United Nations ECE/CECI/WP/PPP/2018/7

Economic and Social Council

Distr.: General
10 September 2018

Original: English

Economic Commission for Europe

Committee on Innovation, Competitiveness and Public-Private Partnerships

Working Party on Public-Private Partnerships

Second session
Geneva, 20-21 November 2018
Item 4 of the provisional agenda
Review of the Public-Private Partnerships work since the first session of the Working Party on Public-Private Partnerships on 21-22 November 2017

Standard on Public-Private Partnerships in Renewable Energy[1]

Implementing the United Nations Agenda for Sustainable Development through effective "People-first Public Private Partnerships"

Submitted by the Bureau

Background

The following international standard contains policy recommendations targeting governments which are considering the development and implementation of PPPs in the renewable energy sector.

It was drafted by a ECE Project Team[2] composed of international experts[3] with experience on Public-Private Partnerships in the renewable energy sector and sustainable development led by Ana-Katarina Hajduka.

[1]The ECE Public-Private Partnerships standards, guiding principles, best practices, declarations and recommendations are endorsed and adopted by acclamation by the ECE intergovernmental bodies – the Working Party on Public-Private Partnerships and the Committee on Innovation, Competitiveness and Public-Private Partnerships – and do not impose any obligations on member States as their implementation is entirely voluntary.

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The document[4] was finalised by the secretariat following a public consultation as envisaged by the Open and Transparent Standard Development Process with input from various agencies, organisations, and individuals.

The document was reviewed and endorsed by the Bureau of the Working Party on Public-Private Partnerships with a recommendation to the Working Party to endorse it. If endorsed, the document is sent to the Committee on Innovation, Competitiveness and Public-Private Partnerships for adoption. The document was also reviewed by the Bureau of the ECE Group of Experts on Renewable Energy, which provided useful comments throughout the document's preparation.

The Bureau is very grateful to Ana-Katarina Hajduka for leading the Project Team; to Anand Chiplunkar for sharing his vast experience of working in this sector; and to Scott Walchak for managing the work of the Project Team.

[2] The ECE draws attention to the possibility that the practice or implementation of this document may involve the use of a claimed intellectual property right. This document is based on the contributions of participants in the PPP standard development process, who have acknowledged that all new intellectual property rights generated belongs to the ECE and have also agreed to waive enforcement of their existing intellectual property rights used in the PPP standards against any party using the outputs.
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[3] The list of experts involved in the work of the Project Team is available at: https://wiki.unece.org/display/pppp/P0008-Contacts+and+members
[4] The document benefited considerably from a review of published information and the responses to detailed questionnaires from public and private sector organisations with experience of programmes of this kind.

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Abbreviation and terms

Abbreviation	*Meaning*
COD	Commercial operation date
ECE	United Nations Economic Commission for Europe
EMDE	Emerging markets and developing economies
EPC	Engineering procurement and construction.
IFI	International Finance Institutions (multilateral and bilateral development banks)
IPP	Independent Power Producer
LD	Liquidated damages
Load	An electrical load is an electrical component or portion of a circuit that consumes electric power. A “load centre” is the centre of concentrated electricity demand, such as town, city or industrial facility.
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt (being 1,000,000 watts)
NDCs	Nationally determined contributions according to the Paris Agreement
Offtaker	Purchaser of electricity (in particular, in the context of energy (renewable energy and non-renewable energy) public-private partnerships, the purchaser under the power purchase agreement)
PPA	Power Purchase Agreement
PPPs	Public-Private Partnerships
PfPPPs	People-first Public-Private Partnerships
PRG	Partial risk guarantee
PSA	Power sale / supply agreement
RE	Renewable energy
REC	Renewable energy certificate
REFIT	Renewable energy feed in tariff
SE4ALL	Sustainable energy for all
SPV	Special Purpose Vehicle
UN SDGs	United Nations Sustainable Development Goals
VfM	Value for Money
VfP	Value for People

I.Introduction

1. The aim of this document is to provide guidance to governments when using People-first Public-Private Partnerships (PfPPPs) to deliver investment in renewable energy infrastructure as a way of meeting the United Nations Sustainable Development Goals (SDGs). It aims to build on the experience of the use of Public-Private Partnerships (PPPs) for renewable energy projects and provide a balanced, neutral account of both the pros and cons of renewable energy PPPs, including an accurate portrayal of the spectrum of risk and return associated with renewable energy PPPs.

2. Thus, the PfPPPs are designed to take the traditional PPPs to the next higher level of linking the design and performance of the PPPs to the achievement of the SDGs, in addition to the well-recognised performance parameters of renewable energy PPPs.

A. The importance of renewable energy to sustainable development

3. The United Nations' commentary on the progress of SDG 7 in 2016 states, *inter alia, "Energy is crucial for achieving almost all of the Sustainable Development Goals, from its role in the eradication of poverty through advancements in health, education, water supply and industrialization, to combating climate change."*[5]

4. Furthermore, the United Nations' commentary on the progress of SDG 13 in 2016 states, *inter alia*, "*climate change presents the single biggest threat to development, and its widespread, unprecedented impacts disproportionately burden the poorest and most vulnerable."* [6]

5. Renewable energy development contributes directly, at project output level, to achieve SDG 7 by expanding the means to provide reliable affordable sustainable and modern energy services. In the process of implementation of such projects, it can also support SDG 5 on gender equality and empowerment of women by employing women in operational and managerial positions.

6. Access to affordable, reliable, sustainable and modern energy is crucial to attaining many of the SDGs. The outcomes and impacts of renewable energy projects indirectly support and contribute to the SDGs of poverty eradication (SDG 1), food security and agricultural productivity (SDG 2), healthy lives (SDG 3), education facilities (SDG 4), access to safe water SDG 6), economic growth (SDG 8), sustainable industrialization (SDG 9) and sustainable consumption of natural resources (SDG 12) and climate change mitigation (SDG 13)[7].

7. The ECE has a dedicated Group of Experts on Renewable Energy which focuses on activities that help significantly increase the uptake of renewable energy contributing to the achievement of the SDGs, in particular SDG 7.

[5] Sustainable Development Goal 7, "Progress of Goal 7 in 2016", https://sustainabledevelopment.un.org/sdg7.
[6] Sustainable Development Goal 13, "Progress of Goal 13 in 2016", https://sustainabledevelopment.un.org/sdg13.
[7] Sustainable Development Goals < https://sustainabledevelopment.un.org/sdgs>

B. The role of renewable energy Public-Private Partnerships in sustainable development

8. The UN SDGs cannot be achieved unless the private sector is mobilized – and on a significant scale. SDG 17 (Revitalize the global partnerships for sustainable development)[8] calls for partnerships between the public and the private sectors as well as civil society.

