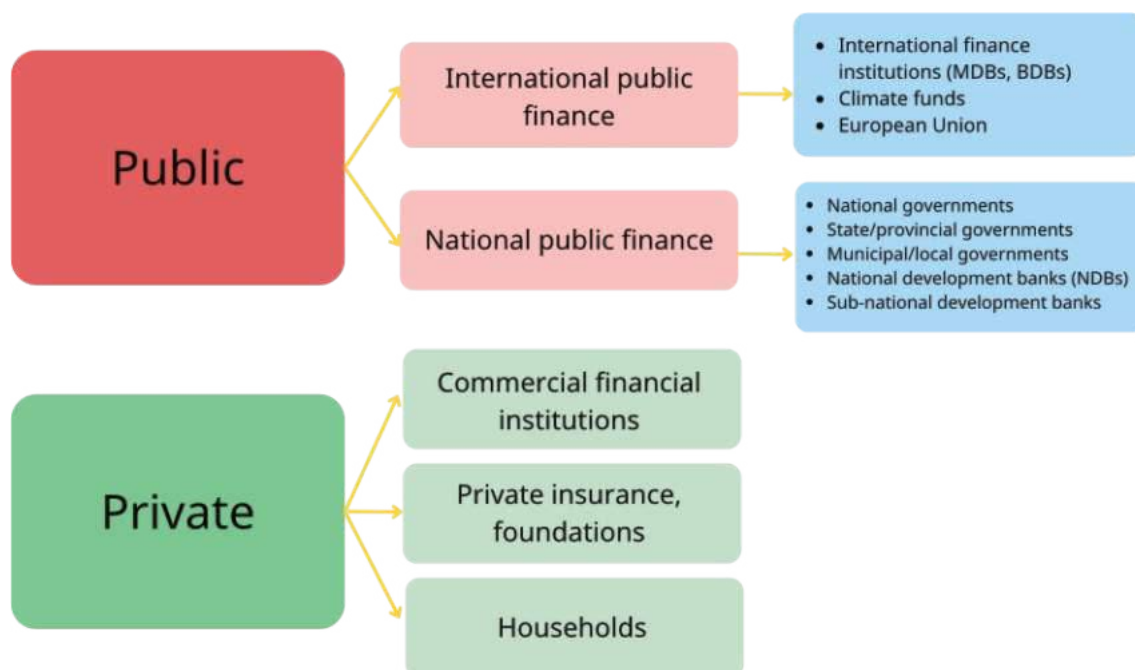


As for funding sources, climate projects are largely funded by private sector developers and national governments. In the case of a PPP the selection of the financial model will vary depending on the project and type of agreement (see **Resource 1.2**), the risks, and the revenue generation potential.

Funding models for climate projects

There are many sources to finance and fund sustainable and climate resilient urban infrastructure projects. These sources can be public and private and can originate domestically or internationally. **Figure 13** below is a simplified illustration of the authors to feature the most typical funding sources.

Figure 13: Climate finance architecture



Public finance includes both national and international sources. At the international level, flows come through international financial institutions (IFIs), the United Nations financing mechanisms (climate funds), and other multi- and bilateral channels. Traditional sources of national public finance involve national/federal governments, state/provincial governments or municipal/local governments. They are responsible for a significant part of the funds destined to climate projects.

Regarding private finance, there is huge diversity regarding both the sources and the mechanisms. Typical sources include commercial financial institutions, insurance companies, corporate actors, institutional investors, philanthropies and foundations. The participation of public and private actors can assume different forms depending on the adopted funding models.

Public sector funding models

In a public sector funding model, the local government covers the total costs associated with the project. As shown in **Figure 13** above, there are different public funding sources.

In order to do so, first it is advisable to assess the LG's own sources of revenue, including taxes, fees, land and assets, to understand if it has sufficient funding in its capital investment budget to cover the costs of the design and installation of the project.

As purely own sources are usually not enough, the second stage of assessment should include information on the LG's ability to source grant and/or concessionary funding to cover costs from other public sources, such as national governments, development partners, climate funds, or other sources.

A third layer of the assessment should focus on the LG's borrowing capacity to take on debt from development finance institutions (DFIs) (CoM-SSA 2020). Once the details of the above points are clarified, it will be possible to understand if public finance alone is suitable and sufficient for the planned investment, or if additional support is needed from external sources.

Private sector funding model










Projects that are financed through private sector models, need to be structured to minimize risks and maximize profit.

Key success factors that the LRG will need to consider in assessing the ability to engage the private sector include (100%RE 2021):

- 🔴 **High levels of revenue certainty** as a result of payment guarantees by the LG or long-term offtake agreements with third parties (such as electricity or biogas sales)
- 🔴 **A commercialized technological solution** (known and tested)
- 🔴 **Predictable development and operational costs** that are not subject to unacceptable foreign exchange risk
- 🔴 **A creditworthy & transparent LG** that will pay the private sector in full and on time for services, and which additionally has institutional stability
- 🔴 Capital expenditure costs that can be minimized by making use of LG's land, other **in-kind contributions, and/or grants** to buy down the cost of equipment and services

In terms of financing instruments, the private sector can provide a wide range originating from different sources, including (CoM-SSA 2020):

- 🔴 **Equity and shareholder loans** where financing is provided by a company's shareholders or parent company
- 🔴 **Debt** raised via the private sector entity's own balance sheet, known as corporate finance. The company that raises the debt remains liable to repay the debt. Unless a company has a strong balance sheet and credit rating it may not be able to raise significant amounts of debt in this way
- 🔴 **Project finance debt**, which is debt raised for a specific project and that is secured against the cash flows of the project. Due to the risks involved for lenders, the due diligence process is extensive and not always justified for smaller projects and loans
- 🔴 **Blended finance** from development finance institutions, which could include a combination of grants, concessionary loans, guarantees and other risk mitigation measures structured to reduce the cost of funding. It addresses market failures by mitigating risks for private-sector investors and/or improving returns. Blended finance can take different forms such as (COM-SSA 2020):

- 
 An *interest rate subsidy* makes use of public grants to reduce a project's debt service payments
- 
Concessional loans and/or grants can reduce interest costs and offer longer maturities than those offered by private banks, allowing annual repayments to be reduced and spread over a longer period
- 
Subordinated debt, which is a form of debt that ranks behind 'senior debt' (e.g. bank loans) but before equity providers. It can help to insulate senior debt investors from unacceptable risks and reduces the cost of capital in cases where equity is too expensive
- 
First loss equity, which shields investors from a predefined amount of financial losses, making it more attractive for the private sector to fund the project's remaining equity
- 
Guarantees can mitigate various types of investment risks, including political, policy, regulatory, credit and technology risk
- 
CAPEX grants which are funds to reduce the capital expenditure (CAPEX) of the project provided by the public sector to make a project more affordable by reducing the amount that the private sector needs to borrow
- 
Pooled finance at the sub-national level is one of the models available to mobilize private financing for local climate projects. An initial assessment is necessary to trace the exact financial structure of the pooled mechanism, depending on the existing legal and institutional framework, as well as the financial needs of the local government. The modular nature of climate projects can provide the basis for pooled development funding as well as pooled financing facilities and pooled procurement. Some possibilities include:
 - 
Club deals are where LGs issue a bond together and each one is responsible for the payment of its share of borrowed capital, with interest. No special purpose vehicle (SPV) is created, and the issuance can be organized by the association that represents the group of issuers, who directly access the market (Inter-American Development Bank 2021).
 - 
Aggregation platforms, where an SPV is created to work as an intermediary between municipalities and capital markets, which can be owned by the central government, subnational authorities or even by a third party, such

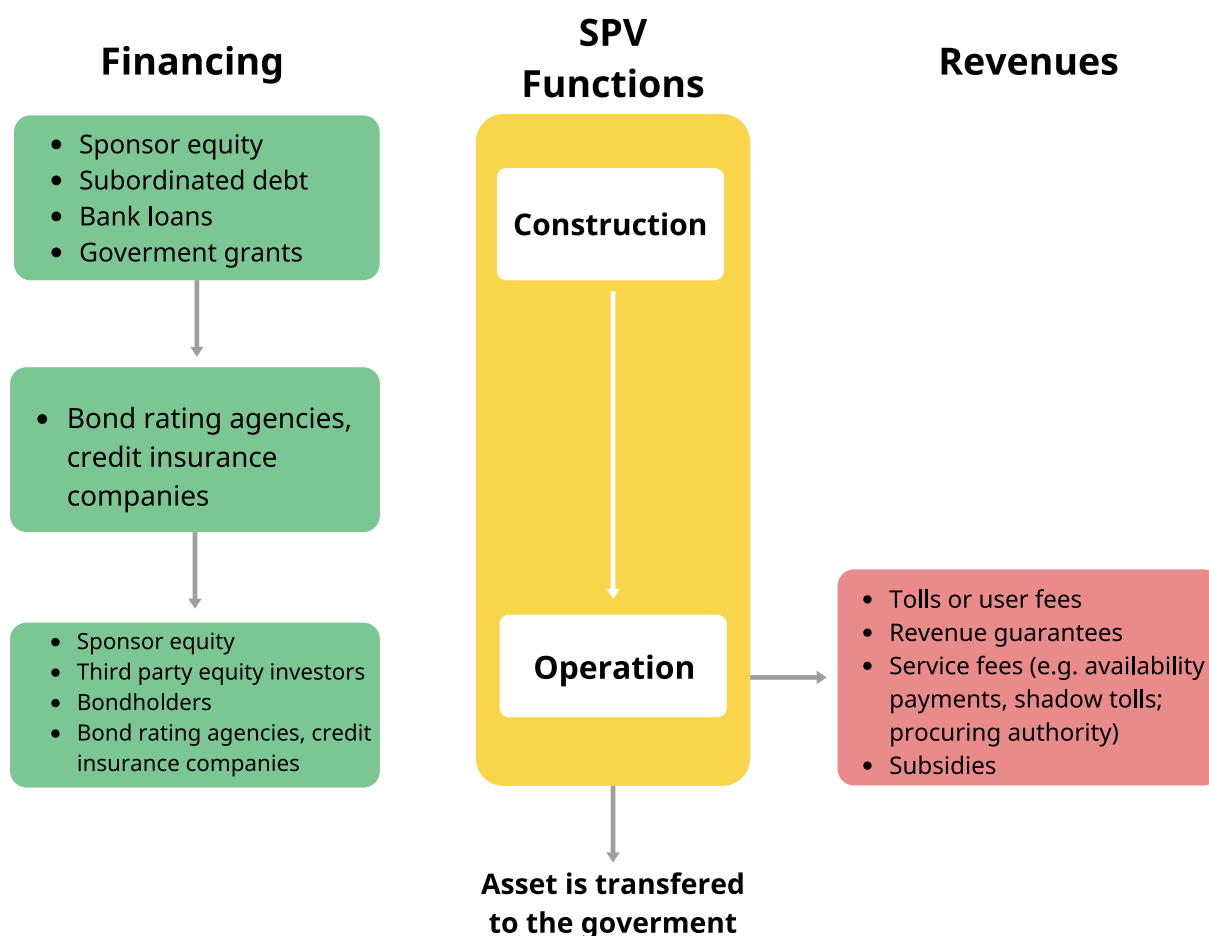
as a pension fund. It can aggregate portfolios, raise larger sums of capital and help public borrowers to diversify their funding sources and to access cheaper financing. SPVs can also be equipped with technical expertise and enhanced risk management and creditworthiness (Inter-American Development Bank 2021).

