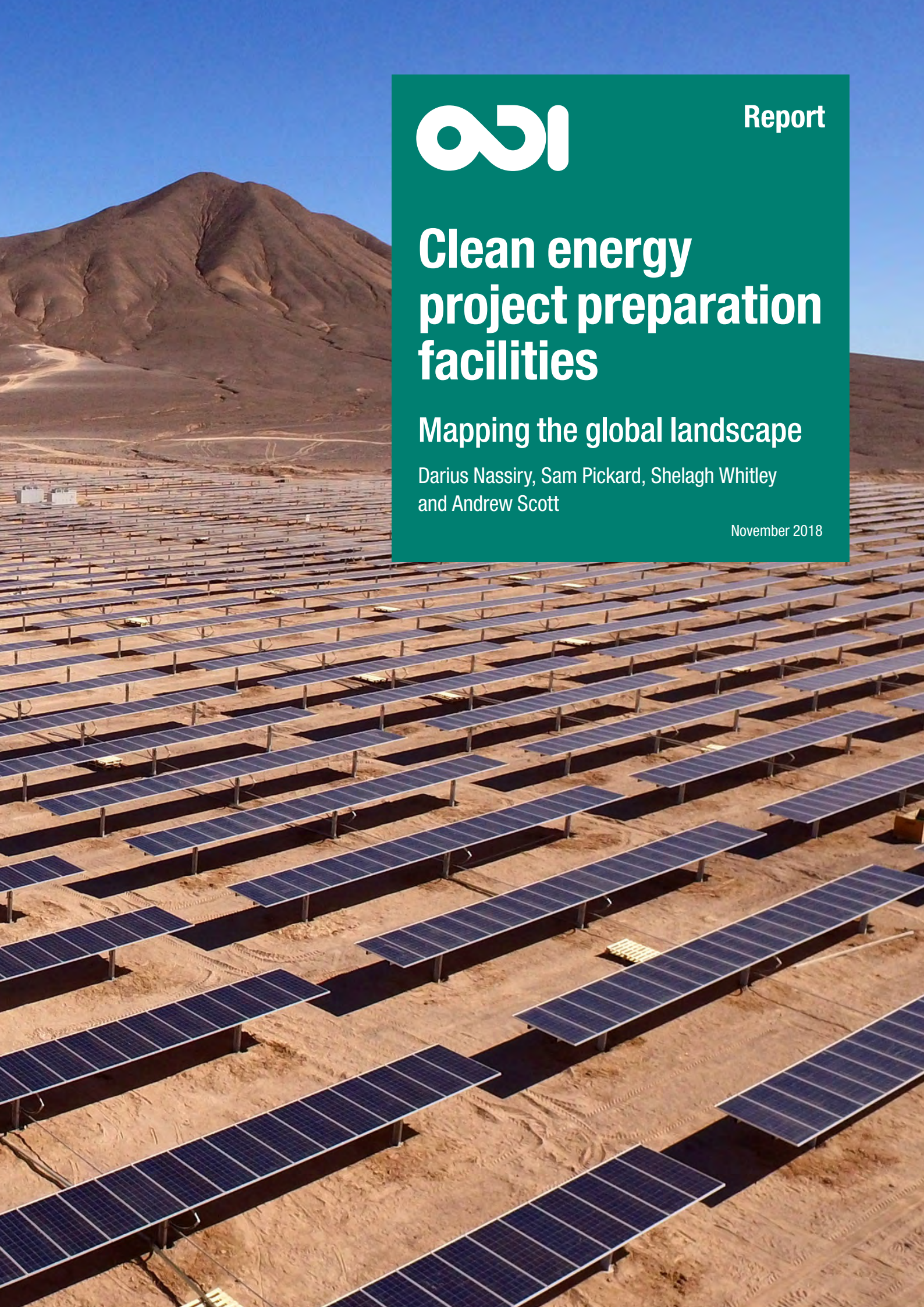

Report

Clean energy project preparation facilities

Mapping the global landscape

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November 2018

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Cover photo: Bolero solar plant, Région de Antofagasta, Chile. Credit: Antonio Garcia/Unsplash, 2017.

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Contents

List of boxes, tables and figures

Boxes

Tables

Figures

Executive summary

We must make significant new investments in clean energy to meet global climate and sustainability goals. Renewable energy investment is growing, but not quickly enough. Faster, better project preparation is needed to drive investment at the speed and scale needed. Project preparation facilities (PPFs) – along with financial innovations, building local capacity and ensuring a strong enabling environment, among other interventions – can help accelerate investment in clean energy.

Recent years have seen a growing number of PPFs for clean energy projects established. This paper presents the results of a high-level desk review that provides a current mapping of the landscape. The results cover 150 PPFs and form the most comprehensive study of its kind to date. The full dataset for the assessed PPFs is provided as an annex to this paper.

We find a broad range of PPFs, operating at different scales, with different institutional structures and mandates, and working on specific stages of project development. Most clean energy PPFs in this study were relatively large, with a regional or global remit. Approximately 40% of PPFs involved with clean energy projects were exclusively focused on this sector.

Taken together, PPFs fall short of their potential positive impact, given the scale of the challenge. We find no standard set of metrics by which to evaluate an individual PPF's performance and there is limited data that is publicly available for such an evaluation. Increasing support for PPFs will be needed to improve their effectiveness – particularly in the early stages of project development – but this should go further than additional funding.

We recommend that donors, governments and the PPF community further develop the sector's focus on:

- evaluating the effectiveness of PPFs, individually and collectively, to assess and chart progress towards closing the clean energy investment gap
- investing in communication and knowledge sharing to accelerate interventions that encapsulate the most effective PPF approaches
- improving understanding of the complementary initiatives that can help PPFs thrive.

1 Introduction

1.1 The clean energy infrastructure gap

The energy landscape is changing. Learning by doing, increasing scale and improvements in technology have led to continuing declines in solar power, wind energy and battery storage prices, which have made renewable energy the most economical form of electricity in many parts of the world (IRENA, 2018). The number of clean energy installations and the role they play in energy systems continues to increase as investors allocate capital to energy efficiency and renewable energy infrastructure. Renewables now represent the majority of electricity capacity additions, with $280 billion invested in 2017 (FS-UNEP and BNEF, 2018).

Even so, change is not occurring fast enough to achieve global climate change goals. To keep rising temperatures below the 2°C goal of the Paris Agreement, the carbon intensity of the global economy[1] must fall by 85% by 2050 and the current pace at which renewables are growing must double (IEA and IRENA, 2017). Renewable electricity and energy efficiency measures can achieve 90% of the reductions required in energy-related greenhouse gases (GHGs) (IRENA, 2018). However, achieving these objectives will require levels of investment in renewable energy to triple, committing $25 trillion between now and 2050 (IRENA, 2017).

The clean energy transition represents a substantial proportion of the additional $1.4 trillion annual investment that is needed in low- and lower-middle-income countries (LICs and LMICs, respectively) to meet the Sustainable Development Goals (SDGs) (Schmidt-Traub, 2015). The International Renewable Energy Agency (IRENA) reports that transition to a sustainable energy system would result in higher welfare, incomes and employment (IRENA, 2018). Key to this transition will be an acceleration in the delivery of new investments.