9. For the purposes of this Renewable Energy Standard, the International Energy Association's definition of renewable energy is acknowledged: "Renewable energy is energy that is derived from natural processes (e.g. sunlight and wind) that are replenished at a higher rate than they are consumed. Solar, wind, geothermal, hydropower, bioenergy and ocean power are sources of renewable energy."[9]

10. PPPs is a mechanism for facilitating private sector participation in the delivery of a variety of sector projects, including renewable energy infrastructure projects. PPPs combine private sector capital, with technological and operational know-how, while mobilizing organizational risk appetite to develop, design, finance, build, operate and maintain RE infrastructure projects. PPPs can also provide alternative management and implementation skills, and value services added to the consumers. Capacity building of private and public sector on PPPs will facilitate further development and improvement of the partnership on RE projects.

C. Renewable energy public-private partnerships as an alternative to 'traditional' public procurement of energy projects

11. Compared to traditional public procurement where a public entity finances and contracts for a specific good or service and retains much of the risk of public service delivery, a distinguishing feature of a renewable energy PPP is the allocation of a significant portion of that risk to the private sector along with mechanisms for recovery of capital with appropriate return. PPPs are particularly valuable in renewable energy projects because the private sector is able to deliver:

- **Technology and Skills:** where the project requires new technology and external expertise that a government cannot provide independently;
- **Quality of Service:** where the private sector would significantly enhance the quality of service compared to what the government could provide independently;
- **Time:** where the private sector would expedite the project implementation significantly; and
- **Cost Savings:** where there would be a considerable reduction in the project cost and also the service cost with the involvement of the private sector.

II. Objectives of the standard

12. To take traditional PPPs to the next level of People-first PPPs (PfPPPs), there needs to be a conscious inclusion of deliverables linked to applicable SDGs mentioned earlier. Likewise, the contributing outcomes and impacts of PfPPPs on other SDGs must also be recognized. If managed well, PPPs in RE can help governments enhance the agenda of

[8] Sustainable Development Goal 17, https://sustainabledevelopment.un.org/sdg17.
[9] https://www.iea.org/about/faqs/renewableenergy/

sustainable energy for all to meet the development needs by bringing sustainable investment, replicable processes and expertise to projects.

13. The traditional concept of Value for Money has limitations when assessing projects being designed for PfPPPs. Value for Money (VfM) is usually at the core of virtually all PPPs and figure large in the public sector's decision-making process.10 It is based on economy, efficiency and effectiveness (3Es) considerations and areas like procurement and administration costs have been the focus of Value for Money considerations. A Renewable Energy PPP would therefore be considered a Value for Money transaction if it generates a net economic benefit for the public in terms of the project outputs related to quantity, quality of the service or facility, cost and risk transfer over the project life, achievement of various transportation related goals, etc. and do so in comparison to the traditionally procured public approach.

14. However, assessing the outputs, outcomes and impacts of the project in improving people's lives is also equally important. A PfPPP should therefore be assessed on the basis of a Value for People (VfP) approach that is aligned to the achievement of the SDGs. A Value for People approach means projects should address critical challenges facing humanity, fighting hunger, poverty, and promoting human wellbeing by increasing access to essential services, tackling a social agenda promoting social cohesion, overcoming inequalities, achieving gender equality and empowering women; and disavowing all forms of discrimination based on race, ethnicity, creed and culture. Projects should bring resilience into infrastructure and mitigate risks and adapt it for climate change; lower CO2 emissions and take on the practices for the circular economy developing more sustainable production and consumption patterns.

15. Accordingly, the Value for Money assessment (with due consideration of its limitation mentioned earlier) needs to be broadened to include equity along with economy, efficiency and effectiveness. A VfP approach includes not only a VfM basis but also proposes that projects' performance be measured by their outcomes and impacts that brings the greatest benefit to the people measured with respect to the SDGs. As a result, this standard recommends VfP should play a fundamental role (implicitly assessing Value for Money as well) in the decision of whether a public institution should enter into a road PPP agreement to be acceptable as PfPPPs[11].

16. This document provides policymakers with guidance and tools for the design and implementation of People-first PPPs in the Renewable Energy Sector.

17. There are many different models of PPPs in the RE sector. The challenge for governments developing RE PPPs is to ensure consistency between their project delivery strategy and programme, and the achievement of the SDGs.

[10] However, some observers note, using the Value for Money approach to inform PPP decision-making can be difficult, and the process can be manipulated and even sometimes controversial. They suggest rather than solely relying on Value for Money assessment, governments need to understand whether or not implementing a project now as a PPP comes at a cost, and if so, to weigh this cost against the associated benefits. Refer "Value for Money Analysis - Practices and Challenges: How Governments Choose When to Use PPP to Deliver Public Infrastructure and Services" Report from World Bank Global Round-Table 28 May, 2013, Washington DC.

[11] A detailed introduction to PfPPPs is contained in document ECE/CECI/WP/PPP/2018/5.

III. Scope of the standard

18. This document offers guidance on best practice in relation to the development and implementation of PfPPPs in RE projects. The growth of the RE market has been driven to a large extent by policies, laws and regulations regarding the generation and uptake of RE through favourable pricing mechanisms to encourage private investment in RE. This document aims to help identify and design feasible RE projects, determine appropriate promotional policies, identify sustainable business models, finance mechanisms and regulatory frameworks.

19. For the purpose of this document, the term PPP programme is defined as a framework and/or series of projects under which a public authority grants long term contracts (with a duration typically exceeding 20 years) to a private sector partner for the design, financing, construction or refurbishment, operation, and maintenance of renewable energy projects and related infrastructure. The term 'public authority' may include a national or local governmental department, a regulator, or other public entity tasked with implementing renewable energy infrastructure. The operation of these renewable energy systems and/or infrastructure often includes the provision of operation and maintenance services and other services such as repair and cleaning. Under most PPP arrangements for renewable energy systems, the private sector partner will raise private capital to pay for the new infrastructure, which will be repaid in most cases by a users' payment or a service concession (e.g. availability payment structure) from the public authority.

IV. Central questions

20. 'People-first PPPs' are PPPs, which:

(a) are seen as synonymous with the purposes of the UN SDGs;

(b) out of all the stakeholders, put people as the main beneficiaries of the projects;

(c) increase access to food, water, energy, transport, and education especially to the socially and economically vulnerable members of society;

(d) promote social cohesion and justice, and disavow all forms of discrimination based on race, ethnicity, creed, culture and gender; and

(e) focus on improving the quality of life of communities, fighting poverty and creating local and sustainable jobs.

A.People-first Public-Private Partnerships in renewable energy

21. In general terms, a host government that undertakes PfPPP projects would prioritize (in order):

- a sufficient provision of flexibility to ensure RE system reliability and resource adequacy;
- RE generation assets are prudently operated and maintained over the useful life of those assets; and
- consumers are charged the lowest possible tariff, and the government takes on the lowest possible fiscal burden, in order to enable the above two objectives to be met, focusing on mature technologies and financial instruments, including suitable tariff plans for vulnerable consumers.

- focus beyond outputs to the outcomes and impacts of the project for achieving SDGs.