- *Bond banks*, where LGs can create entities to finance municipal projects. These funding vehicles make pooled issuances for local authorities who will eventually pay back the interest and the borrowed capital to the bank. Bond banks can offer lending at lower costs, higher creditworthiness and diversification, risk reduction and technical assistance (Inter-American Development Bank 2021).

Resource 4.2: Financial aspects of an SPV

A typical PPP project involves a large initial upfront investment, and a smaller part to cover operations and maintenance costs, which are paid over the project's period. Certain aspects of PPP projects influence the choice of the most suitable financial model, which usually includes the SPV as the actor responsible in managing the financial flows. This includes revenue from user fees and government payments, as well as distributing capital for the construction and ongoing expenditures, namely for maintenance and operations (World Bank 2021). PPP projects are usually large enough to require independent management, and most of the stages can be subcontracted (Engel et al 2014). **Figure 14** below illustrates how PPPs can be financially sourced and structured, starting from the establishment of a Special Purpose Vehicle, which is responsible for the project's construction and operation.

Figure 14: Financial cycle of a PPP project



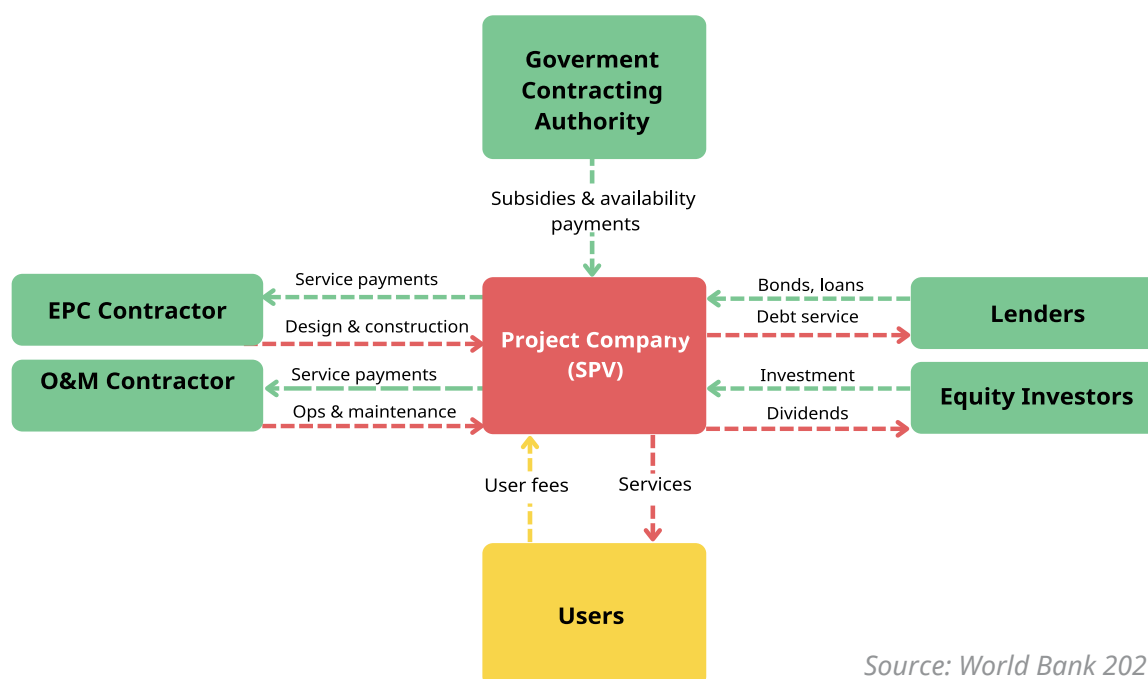
Source: Engel et. al 2014

The financial instruments employed in a PPP project are divided between the construction and the operation phase. During the former, there is general uncertainty and constant changes in the project design. Therefore, sponsor equity is the main financial resource, combined with bank loans and grants provided by national governments. Sponsors are highly interested in the project’s profitability in order to compensate for their costs incurred. In the case of projects that include user fees, the initial contribution to investment is supplemented with subsidies from the government, in case the project revenues are insufficient to repay the costs (Engel et al 2014).

As the construction phase is concluded, rating agencies and credit insurance companies offer bonds, replacing the loans and grants as the finance source. Once operations start, there are other options available to mobilize resources such as the charge of a user fee and subsidies, among others, depending on the project’s local regulatory context.

As shown in **Figure 15** below, the most common financial model is the combination of equity and debt, and contractual relationships between the equity holders and lenders. Equity or project shareholders are the initial equity investors, usually the members of the consortium that designs and establishes the PPP. This category can include project developers, construction companies, infrastructure management companies, and private equity funds. This group usually accepts a high risk and therefore requires a higher return on their investment. On the other hand, lenders may include commercial banks, multilateral and bilateral development banks and finance institutions, and institutional investors such as pension funds and insurance companies (World Bank 2021).

Figure 15: Financial flows of an SPV



Source: World Bank 2021

Financial benefits of an SPV

Special purpose vehicles provide multiple benefits to both investors, that have the opportunity to improve the financing aspect of PPP projects, and the host government, which can check its competence in financing such projects. The main benefits are listed below:

Securitization

SPVs can assure that investors will have a return on their investment and make securitization easier. Since the pooled assets of investors are isolated from the parent company, the SPV has more control over such assets, leaving them less vulnerable to potential issues. It is also simpler and more cost-effective to sell off a pool of asset securities rather than the individual assets (Trade Finance Global 2022).

Risk sharing

In some cases, a PPP project can represent a high risk due to its complexity and the multiple actors involved. SPVs are used to reallocate financial risks, sharing it between several investors. Therefore, an SPV protects both the private and public sector and neither entity would be affected by financial issues in the other. In practice, risk mitigation can give freedom for the SPV to operate, since none of the actors will be impacted by any burden that the project might create (Assure 2022).

Attract investment

SPVs can be used to raise additional capital at more favorable borrowing rates. Creditworthiness is determined by the collateral of the SPV, rather than the credit rating of the parent company. The amount of investment is lower in an SPV when compared to other arrangements, which increases the pool of potential investors and lenders. Through this process, companies are able to lower funding costs by isolating assets in a SPV.

Financing without increase debt

When an SPV is created to finance a project, the debt burden of the parent company will not be increased. Besides, PPP partners can raise funds for new deals or acquisitions without increasing their debt (Trade Finance Global 2022).

Resource 4.3: Carbon markets assessment

Historical development of carbon markets

Kyoto Protocol

International carbon markets started to gain attention during the signature of the Kyoto Protocol in 1997, when the topic of emissions reduction was at the center of the discussions. At this point, developed countries agreed on targeting reductions in their greenhouse gas (GHG) emissions by funding offset projects in developing countries, who would not have such obligations but could opt to reduce their own emissions and sell credits to the developed ones (Höhne 2015).

The Protocol inaugurated three mechanisms to assist countries in reducing emissions:

- 1. Emissions trading:** A cap-and-trade mechanism that limits the total amount of emissions from all the entities engaged (companies, organizations)
- 2. Clean Development Mechanism (CDM):** A project-based mechanism where reductions are the result of investment in green projects. It allowed developed countries to fund GHG emissions-reducing projects in developing countries and claim the saved emissions as part of their own efforts to meet international emissions targets
- 3. Joint Implementation (JI):** Another project-based mechanism, but in this case developed countries can carry out emissions reduction or removal enhancement projects in other developed countries. It represented a project-based transfer between two so-called Annex I countries with 'Quantified Emission Limitation and Reduction Objective' (QELRO) targets

These mechanisms enhanced the market's flexibility and played a role concerning the private sector, since they encouraged an enhanced level of engagement and buy-in that may not have been possible through traditional modes of regulation. Kyoto represented the first step in establishing a solid carbon pricing framework at the international level, which set the scene for the present structure under the Paris Agreement (Höhne 2015).

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Article 6 of the Paris Agreement

After the initial steps towards emissions reduction under Kyoto's umbrella, the Paris Agreement (PA) ushered in a new era in climate change governance, especially in improving the role of carbon markets.

The Agreement defined ambitious climate change mitigation targets and the goal to limit the increase in global temperatures to 1.5°C above pre-industrial levels. Based on the idea of global cooperation and that countries have common but differentiated responsibilities, the Agreement created the concept of Nationally Determined Contributions (NDCs). Countries could indicate their mitigation (and in some cases adaptation) targets voluntarily and could also identify the instruments and measures to achieve them. The NDCs were meant to be revised and stepped up every five years.

Article 6 of the Agreement established the international accounting rules required to govern a global carbon market and, although lacking in details, it also defined the rules for international cooperation between countries to reduce emissions and achieve their NDCs. The Agreement also established rules to avoid double counting. In practice, if a country transfers an emission reduction, it will adjust its GHG balance sheets so that the reduction is not counted toward its own pledged "contribution," while a country receiving the transfer can apply the reduction to its own GHG balance sheet.

According to Michaelowa et al (2019), the Paris Agreement changed the international climate regime from a top-down approach based on mandatory emissions commitments to a bottom-up system of voluntary government pledges.

The Agreement does bring additional challenges, since rules for accounting and baselines are more complex when all countries have mitigation targets. Besides, the fact that every country has obligations restricts their ability to make additional reductions since they are busy with activities and projects to meet their own targets.

Types of carbon markets

International carbon markets can be mandatory or voluntary. Mandatory markets, or compliance markets, are established by regimes at different levels of government, while voluntary schemes include the non-compulsory participation of companies and individuals in reducing emissions.

While compliance offset market credits may be purchased by voluntary, non-regulated entities in some instances, voluntary offset market credits—unless explicitly accepted into the compliance regime—are not allowed to fulfill compliance market demand. **Figure 16** below gives an overview on the major differences between the two types of markets.

Figure 16: Voluntary vs. compliance markets

Type of market/ Criteria	Voluntary market	Compliance market
Exchanged commodity	Carbon offsets, facilitated by a project-based system	Allowances, facilitated by a cap-and-trade system
How is the market regulated?	Functions outside of the compliance market	National, regional or international carbon reduction regimes E.g. Article 6, Kyoto Protocol, California Carbon Market, EU Emissions Trading System
What is the price?	Voluntary credits tend to be cheaper because they cannot be used in compliance markets. The price is impacted by project type, project size, location, co-benefits, and vintage	Compliance credits tend to be more expensive because they are driven by regulatory obligations
Who can purchase credits?	Businesses, governments, NGOs, and individuals	Companies and governments have adopted emission limits established by the United Nations Framework Convention on Climate change
Where are credits traded?	Currently no centralized voluntary carbon credit market. Project developers can sell credits directly to buyers through a broker or an exchange, or sell to a retailer who then resells to a buyer	Companies that surpass their emission targets can sell their surplus credits to those looking to offset emissions. Credits can be sold under regulated emissions trading schemes

Mandatory carbon markets (compliance offset)

International markets


As described above, the Kyoto Protocol and the Paris Agreement emerged as the most relevant mechanisms at the international level. However, the Kyoto era ended in 2020, and there is still uncertainty on the transition between the two regulatory frameworks.

As agreed at COP26, a full transition of Clean Development Mechanism (CDM) activities and a carry-over of Certified Emission Reductions (CERs) from activities registered after 2013 into the first NDC implementation period is allowed. Still, as substantive requirements for this transition remain unclear and without clear guidance, a lot of burden will be placed on host country institutions and their approval of the transition.