In 2017, three-quarters of investment in renewables occurred in China ($126.6 billion), Europe ($40.9 billion) and the US ($40.5 billion) (FS-UNEP and BNEF, 2018). Nearly 90% of the global total was provided by, mostly domestic, private investors (IRENA and CPI, 2018). Future markets are unlikely to reflect current investment patterns as most of the growth in electricity demand in coming decades will be from non-OECD countries, of which many have limited capacity and experience to mobilise this scale of investment (Tonkonogy et al., 2018).

In these newer markets, domestic governments, providers of official development assistance (ODA)[2] and development finance institutions (DFIs)[3] have limited resources and will be unable to cover the required investment. Closing this investment gap will require much greater involvement from the private sector (ADB, 2014; Chelsky and Morel, 2013). Domestic private investors will continue to play an important role but foreign capital will also be required, scaling up investments through

1 Carbon intensity refers to quantity of CO^2 emissions per unit of gross domestic product (GDP).

2 Total ODA disbursements from OECD Development Assistance Committee members have averaged $108 billion per year over the past decade, with less than 5% of this allocated to energy projects (OECD, 2018).

3 DFIs in this report are comparable to the 'official sector' institutions described in Chelsky and Morel (2013). This includes bilateral and multilateral agencies, such as the multilateral development banks (MDBs). DFIs also have a role to play in using ODA and non-concessional international public finance to catalyse international private finance (UN, 2015; NCE, 2016).

intermediary funds,[4] capital market instruments (e.g. green bonds) and expanding the group of large institutional investors that invest in clean energy infrastructure.[5] At the same time, this opportunity offers significant potential attraction as investors continue to respond to stakeholder and regulatory pressures to increase their exposure to climate-friendly assets and shift institutional funds from fossil fuel investments into renewable assets (WEF, 2016; Oberholzer et al., 2018).[6] This reallocation of capital towards clean energy infrastructure was recently described as 'a $1.2 trillion market opportunity by 2030' (Blended Finance Taskforce, 2018).

Although 'liquidity in global financial markets is available in abundance' (Oberholzer et al., 2018) and there is a 'strong interest among investors to explore emerging markets' (BFT, 2018), private capital is competitive and will flow to what investors see as the most attractive location and sector, given their investment objectives, expected returns and risk perception. Public capital and supportive policy and regulatory conditions can help establish attractive conditions for investors and draw private finance into climate investment (Huxham et al., 2017; NIRAS, 2018; CEPA, 2015; BFT, 2018).

The catalytic role that public finance can play varies between countries, sectors and the type of private capital,[7] but may be generalised according to a country's income level (see Table 1) (Sahoo et al., 2015). These are not hard boundaries: in some upper-middle-income countries (UMICs) the investment environment is robust enough for projects to attract private financing without the need for concessional public finance (BFT, 2018).

1.2 Key barriers to clean energy investment

There is no shortage of proposals for early-stage clean energy opportunities vying for investors' capital (Oberholzer et al., 2018). However, there are significant challenges in bringing projects and investors together, creating a supportive investment environment and managing the process of project development through to the point of financial close where a positive

Table 1 Generalised priorities for countries targeting clean energy infrastructure development

	Priorities for clean energy infrastructure development
Low-income countries (LICs)	Use ODA and international financing to compensate for weak domestic markets. Relatively low amounts of infrastructure in place offers potential to develop along low-carbon pathway.
Middle-income countries (MICs)	Increasing focus on developing policy and financial environment to attract private finance while making development finance more catalytic. Continued drive to decrease costs and create internationally comparable markets.
High-income countries (HICs)	Cost reductions for privately financed projects driven by technical, behavioural and financial innovation. Public role mainly involves shaping the market.

Note: for country classifications by income group, see https://blogs.worldbank.org/opendata/lics-lmics-umics-and-hics-classifying-economies-analytical-purposes or https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined.
Source: adapted from Sahoo et al. (2015).

4 For example, see the recent acquisition of Equis by Global Infrastructure Partners: https://reut.rs/2hbpfik and https://bit.ly/2KdTYay.

5 For example, USS, Aviva and M&G (Tonkonogy et al., 2018).

6 For example, the Danish pension firm Matter allows individual investors to specify the sector(s) in which they wish to invest.

7 Many sources of investment exist with very different approaches, such as seed capital, 'angel' investors or private equity. The focus here is predominantly on institutional investors owing to their untapped long-term investment potential and reported desire to increase investments in clean energy infrastructure (Huxham et al., 2017).

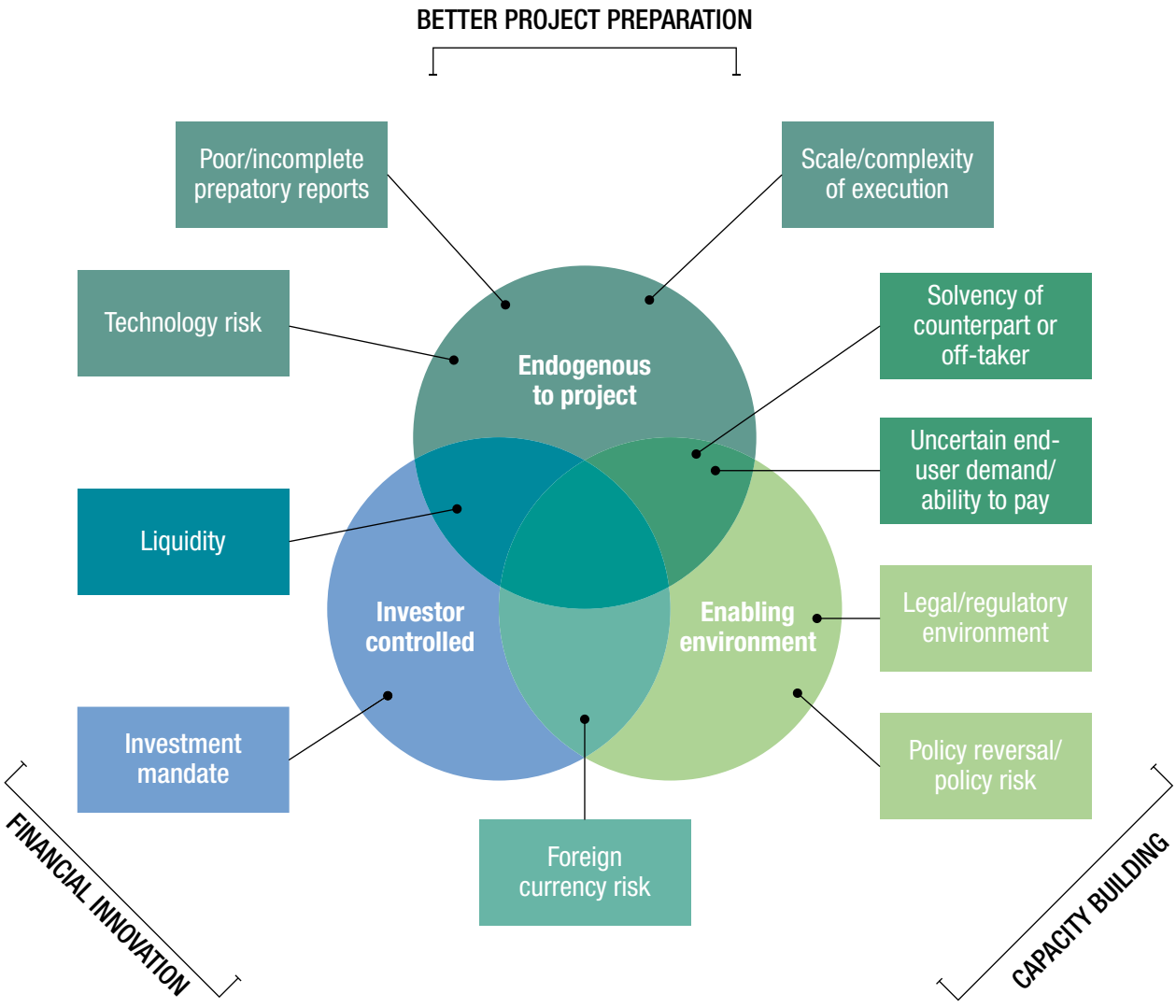
investment decision is taken. As the Addis Ababa Action Agenda states:

> Insufficient investment is due, in part, to inadequate infrastructure plans and an insufficient number of well-prepared investable projects, along with private sector incentive structures that are not necessarily appropriate for investing in many long-term projects, and risk perceptions of investors. (UN, 2015)

Too often investors are unable to find 'bankable' projects – that is, projects that banks will lend to and investors will invest in. Investors assess bankability at each stage and will have different requirements depending on the phase of project development but will likely assess their investment decisions against the factors shown in Figure 1. Investors may have different investment criteria and different stakeholders may disagree about the bankability of the same project, often because of factors that are beyond the project's control (CEPA, 2015).

The rapid changes that the clean energy industry is witnessing can make clean energy projects particularly prone to information gaps, which can create outsized perceived risks (Huxham et al., 2017; Mercer and IDB, 2017). Inaccurate or out-dated perceptions can hamper

Figure 1 Addressing key factors that shape views of bankability



Source: authors; adapted from Nassiry et al. (2016).

clean energy projects, especially where they must overcome status quo bias[8] to compete with conventional energy sources and where stakeholders may not share a common vision (NCE, 2014; 2016; Mercer and IDB, 2017).

Barriers to investment can be due to the context in which the project is being executed – such as risks associated with economic, political and legal environments – and to specific investor requirements such as their mandate, target risk-return profile, liquidity requirements, experience with similar projects, and in-house capacity to manage the investment.[9] Modifying the ways that governments, regulators and the investment community operate could mitigate many of the risks that currently constrain development of clean energy. Appendix 1 provides more information about how other measures can contribute to accelerating clean energy investment. Other factors that shape bankability are endogenous to projects. More, better-prepared projects are clearly needed to close the renewable energy infrastructure gap.

From an investor's viewpoint, inadequate project pipelines have often been attributed to insufficient project development capacity to bring forward bankable projects (e.g. Leigland and Roberts, 2007; ADB, 2014; WEF, 2014; Kortekaas, 2015; MMC, 2017). Project preparation typically accounts for 5%–10% of total project costs and the inherently speculative nature of project preparation, particularly during the initial stages, and the cash constraints that many developers face, result in a significant barrier for early stage project development. Few third-party investors are willing to take on these risks as not all projects reach financial close, and there is a lack of investment vehicles able to manage these risks effectively (OECD, 2011; UNEP, 2011; EMPEA, 2015; Ramboll 2015; Hamilton and Zindler, 2016; WEF, 2017).

As a result, project developers can spend considerable time fundraising – delaying individual project development and potentially making the project appear 'troubled' – which constrains the number of projects entering the project development cycle. Delays to project development also increase difficulties regarding sustaining political support, engagement from developers and an appropriate capital structure. Early-stage support is therefore critical to project preparation activities and, ultimately, to attracting additional investment, achieving financial close and getting projects built. The need for this early-stage financing and technical assistance is the justification for many PPFs.

1.3 Project preparation facilities

PPFs have received high-level political support.[10] A growing number of publicly funded project preparation facilities (PPFs) have appeared over the last decade to address the lack of preparation capacity in the infrastructure sector and the clean energy sector specifically (Mercer and IDB, 2017; NIRAS, 2018). PPFs support clean energy investment by helping to speed up the technical, financial, legal and regulatory steps required to advance and conclude investments.[11] They guide projects through part or all of the project and investment development cycles and ideally work to complement capacity-building and financial-innovation initiatives (see Conclusions and

8 Status quo bias can take many forms ranging from energy policy and decision-making structures created for energy sectors that were heavily influenced by state-owned enterprises dependent on conventional fuels to a lack of analysts, decision-makers and civil servants with experience of the cost–revenue profile and grid-integration needs of clean energy projects. This is especially the case where sustainability is viewed in competition with other development objectives (Mercer and IDB, 2017).

9 See Tonkonogy et al. (2018) and references therein for a characterisation of political, technical and commercial risks at the project level and within the broader environment.

10 In 2014 and 2015, the G20's Infrastructure Working Group commissioned studies on PPFs for sustainable infrastructure in Africa and Asia. In response, the G20 set out a number of actions to strengthen the upstream environment for infrastructure project preparation and to maximise PPF effectiveness (G20, 2014). The G20 noted that several large-scale PPFs had recently been launched and additional capital has been made available to the sector's MDB-based investors (G20, 2016). See also G20 (2016) for additional detail on MDB and DFI investments in PPFs.

11 Adapted from https://2012-2017.usaid.gov/sites/default/files/documents/1860/PPF%20Toolbox%20REVISED.pdf.

Appendix 1) to close the gap between the needs of investors and project developers.

PPFs – along with financial innovations, building local capacity and ensuring a strong enabling environment, among other interventions – can help accelerate investment in clean energy.

This study presents the results of a high-level desk review that provides a mapping of the current PPF landscape and makes suggestions to strengthen PPFs' contribution to accelerating renewable energy project development and closing the clean energy infrastructure gap.

2 Mapping the clean energy PPF landscape

PPFs often work beyond the boundaries of individual projects and overlap with other initiatives to help foster a more supportive enabling environment and combat constraints posed by the lack of appropriate technical, legal and financial skills both inside and outside government (CEPA, 2015). PPFs can also help realise projects by coordinating and accelerating the development process to ensure momentum, build investor confidence in the skills of the developers and accelerate clean energy deployment.

In addition to generating new infrastructure, the project preparation process can play a key role in expanding human and technical capacity and strengthening the ecosystem necessary to give investors confidence in 'deal flow' – the volume of investment opportunities available to investors over time – and comfort in managing execution risks. In this way, each successful clean energy project can create positive signals for investors about the future direction of the sector, strengthening links between ODA, domestic public finance and international investors, and building investor interest in future clean energy projects.

To analyse the PPF landscape, the project development process can be considered to have three consecutive stages – defining, designing and financing – that lead to financial close and then subsequently to construction and operation.[12] Successfully navigating these stages depends on satisfying the varying requirements of a range of public and private stakeholders (Kortekaas, 2015) and on a conducive enabling environment – that is, the social, legal, political and economic factors that surround a project.

Action to address the enabling environment may be required before a project is defined and can continue when a project is in operation. Figure 2 presents an overview of the process, highlighting barriers to bankability at each stage (enabling, defining, designing and financing) and providing examples of specific actions that PPFs may take to address them.[13]

In our brief review, we identified 150 PPFs that offer support for the preparation of clean energy infrastructure projects. The overall picture that emerges from these facilities is that of a large, diverse and fragmented set of approaches, which vary in geographic coverage, type of institution and stage of intervention in the project development process (see Figure 3 for more detail). Fuller details of the methodology used are provided in Appendix 2.