B.Environmental and social sensitivity[12]

22. Another important component of RE projects that are SDG compliant and put people- first is environmental and social sensitivity. RE projects do have an impact on the environment. After all, they rely on natural systems to generate energy and if not designed, implemented and operated in full compliance with domestic environmental and social protection laws, and international best practice standards, they risk having a negative impact on the environment. Governments must therefore:

- implement policies to guide the partnership with respect to environmental and social impacts;
- establish a process to identify and assess those impacts;
- develop a management programme, including mitigation measures, which address the impacts throughout the life of the project;
- employ communication and disclosure practices that identify and communicate with stakeholders who are affected by the project, and
- institute a grievance mechanism system to resolve outstanding stakeholder issues, in particular for projects which involve resettlement.

23. For example, large-scale RE PPPs, in particular hydropower projects, can have adverse effects on ecosystems which sustain community livelihoods far beyond the vicinity of the project. Other forms of RE require significant land use directly as in the case of solar or wind RE projects or indirectly as in the case of agricultural production sites for substrate for biofuels. On one hand, communities have objected to siting of such facilities in their area due to the visual intrusion. On the other hand, communities have also embraced such projects as RE production may contribute to a local economy in three different ways: by creating jobs, by creating local tax-income from sold-off energy, and by lowering energy costs.[13] Accordingly, People-first RE PPPs must avoid or mitigate irreversible impacts on biodiversity, natural habitats and protected areas and be aware of the breadth of potential stakeholders, however remote to the project.

24. People-first includes also considerations of social aspects. RE PPPs and the energy they produce can potentially create jobs and economic opportunities, increase access to education and improve personal security, and even promote gender balance through structuring and procuring the partnership or providing energy to underserved areas so women can have more job opportunities.

[12] The ECE Espoo (EIA) Convention, which sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning, could be relevant to renewable energy PPPs. The Convention, adopted in 1991 and entered into r in 1997, lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across borders.

[13] In 2009 approximately 100 municipalities in Germany declared the political goal of satisfying the complete local consumption of energy in the near future from local, renewable sources. Amongst Swiss, Germans, and Austrians those best practice cases, which are serving as a point of reference, became known as energy-villages (Energiedorf), energy-regions, or energy autarkic regions. A region, village, or city is called “energy autarkic” if it covers the main part of its demand for heat and electricity from locally produced renewable energy (wind, sun, water, biomass/gas).

C.Maximizing people benefits

25. To maximize the benefit a RE PPP project brings to people, host governments should explore how their renewable energy projects can deliver more value that also can be monetized. Mandatory requirements in a RE PPP programme however require diligent and realistic assessments of what the partners, suppliers, and projects can provide. Including externalities such as economic development and community shareholding as project criteria, can be positive, but may also lead to increased tariffs to protect a project's commercial viability, representing financial harm to community stakeholders.

1.Project types and examples

26. RE PPPs typically involve solar, wind, geothermal, hydropower and/or bioenergy-based energy generation. They also typically come in two distinct types of structural arrangements:

(a) Concession based agreements, which may be entered on a project-by-project basis, or under a coordinated procurement programme[14] of multiple projects, where the private entity undertakes the delegated public energy service, and

(b) Joint (equity) ventures where a mixed public and private entity is formed to undertake the provision of energy.

27. Many Emerging Markets and Developing Economies (EMDE) countries have either successfully implemented coordinated RE PPP procurement programmes, or have moved towards coordinated procurement programmes, often with targeted technical and financial support from international finance institutions and development cooperation actors.

28. Although the typical RE PPP structure is understood as a privately sponsored project with non-recourse or limited recourse project financing, in EMDE countries the government usually must also provide some level of guarantee to back up the utility's obligations to the private partner. This could also occur through subsidies to support the tariff rates, in particular if end-user tariffs are not cost reflective, or through governments holding (directly or indirectly) some portion of the equity and/or debt to ensure project feasibility.

Common features of RE Concession Structures

29. RE PPPs are typically concession structures where the government confers the right to develop and operate the RE facility to a private party and also agrees to buy some or all of the power it will produce through a Power Purchase Agreement (PPA).

30. RE concessions also include most or all of the following features:

(a) a single-purpose project company or special purpose vehicle (SPV) established and owned by shareholders (often referred to as "sponsors"), which will take on the responsibility of designing, financing, constructing, operating and maintaining the power generation facility over the life of the contract;

(b) a long term (typically 20-25 years) PPA between the SPV and the offtaker, which is often a government owned utility;

[14] A successfully implemented coordinated procurement programme will reduce the amount of money spent by public entities procuring infrastructure, goods and services by aggregating the volumes purchased across the whole of the government to attract better prices from suppliers.

(c) an agreement between the SPV and the host government (such agreement often referred to as an "Implementation Agreement", "Concession Agreement", "Government Support Agreement" or similar) which sets out various rights and obligations between the SPV and the host government;

Joint Venture RE PPPs

31. Another model is when the public entity and a private partner hold shares of an energy venture jointly and the project along the same principles as an Independent Power Producer (IPP), which is an independent entity that generates power to sell to a utility or other end user. However, joint ventures present additional administrative and corporate governance challenges, such as conflict of interest and regulatory interference issues, which may arise as a consequence of the institutionalized partnership.

Renewable energy procurement programmes		*Single concession renewable energy public-private partnerships*		*Joint venture renewable energy public-private partnerships*	
Pros	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**
Scalability Likely lower power tariffs Lower transaction costs per project Attract investors and financiers more efficiently	Require long-term dedicated governmental support and complex sectorial arrangements Often require costly public support instruments	Potentially quicker to implement than a full RE PPP programme	One off transaction, so no scale and less added capacity Higher transaction and financing costs per MWh, thus higher tariffs in most cases	Involvement of utility in joint venture may make RE PPP quicker Dividends as revenue source	No scalability Potential public interference and conflict of interest

2.Pros and cons of renewable energy Public-Private Partnerships

32. RE projects are complex in nature due to the following characteristics:

(a) project barriers: includes navigating siting regulations, permitting requirements and interconnection agreements with their electric utilities;

(b) energy production potential: availability and quality of a renewable resource has a critical impact on energy output and cost effectiveness;

(c) economic costs and benefits: incomplete, inaccurate or unrealistic assumptions in financial modelling can significantly impact the cost-effectiveness of the project;

(d) long term commitment to operation and maintenance: capturing the full economic benefits requires a monitoring and maintaining the RE systems over a period of 20 years or more; and

(e) social complexity[15]: arising mostly out of consumption of horizontal space, it relates to the RE technology and includes organizational complexity, technology acceptance, participation by locals and financing models.

33. Carrying out RE projects as PPPs can ensure that each risk is allocated to the party best able to manage and/or mitigate that risk. If done properly, this ensures, for example, that host governments and utilities share the risk of facility creation, operation and maintenance in a balanced manner. This risk allocation exercise also typically adds a high degree of rigour to the project analysis.

34. However, RE PPPs require a relatively large number of public and private participants to agree on a complex, interconnected allocation of risk and return. This can be very difficult to manage and require sophisticated technical, financial, legal, and/or transactional capacity.