Looking to the future, although the relevant technical work will continue through 2022 and 2023, with the adoption of the Article 6 rulebook at COP26, international market-based mechanisms can now be implemented under the Paris Agreement. Article 6 sets out guidelines for voluntary international collaboration using both market mechanisms and non-market approaches. Key elements include:

-  **Article 6.2**, which establishes rules on how governments can engage in cooperative approaches that involve the trading of carbon credits or emission allowances (**internationally transferred mitigation outcomes, or ITMOs**);
-  Article 6.4, a crediting mechanism for mitigation activities, seen as a successor to the Kyoto Protocol's **Clean Development Mechanism (CDM)**, and
-  Article 6.8, which promotes non-market approaches

Paragraphs in Article 6.2 and 6.4 also establish key mechanisms with detailed guidelines as follows:

-  *Cooperative approaches (Article 6.2)* allow room for countries to cooperate bilaterally under their own agreed rules. This makes it possible for mitigation measures to be implemented in one country and the resulting emission reductions to be transferred to another and counted towards its NDC.

- 🕒 The final COP26 outcome on Article 6.2 contains 14 pages of guidance, including a detailed definition of ITMOs:
 - 🕒 CAs must be applied to all ITMOs to avoid double counting.
 - 🕒 The guidance now differentiates between three types of use of ITMOs: a) for NDCs, b) for other international purposes (meaning international regimes outside the PA, such as the International Civil Aviation Organization for aviation and the International Maritime Organization for shipping, and c) for other purposes, meaning the voluntary carbon market (VCM).
 - 🕒 An international registry and Article 6 database to be established for recording and tracking ITMOs.

- 🕒 The outcome also strongly encourages participating parties and stakeholders to commit to contribute resources for adaptation, in particular through contributions to the Adaptation Fund, with a reference to how this is made in the A6.4M.
 - 🕒 Although it is subject to UNFCCC guidance, it is not under direct international supervision.

- 🔴 *The Sustainable Development Mechanism (Article 6.4)* sets up a new market mechanism that would replace Kyoto's CDM and focuses on creating an international carbon market that would generate emissions credits. The buyer-seller split depends on the relative wealth of countries, as well as the ambition of their climate goals and the carbon intensity of their energy and industrial systems. Activities will generate long-term emissions reduction in the host nation, which normally consists in developing countries that sell credits. The emissions reductions achieved using this mechanism can be transferred from the country in which they were achieved to another country and then counted towards its NDC. CAs must be applied to Article 6.4 emission reductions (A6.4ERs) which are authorized by host countries for the three types of use defined under Article 6.2.

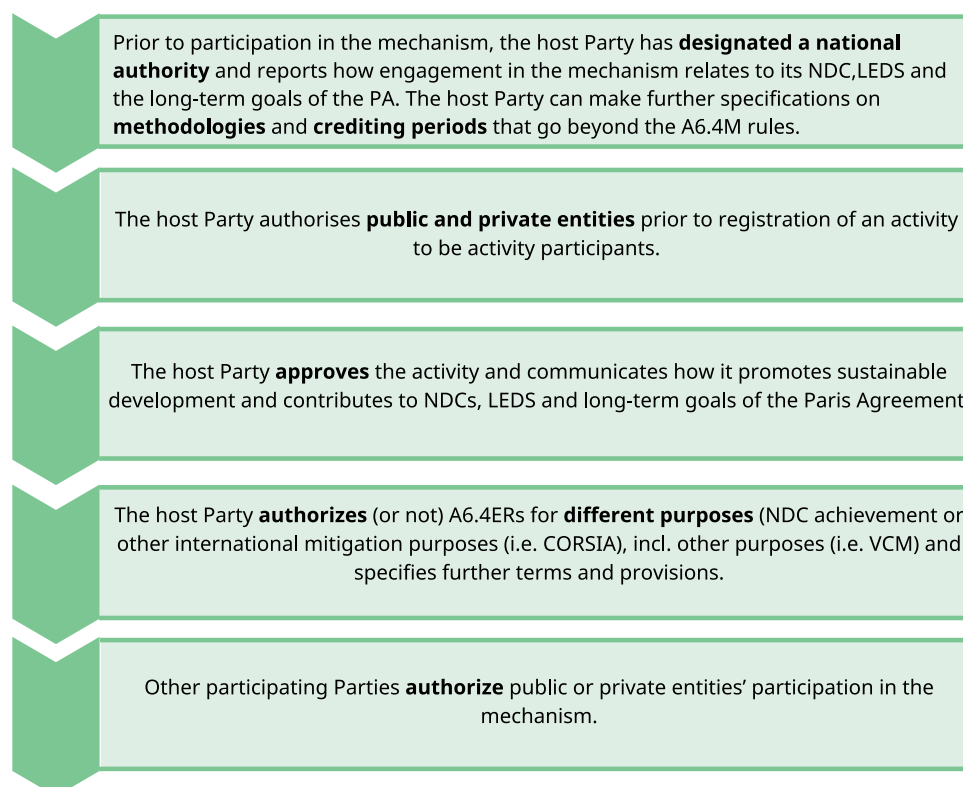
- 🕒 Only A6.4ERs with CAs can be used towards NDCs or international mitigation purposes.

- 🕒 Crediting periods are a maximum of 5 years (renewable twice) or 10 years with no renewal.

- ④ Baselines will be set based on a best-available technology benchmark, with a benchmark derived from average emissions of a best performing comparable activity or based on actual or historical emissions that are adjusted downwards.
- ④ Activities must credibly demonstrate additionality, including to existing policies, and avoid lock-in of emissions. Activities in Least Developed Countries (LDCs) and Small Island Developing States (SIDS) may use a simplified approach to demonstrate additionality.
- ④ Adaptation share of proceeds will be delivered to the Adaptation Fund and consist of an in-kind levy of 5 percent of A6.4ERs issued.
- ④ This mechanism is managed by a UNFCCC body and has rules recognized at the international level. The 16 page decision outlines participants' responsibilities and provides guidance on activity design. **Figure 17** illustrates the host country responsibilities and the authorization process.

As **Figure 17** shows, Article 6.4 defines some responsibilities for the host countries, which includes the power to authorize entities and approve activities.

Figure 17: Host country responsibilities and the approval process under A6.4M



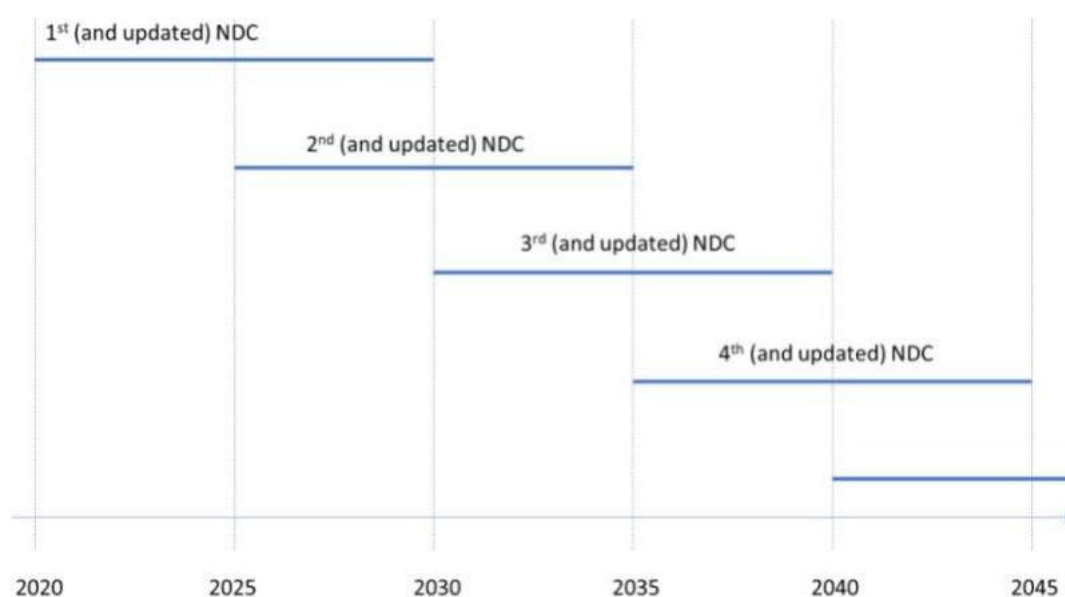
Source: Adapted from Kessler et al 2021

Article 6 can present multiple benefits that justify countries' engagement such as revenue generation, technology transfer, capacity building, financing high-cost measures, and sustainable development co-benefits. However, a host country should carefully assess its own situation to ensure that the export of an ITMO undermines neither the achievement of its current nor future NDC ambition (NewClimate Institute 2018).

This happens because the Paris Agreement does not allow **double counting**, which means that if a host country sells emission reductions internationally, it cannot use that emission reduction towards achieving its own NDC. Thus, a country must always weigh the potential benefit of transferring an emission reduction unit against the option of using that reduction for the country's own efforts to reduce emissions (NewClimate Institute 2020).

Depending on the final rules and scopes, countries may be able to choose to engage in activities either under Article 6.2 or under Article 6.4. While Article 6.2 envisages decentralized cooperative approaches between countries, 6.4 establishes a mechanism with centralized oversight. The former offers potentially more flexibility to countries but is likely to be less efficient and less transparent and provides less fungibility of mitigation outcomes. Mitigation outcomes must be used in the same NDC implementation period in which they were generated (UNFCCC 2021a, Annex, para. 8). This will generate challenges once overlapping NDC periods exist as shown in **Figure 18**.

Figure 18: Overlapping NDC periods as per “common timeframe decision”



Source: Kessler et al 2021

National and regional markets

Apart from carbon trading between developing and developed countries, some countries have established their own domestic or regional carbon trading systems. These systems usually focus on the biggest emitters, typically power producers and manufacturing companies.

In these cases, the government works out how much companies can emit and still allow the country to meet its national commitment under the Kyoto Protocol. The European Union (EU), the UK and the state of California are some examples of national and regional markets that already have mandatory carbon markets.

In most cases, compliance programs exist as regional or national cap-and-trade emission trading schemes. In these cases, each company receives a number of carbon credits per year. If a company generates less emissions than this number, it has a surplus. On the other hand, some companies produce more than their numbers and search to purchase credits to offset their emissions (mandatory).

Within the sectors covered by the scheme, only a limited quantity of emission permits (allowances) are issued, namely just enough to allow the reduction target to be met. These allowances are established by a law or regulation and cannot be adjusted based on demand increases (UBA 2021).

Box 8: Examples of national and regional markets

European Union Emissions Trading System (ETS): Launched in 2005, it was the world's first carbon market. The cap-and-trade scheme limits emissions in 10,000 installations of the power sector. The ETS issues credits called EU Allowances (EUAs) that allows firms to emit one ton of carbon.

Mexico: The carbon market in Mexico consists in a blended approach where the carbon tax is combined with a credit offsetting mechanism. The carbon tax raises governmental funds that will be used, in turn, to develop and promote climate change mitigation actions. The ETS operates alongside the tax, covering CO₂ emissions from all sectors.

Voluntary carbon markets

The increased awareness about the importance of emissions reduction and the challenges faced at the local level have led some in the business community and civil society to engage voluntarily in offsetting emissions, even though they are often not required by law to do so. Voluntary carbon markets (VCMs) have gained recognition as an important tool to complement and support compliance efforts made by governments.