Analysis of these PPFs reveals the following:

There is no blueprint for a PPF – nor is there consensus on the definition of a PPF or their precise roles. PPFs may be large or small (in terms of scale of investment and number of countries and regions targeted), can target specific technologies or clean energy in general, or have a broad infrastructure focus. PPFs can be publicly or privately funded, financially self-sustaining or dependent on grants, and focus on all, some, or just one stage of the project development cycle.

PPFs exist mainly to support projects in developing countries and often (but not always) have a regional or global focus. A significant

12 For a detailed framework of the specifics of developing renewable energy infrastructure projects see Springer (2013).

13 This is not an exhaustive list of barriers and activities. In practice, activities may span several stages or require iteration that deviates from the stylised linear process.

Figure 2 Overview of PPF activities throughout the project development process

Stage	Enabling	Defining	Designing	Financing	
Function	Creating a supportive environment for investment	Early-stage preparation	Main preparation phase	Facilitating investment	
Addresses	• Legal/regulatory environment • Policy reversal/risk	• Uncertain end-user demand/ability to pay	• Poor/incomplete prepatory reports	• Solvency of counterpart/off-taker • Foreign currency risk • Liquidity	**Financial close**
		• Technological risk • Scale/complexity of operation			
Examples	Designing enabling legislation, reforming relevant institutions, capacity building, ongoing stakeholder engagement	Pre-feasibility studies, identifying desired outcomes and potential project partners, preparing systems and structures	Detailed feasibility studies, environmental and social impact assessments, defining administrative roles	Assessing public/private finance options, negotiating contracts, marketing to investors	

Source: authors.

proportion of the PPFs identified (approximately 40%) have a regional focus. Just over a third have a multi-regional or global scope. Most regional PPFs were in Africa, followed by Asia and Latin America. Few PPFs were identified in other regions.

Overall, almost 40% of PPFs appear to focus exclusively on clean energy infrastructure. This includes both PPFs that focus on all types of clean energy – such as the Sustainable Energy Fund for Africa (SEFA) and the US–India Clean Energy Finance (USICEF) initiatives – and technology-specific PPFs, such as the Scaling Solar and Geothermal Risk Mitigation facilities. The majority of PPFs have a general infrastructure focus that includes energy as one of its target sectors. PPFs with a general infrastructure focus dominate (>90%) the landscape for the smaller-scale, single-country PPFs.

PPFs represent a wide range of renewable energy projects in terms of scale and complexity – from utility-scale solar power and wind energy installations, energy efficiency and technologies, battery storage, to decentralised mini-grids and other supporting infrastructure.

Clean energy PPFs focus more heavily on the later stages of the project development process. Approximately 90% of the facilities participate in the designing stage (i.e. the phase before financing), with about 70% involved in sourcing or facilitating of financing, while 60% support projects during the defining stage and 50% undertake activities focused on strengthening the enabling environment. This 50% figure includes only PPFs that address the enabling environment in addition to other areas. It does not include initiatives that are solely focused on developing the enabling environment, such as those presented in Appendix 4.

It is challenging to comment on the scale of PPFs, as data is limited. Information on the scale of resources available to each PPF, which might be a proxy for its size and potential impact,[14] is only available for approximately one-third of the facilities (Figure 4).[15]

Over 90% of the clean energy PPFs identified are publicly funded, with over 85% also hosted in public institutions. Available evidence suggests that funding for PPFs tends to come from co-investments from a range of large

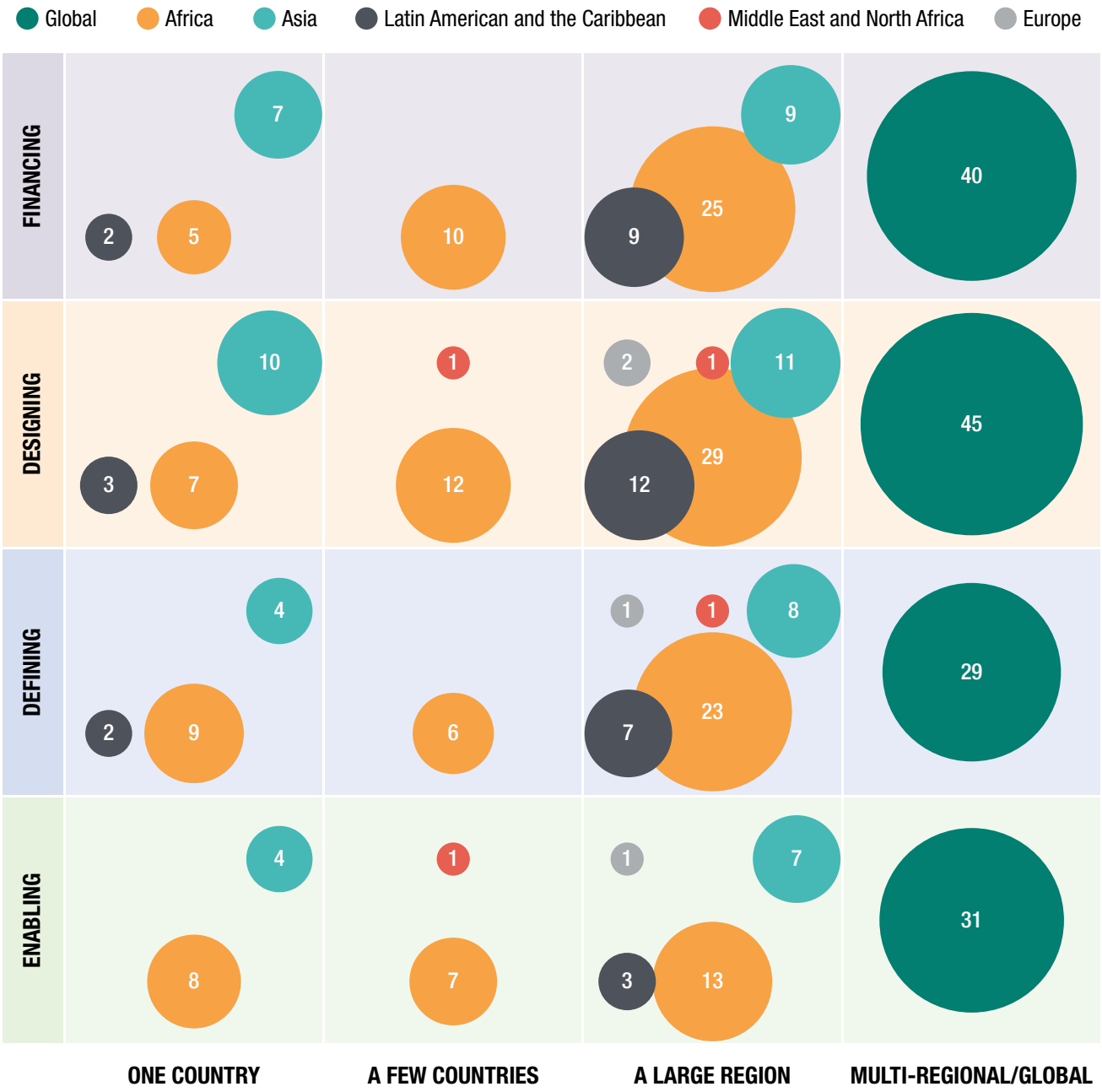
14 Even if complete data on resources was available, information about the type of activities that received support would still be needed in order to assess their possible impact.