35. For example, risks which are not allocated to the host government and/or utility will initially be allocated to the SPV, either explicitly in the PPA or implementation agreement, or impliedly by failing to allocate those risks to the host government and/or utility. In turn, the SPV will divide these risks and allocate them again to other contractors, investors, insurers, lenders, or other stakeholders best able to manage said risk. One consequence is that the stakeholder who is ultimately expected to bear a certain risk may not be involved at the stage when that risk by default is allocated to the SPV. This in turn can lead to an unrealistic assignment of risk and increase the chance for renegotiation or the need to work out another arrangement. Early participation of all stakeholders during project preparation is therefore essential. Governments must therefore be prepared to tackle the complexity of partnering with a private partner and utilizing private finance to accomplish their energy needs.

3.PPPs meeting people-first objectives – replicability, scalability, equity, efficiency, sustainability, effectiveness demonstrated

36. In light of the 2030 Agenda, and going beyond just measuring VfM of projects, the concept of PfPPPs provides a metric which seeks to measure the degree to which a project delivers VfP and whether the PPP is ‘fit for purpose’ for the SDGs, i.e., its ability to provide poverty alleviation, the degree to which it brings transformational effect to the communities it serves, etc.

37. A People-first RE PPP therefore achieves more than energy generation. It should improve health and environmental quality locally by not only generating sustainable green energy, but also reducing the negative effects of non-renewable energy generation like burning coal and oil. People-first means projects are designed to create jobs and promote technology transfer to local markets while boosting local and regional economic capacity. These projects are implemented to make electricity affordable, reliable, sustainable and available to people, improve personal security, access to healthcare, and increase the productivity of individuals. These projects promote energy independence, reduce reliance on carbon-intensive fuels, mitigate the negative effects of fuel markets variability on host governments and their citizens, and create long term savings for the government and the people.

38. To make this level of impact governments will need multiple RE projects. The governments should develop a RE Programme. Individual projects can bring great benefits,

[15] Social complexity refers to the sum of necessary efforts for organizers to convince locals to participate, propagate popular acceptance of a technology, take care of fund raising and legal permissions, and to convince local opinion leaders and small businesses of the technology´s benefits.

but the most efficient outcomes can be achieved with programmes that bring economies of scale.

39. However, each government's needs are different and single concession RE PPP or joint venture RE PPPs may also be suitable depending on the capacity of the country to take on a comprehensive programme, the amount of generation required, the locational or system needs (such as grid coverage or reliability factors), and the financing and contracting/partnering approach. These single-facility RE PPPs could also feed into a larger programme or act as pilot projects to test concepts, build capacity, and feed into a full RE PPP programme.

V. Delivering the model

A. General

40. RE PPP procurement programmes should be closely considered by governments. Alongside their sustainable development goals, governments must weigh their generation needs, the capacity of domestic utilities and governmental host institutions, the generation technology in question, the overall strategy toward RE generation, and more. After making a full assessment, a RE PPP programme may be developed through a phased approach to allow for institutional capacity development, price discovery and overall risk reduction for both the host government and private sector.

41. The success of an RE PPP programme is therefore a function not only of what the host government decides to do, but also how it designs its programme. The 'how' aspect of PPP programmes is about:

(a) the assessment of the affordability of the programme and its Value for Money versus alternatives (technologies, non-PPP alternatives etc.);

(b) leadership, vision and buy-in: clear endorsement of the programme at the highest levels in government, to ensure political and administrative commitment to implementing the programme;

(c) the process of programme development which a host government implements from the start;

(d) the consistent process and activity of stakeholder engagement – including affected local communities, private investors, financiers, transmission system operators, off-takers, relevant ministries, etc.; and

(e) the size and impact of the programme and the individual projects within it.

42. A RE PPP programme should educate stakeholders about the ultimate project cost. This includes the project's impact on the communities and consumer over time, the affordability of electricity for the population at large and other affected parties (departments of finance, utilities, private sector as an off-taker, energy intensive users etc.), and the environmental impact of such initiatives and plans for mitigation.

43. Depending on the size of the programme, it can place a significant strain on the balance sheet of a country, especially where revenues are constrained by regulation or the ability of the consumer to pay. This is true for both the utility, which has to purchase additional RE capacity at potentially higher cost, as well as for host governments who provide explicit or quasi-sovereign guarantees. The impact of RE PPP projects and programmes should therefore be subjected to cautious due diligence and a comprehensive review of a country's ability to meet its obligations under the RE PPP programme.

44. In such economic conditions, new projects must make their case on the basis of net economic benefit. They must demonstrate that they are cheaper than the marginal cost of supply from alternative sources which, in a network with endemic load-shedding, equates to the cost of back-up supply. In off-grid or grid expansion cases, the project's levelized cost of electricity needs to be lower than the wider economic and social benefits of access to electricity for the end-user. For industrial users, self-generation brings reliability of supply and cost certainty. The challenge is to create structures which match payback for the project to the realisation of the user benefits, and which can capture those benefits to secure revenues for the project.

45. An efficient RE PPP programme should also be embedded in a broader process or integrated planning which should include realistic supply and demand forecasts, least cost planning associated with the energy mix, resource assessments, transmission network development and broader power sector development. It is incumbent upon a host government to assess the building blocks of its programme. For example, the availability of data on resource assessments, transmission risks, and land titles, while designing a process that takes its strengths and weaknesses into account.

46. RE PPP programmes targeting intermittent power sources impose additional requirements to a country´s grid absorption capacity and management. Ignoring these principles usually leads to a higher cost of service and a risk mitigation programme leaving the host government with risk that could otherwise be borne by the private investors[16].

1. Selection of appropriate renewable energy public-private partnerships projects / baseline requirements for private interest

47. Due to the high upfront investment costs, RE PPP projects generally require a significant degree of long-term investment certainty. However, the decision of which PPP model is most suitable depends on a variety of factors. Host governments must determine whether an infrastructure project, RE or otherwise, can best be delivered by a PPP. Governments should acknowledge that RE PPPs are not a panacea for all energy development initiatives, and it is therefore crucial in the planning phase to select RE projects for a PPP procurement programme that fit within the government's overall energy strategy but are also well suited to the PPP model. Financial feasibility and operational objectives are key to this assessment, but private sector interests and the overall viability of the project will be key to attracting qualified partners.

2. Efficient risk allocation

48. Risk is ideally allocated to the party best able to manage and/or mitigate that risk, despite the fact that it may not be fully controlled.

49. Nevertheless, the risks associated with RE generation and PPPs are by nature difficult for the government to control. These risks include:

[16] For example, a comparison of the outcomes of RE programmes in India and Sub-Saharan Africa. As a result of the programme initiated by the Indian Government, wind and solar projects regularly result in levelized tariffs in Rupees equivalent of $0.08/kWh, where 50% of the tariffs goes towards capital expenditure and operation and maintenance, and 50% to interest and equity return. In contrast, a Sub-Saharan African project which did not follow such a process, would probably end-up with a tariff of US$ 0.12/kWh, where the level of capital expenditure and operating expenditure would be the same as with a project in India, with almost a 3.0x multiple going to equity.