In these markets, organizations choose to voluntarily offset emissions that otherwise would not be possible, or very expensive, to eliminate, by purchasing carbon offsets from third-party projects that generate emission reductions or sequester carbon from the atmosphere.






Interest and activity in the voluntary market is growing. Since VCMs came into operation, approximately 1.2 billion tons of CO_{2e} have been transferred. According to Ecosystem Marketplace (2020), 612 million carbon credits were issued between 2007 and 2019 from baseline-and-crediting programs that targeted mainly the voluntary market, including 142 million in 2019 alone.

The classical approach of the voluntary market consists of the purchase and cancellation of credits generated by baseline-and-crediting programs. Businesses, institutions and individuals can buy credits to offset their carbon emissions voluntarily. Companies in this marketplace have the opportunity to work with businesses and individuals who are environmentally conscious and are choosing to offset their carbon emissions because they want to. So far, voluntary offsetting has occurred almost exclusively through such programs.

Box 9: Voluntary Emissions Reduction (VER)

VER are credits originated from the voluntary CO₂ market. All VERs must be verified by an independent third party. Currently, VERs are mostly used by companies who are looking to voluntarily offset the emissions generated during their business activities in order to show social responsibility and establish a healthy and green corporate image. An increasing number of companies are investing in VER projects in order to reduce their carbon footprint and to reach a “zero emission” status.

The pricing of carbon credits in the VCM is not as straightforward as it is in the compliance market. This is due to the many types of environmental projects that are available. Prices vary widely according to the category of the project (e.g. renewable energy vs. forestry) and even within a particular category. Several factors contribute to how a carbon credit is priced, including:

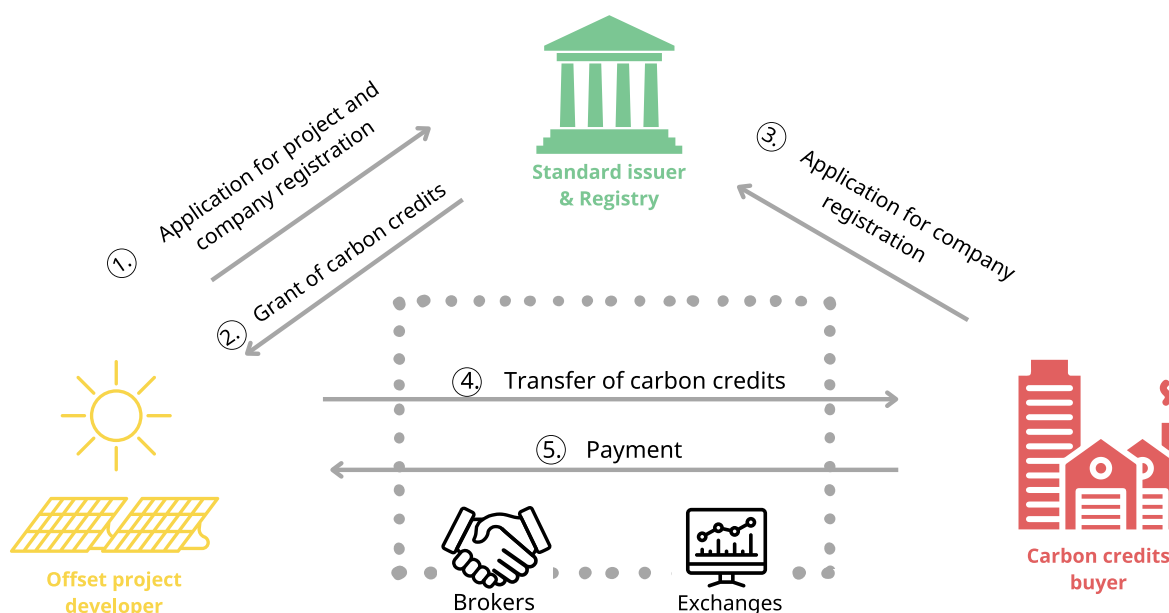
- 
Size of project: Larger projects that produce higher volumes of carbon credits are often associated with a lower price. Smaller projects are often more expensive to implement and produce fewer carbon credits.
- 
Location of offset: Locations where there is conflict and higher risk may make the project more expensive.
- 
Vintage: This depends on the year the emission reduction occurred—older projects are typically priced lower.
- 
Quality: The standard in which the project was certified can affect the price.
- 
Co-benefits: A co-benefit is any positive impact that is produced by the project above and beyond GHG emissions. For instance, if a project creates jobs for local communities or increases biodiversity, these would be considered co-benefits.

Community-based projects for example—which are usually very localized and typically designed and managed by local groups or NGOs—tend to produce smaller volumes of carbon credits. It is also often more expensive to certify them. However, they usually generate more co-benefits and contribute to the UN Sustainable Development Goals (SDGs), for instance through improved welfare for the local population, better water quality, or the reduction of economic inequality (Favasuli, 2021).

Voluntary carbon markets have a significantly more fluid market mechanism, with the pricing determined by voluntary supply and demand and not being limited to one country or region. Therefore, they are considerably less susceptible to regulatory mandates and policy.

Figure 19 below shows how a voluntary carbon market works, with the main actors and stages.

Figure 19: How a voluntary carbon market works



Source: Adapted from Burzec and Lewis 2021

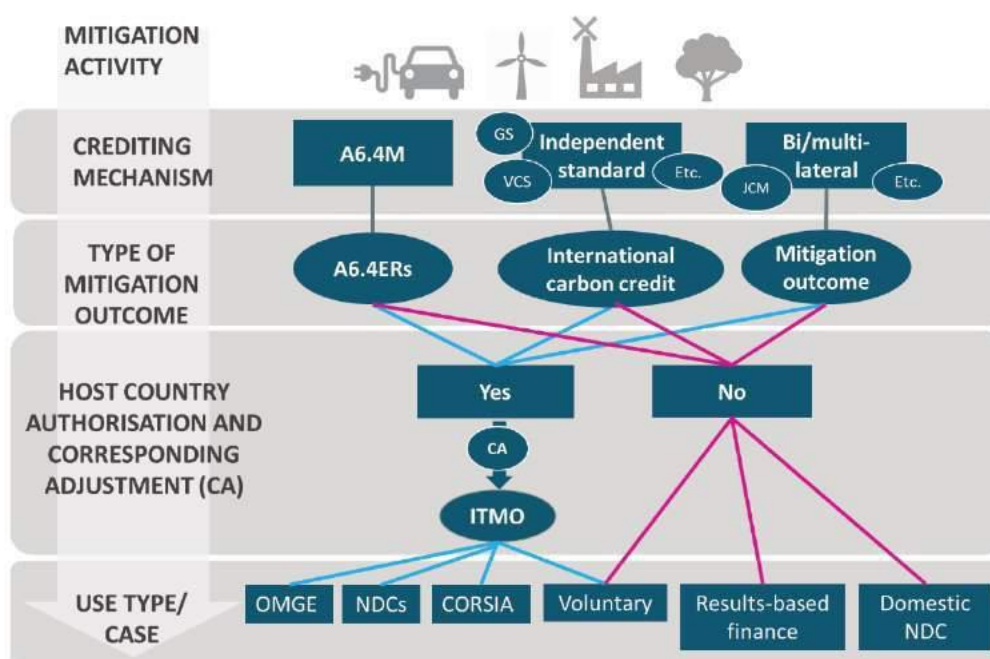
In a VCM, private entities or entitled standard-setters, are responsible for the project certification. There are a number of entities that use different methodologies for measuring and verifying carbon emissions reduction, and they provide a robust verification process to ensure the credibility of emissions reduction projects. Developers of projects resulting in the avoidance, decrease or removal of carbon emissions can apply to these entities to certify and prove the amount of carbon emissions avoided, decreased or removed. As a result of certification, the developer can obtain voluntary carbon credits (or “VCCs”). One carbon credit represents 1 ton of CO_{2e} emission reduction. Such VCCs are stored at a personalized account in a registry owned or retained by the certifying entity. The developer can either retire the credits, i.e. annul them to claim the reductions they represent, or sell them to another entity with an account at the registry. Brokers, exchanges, retail traders, advisors are all involved in the process. VCCs issued by a given entity and stored in a registry managed or retained by this entity cannot be transferred to a registry of a different certifying entity (Burzec and Lewis 2021).

Even though the adopted Article 6 rules do not directly regulate the voluntary carbon market, they do have some implications, as they set a standard for a high-integrity VCM.

Article 6.8 sets the framework to facilitate the use and coordination of non-market approaches (NMA), which has made it possible for countries to buy voluntary carbon credits, as long as Article 6 rules are respected. It does not involve the transfer of mitigation outcomes and will not be regulated by Articles 6.2 and 6.4. COP26 defined that this article should include social inclusivity, financial policies and measures, circular economy, blue carbon, just transition of the workforce, and adaptation benefit mechanism. Article 6.2 rules enable—but do not require—stakeholders on the VCM to seek an authorization and a CA for mitigation outcomes for purposes other than towards NDCs, including voluntary offsetting.

A6.4M is available for voluntary carbon market actors and private entities can be authorized by host countries to become activity participants. A6.4ERs with CAs for which a host country authorization is required can also be used towards voluntary offsetting. This implies among other things that there is no distinction made whether mitigation outcomes are inside or outside the NDC’s scope. The Article 6.4 rules do not discuss the legitimacy of mitigation outcomes without CAs. The use and claims that can be made in association to non-authorized A6.4ERs thus remains under debate by the carbon market actors. **Figure 20** describes the future interplay of generation of mitigation outcomes.

Figure 20: Generation of mitigation outcomes for different uses within and outside Article 6



Source: Kessler et al 2021

Voluntary carbon markets present multiple **benefits**, especially in regards to their lower development and transaction costs in comparison to compliance schemes. Besides, participants from all geographical locations or business sectors can freely register their projects, sell and buy carbon credits. It is also easier and faster to register a project and sell carbon credits in a voluntary market than in the compliance schemes. This happens because VCM do not need national approval or verification among international bodies such as the UNFCCC.

Regarding standards, the calculation and the certification of the emission reduction are implemented in accordance with a number of industry-created parameters. This results in a variety of standards, giving project developers the liberty to choose the most suitable for their situation. Finally, a relevant advantage of the voluntary carbon market is that it provides additional funds to the Global South.

Nevertheless, VCMs also experience some **challenges** that still need to be addressed. First, due to the weakness of enforcement rules, there is a high risk of engagement from unreliable buyers or sellers. The lack of governance is also a challenge. Voluntary carbon markets do not have a regulatory body and common standards, since each standard establishes its own eligibility criteria for projects that it registers, as well as for entities that can obtain access to the registry and thus trade in carbon credits. This undermines the capacity to define the legal status of voluntary carbon units.

This market is also susceptible to common issues in other carbon pricing instruments such as additionality, double counting and the overestimation of baselines. Double counting can be generated due to the absence of consistent or complete accounting protocols and a lack of alignment between market jurisdictions or operators. In addition, only the companies know the baseline of their projects and external experts might have difficulties in unveiling this information.

Finally, greenwashing is a risk, where companies seek to appear as if they are making a greater contribution to environmentalism than the actual impact of their actions. Voluntary carbon markets can be a victim of such a phenomenon. In practice, it can be considered a 'right-to-pollute' since companies can, instead of reducing their own emissions, simply choose to purchase carbon credits generated elsewhere in order to achieve their net-zero targets.