15 For many facilities that are attached to larger funds or programmes, we were unable to evaluate the proportion of the total capital that was available for project preparation activities.

DFIs – particularly for facilities hosted by the MDBs. This funding also supports many of the government-hosted facilities, including directly through bilateral relationships rather than via the pooled resources of the MDBs. Host entities (notably governments and MDBs) may also provide in-kind contributions as an additional means of support for publicly hosted PPFs. In the few instances where PPFs have some degree of private funding, these facilities tend to include a mechanism to recover, at least partially, the investment in project preparation activities.

Publicly funded and non-self-financing PPFs are operating in high-, medium- and low-income countries. Some observers suggest that PPFs should aim for a 'self-sustainable financial model', whereby the PPF is funded through charging fees to or taking a stake in successful projects (WEF, 2015;

Figure 3 Mapping the PPF landscape: PPFs by number of target countries/regions and development stage

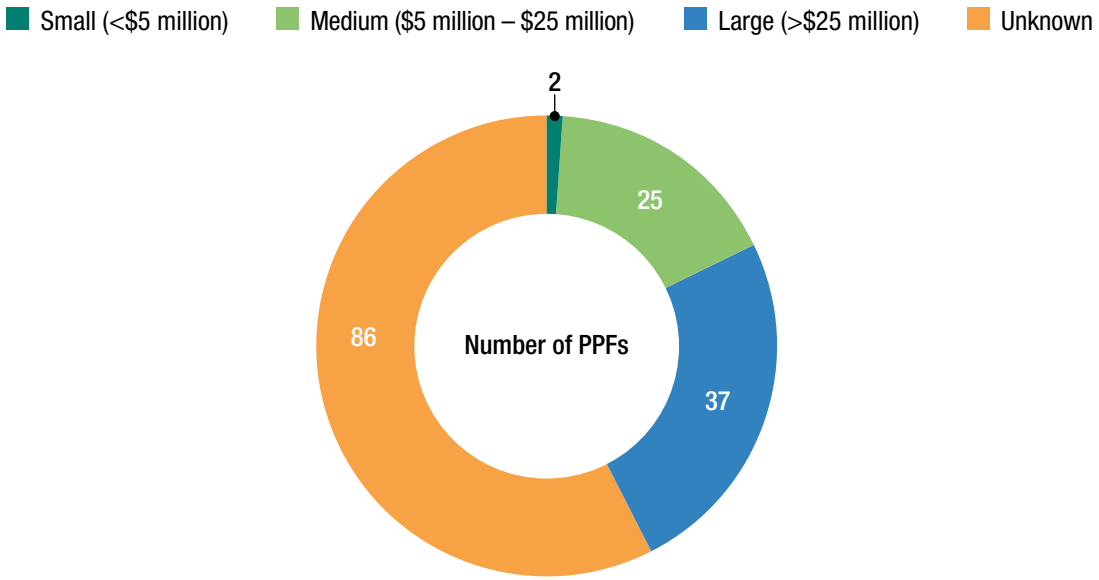


Note: bubble size reflects numbers of PPFs in set (labelled in centre of bubble) and colour represents target region.
Source: authors' analysis.

NIRAS, 2018). However, we find that PPFs in the clean energy space are in place in high-income countries, which indicates that they may require public support regardless of the wider regulatory and economic context.

PPFs defy rigid categorisation but facilities can be grouped by their similar functions, as shown in Table 2. These groupings may overlap, as illustrated by the fuller descriptions of selected PPFs for each grouping that are available in Appendix 3.

Figure 4 Distribution of PPFs by the scale of available resources



Source: authors' analysis.

Table 2 Illustrative groupings for PPFs

Group	Focus	Example	Focus area
Sector-specific	Niche facilities prepare projects for a specific sector or subsector of clean energy infrastructure.	Scaling Solar	All stages of project development process
Independent multi-sector	Global focus and provide support to developers across a range of infrastructure sectors.	Private Finance Advisory Network	All stages of development process
Integrated	Attached to funds as a step to preparing projects that the fund will then finance.	Climate Investor One	Mainly designing and financing stages
Programmatic	Tend to involve PPPs and work further upstream in project development process to ensure a supportive enabling environment that encourages project developers to take on the later-stage preparation activities themselves.	Global Infrastructure Facility	Mainly enabling environment and defining stages
Government PPP units	Carry out similar work to external PPFs but typically focus on defining projects and attracting private developers to invest. Can facilitate links to other government ministries (e.g. finance, planning, energy) which can accelerate development.	The Philippines' PPP Unit	Mainly enabling environment and defining stages

Source: authors' analysis.

3 Preliminary assessment of PPF effectiveness

3.1 Challenges in, and approaches for, undertaking assessments of PPFs

Many PPFs do not appear to publish assessments of their effectiveness and reviews do not seem to be universally carried out. A literature review and our own analysis highlight several factors that hamper detailed evaluation of the effectiveness of PPFs:

1. A paucity of publicly available data (see Chapter 4).
2. Where data is available, the range of contexts that PPFs operate in impedes direct comparisons of their performance, as a result, they do not capture the different impacts of the broad variety of types of clean energy infrastructure, and therefore risk overly simplified comparisons.
3. When measurements are carried out, differences in the methodologies used can also limit comparability between the results (BFT, 2018). This could be further compounded if projects within a PPF were aggregated to provide an overall 'score' on effectiveness.
4. Seemingly objective factors, such as the direct and indirect effects on private financing are often difficult, if not impossible, to measure accurately (Chelsky and Morel, 2013).
5. Where institutions evaluate the PPF against a predetermined log frame, a PPF's effectiveness is defined only according to the metrics set out at its launch.

In response to some of these challenges, Rohde (2015) and Fay (2016) suggest looking beyond the headline dollar or megawatt figures to ensure that investment is occurring in projects that advance broader policy objectives, such as those of ensuring energy access or meeting one or more of the Sustainable Development Goals. In some cases, such multi-dimensional approaches, based on criteria similar to those used by DFIs to evaluate projects, have been employed in studies evaluating PPF performance (ICA, 2012; ASI, 2014; Oberholzer et al., 2018). These approaches analyse performance qualitatively against several criteria (Table 3).

There appears to be an opportunity both to deepen the analysis in these areas (e.g. through adopting a more objective and data-driven approach) and to expand the breadth of the analysis to consider the impact of PPFs specifically. For example, in addition to the assessment questions provided in Table 3, an analysis of PPF performance could assess its efficiency in mobilising private capital; effectiveness in delivering co-benefits, including the SDGs; financial sustainability (recycling of capital); knowledge sharing among PPFs; and contribution to project-related capacity building. The continuation of a PPF across funding cycles could also be used as a broad indicator of effectiveness (see Box 1).

Table 3 Questions used to assess a PPF's degree of success

Success factor	Assessment question
Relevancy and effectiveness	Do the managed projects match the infrastructure challenges in the respective environment?
Efficiency	How does the PPF ensure that financial and human resources are employed in the most effective way?
Co-benefits	How can co-benefits for local communities and the project preparation process be created?
Financial viability of projects	How is financial viability and bankability of projects achieved?
Sustainability	How are environmental and social aspects taken into account?

Source: Oberholzer et al. (2018).