(a) the difficulty of matching electricity supply and demand. This is particularly relevant for large RE PPP programmes or projects, whose installed capacity may sometimes exceed 100% of a host country's total peak demand (including the reserve capacity) at the time of inception;

(b) exchange rate risks (capital and repayment);

(c) 'political force majeure' risks, such as war, civil disturbance, terrorist attack, currency convertibility, etc., which are out of the host government's control; and

(d) climate change that may affect the efficiency of the systems or their level of generation.

50. A project's cost of capital will somewhat reflect these actual and perceived risks associated with carrying out the project. These risks include inflation, interest rate variability, political turnover, legal, project design, financing, construction, operation and maintenance risks, grid or counterparty (offtaker) risk and demand and regulatory risks.

Risks typically allocated to the public sector

51. Risks commonly allocated to the host government include change in law, change in tax, failure of government authorities to issue requisite permits and consents, counterparty risk (in case of government sponsored utility is the offtaker), undue interference by public authorities/officials, war, civil commotion/unrest, strikes, and in some cases unforeseeable ground conditions. In countries with weak foreign exchange, projects are sometimes made viable by involving supranational political risk guarantee products.

52. When risk events allocated to the government arise which have effects enough that early termination of the contract is necessary, the government will typically be required to purchase the generation facility. The purchase price will almost certainly be one which

(a) covers any termination and transfer costs;

(b) repays outstanding debt;

(c) returns equity invested; and

(d) provides a negotiated return on equity.

53. If circumstances require the host government to purchase a RE project's assets, it is possible that those circumstances may:

(a) affect most energy (RE and non-RE) PPPs in a host country (e.g. the applicable circumstance may be a prolonged civil war); and

(b) coincide with a period when the host government is least able to pay (many EMDE host governments may be unable to pay the early termination buyout price regardless of timing).

54. 50. A wide disparity exists, in current market practice for the formulation of an early termination buyout price formula, so governments should carefully consider fiscal impacts of such termination provisions. Accordingly, host governments should:

(a) ensure that all relevant host government personnel understand the surrounding issues and risks involved;

(b) ensure that contingent liabilities which crystalize upon early termination are kept to the minimum level required for project financing, and

(c) engage specialists in these areas where necessary.

55. One particular risk worth highlighting is grid risk; i.e., the risk that the electricity grid is not able to absorb the electricity produced by the project company. Even if grid outages are caused by a force majeure event, project lenders will require (as a condition to the provision of finance) that this risk is allocated either to the utility and/or to the host government (i.e., that they should be obliged to reimburse the RE PPP for the revenue which it would have otherwise lost), on the basis that (a) the RE PPP cannot realistically insure against events which may be caused or occur anywhere on the electricity grid, and (b) the utility has the dual duties of ensuring that the grid is robust in the first place, and re-instating the grid promptly if for any reason it is knocked out of service.

Risks allocated to investors

56. Different classes of investors have different risk appetites. This reality should be acknowledged and embraced. Generally, the private sector is willing to take the following risks: project cost, construction, technology, operation and maintenance.

B. Renewable energy people-first public-private partnerships programme - improving the baseline

57. To build a RE PfPPP programme with the transformational effect called by the SDGs, host governments should aim to develop a RE policy framework which will promote successive projects but also drive down the cost of RE PPP transactions ensuring that economic and social gains exceed the cost to end-users, off-takers, and governments. Some practical measures include:

(a) **policy guidelines** – public sector identification of priority technologies and regions for investment, including lists of potential projects sites;

(b) **resource mapping** – mapping RE resource, collecting RE resource data (wind speed, irradiation, hydrology, etc.) on an ongoing basis and publishing this data;

(c) **investor guidelines** - development of detailed investor guidelines clearly defining all steps investors must take, including permits and consents which must be obtained from government authorities starting from project initiation through to commercial operations, as well as guides to the tax treatment and investment incentives available;

(d) **standardised project agreements** – development of a full suite of realistic, technology specific, bankable project documentation that is also customisable;

(e) **engagement of external advisors** – working with financial, legal and technical advisors can help designing an efficient RE PPP programme or project in line with international best practice, attracting more prospective investors, and driving the competition up and prices down. Associated costs can be sponsored through IFI support programmes or recuperated through the project;

(f) **site selection, early project development** - site selection or identification of priority locations by the public sector, as well as carrying out preliminary legal and technical due diligence which can be shared with all shortlisted bidders;

(g) **Environmental and Social Impact Assessments (ESIA)** – in order to ensure the environmental and social compatibility of a project, an Environmental and Social Impact Assessment is necessary to evaluate the potential impacts on the physical, biological and social environment;

(h) **RE appropriate grid code** – acknowledging in the grid code the specific requirements and technical limitations of various RE technologies and development of detailed RE grid connection guidelines; and

(i) **Interconnection and associated costs** – governments, utilities and / or regulators must provide uniform and transparent interconnection procedures, guidelines and application forms for RE generation connection. It is also important to provide transparency on how required grid network upgrades triggered by RE PPP are identified and associated cost responsibilities allocated to specific generation projects.

58. **Operations guidelines** – Once the project is successfully established, a well-designed operations programme is necessary for healthy revenue stream, to ensure the financial commitments can be met. The operations guidelines could come from the industry but the government should get involve to ensure that such guidelines would not only focus on the VfM but also VfP. Since the PPP project has a strong connection to the government, the government is expected to discover the weakness of the market design during their operation and work together with the policy makers to mitigate it.

C.Financing

59. Even though the lower fuel and operating costs may make RE cost competitive on a life-cycle basis, RE investments have higher initial capital costs thus they require more financing than fossil fuel plants of comparable capacity. This makes the cost of RE investments more dependent on the cost of capital than conventional energy systems, which are more sensitive to the cost of fuel.

1.Project finance

60. RE PPPs with costs above about US$20 million[17] are typically project financed; however, project finance often requires cumbersome and expensive processes leading to higher upfront transaction costs and extended negotiation and preparation timelines. Project sponsors (and host governments) need to accommodate project lenders who are more risk averse than investors/sponsors (as lenders expect a lower return than the project sponsors).

61. RE PPPs that are project financed are structured to:

(a) maximize the ratio of debt finance to equity investment, as the interest rates required by lenders are typically much lower than the returns sought by equity investors;

(b) lend against the expected long-term income stream flowing from the PPP (project finance), and not against the value of the underlying assets or a balance sheet (corporate finance);

(c) compensate parties should the RE PPP project terminate early because the expected value to the equity investors and lenders of the underlying infrastructure (such as immobile infrastructure with no certainty of a consumer or means of earning income) is minimal at best;

(d) accommodate project lenders; and

(e) minimize recourse to the investor’s balance sheet.