Some examples of voluntary carbon market standards include:

Verified Carbon Standard (VCS)

The Verified Carbon Standard (VCS) is an international voluntary GHG offset program developed and run by the non-profit Verra. It issues carbon credits, the so called Verified Carbon Units (VCU) to projects that reduce or remove greenhouse gas (GHG) emissions. Those VCUs can then be sold on the open market and retired by individuals and companies as a means to offset their own emissions.

Broadly supported by the carbon offset industry, VCS certification consists of validation of the project design and periodic verification of the volume of emissions reduction or removals that can occur during or after the end of the project. Validation and verification are required by VCS in order to guarantee that the VCS requirements are met and the methodologies are properly applied.

Gold Standard (GS)

The Gold Standard (GS) is a voluntary carbon offset program focused on progressing the UN SDGs and ensuring that projects benefit their neighboring communities. The GS can be applied to voluntary offset projects and to Clean Development Mechanism (CDM) projects. It was developed under the leadership of the World Wildlife Fund (WWF), HELIO International, and SouthSouthNorth, with a focus on offset projects that provide lasting social, economic, and environmental benefits. For projects to be accepted by GS, they must conduct additional assessments of the project's communal impact and ensure neighboring populations are benefiting.

Box 10: Gold Standard's Betulia Hydroelectric Project in Honduras

The hydroelectric power plant provides renewable energy to the national grid, whilst improving the quality of electricity for local communities in the department of Colón in Honduras. Improved access to electricity also reduces the dependency on fuel wood, helping to relieve deforestation pressures. The project generated 2970 carbon credits.

Local governments and carbon markets

Local and regional governments can benefit from the carbon markets in multiple ways. Article 6 presents a solid framework that can be used as guidance for local and regional governments when engaging in carbon markets.

The rules, modalities and procedures for the mechanism established by Article 6.2 and 6.4 was a major step recognizing the importance of the subnational level and invitation to engage with the local communities. The same decision requests parties that activities shall undergo local and, where appropriate, subnational stakeholder consultation.

In addition, the “Work programme under the framework for non-market approaches” referred to in Article 6.8 calls for the replication of successful non-market approaches (NMAs), including in the local, subnational, national and global context. It urges parties to create enabling environments and successful policy frameworks that enhance the engagement of the private sector, communities, civil society organizations and vulnerable and impacted sectors. These COP26 decisions clearly position and empower local governments to articulate and represent their needs.

Participating in the mandatory carbon market (through Article 6) is also strongly linked to the achievement of the goals set in the NDCs . As explained in Section 2.1.1, having a solid and regularly updated NDC is also a prerequisite to participate in the Article 6 carbon market. In the Article 6.4 mechanisms, each activity has to explain and demonstrate how it relates to the implementation of the party’s NDCs and A6.4ERs may only be used towards NDCs.

Article 6.4 is also important as it acknowledges and encourages private sector engagement also in the mandatory carbon markets. This can be a useful tool in exploring alternative financing sources for local climate projects, especially in the case of PPPs. National systems are key to enable the private sector’s active involvement in carbon markets and ensure that a transparent and stable framework for the private sector engagement to plan emission reduction projects, trade emission reductions, and calculate potential revenues, is in place.

Local and regional governments normally have the same types of tools available as at the national level to reduce CO₂ emissions such as performance, technology standards, and carbon-pricing instruments, including both carbon taxes and emissions trading systems. Pricing approaches can also stimulate

clean technology and market innovation, fueling new, low-carbon drivers of economic growth (World Bank 2021).

The choice of the most suitable carbon pricing instrument, whether the creation of a carbon tax or the development/participation of an emission trading system, will depend on the level of political interaction between local and national governments, institutional framework and economic context.

Local and regional governments have a key role in achieving countries' NDCs. They can act in managing projects at the local level or helping in private sector engagement, also taking into account the local needs. Sub-national efforts can, for example, work as a facilitator of national schemes, identifying opportunities to engage communities in projects or raising awareness of the importance of such systems. Local governments can also develop projects that help to address the countries' emission reduction goals.

In some cases, national policies can face barriers that are less likely to occur at the local level such as extensive bureaucracy and intense lobby from different civil society groups. Local initiatives can also share specific information on emissions reduction at the local level that the national government would not have access otherwise.

Regarding voluntary carbon markets, these schemes offer some level of flexibility as it allows the participation of local governments and private actors, opening room to leverage external sources to climate projects. These actors can work, through the VCMs, as complementary of the public action, filling the gaps in the mandatory market and supporting governments in the achievement of more ambitious climate goals. Lastly, VCMs allow local governments to undertake initiatives beyond the actions prioritized by the national level, tailoring solutions to the local context.

Tool 4.1: Bankable climate projects

The guide, developed by ICLEI under the **Urban-LEDs** project, aims to provide tools to improve the processes in developing bankable projects that meet climate criteria and standards at the local level.

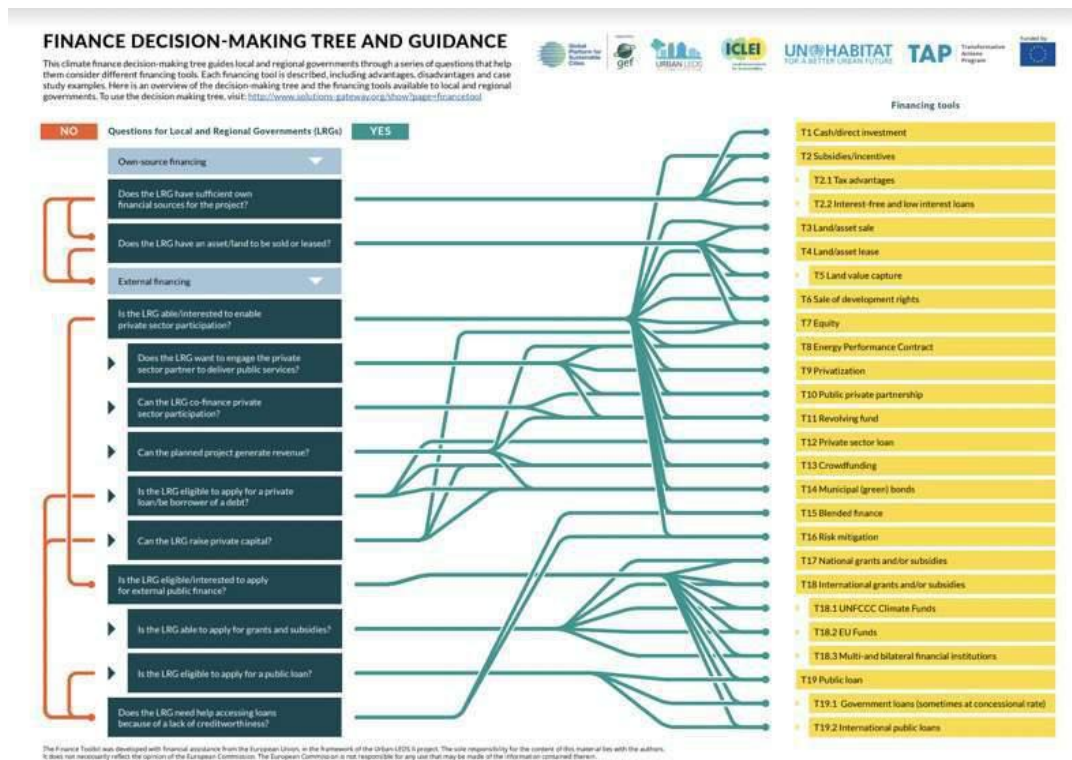


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 **The tool can be accessed at this link.**

Tool 4.2: Climate finance decision-making tree

The Climate Finance Decision Making Tree assists LRGs in ascertaining what is the most suitable financing instrument for them through a series of guided questions. The full interactive tool is available in four languages on the Transformative Actions Program website for free.



 [The tool can be accessed here.](#)

Tool 4.3: Minimizing PPP financial risks

PPPs can offer multiple opportunities for local and regional governments to raise funds for projects that otherwise would not be undertaken. Especially in infrastructure projects, an alliance with the private sector can help improve the efficiency of a public investment, bringing along innovation and high performance standards. However, PPP contracts have financial implications for governments which are accompanied by risks (see **Resource 2.1**). This Tool provides a checklist that helps to think through and avoid or minimize financial risks when engaging in PPPs.

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- 1. **Assess the fiscal implications** of a PPP project/portfolio and integrate the costs in the LRG budget and planning. This will demonstrate the commitment of the government and also help to reduce uncertainty regarding the project
- 2. **Involve the financial department** in the project. As they work in regulating the local government's fiscal balance, they can assist in assessing the fiscal costs and risks, checking the fiscal sustainability, managing fiscal PPP risks and reporting on PPP liabilities
- 3. **Develop a fiscal risk assessment.** This will allow assessing fiscal costs and the risks arising in PPPs (see **Tool 4.4**)
- 4. **Evaluate the project's value for money**, which means checking if the cost-benefit of the project is justified and proves that the PPP will provide better value for money than alternative public procurement modes
- 5. **Choose the most suitable financial model** after evaluating the public and private funding options available to the local government e.g. its capacity to utilize its own sources, engage in debts, provide grants or receive international funds
- 6. **Make sure money is appropriated and available** to pay for whatever cost the local government has agreed to bear under its PPP projects
- 7. **Elaborate and publish periodic financial reports** to enable other interested parties—such as lenders, rating agencies, and the public—to reach an informed opinion on the government's public financial management performance, enhancing confidence in the project and minimizing risks of disengagement.

Tool 4.4: PPP Fiscal Risk Assessment

The Public-Private Partnerships Fiscal Risk Assessment Model, PFRAM, developed by the International Monetary Fund (IMF) and the World Bank Group (WBG), is an analytical tool to assess fiscal costs and risks arising from public-private partnership projects. The tool requires some information on the project, including contract parameters, funding, asset details, service to be provided, costs and guarantees. The model is accessible for free at the PPP Knowledge Lab website.



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 [The tool can be accessed here.](#)

Building Block 5: Partnerships for Solar Energy

Building Block 5 provides information on PPP considerations specific to the solar PV sector.

Resource 5.1: Considerations for Solar PPPs, provides an overview of the various aspects of solar PV projects, and how these affect the risk calculus.

Resource 5.2: Case Studies of Solar PPPs provides a number of good case examples where solar projects were developed through a PPP structure at a local level.

Tool 5.1: Solar Resource Potential Maps provides access to external tools to determine the potential for solar PV at a certain site through interactive maps, including irradiation and information on electricity generation potential.

Tool 5.2: Avoided GHG Emissions Calculator, provides a user-friendly calculator to estimate the volume of GHG emissions avoided by opting for solar energy instead of conventional sources of energy to meet energy demand across a number of uses.

Tool 5.3: PPP Models for Solar Energy, is a decision-making tree to help reflect on some crucial questions when it comes to PPPs for solar projects.

Further reading (external links):

 **PPP Risk Allocation Matrix: Solar Photovoltaics**

Developed by: Global Infrastructure Hub

566

 **Promoting the Solar Industry in Ghana through Effective Public-Private Partnership (PPP): Some Lessons from South Africa and Morocco**

Developed by: Awuku et al

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Resource 5.1: Considerations for solar PPPs

This Resource aims to provide local and regional governments with the specific considerations for solar projects developed and implemented under a PPP. While PPPs provide certain advantages, they can also be complex to design, implement and manage. Given that various parties and stakeholders to a PPP perceive risks differently owing to their differentiated interests and roles, an appropriate risk allocation is at the center of the success of PPPs.