3.2 Findings from existing PPF evaluations

Some fuller assessments of the performance of individual clean energy PPFs are publicly available. These tend to form part of standard monitoring protocol of the host organisation (see, for example, IFC, 2014; DFID, 2017; SEFA, 2016). These reviews of PPF performance have shown mixed results.

An in-depth review of PPFs in Asia found that they were, in general, 'performing satisfactorily [and] have been able to facilitate the preparation of a range of projects including regional transformative projects' (ASI, 2014). However, for PPFs in Africa, ICA (2012) reported projects were not performing as hoped. Similar results were suggested by World Bank evaluations of their own projects, but PPFs in other countries (including projects funded by other donors) were reviewed more positively (CEPA, 2015). In many cases, PPFs seem to have responded to criticisms and shifted their focus to increase the amount of support targeted towards earlier stages of project development.

Positive examples of individual PPFs' and projects' activities are also available. These include Africa50 seeing its first in-house-prepared project (a 400 MW solar plant in Egypt) reach financial close in half the time usually taken by African infrastructure projects (NIRAS, 2018; Nassiry et al., 2016) and the successful preparation of clean energy infrastructure projects – like the Ruzizi III hydroelectric power station, Inga III hydroelectric dam and the Nacala Logistics Corridor – which crowded-in private investors despite challenging regulatory and legal environments (CEPA, 2015).

Box 1 Scaling up and replication of successful PPF models

Many PPFs are the second or third iteration of successful initiatives, including MDB-hosted PPFs and funding windows (such as the Seed Capital Assistance Facility or the Africa Renewable Energy Fund). In lieu of publicly available data, we can infer that these PPFs have impact by satisfying their original mandate, at least in part, and attracting follow-on funding. Successor PPFs tend to operate in a similar context to their predecessor, though often with greater resources.

In addition, several PPFs have been launched in new areas following success in other contexts, often with specific modifications. For example, the US–India Clean Energy Finance (USICEF) initiative was launched in 2016 after the US–Africa Clean Energy Finance (ACEF) initiative was deemed a success. Both initiatives were initially backed by the US Overseas Private Investment Corporation (OPIC) but differ in terms of institutional arrangements: the ACEF was funded and coordinated by the US government while USICEF sources funding from philanthropic foundations and the Indian Ministry of New and Renewable Energy and is implemented by the non-profit organisation Climate Policy Initiative.

Sources: Crown Agents (n.d.), Morton (2015), USICEF (n.d.; 2016; 2017; 2018).

Reviews of the aggregate impact of PPFs tend to present less positive views of PPF performance in terms of overall progress towards closing the clean energy infrastructure gap. Shortcomings can include a general lack of in-house technical capacity, limited coordination between activities and PPFs, difficulties interacting with private sector developers, and a failure to fully engage with early-stage development or build a supportive enabling environment. Suggestions for improving the sector vary: BFT (2018) concludes there is a 'need to change the way project preparation and technical assistance is provided' and suggests that PPFs should become more closely involved with project funders. NIRAS (2018) suggests that rent-seeking consultants and poor advertising by the PPFs limit their effectiveness and that they should integrate more closely with developers.

At both an individual and aggregate level, much less is known about where or why PPFs are not performing as expected. For example, analysis assessing why projects do not achieve bankability once they have entered PPF pipelines remains scarce (see Box 2).

Box 2 Understanding why PPF-supported projects fail to achieve bankability

Despite the consensus that there is an undersupply of projects reaching bankable status, there seems to be very little information available identifying *why* PPF-backed projects fail to achieve bankability.

Some analysts suggest that it is normal for PPFs to funnel projects, discarding a portion of those accepted into their pipeline as project preparation proceeds (ICA, 2015; Ramboll, 2015; NIRAS, 2018). Yet projects accepted into a PPF's pipeline that fail to reach financial close drain PPF resources available to deserving projects. Some projects fail to achieve bankability for reasons that could not have been foreseen at the outset but are revealed by progressively deeper analyses undertaken during the preparation process. Rejected projects may, however, also indicate a need to improve the PPF's operations or a need for stricter acceptance policies. All instances of accepted projects failing to reach bankability should be viewed as learning opportunities and used to update collective understanding of the market and PPFs' target rate for projects to proceed through to financing.[1]

The Sustainable Energy Fund for Africa (SEFA) provides a useful example. In its 2016 annual report, SEFA (2016) state that, of 175 applications, 111 were rejected on the grounds of being ineligible (e.g. too small or having no pre-feasibility study). Of the remaining 64, 26 were then rejected by the Secretariat with no reasoning given and just 10 projects were approved for entry into the pipeline (the target for 2017 was 12). Although anecdotal, this appears to be a considerable bottleneck in terms of progressing projects – and therefore closing the clean energy infrastructure gap – but we have little information as to why so many projects failed to be accepted into the development pipeline.

The data needed to establish why PPF projects fail to reach bankability may already exist, even if currently it does not appear to be available. In addition to monitoring existing projects, PPFs (or their funders) could commit a small amount of resources to find out more about projects that have already passed through or dropped out from their pipelines.

1 This could be carried out in a similar fashion to the recent analysis of lessons learned from infrastructure and conflict (Watkins et al., 2017), the capacity-building impacts of PPP projects (Marcelo et al., 2017) or government PPP capacity (World Bank and PPIAF, 2016).

4 Areas for improvement in PPF effectiveness

4.1 Improving the effectiveness of PPFs involves more than additional financial resources

Some PPFs may be under-resourced. In principle, increasing their funding could enable them to better develop projects (ICA, 2012; 2015; NIRAS, 2018) – but this does not seem to be the case universally. Developing the projects to close the clean energy infrastructure gap will require investing more resources in project preparation. But clean energy PPFs are only responsible for a small share of overall project preparation activities; the majority is borne by developers and public bodies (Chaponda and Lishman, 2013; World Bank, 2013; ASI, 2014; Kortekaas, 2015). The resources required are also broader than capital – achieving improvements will also involve technical assistance and tools that facilitate the preparation process (for examples, see Appendix 5).

In addition to the general need for greater investment in project preparation activities, almost all published PFF studies call for more resources to be invested further upstream in the project preparation process. In some cases, there is poor visibility of existing upstream initiatives that support early-stage project development to strengthen the enabling environment. For example, we found more than 50 PPFs with a mandate to work in the enabling environment in Africa, 10 of which were located within African governments, yet a recent report by Africa Investor (Danso and Samuels, 2017) reported:

> The public sector and the private sector need to collaborate together in a more effective way to create 'infrastructure-enabling environments' […and that] there needs to be public support for the professionalization of the project development industry in Africa.

Unfortunately, as ASI (2014) note, the type of capacity-building that forms the core of work to strengthen the enabling environment 'has been a theme of external support to developing countries for a number of decades yet remains an area of weakness.'

4.2 Attracting private funding

Public financing will likely continue to play an important role in funding PPFs, though this role may be changing. Some analysts suggest that governments should increase their portion of project preparation funding (G20, 2014; CEPA, 2015). This may come alongside financial incentives that reduce the risks and encourage private sector investments in the preparatory stages (see Appendix 1) (Oberholzer et al., 2018) but this should not result in the private sector charging higher costs than if project preparation were publicly funded. Similar caution is required for facilities able to recycle resources by charging fees to successful projects. New schemes are under development – such as the Renewable Energy Scale-up Facility (RESF) – and will provide more insight into the potential for this

funding structure.[16] But too few self-financing examples yet exist to draw general conclusions. It is likely that PPFs in many contexts will still require concessionary capital to realise infrastructure investment plans.