2. Public finance

62. Public finance instruments and incentives are equally important, especially for projects below about $20 million or to complement project finance for risk balancing and

[17] There are no hard and fast rules; however, most project lenders have minimum deal sizes, below which they are not prepared to incur the significant time and expense require required in project preparation (which in turn is to a large extent fixed regardless of the project size).

viability issues. Increase in investment and financing is closely policy-dependent. Good policies reduce country risks and consequently attract more investors for the implementation of new and large renewable energy projects. It is worth noting that the content and scope of policies generally depend on the situation. Appropriate policies can be chosen and settled according to the energy capacity to install, energy resources available (wind, solar, geothermal, biomass, hydro), or even the types of investors required.

63. The public finance instruments include:

(a) Grants and RE development funds;

(b) Concessional loans;

(c) Guarantees;

(d) Insurance;

(e) Public equity;

(f) Bonds - general RE obligation bonds, clean energy / RE bonds, municipal bonds;

(g) Mezzanine funds or equity; and

(h) Foreign exchange risk mitigation.

64. Fiscal incentives include:

(a) Capital subsidy or rebate;

(b) Investment or production tax credit;

(c) Reductions in taxes related to sales, energy, carbon, value added or others; and

(d) Energy production payment.

3. Other sources of financing

(a) Global Environment Facility (GEF);

(b) Bilateral and Multilateral Banks providing grants, loans, guarantees or insurance;

(c) Carbon Market and Clean Development Mechanism.

Transaction documentation

1.Power Purchase Agreements

65. PPAs play a central role in raising finance from the private sector in RE PPP by creating the expected income stream against which finance is provided. In RE PPPs, the PPA performs several important roles, including:

(a) providing the contractual mechanisms for the sale and purchase of electricity;

(b) setting the contractual obligations of the project company with respect to attaining the commercial operation date (COD) of the project, and post-COD performance standards.

(c) Each PPA will also require project specific tailoring to address such issues as:

(i) commissioning test procedures;

(ii) whether a capacity charge plus energy charge tariff structure is appropriate, or delivered energy plus deemed energy tariff structure is appropriate;

(iii) the methodology for calculating deemed energy; and

(iv) appropriate performance requirements and the methodology for calculating performance.

66. It should be recognized that (a) a single PPA will not be appropriate for multiple generation technologies, and (b) if the PPA has not been tailored to a specific technology, it is unlikely to be bankable for any technology. Crafting the PPA requires expert advice to optimize various provisions including liquidity support, economic stabilization, required performance standards and end of term transfer obligations.

67. Finally, although the PPA is the cornerstone of RE PPP documentation, the PPA is part of a suite of documentation which works together to allocate risk and responsibility between RE PPP stakeholders; thus, even the best PPA is not bankable without the package of documentation which surrounds it.

2. Liquidity support

68. A strong utility credit rating is usually key for underpinning a credible RE PPP programme or project. The reality in many countries is that utilities struggle to keep up with cost recovery and have a poor payment track record. An important effort of host governments therefore should be to map out a path for strengthening utility creditworthiness.

69. Liquidity support mechanisms ensuring timely payment to the project company are also important and can occur through bank guarantees, letters of credit, or a cash escrow account. In many instances the bank guarantee or letter of credit provider will in turn require further backstopping with, for example, cash collateral or a partial risk guarantee provided by another credit worthy entity such as Multilateral Investment Guarantee Agency or some regional insurers, e.g. African Trade and Insurance Agency in their member countries.

Lowering risk perceptions

70. Lowering a risk perception may also be achieved by improving the financial viability, creation of contingency fund, use of insurance and guarantee products and improving the performance of the electricity subsector as a whole through measures such as:

(a) implementing cost-reflective and adequate end-user tariffs, so that the utility (offtaker) is not perceived to be structurally loss making and thus a high credit risk;

(b) improving the utility's revenue collection performance, e.g. by promoting pre-paid metering, again so that the utility is perceived to be on a sound financial footing; and

(c) ensuring that the utility develops a good track record of timely payment to its existing IPP suppliers.

D. Feasibility for low and middle-income countries

1.Fiscal burden

71. RE PPPs in EMDE countries face many of the same challenges as those in more affluent countries, but those challenges can have a larger impact on the success or failure of a project or programme in a low and middle-income country. For example, the fiscal burden of a project should be accounted for in all countries, but the cost of a project and its contingent liabilities can have a disproportionate impact in an EMDE country over that of its wealthier neighbours. This, coupled with the fact that host governments have only partial (and sometimes quite limited) control over the risks allocated to them, it is clear that certain classes of termination events, for example an early-termination 'put option' and any accumulated claims, could bankrupt the host country or, at least, significantly curtail public expenditure available for public services. While there is no 'magic bullet', host governments should at least:

(a) address the issues surrounding fiscal burden openly with all stakeholders;

(b) ensure that the Ministry of Finance (or equivalent and, where appropriate, the government Cabinet or equivalent): (i) is fully apprised of the contingent liabilities which the host government will take on in connection with the RE PPP, and (ii) formally approves the government taking on those contingent liabilities;

(c) consider how it accounts for contingent liabilities which arise under 'put and call option'[18] arrangements (or explicit sovereign guarantees if these are used); and

(d) embrace the other policy standards recommended in this document as a means of reducing the cost of project delivery, which in turn has a direct impact on fiscal burden.

2. Electricity tariff

72. Electricity tariffs are also an important socio-economic factor in EMDE countries. Low electricity prices may not only facilitate industrial development, but also decrease the financial burden on the poor. Thus, achieving the lowest possible cost of electricity production must be a focus of PfPPPs. Host governments should explore possibilities to lower project development and financing costs through appropriate regulatory and fiscal measures.

New innovative renewable energy Public-Private Partnerships models

73. Achieving financial close on RE PPPs in EMDE countries is difficult. Innovations should be embraced, especially for smaller projects where the pre-development and project costs of implementing existing models can be prohibitive. Simplified contracts and project models are also recommended in order to combat the complexity, expense, and high level of technical, financial, legal, and/or transactional capacity that is often needed.

74. In addition, in many EMDE countries, the first power generation (RE and non-RE) PPPs were individually negotiated on an *ad hoc* basis. In some circumstances these lead projects set *de facto* market standards that were unfavourable to the host governments. The host governments should employ new models that over time are able to reset the market standards to more favourable terms and conditions for the public.

[18] Put and Call options provide the holder the right to sell and buy the asset at a specified price.

1. Renewable energy feed in tariff

75. EMDE countries should also consider renewable energy feed in tariff (REFIT) regimes, incorporating additional People-first requirements, in addition to traditional requirements which typically:

(a) provide for a prescribed feed in tariff (i.e., wholesale electricity tariff for sale of electricity under the PPA between the generation company and the buyer/offtaker, which is typically a government owned utility) for different generation technologies and classes of generation capacity, often also providing different tariffs for different sizes of projects; and

(b) prescribe standard form PPAs (and perhaps other project documents) and set out standard procedures for carrying out qualifying projects.