Risk allocation and funding models

Figure 21 below showcases the allocation of responsibility and associated risk for solar energy projects across the private and public sector, situating PPPs with other types of financing models that are most commonly used in the energy sector.

Figure 21: Different funding models and allocation of roles for solar energy

Funding models/ Roles & responsibility	Public owned, operated	Public owned; private operated (SLA)	ESCO-funded	PPP (100% private)	PPP (minority LRG ownership)	Private owned & operated	PAYG
Design risk	Local government		Private sector				
Construction and CAPEX risk							
Performance risk							
CAPEX funding	Local government raises grants and debt		Private sector raises debt and equity		LRG share of equity; rest raised by private sector	Private sector raises debt and equity	Private sector raises debt and equity (and possibly DFI grants)
Grants	Local government can raise grants to make the funding model more affordable					Private sector could secure grants	
Operation	Local government		Private sector				
Maintenance							
Sales and marketing							

To be able to identify the most suitable funding model, local and regional governments need to assess their own abilities to implement a given solar project (refer also to Resource 3.1), which includes to:

- ① Evaluate the approximate scope and cost of the design and installation of the solar PV project, considering the current and projected needs of the beneficiary local community
- ② Quantify how much the LRG spends annually on electricity or energy (current and projected) that would be substituted by the proposed solar project, working with the LRG's financial staff
- ③ Determine how electricity or energy budgets can be reallocated to compensate for the costs of the design and installation of the solar project
- ④ Calculate the net cost of the proposed solar project (after subtracting total budgeted amounts, current and projected)
- ⑤ Assess the LRG's capacity to manage and monitor contracts effectively for the design, installation, and operations of the solar project, including technical and legal support for contract negotiations, and if there is the need to engage one or more external experts to negotiate, manage, and monitor contracts, estimate the additional cost for the solar project

Project development

There are a number of factors to be considered when developing a solar project, from which determination can be made as to whether or not to enter into a PPP. In solar energy project development and implementation, the most common models used are the types where the private party has ownership of the solar asset (Amo Awuku, Amar, & Firdaus, 2022; IFC, 2015). Nonetheless, the following represent important considerations for every solar PV project to be developed and implemented via a PPP mechanism:

- ① **Setting objectives:** Identifying the main purpose of the project (e.g. energy access, decarbonization etc.) will help to bring clarity, focus and direction to the development of the project (EPA, 2022). It can also unify the stakeholders' intentions and help to prioritize project pathways, goal-setting, progress measuring and to ensure the successful completion and sustainability of the project over the long term (EPA, 2018). Objectives of any given solar PV project can be established with reference to the Sustainable

Development Goals (SDGs), or other local, regional or national development priorities and goals; see **Figure 22** for an overview of the applicable SDGs. PPPs perform best if the interests of key participants are strategically incorporated and the goals of the parties involved are aligned.

Figure 22: Applicable SDGs to renewable energy projects




Broader policy framework: An uncertain policy landscape can affect risk perceptions during the concession period and can influence the decision on which type of contract to use. In the worst case, if this is not well managed, it can affect the viability of the project (Gardiner, Bardout, Grossi, & Dixon-Declève, 2015). For instance, in the Global Energy Transfer Feed-in Tariffs Program (GET FiT), an international PPP for RE projects in Uganda, saw the introduction of a new tax regulation which created uncertainty among the private sector actors and led to the removal of the initial capital allowance. A reduced appetite for risk-taking for the private sector leads to them opting for lower-risk projects, such as O&M contracts. A long term contractual bond that represents more risk for the private sector, such as a BOOT contract, is a good option when the policy environment is stable. The Ouarzazate Solar Power Station in Morocco, which opted for a BOOT concession, has been a successful case of a solar PV project resulting from the government’s commitment and well legislated PPP laws (Awuku, Bennadji, Muhammad-Sukki, & Sellami, 2022). In some cases, some instruments can make certain types of PPP structures more suitable for solar energy projects, such as state guarantees (ADB, 2021).

- **Duration of the project:** Large-scale renewable energy projects are generally long-term projects (e.g. 20-30 years), which lends well to opting for a PPP due to the ability to develop efficiencies and therefore value for money (UN ESCWA, 2017; PPIAF, 2009). The contractual term in a PPP solar project is usually long enough for the private sector to have an incentive to integrate service delivery cost considerations into the design phase of the project (World Bank, 2022). Long-term contracts may require a higher level of private engagement, and as such a higher level of revenue certainty. Until the operations period, solar projects are unlikely to generate revenue, and so it is key to lenders and other investors that the revenue stream is certain and that revenue forecasts are accurate (World Bank 2020). In cases of complex project infrastructure, as can be the case for solar projects, a PPP offers the possibility for effective implementation and adequate maintenance of the assets during the term of contract, mitigating the delays and cost overruns that traditional procurements usually encounter (Matsumoto, Monteiro, Rial, & Aydin Sakrak, 2021). However long term-contracts can also create new risks linked to pure chance (Matsumoto, Monteiro, Rial, & Aydin Sakrak, 2021). For example, in cases where less electricity is generated than anticipated (Byun & Kneip, 2022), it is typical to opt for concession models as BOO, BOOT and BOT, which has been the case for most PPP solar projects in developing countries (Amo Awuku, Amar, & Firdaus, 2022). Usually, bid-build, design-build and O&M structures are more applicable when the local government party to the PPP has a capital budget and skilled advisory team to address most of the functions and stages of the solar project. For smaller scale projects, PPPs are not the best funding model to choose as Service Level Agreements (SLA) would rather be more suitable.
- **Revenue certainty:** Properly structuring a solar PV project with a solid business case/revenue flow is a prerequisite to making the project as well as the partnership itself viable. Defining the terms and conditions for selling a specific amount of electricity from the solar generation asset secures the revenue flow of the project, and this can be defined through a power purchase agreement (PPA) (IRENA & TWI, 2019). RE projects are generally associated with high upfront costs, which disincentivizes investors as revenue is only generated during the operations period (Byun & Kneip, 2022). As such, governments can use various tools such as subsidies to reduce this risk. Governments may also initiate renegotiation at a later stage to adjust the initial contract based on realized uncertainties (Feng, Song, Yang, & Ran, 2022).

- **Risk allocation:** One of the key aspects of a PPP is an appropriate allocation of risk (see **Resource 1.1**). The key risks that a PPP for a solar PV project might face include resource risks, such as suitable solar irradiation levels and site suitability, and operational resource or input risks. For example, cleaning solar panels in arid deserts, which usually have good solar potential, can make the cost of water an important factor in pricing for the operations phase, and the private partner will seek to limit their exposure to significant increases in the cost of water. Another important risk is performance/price risk, in which the actor responsible for operation is responsible for the performance of the Solar PV plant and complying with all guaranteed performance ratios (GIHUB 2019). At the stage of transmission and distribution there are two key risks to consider: congestion risk on the electricity network due to insufficiency grid capacity, which can create divergences in the settlement price of electricity in the market, and curtailment risk, caused by congestion and a supply/demand imbalance linked to variable RE, leading to 'wasted' RE generation (Byun & Kneip 2022). Solar projects are generally longer-term, and the choice of ownership structure should foresee all uncertainties. Despite the fact that PPPs do not eliminate the risk, they do offer a partner that is able to make swifter managerial decisions and bring a business approach for implementation (Matsumoto, Monteiro, Rial, & Aydin Sakrak, 2021). Previous experiences for both the private and public sector working in an environment like this have shown that the private sector would have the capacity to handle these risks, as well as a preference for greater control to be able to do so, at times making it likelier for them to opt for larger and riskier projects. After the success of Gujarat's solar project in India, for example, the government replicated this model in the city of Vadodara in the same state. The International Finance Corporation recommended 25 years of concession under a BOO model, in which the private sector has the control and responsibility of the solar project.
- **Technical capacity and innovations:** Besides the high upfront costs, solar PV projects also require technical and innovative capacity. Such skillsets are generally under the control of the private sector (Schmaus, 2017). Technical capacity and innovation involve high investment risks and banks evaluate the creditworthiness of the private company based on experience, financial capacity and management capabilities among others. Lacking these factors make it probable that the PPP will fail (Laza Y, et al 2019). In such cases, a PPP

structure where the private sector finances the project and interfaces with the banks seems more suitable for local governments to opt for. However, care must be taken to account for the risks of this approach, as in the case of the Mulilo Sonnedix Prieska PV project of South Africa (Awuku, Bennadji, Muhammad-Sukki, & Sellami, 2022).

-  **Transparency:** Given the fact that situations can arise during the course of a PPP contract, which may need a change in scope or the amendment to the contract, communication and transparency between the public and private sector is a prerequisite in such a long-term relationship (PPIAF, 2009). Issues of accountability and transparency as well as the politicization of PPPs can cause failures in implementation (Amo Awuku, Amar, & Firdaus, 2022). While transparency is important for both the partners in a PPP agreement, open communication about the project is also important to avoid misconceptions in the greater societal community, which could lead to lack of support (Schmaus, 2017). Transparency not only determines the success of the PPP in terms of the risk related to the project itself (as in the case of the Sonnedix Prieska solar project), but also the decision about the level of private support and investment, considering the financial risk that it implies. For example, lack of transparency leads to considerable risk for the private sector, making them more hesitant to opt for more complicated structures.
-  **Broader economic and business environment:** A PPP structure should be selected according to the financial and operating conditions of the government and also the nature of the project. In a well-functioning business environment, the private sector may have more capabilities to take on riskier or more complex projects. In cases where an initial upfront investment is necessary, PPP structures such as BOT, BOOT, BOLT and BOO in which the financial and operational responsibility and operations lie with the private party would be more suitable. However, the payment source and mechanism should be analyzed in detail to determine the appropriate scheme. Private investment allowed the implementation of the Rewa Ultra Mega Solar Park in India using a BOOT model (IFC, 2017, NSEnergy, 2020). If the government is still heavily involved in infrastructure-related activity, then perhaps models where it has more control and ownership of public assets could be more viable.

- Community benefits:** The public sector can also opt for PPPs to create a wider social impact (WEF, 2019). Involvement of civil society from the beginning not only enhances community buy-in, but also enhances the efficacy of PPPs (Gardiner, Bardout, Grossi, & Dixson-Declève, 2015). Solar PV projects promote jobs and create demand for skills in the community (DBJ, 2022), which can be boosted through a PPP. One example of this is a solar home system (SHS) project in Bangladesh, where the program contributed to employment and solar enterprise development (Cabraal, Ward, Bogach, & Jain, 2021). In this case, direct engagement enabled a sense of ownership and trust among customers (Gardiner, Bardout, Grossi, & Dixson-Declève, 2015). Equity in solar PV project deployment and creating workforce training programs can also maximize the benefits of solar to all communities (Fekete et al., 2022). Should this be a specific goal of the government, contracts such as bid/build, O&M, design/build would be suitable here, provided the government has sufficient funding in its capital investment budget. This can give it greater control over the specifics of the project. However, if the government cannot meet the funding requirement but still wants to have ownership of the project, it could opt for a DBF structure where the control of the operation and maintenance remains with the government. If this is also not feasible due to a lack of expertise for example, a DBFMO structure could be suitable.
- Environmental enhancement:** Considerations about nature/environmental protection are gaining more attention with regards to energy generation projects, and solar energy in particular. It is important to ensure that the technologies and installations do not pose significant risks to wildlife and habitats (Bennun, 2021). For example, solar plants require water for cleaning collectors, which may affect some arid ecosystems that depend on this resource (EIA, 2022). The government should determine how the impacts can be kept to a minimum, and this can include clauses in the PPP agreement depending on the broader context and regulatory framework. Moreover, there may also be standards that must be complied with, for instance many international finance institutions require environmental impact assessments to be carried out before the project can proceed. To ensure compliance with these standards, the government will need to find a monitoring mechanism. (World Bank, 2020). Some examples of projects generating environmental benefits from the application of PPPs in emerging economies include the Ghana Clean Water Project, the Chesapeake Forest Project and the en.lighten Initiative (Gardiner, Bardout, Grossi, & Dixson-Declève, 2015).