Making the best use of public resources is clearly important. It is often appropriate to consider public resources' catalytic potential to attract private capital into all stages of the project development process and avoid crowding out private developers where markets are sufficiently developed (Chaponda and Lishman, 2013).[17] CEPA (2015) note examples of several strategies, including South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPP) where public resources were used to design the PPP process, but the preparation activities for the individual bids (i.e. infrastructure assets) were led by private sector developers. The process also required developers to contribute 1% of the total project cost to a revolving project preparation facility for future smaller and medium-sized projects (Nassiry et al., 2016). This approach is similar to the desired outputs of the Global Infrastructure Facility's (GIF) project in Colombia (see Appendix 3).

Commercial approaches to PPF funding should be recognised for their benefits, particularly in terms of financial sustainability, but may also bias PPFs towards more profitable and possibly larger projects and overlook the public goods and services that smaller clean energy projects provide. Partially or entirely recovering costs may be more feasible for later stages of project preparation but this could disadvantage PPFs that focus on earlier preparation stages, which are already less well developed (CEPA, 2015). Resolving this issue depends on the operating context of a PPF and its specific mandate, and more effort to measure the impact of PPFs and justify the allocation of scarce resources.

4.3 Improving communication, coordination and potentially consolidation across PPFs

Improved communication between PPFs and their public and private partners would allow practitioners to spot common trends, prioritise systems and resources and learn from mistakes (see Box 2).[18] This could cover a range of topics and better convey the various functions that PPFs provide. Better coordination could also help build momentum to support projects across political cycles, engaging effectively with stakeholders, and to confront wider political economy issues, such as the willingness to pay for clean energy services, reforming fossil fuel subsidies, and changing the role of the public and private sectors in delivering energy services (ASI, 2014; Nassiry et al., 2016).

Scaling up and replicating PPFs implies that mechanisms to share good practice across contexts already exist.[19] Several initiatives and tools have been established to improve coordination between PPFs (see Appendix 5 for examples), although the role of PPFs also requires clarification for project developers in some places (NIRAS, 2018). A greater focus by PPFs on knowledge sharing could achieve higher adoption and impact of these tools, better coordinate multiple PPFs to build momentum and foster a collaborative approach in similar contexts, and collectively identify areas lacking local public and private capacity for

16 RESF involves an incremental approach to financing projects and offers investors to buy equity at financial close at below-market rates. See www.climatefinancelab.org/project/renewable-energy-scale-facility-resf/ and www.climatefinancelab.org/wp-content/uploads/2017/09/Global-Lab-Instrument-Analysis-RESF-1.pdf.

17 As the renewable energy market matures, investors may also question projects that required concessionary PPF support as this kind of support may send an adverse signal about underlying risk.

18 Such experience may be particularly useful for more recently established PPFs that may not yet be able to draw on their own institutional experience.

19 For example, experience with the ACEF helped to identify the need to foster alignment between the developers and financiers, ensure that the 'hand-off' between the two is as quick and efficient as possible, develop a clear, shared understanding of what success looks like, and agreement among the partners on a success target (R. Nogueira, personal communication, 2018).

preparing clean energy projects (Ramboll, 2015; NIRAS, 2018).

Previous analysis also points to the importance of maintaining focused, specialised PPFs and suggests a clean energy transition would occur faster if PPFs collaborated to develop robust project pipelines. Such collaboration could involve individual facilities specialising in targeted contexts, such as the clean energy sector in a single country (Ramboll, 2015). While large-scale facilities may benefit from broader in-house experience of similar projects, they may be less tailored to individual countries' needs. And providing top-down support across multiple sectors can waste resources if their use is not well aligned with the country's infrastructure plans (CEPA 2015) or may even foster '"mission creep" for donor agencies towards generalised capacity building' (Chaponda and Lishman, 2013).

The large number and ostensibly similar mandate of many renewable energy PPFs also suggest potential for consolidation. Views differ as to whether PPFs should be merged or their separate operations preserved. As CEPA (2015) notes, there has been a shift towards establishing large, multi-sector PPFs that cover several regions to counter an earlier G20 view that support provided by PPFs was too diffuse and fragmented. Arguments for consolidation seem primarily driven by a desire to take advantage of economies of scale to lower transactional costs, concentrate and coordinate resources, and allow facilities to build the expertise of their in-house teams (Chaponda and Lishman, 2013; ASI, 2014; Ramboll, 2015; NIRAS, 2018).

5 Conclusions and recommendations

To achieve the SDGs and avert the worst impacts of climate change, governments need to increase investment in clean, renewable energy. And, key to the deployment of clean energy projects, will be high-quality project preparation at scale, with a sense of urgency consistent with the timeframe of meeting the SDGs and objectives of the Paris Agreement.

PPFs and other project preparation activities, alongside efforts to address wider investment barriers, can help accelerate the development of clean energy projects in terms of transactions brought to financial close, the amount of private capital mobilised, and the speed of operations. The project preparation sector should strive to understand how it can drive progress towards achieving the SDGs and objectives of the Paris Agreement and track its contribution to this progress.

More early-stage project preparation activities are needed, as are PPFs that help foster a supportive, enabling environment for clean energy investment. Less clear is whether additional resources for this should be deployed to existing PPFs, whether PPFs can or should reclaim some or all their costs, and the role that donors, governments and private stakeholders should play in supporting and guiding PPFs. Identifying a common set of success factors for PPFs individually and collectively will be an important step in expanding the clean energy sector and understanding their contribution to wider development goals.

Based on our analysis, we recommend that donors, developing country governments and DFIs:

1. allocate more resources for project preparation activities throughout the project development cycle, particularly for early stages of project preparation and for activities that strengthen the enabling environment
2. determine how, in general, PPF functions could be conducted to achieve outcomes that are aligned to international goals. PPFs vary widely and it is unclear whether they have adopted evaluation criteria consistent with the Paris Agreement objectives or the SDGs.
3. undertake a comprehensive assessment of factors that drive the effectiveness of PPFs collectively, and how to better measure their impact. Such an assessment might address the following questions:
   - Are current PPFs targeting the right technologies and stages in the project cycle?
   - Should there be guidelines or principles for designing, operating and evaluating PPFs? If so, what would these guidelines look like?
   - Are there steps or reforms that would accelerate the development of PPF-supported investable projects?
   - Can PPFs distort markets for investment in different contexts? If so, how can this be avoided?
   - Are PPFs a sustainable way to promote good projects?
   - Are PPFs targeting the right contexts (e.g. geographic locations, industry sectors) to help close the clean energy infrastructure gap and meet the SDGs and objectives of the Paris Agreement?