76. One necessary consequence of a REFIT regime is that the prescribed tariff for a particular project will almost certainly either be:

(a) too high, i.e. more than what would be required in order to attract the private sector investment required to carry out the project. In this case the project's private investors may be thought of as being over-compensated at the expense of electricity consumers (and/or host governments to the extent of any subsidy of the tariff);

(b) too low, i.e., less than what would be required in order to attract the capital investment required to carry out the project, in which case certain projects which may well be very worthy for any number of reasons will not be financed by the private sector.

77. In current market practice, REFITs are likely to be suited to RE projects:

(a) which are too small to justify made to order negotiations or procurement processes;

(b) where the benefit of certainty outweighs (i) the cost of some projects being over-compensated, and (ii) the risk that other projects will not be carried out as the REFIT tariff is too low for those particular projects; and

(c) where the generation technology and costs associated with it are well established and fairly stable, e.g. not in the case of solar photovoltaic system over recent years, where reverse auctions have discovered rapidly reducing costs.

Role of the regulator

78. The role of the regulator in the RE market is critical given the multiple number of electricity generators using different RE and traditional sources, all using the same grid for transmission and distribution. The regulator has to protect the interest of the communities and consumers (excessive charging, poor service, interruptions in service etc.); the interest of the investors (price they can charge, service standards to be met, duration of license etc.); monitor and enforce the PPP operator's obligations; and address other interests such as environment, asset creation, maintenance and replacement. Thus, while economic regulation (setting tariff, monitoring cost of operations, setting sector entry/exit requirements etc. for a level playing field) is necessary, it should not be considered in isolation from other regulatory functions such as setting quality standards; monitoring performance; setting and enforcing planning, environmental, health and safety rules/regulations; setting procurement rules for contract out; and use of natural resources.

79. Financiers of RE PPPs in EMDE countries typically assume that regulated or market-determined wholesale electricity tariffs throughout the life of their project will stay at a level of viability. This may be due to perceived inexperience of the electricity regulator, perceived risk of political interference, or simply a 'chicken and egg' issue of the electricity

regulator not having a sufficient track record of tariff setting, and thus being precluded from gaining and demonstrating that experience.

80. Learning from the experience of the developed economies, the main challenge of the regulation is to integrate the less controllable renewable energy sources like wind and solar energy into the future electricity supply, which needs to be a competitive, single internal energy market with affordable electricity prices having security of supply. Investment in RE is capital intensive, with more front-loading resulting in financing challenges.

81. A common feature of electric power RE PPP in EMDE countries is a requirement for a long-term (20-25 year) contractually agreed tariff, together with contractually agreed mechanisms to adjust the tariff should various risk events arise.

82. Building market acceptance of the regulator's role will result from the absence of actual or perceived political intervention in the performance, decisions and awards made by the regulator. Independent regulators staffed with conscientious and knowledgeable professionals will be more successful in attracting international investment into RE PPP.

83. The conflicts to be addressed arise from the drive for affordable electricity prices, having security of supply on one hand and a policy towards increasing weather-dependent renewable energy on the other.

84. The regulation typically will have to address some of the important issues mentioned below.

1.Payment for capacity

85. It should be recognized that the private sector incurs fixed costs associated with constructing, financing and operating RE infrastructure regardless of the extent to which the public sector utilizes that infrastructure. Accordingly, governments in EMDE countries should expect payment under the PPA to be based on availability (including 'deemed availability') and performance, so that the project is paid for the output which it can deliver rather than its utilization, i.e. the output which it is required to dispatch.

2. Interconnections and grid use for dispatch

86. The interconnections and dispatchability of RE has to be transparent and non-discriminatory. Utilities may not allow reasonable conditions for transmission access to RE producers or may charge high prices for transmission access. Transmission access is necessary because some RE resources like windy sites and biomass fuels may be located far from population centres. Transmission or distribution access is also necessary for direct third-party sales between the RE producer and a final consumer. New transmission access to remote RE sites may be blocked by transmission-access rulings or right-of-way disputes.

3. Reliability and safety

87. Safety and power-quality risk from non-utility generation is a legitimate concern of utilities, but a utility may tend to set interconnection requirements that go beyond what is necessary or practical for small producers. At the same time, in many EMDE countries the grid can be less reliable and trip from time to time, in some case many times per month. The grid is also more likely to be prone both to constraints and to downtime during upgrades. Small RE projects can collectively account for a material percentage of overall generation capacity. When the grid is down or constrained, the off-taker will not be able to honour the offtake obligations resulting in a breach of contract. This can give rise to an obligation on the offtaker to pay damages, potentially triggering breach of provisions in other contracts.

88. Alternatively, if the RE operator has a dispatch obligation (with a provision to pay for deemed energy if it does not dispatch), then grid down time could result in the RE operator having to pay the deemed energy charges, typically identical to the damages which would have been paid by the offtaker for breach of offtake contract. The RE operator's damage payment could also potentially result in violating provisions in other contracts.

4. Rate-based regulation and feed-in tariff

89. Tariff setting procedures are needed to provide long-term predictability for project finance or equity investment in RE systems. Procedures for establishing, maintaining and changing tariffs need to be transparent, consistent and fair if small producers, especially producers of RE systems are not to be put to a disadvantage. For large utilities, rate-base regulation for setting rates incentivizes utility managers to be conservative in their technology choices and to prefer low capital costs power plants even if future fuel prices are likely to be very volatile. Therefore, regulated utilities typically have not been strong adopters of RE, with the exception of hydropower and in a few cases geothermal. However, for smaller RE projects, REFIT regimes provide for a prescribed feed in tariff for different generation technologies and classes of generation capacity, which could be too high or too low creating conditions that may need to be resolved by the regulator.

5. Sharing costs of grid infrastructure

90. Bearing and sharing of grid infrastructure (intelligent network and storage facilities) along with grid expansion and connectivity to RE sources needs to be defined in administrative and planning procedures.

6. Regulating government mandated market policies

91. Promotional policies, relevant to grid connected systems, impose a quota or target obligations for sources of electricity being used in the network such as conventional coal / gas-based electricity, renewable energy, biofuel, etc. The implementation options exercised are share-setting that is to say a share of the electricity delivered to end consumers by distributors comes from renewable sources; or through price setting, in other words, they impose an obligation on electricity distributors to buy RE based electricity at a government determined price. The issue to be regulated is who will pay for the incremental financial costs between RE and conventional energy sources and the right of the electricity distributors to recover the additional cost from consumers and for RE generators to be able to connect to the grid.

7. Net metering

92. Net metering is a limited form of feed-in tariff that permits consumers to install small renewable systems at their homes or businesses and then to sell their excess electricity into the grid. This excess electricity must be purchased at retail market prices by the utility. In some cases, producers are paid for every kilowatt hour they feed into the grid; in other cases, they receive credit only to the point where their production equals their consumption. It is of benefit to electricity providers as well as system owners, particularly in the case of photovoltaic, because excess power generated during peaking times can improve system load factors and offset the need for new peak load generating plants.