- 🔴 **Land acquisition:** A solar PV project location must consider physical, environmental, economic, and social factors, as well as the land acquisition process. Delays and difficulties in obtaining land represent one of the most challenging factors, causing obstruction of some promising PPP projects (World Bank, 2022). For example in Ghana, tensions due to land litigation is among the major reasons for failures in PPP agreements for solar PV projects (Amo Awuku, Amar, & Firdaus, 2022). In most projects, establishing the rights and title, as well as the use of land is fundamental to successful implementation. To avoid problems and delays in the future, land acquisition is a factor that has to be considered when drafting the contract. For example, if the government has the land but not the financial and technical resources for designing and constructing the facilities for the solar project, it could opt for BLOT scheme, given that in this type of PPP, the private partner designs, finances and builds a facility on leased public land.
- 🔴 **Capacity and level of investment:** To determine the level of investment by the private sector, the government needs to evaluate its own investment capacity by estimating the lifecycle cost of the solar project and evaluating its own budget during feasibility analysis. Depending on this, suitable funding mechanisms and PPP structures can be determined for a solar PV project. The capacity of both parties determines the size of the PPP contract. However, the investment from the private sector in a PPP project seeks a reasonable rate of return as remuneration for its equity as well as for carrying the risk. Governments should also consider that if there is significant risk that project revenues will be insufficient to recover costs, some form of government support will be needed to make the PPP project bankable (PPIAF, 2009).

Resource 5.2: Case Studies

The following case studies present an overview of renewable energy projects undertaken as public-private partnerships at the sub-national level. In these cases, local or regional governments or agencies were involved in developing projects with private sector partners that combined the benefits of distributed renewable energy with other overlapping goals such as cost savings or climate targets. The examples of the following cities and regions are given:

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Case Study 1 presents the example of the **Malicounda Solar Farm** in Senegal that aimed at expanding access to sustainable energy.

Case Study 2 shows how the **Batesville School District** in the United States was able to reduce its expenditure through rooftop solar.

Case Study 3 on the **Pituaçu Stadium** in Brazil showcases how existing facilities can be used to develop solar energy projects.

Case Study 4 shows how the city of Chicago in the United States set up solar PV in its public housing projects in **Bronzeville**.

Case Study 5 shows how the state of Gujarat in India expanding the adoption of solar PV on rooftops in the city of **Vadodara**.

Case Study 1: Malicounda Solar Farm

Project name: Malicounda Solar Farm		Year of completion: 2016
Country: Senegal	Region: Thiès	Community: Malicounda
Population (2013): 61,031	Area: 124 km ²	Pop. density: 492.2 p/km ²
Key economic activities: Tourism is the most representative sector of employment		

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Project overview

Malicounda is located in the Region of Thiès in western Senegal. The country adopted a Renewable Energy Law in 2010, which aimed to increase the installed capacity of RE to 20 percent by 2017, reduce the cost of energy for households and companies, and improve the country's energy independence. The project was implemented through the special purpose vehicle (SPV) Groupe Solaria, with Chemtech Solar, an Italian company, financing the initial construction of the plant.

Public-private partnership characteristics

The plant was commissioned in partnership with the local municipality. Chemtech also owned the EPC contractor, Techno Solaire, which also operated the plant. Malicounda Municipality acquired the land for the project, and holds a 5 percent share. A contract with national utility SENELEC was signed for 25 years to offtake the electricity. The total investment amount to EUR 33,500,000.

Technical approach

The 22 MW solar PV plant, comprising 90,000 solar panels, used state-of-the-art PV and inverter technologies including outdoor string inverters, crystalline modules, and earth screws foundation types. The project is expected to produce 36 Gwh of electricity annually, and to cover the energy demand for 9,000 households. Most of the materials were imported, and focused on robustness and reliability. The Malicounda Solar Farm maximized the use of local labor through the installation of string inverters and construction of transformer stations on site.

Benefits and lessons learned

The project now ensures electricity supply to 22 villages.

Due to the fact that the project was largely financed through equity, it did not undergo a debt financing closing process, which is typically lengthy.

The contractor put an important focus on the use of local labor for plant construction and maintenance. New jobs were created for the operation and maintenance of the plants.

Groupe Solaria also committed to further invest in 20 ha of agricultural production with installed irrigation systems for the local population. Thus the success of the PPP is spurring further investments in other sectors.

Case Study 2: Batesville School District

Project name: Solar on schools in Batesville		Year of completion: 2019
Country: United States	Region: Arkansas	Community: Batesville
Population (2020): 10,749	Area: 27.5 km ²	Pop. density: 414 p/km ²
Key economic activities: Manufacturing and production, commerce and services		

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Project overview

The Batesville School District spent over USD 600,000 annually on utilities. Seeking to cut energy and water utility costs, the ‘Solar on Schools in Batesville’ project was signed to avoid shuttering schools or laying off teachers. The project was based on a partnership between Batesville and an energy services company. As of the time of writing, it constituted the largest solar energy installation in any school district in Arkansas. The project involved goals for student achievement, hiring/retaining staff, efficiencies, and partnerships. This project has also generated interest among the neighboring school districts to achieve the same cost savings and benefits. The project has a total capacity of 759 kW of solar energy, installed in two campuses with upgraded lighting, energy efficiency and water efficiency, which saves the district nearly USD 100,000 per year.

Public-private partnership characteristics

The project was developed and implemented through a PPP between the local government and the energy services company Entegriety. An energy service performance contract was signed, through which Entegriety guaranteed that the energy and the operational savings will pay for the project cost each year and generate additional savings.

Technical approach

A total of 1,483 solar panels were installed to generate about half of the district’s electricity demand. Furthermore, Entegriety conducted an energy audit as part of the PPP agreement, which showed that lighting, thermostats, windows, heating, ventilation and air conditioning (HVAC), and water fixtures must be upgraded to be energy efficient.

Benefits and lessons learned

From the solar energy generation, energy conservation and water efficiency upgrades which constitute the PPP project, the district is expected to save nearly over USD 4,000,000 over 20 years. These savings propelled the district from a USD 250,000 budget deficit to a USD 1,800,000 surplus within three years, further enabling increases between USD 2,000–3,000 in annual salaries of some teachers in the district.

Case Study 3: Pituaçu Stadium

Project name: Pituaçu Stadium		Year of completion: 2012
Country: Brazil	Region: Bahia	Community: Salvador
Population (2021): 2,900,319	Area: 693.5 km ²	Pop. density: 4,187 p/km ²
Key economic activities: Tourism and cultural activities		

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Project overview

The Governador Roberto Santos stadium, also called Pituaçu Stadium, in Salvador is the first football stadium in Latin America to use a solar PV system. The PV system was installed to cover the stadium's energy demand, as well as the consumption of a nearby public building. The solar project was developed by Coelba, the electricity company of the state of Bahia, under its energy efficiency program. The project also served as a pilot case that sought to demonstrate the advantages of decentralized energy generation and distribution systems and integrating solar PV into buildings and urban environments. This project was also expected to positively influence future policies to allow the effective integration of decentralized renewable energy sources into the grid.

Public-private partnership characteristics

For the Brazilian energy sector, this project presents not only technological and scientific advancements, but also has social and economic benefits. The PPP involved Coelba, the electricity company of Bahia, which financed 66 percent of the project and was in charge of purchasing and installing equipment. The Bahia State Government invested 32 percent of the total funds which were used to reinforce the stadium structure. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) contributed 2 percent in the financing of the project, to cover the cost of engaging consultants and related trip expenses. In addition, other partners from the public and the private sectors were involved such as the Universidade Federal de Santa Catarina and Neoenergía, a Brazilian electricity company. The total investment for this project was USD 1,032,265.

Technical approach

Pituaçu Stadium solar project has a total capacity of 408 MW. Utilizing the roof and the parking lots of the stadium, the project consists of 2,294 modules, 52 inverters, and 4 generator junction boxes.

Benefits and lessons learned

The project set a good precedent for other solar PV systems to be implemented in Brazil, and also promoted discussions about regulations for decentralized energy generation from renewable sources. It became a reference in the production of clean energy connected to diversifying the energy mix of the country at large.

Case Study 4: Bronzeville Microgrid

Project name: Bronzeville microgrid project		Year of completion: Ongoing
Country: United States	Region: Illinois	Community: Chicago
Population (2020): 2,746,388	Area: 606.1 km ²	Pop. density: 4,656.3 p/km ²
Key economic activities: Major hub for finance, transport, commerce, industry and hospitality		

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Project overview

Bronzeville is a community in Chicago where approximately 43 percent of its residents live in low-income households. Energy insecurity is a concern as the community is vulnerable to frequent power outages. The Bronzeville Solar Energy Project, developed by Exelon subsidiary Commonwealth Edison (ComEd), VLV Development and the Chicago Housing Authority, aims to demonstrate the social benefits of decentralized energy. It aims to improve the resilience and sustainability of the community's energy system and to lower the costs of energy. The project features 660 solar installations on residential units in the Dearborn Homes Community, a high-rise public housing project. The solar PV installation includes both rooftop and ground-mounted systems and consists of a microgrid that includes 750 kW of solar and 500 kW of battery storage system and 5 MW of dispatchable natural gas generation.

Public-private partnership characteristics

The project was developed and implemented through a PPP involving the Chicago Housing Authority, with ComEd and VLV Development as the private partners. It was also supported by incentives from the Illinois Future Energy Jobs Act and a US Department of Energy (DoE) grant. The DoE and other stakeholders such as the Illinois Institute of Technology also contributed with the research, development, and installation of the system. USD 25 million was invested in the development of this project.

Technical approach

This project creates a utility microgrid cluster, linking the Bronzeville microgrid to the microgrid of the Illinois Institute of Technology. During an outage, both microgrids can 'island' and share power. Or, if necessary, either party can cut back on its nonessential loads and share power with the other.

Benefits and lessons learned

The project serves more than 600 households in high-rise public housing buildings, and is unique in that ComEd is linking the solar-plus-storage directly with the microgrid controllers. A portion of the solar energy is delivered to the Chicago Housing Authority, leading to cost savings of about USD 1 million over 15 years.

Case Study 5: Vadodara Solar Rooftops

Project name: Vadodara Solar Rooftop project		Year of completion: 2016
Country: India	Region: Gujarat	
Population (2011): 60,383,628	Area: 196,000 km ²	Pop.density: 308.04 p/km ²
Key economic activities: Industries such as petrochemicals, dairy, pharmaceuticals, textile		

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Project overview

Gujarat, a western Indian state, has a high potential for solar energy. The Vadodara Solar Rooftop project was launched to spur the growth of rooftop solar in particular. The project was structured to install solar panels on 80 percent of the rooftop capacity on pre-identified government owned buildings. The participation of citizens was also sought, with the state government aiming to expand the rooftop solar concept to other cities in the state where most of the buildings were privately owned.