8. Tradable renewable energy credits

93. Renewable energy certificates (RECs) represent the environmental attributes associated with one megawatt-hour (MWh) of electricity production. RECs can be traded, bought and sold separately from commodity electricity. In cases where a renewable electricity standard (RES) is in place, compliance can be demonstrated by the use of RECs.

Renewable electricity targets and standards can provide a strong foundation for development of REC markets. Renewable electricity standards are regulatory mandates that require a specified amount of electricity that is sold or generated within a given area to come from eligible renewable resources. RECs can be linked with renewable electricity standards and provide a mechanism to support compliance. In cases where RECs are traded in short term or spot markets, establishing a minimum price floor for RECs can reduce investor uncertainty and potential increases in cost of capital that could stymie upfront investment.

E. Other issues

94. Risks resulting from climate change are often underestimated when host governments and project sponsors analyse RE PPP projects viability. It is important to diligently analyse and address such risks in early stages of an RE PPP project and agree on a fair share of subsequent revenue risks and eventually consider available insurance instruments.

VI. Indicators of compliance

95. The traditional RE PPPs have a focus on output-based specifications and service delivery targets. The key performance-based indicators to be achieved are monitored accordingly.

96. PfPPPs need to include indicators relevant to the achievement of SDGs. The output- and outcome-based SDGs that are in the control of the project concessionaire must be a part of the contract performance monitoring. The relevant indicators are detailed in the Annex I, Table 1.1.

97. The government also should monitor and evaluate the contribution of the RE PPP project impacts to the relevant SDGs as defined in the Annex I, Table 1.2.

Annex [English only]

Indicators for compliance of sustainable development goals

In addition to the performance parameters listed in the main text of the document, related to the technical aspects of renewable energy management, PfPPPs must also include indicators to monitor the outputs, outcomes and impacts of the project. Given below in Table 1.1 is a matrix of indicators that can be used as appropriate. Table 1.2 deals with the contribution of project to the impacts on the SDGs. These are beyond the control of the concessionaire and not a part of the contract performance per se. However, the government agency can take cognizance of the impacts in reporting the progress of achievement of the SDGs.

Table 1.1
Direct renewable energy public-private partnerships targets relevant to the SDGs and measurement indicators (to be a part of PfPPPs Contract as performance targets within the contract period)

Sustainable development goal	*Relevant sustainable development goal indicators and measurement*
SDG 5. Achieve gender equality and empower all women and girls (Project output related) *Use of the PPP model in renewable energy projects provides an opportunity to seek and achieve greater gender equality*	5.5. Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life • 5.5.2. Proportion of women in employment and managerial positions
SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all (Project output related) *Provision of renewable energy expands the means to provide reliable affordable sustainable and modern energy services*	7.1. By 2030, ensure universal access to affordable, reliable and modern energy services • 7.1.1 Proportion of population with access to electricity • 7.1.2 Proportion of population with primary reliance on clean fuels and technology 7.2. By 2030, increase substantially the share of renewable energy in the global energy mix • 7.2.1 Renewable energy share in the total final energy consumption

Note:
1. The scope of the private sector participation needs to be enhanced to include applicable PfPPP indicators linked to SDGs. However, depending on the allocation of PPP responsibilities, the indicators also need to be balanced between direct contract deliverable indicators and those attributable to the public-sector agency/government as additional contributions to the project.

2. Above indicators may be suitably altered and are not prescriptive.

3. Applicable indicators need to be chosen depending on type of project.

Table 1.2
Indirect renewable PPP targets relevant to the SDGs
(To be measured by the Government Agency as a part of contract impact contributing to the overall SDGs for the country)

Sustainable development goal	*Relevant sustainable development goal indicators and measurement*
SDG 1. End Poverty in all its forms and everywhere (Project impact related) *Universal access to reliable affordable sustainable and modern energy services is critical to reduce poverty*	1.4. By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance • 1.4.1 Proportion of population living in households with access to basic services
SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture (Project impact related) *Access to reliable affordable sustainable and modern energy services is essential to increase agricultural productivity*	2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment • 2.3.1 Volume of production per labour unit by classes of farming/pastoral/ forestry enterprise size • 2.3.2. Average income of small-scale food producers, by sex and indigenous status
SDG 3. Ensure healthy lives and promote well-being for all at all ages (Project impact related) *Access to reliable affordable sustainable and modern energy services is essential to provide reliable health services and essential medicines and vaccines*	3.8. Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all • 3.8.1 Coverage of essential health services

Sustainable development goal	*Relevant sustainable development goal indicators and measurement*
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (Project impact related) *Access to reliable affordable sustainable and modern energy services is essential to provide access to education facilities*	4.a. Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all • 4.a.1 Proportion of schools with access to electricity
SDG 5. Achieve gender equality and empower all women and girls (Project impact related) *Use of the PPP model in renewable energy provides an opportunity to seek and achieve greater gender equality*	5.1. End all forms of discrimination against all women and girls everywhere • 5.1.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex
SDG 6. Ensure availability and sustainable management of water and sanitation for all *Access to reliable affordable sustainable and modern energy services is essential to provide access to water*	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all • 6.1.1 Proportion of population using safely managed drinking water services
SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all *Provision of renewable energy expands the means to provide reliable affordable sustainable and modern energy services*	7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology • 7.a.1 Mobilized amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment
SDG 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (Project impact related) *Access to renewable energy improves global resource consumption and production efficiency, reduces environmental degradation and contributes to triggering economic growth and development*	8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead • 8.4.1 Renewable energy footprint, footprint per capita, and renewable energy footprint per GDP
SDG 9. Build resilient infrastructure,	9.4 By 2030, upgrade infrastructure and

Sustainable development goal	*Relevant sustainable development goal indicators and measurement*
promote inclusive and sustainable industrialization and foster innovation (Project impact related)	retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies
Investment in renewable energy is generally for the long term and is designed to provide high quality, resilient, infrastructure that will last for years to come	• 9.4.1 CO2 emission per unit of value added
SDG 12. Ensure sustainable consumption and production patterns (Project impact related)	12.2. By 2030, achieve the sustainable management and efficient use of natural resources
Renewable energy reduces the global resource consumption for energy production reduces environmental degradation	• 12.2.2. Domestic renewable energy consumption, domestic renewable energy consumption per capita, and domestic renewable energy consumption per GDP
Renewable energy support food preservation facilities reducing potential food wastage	12.3. By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
	• 12.3.1 National/provincial food loss index
SDG 13. Take urgent action to combat climate change and its impact (Project impact related)	13.2. Integrate climate change measures into national policies, strategies and planning
Integrating well designed renewable energy projects that can contribute to climate action by reducing in greenhouse gas emissions	• 13.2.1. Establishment or operationalization of an integrated policy/strategy/plan which increases countries' ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions
SDG 17. Strengthen the means of implementation and revitalise the global partnership for sustainable development (Project impact related)	17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships
PPPs in renewable energy provide opportunities for public and private alignment and win-win situations where both public and private interests are served through a mutually beneficial long-term relationship	• 17.17.1 Amount of United States dollars committed to public-private and civil society partnerships