Public-private partnership characteristics

The Vadodara Solar Rooftop project is a PPP project involving the state of Gujarat. It was implemented with financial support from the Norwegian Trust Fund for Private Sector Development and Infrastructure, the Canada Climate Change Program, and the South Asia Infrastructure Facility. The International Finance Corporation provided transaction advice, and technical, legal, and analytical support. The concessionaire won a 25 year concession for a 5 MW rooftop solar project, under which solar PV panels on the rooftops of privately-owned properties were installed and the energy generated was sold to the local utility. Additionally, the owners received a lease rental. The investment amount was USD 8 million.

Technical approach

The project relies on leasing rooftop space from private and government buildings, which were selected through a competitive bidding process. Operators were responsible for installing the panels and connecting them to the grid. The optimal terms of the lease and power purchase agreements (considering connectivity issues and solar panel selection) were determined in light of existing regulations and business conditions.

Benefits and lessons learned

Nearly 9,000 people have benefited from improved energy services at affordable prices, and the project project would lead to GHG emissions reductions by replacing largely fossil-fuel-powered generation in the state.

Public benefit and participation were promoted, providing rooftop owners with economic benefits from their unused rooftops by renting them to the developer.

Tool 5.1: Solar resource potential maps

A number of tools exist that can help determine the potential of various renewable energies in a particular region, including solar photovoltaics.

- Some tools, such as the **Global Atlas** developed by the International Renewable Energy Agency (IRENA), provide resource maps for various types of renewable energy sources across the world.

 [This tool can be accessed here.](#)

- The **PVGIS Photovoltaic Geographical Information System** has been developed by the European Union to assess solar potential. The user can obtain information on solar irradiation such as electricity generation potential for different PV technologies and configurations, and PV system performance. It also includes maps of solar resources and software to make customized maps.

 [This tool can be accessed here.](#)

- The National Renewable Energy Laboratory developed the **PVWatts** calculator, an online tool which aims to estimate the energy production and cost of energy of grid-connected photovoltaic energy. It determines the energy generated as well as the cost of roof-mounted solar PV systems around the world.

 [This tool can be accessed here.](#)

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Tool 5.2: Avoided GHG emissions calculator

This GHG emissions calculator has been designed to provide a simple means to estimate the GHG emissions avoided by opting for solar photovoltaics (which have zero operational emissions) unlike conventional (i.e. fossil-fuel based) technologies for specific purposes. Depending on the type of energy consumption under consideration—stationary combustion, mobile combustion, transport, or purchased electricity—the corresponding emission factors are applied. Each category includes different “items” or uses for energy.

Stationary combustion refers to all the sources that use any kind of fuel to produce electricity, steam, heat, or power. This category includes fossil fuels as well as biofuels. Depending on the fuel type selected, emissions are calculated in CO_{2e} after inputting relevant activity data.

Mobile combustion uses the amount of fuel consumed and the type of vehicle to calculate the equivalent emissions, while the transport category uses more specific information about the different means of transportation and the characteristics of the trip (distance), to calculate CO_{2e} emissions. In a 100 percent zero-carbon electricity grid, all of these emissions would be avoided. However, in the event that ICE-powered vehicles are replaced by electric vehicles, the avoided emissions (during operation) would be the difference between the emissions factor of the grid and the emissions of the ICE vehicle.

Finally, the **purchased electricity** category displays the CO₂ emissions of a country’s electricity mix, for several Global North and South countries.

The calculated emissions from the use of conventional energy sources and technologies can be considered as avoided emission once these conventional sources are substituted with renewable energy such as through solar PV.

 [The calculator can be found here.](#)

To use it, please download it as an Excel file, and kindly consider the recommendations related in the first sheet of the calculator.

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Tool 5.3: PPP models for solar energy

Having considered success factors as mentioned under Resource 5.1 for solar PV specific projects, a cursory look into risk identification and allocation in this context is crucial. The ability to take risks and the investors' risk appetite, the types of risks and corresponding implications, as well as transfer of risk and responsibilities to the private sector are key determinants of decisions about the type of contract to choose. Furthermore, since the PPP encompasses multiple phases and functions, the responsibility of the private party in a solar PV project varies as well as the payment mechanism (for more information, see **Building Block 4**).

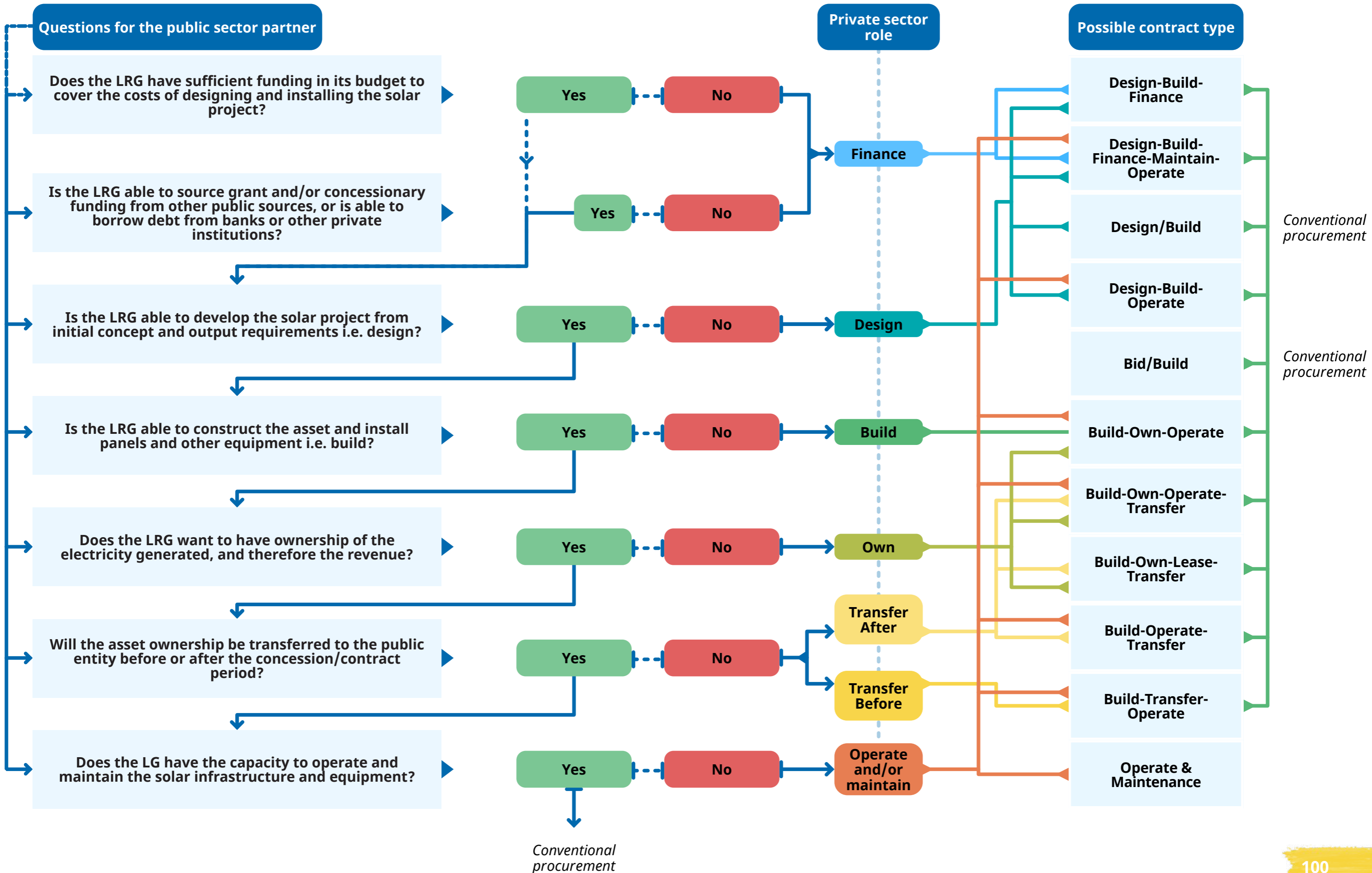
The following decision-making tree aims to provide guidance on how governments can decide on which type of PPP contract to use for a particular solar PV project. For more information about the description of each contract agreement, see **Resource 1.2**.

The Tool presents key questions that are related with the functions and responsibilities of the public sector in order to reach the most suitable PPP model. This series of questions guide LRGs to consider different contract arrangements and to decide on the most appropriate option that reflects their specificities and contexts. For each question, answer yes or no and follow the corresponding arrows to proceed through the next questions.

This tool has been designed as a simplified guide to facilitate decision-making and is meant as a starting point; further context-dependent considerations will need to be taken into account when determining the most suitable PPP contract type.

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Decision-Making Tree for PPP Models for Solar Energy



Annex: The Case of Benin

Despite considerable energy resources and a recent growth in the electrification rate (from 33 percent to 46 percent in 9 years), 570 million people were still without access to electricity in Sub-Saharan Africa in 2019. Many African countries are still dependent on fossil fuels, which makes them vulnerable to international shocks and changes in commodity prices. Renewable energy offers multiple benefits for African economies such as (i) reduced vulnerabilities, health and environmental impacts from conventional fuel use, (ii) cost-effective technologies to expand and improve energy access, and (iii) industrial development along new value chains, with the potential for local job creation (IRENA 2022).

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In terms of energy potential, West Africa has the second-highest electricity access rate on the continent (53 percent) and the second-largest energy market in Africa. In the case of Benin, 40 percent of the population has access to electricity, but this access is deeply unequal between urban and rural areas—only around 18 percent of its rural population had access to electricity as of 2019 (IRENA 2022). Local communities still face financial barriers to increase the availability and access to clean energy. Therefore, the public-private partnerships can be a cost-effective solution to unlock resources for renewable technologies.

As a complementary piece of the Toolkit, **the Annex**, developed by **ICLEI Africa and the Association Nationale des Communes au Bénin (ANCB)**, aims to zoom in on the Beninese context, presenting the enabling conditions and instruments to implement PPP in renewable energy in the country, as well as the current policy framework and renewable energy scenario.

About the Annex

To accelerate the expansion of electricity access throughout Benin in order to foster equitable socio-economic development, it is essential to create an enabling environment to encourage the private sector to support the government in developing and operating the electricity sector.

Private sector participation in off-grid electrification requires a set of safeguards contained in a regulatory framework that reduces technical and financial risks and allows the sector to operate smoothly. This framework must focus on the sustainable integration of off-grid electrification into Benin's national electrification strategy, include equal participation of men, women and marginalized groups in the country's electrification efforts, and establish a level playing field for private actors so that off-grid electrification can compete with grid extension electrification.

This document is a synthesis of the different mechanisms, instruments and measures adopted to facilitate the establishment of an enabling environment for off-grid electrification (OGE/EHR) in Benin. Through its components, it addresses various legal measures, off-grid electrification business models and associated licensing mechanisms, as well as options for setting appropriate tariffs for off-grid electricity services. Fiscal and financial incentives for private sector entrepreneurs and off-grid electrification operators are also considered.

The regulatory framework also addresses the institutional arrangements necessary for its implementation by identifying the roles and responsibilities of various ministries, government agencies, and other stakeholders.

Finally, the framework provides guidance for social inclusion and the equal integration of men and women in off-grid electrification projects. Specifically, a projection will be made here on the existing instruments and measures in Benin in order to highlight the possible obstacles to be noted at the financial and regulatory levels.



**The Annex can be
accessed here.**

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