4. establish criteria to evaluate PPFs individually. These might include the following:
    - The forward pipeline of planned additional capacity and energy access projects, and how this compares with the development plan of the country/region where the PPF is based.
    - Whether a PPF is achieving its potential in terms of the number of projects, MW and/or access points added per year compared to a baseline target, the time required to move projects through the PPF pipeline, and the 'hit rate' for projects accepted into the PPF pipeline.
    - The degree to which a PPF is deploying its resources in line with its overall objectives.
    - How the PPF coordinates with other sources of preparation support to ensure a collaborative approach to building robust project pipelines.
5. foster better coordination and communication among PPFs to identify best practice, and facilitate sharing of lessons learned in screening projects, advancing them through the project development process, identifying bottlenecks and establishing a universal approach to areas, such as risk management (including, for example, environmental, social and governance performance)
6. encourage concessional finance to move upstream in project preparation while looking to collaborate with sustainable (i.e. recyclable) commercial early-stage equity providers without overburdening end-users
7. consider activities that may be complementary to PPF activities, such as setting up investment consortia of potential follow-on investors with 'right of first refusal' to a PPF's pipeline in exchange for support to develop projects in line with market expectations
8. explore expanding from a PPF approach focused on projects to one focused on strengthening project developers. For example, consider providing seed funding for teams that are building tools and mechanisms that can facilitate the finance of renewable energy
9. support, where appropriate, the design of commercial and revolving fund PPF models that foster a mindset oriented towards bankability from the beginning of the project and that may be (partially) privately funded.
10. ensure that support provided collectively by PPFs is targeting all sectors relevant to the clean energy infrastructure gap and is prioritised for the necessary but least commercial segments.

Finally, it may be particularly useful to analyse PPF prepared projects that do not achieve 'bankability'. This analysis should be carried out across contexts to create a broader understanding of bankability, shape future initiatives and increase the flow of capital to clean energy investments.

Annex 1 Additional measures to accelerate investment in clean energy

Getting the finance right

Institutional investors are often targeted for future clean energy infrastructure, in part because of the match between their investment timeframes and the long-lived nature of infrastructure assets. Aside from a relatively small group of sophisticated investors with significant experience of investments in renewable projects and a mandate to invest in the sector, few institutional investors invest directly in clean energy infrastructure (Tonkonogy et al., 2018). Intermediate vehicles (such as funds) or instruments (such as green bonds) are generally preferred, partly because of their liquidity. As well as scaling up indirect investments (e.g. via specialised funds), mobilising untapped finance will require overcoming barriers within the investment community that constrain direct investment in clean energy infrastructure to less than 1% of assets under management (Sahoo et al., 2015).

Barriers for institutional investors include: (1) investments in clean energy infrastructure typically being greenfield (i.e. a project that is not continuing or building on prior work) and illiquid (i.e. cannot be easily sold to release the capital invested) while investors seek operational and liquid assets for their portfolios (ASI, 2014; CEPA, 2015); (2) regulatory constraints on allocation of capital to 'alternative' investments (Nassiry et al., 2016); and (3) in-house policies on capital allocation and an inability or reluctance to carry out due diligence on smaller and innovative clean energy projects (CEPA, 2015; WEF, 2016; Tonkonogy et al., 2018).

New approaches to bringing investors and projects together are appearing. These include dedicated firms and philanthropic initiatives (e.g. Sustainable Development Investment Partnership PRG, Allied Intermediary, Prime Coalition, the Philippines Sustainable Energy Finance Programme, the Renewable Energy Scale-Up Facility) and some developers self-financing the projects (e.g. Frontier Energy, Lekala Power, Scatec Solar, and the recent deal between Denham and Themis). However, these remain at an early stage and are yet to be proven effective at scale.

Financial innovation is needed to mobilise much larger investor groups, directly or indirectly. Promising private-sector facing initiatives that build on experience with YieldCos and green bonds, and shift away from the illiquid, unlisted, project-financing approach (CEPA, 2015) are beginning to appear (e.g. Climate Investor One and the Clean Energy Investment Trust). These split single greenfield assets that are held by an investor throughout the project lifetime into several financial products with various risk-return profiles. Concessional finance is used to attract commercial finance to earlier project stages and the operational asset is listed to improve liquidity and attract institutional investors. As well as delivering more infrastructure this approach could reduce the project's cost of capital (Huxham et al., 2017).

Public initiatives to crowd in private investors

Private funding is more likely for projects with a strong economic case in well-developed markets. Public funding, therefore, tends to focus on projects with positive externalities that the current market does not or cannot reflect and where there are risks (perceived or real) that need to be mitigated. Public–private partnerships (PPPs) involve public finance to 'procure and implement public infrastructure and/or services using the resources and expertise of the private sector'.[20]

The public sector can use a number of levers to decrease or mitigate risks to attract private investment. This can involve governments, state-owned entities, MDBs and other DFIs taking equity stakes in projects, committing to providing supporting infrastructure, or funding early-stage feasibility studies.[21] Public finance in the form of guarantees and related products can mitigate key risks associated with the project that neither developers nor governments can directly control (e.g. currency fluctuations). In some cases, direct investment is unnecessary and governments can mitigate risks by shaping market conditions within which the project will operate. For example, power purchase agreements (PPAs) can mitigate off-taker (buyer) risk, and policy that establishes market-support schemes such as feed-in tariffs or renewable energy quotas can give private investors certainty for their revenue stream. As countries shift from developing clean energy infrastructure on an individual, project-by-project basis towards more programmatic approaches, the need for governments to create an enabling framework that supports private developers – such as generation capacity auctions to promote renewable energy deployment – will become even more important.[22]

20 As defined by the World Bank (https://ppp.worldbank.org/public-private-partnership/node/335/).

21 This is especially the case involving public goods or particularly high and speculative up-front risks, such as in the early-stage development of geothermal resources (IDB, 2017).

22 A detailed discussion on project-by-project versus programmatic approaches is included in a forthcoming OECD report on project preparation pipelines, due to be published in 2018.

Annex 2 Methodology: mapping PPFs for clean energy

Definitions

We interpret clean energy PPFs broadly as initiatives, programmes, companies or other entities that have a mandate to work with project developers or governments – providing funds, technical assistance or both – to define, design or finance renewable energy or energy efficiency infrastructure projects. In the mapping, we noted PPFs' functions based on publicly available information.

The term 'clean energy infrastructure project' includes both individual assets (discussed on a project-by-project basis) and aggregated developments that have a defined phase (which we term programmatic approaches).[23]

Sources

An in-depth, comprehensive and systematic survey of PPFs was beyond the scope of this review. However, secondary sources enabled us to draw some tentative conclusions.

Preliminary analysis of references in previous reports (e.g. ASI, 2014; Ramboll, 2015; Nassiry et al., 2016) suggested that information was available from researchers and practitioners in the field. We therefore conducted an initial review of previous studies. To focus on recent developments, we focused on reports from 2010 onward and then on reports cited in these first-pass documents.

Reviews of PPFs in Africa (Ramboll, 2015; USAID, 2016; 2018) and Asia (ASI, 2014) were useful in the preliminary construction of the database. Further websites, databases and reports that survey support available for infrastructure project developers were included (ICA, n.d.; Infradev, n.d.; CEPA, 2015; Moser and Nealer, 2016; Floater et al., 2017; GIZ, 2018; Oberholzer et al., 2018; Tonkonogy et al., 2018). Only PPFs that identified energy as a target sector were included. Finally, given that many PPFs are hosted or supported by DFIs, their websites were searched for 'project preparation facilities'.[24]

23 Programmatic approaches may be confused for policy targets but here we define programmatic projects as procurement phases that are bounded by a financial close of some description. For example, South Africa has a policy target of adding 55 GW of wind and solar energy to the grid between 2021 and 2050 and has been working towards this through a number of auctions (with each round of auctions – the Round 4–4.5 window was for 1.8 GW – considered a project). See http://global-climatescope.org/en/country/south-africa/.

24 These include the World Bank Group, the African Development Bank, the Asian Development Bank, the Asian Infrastructure Investment Bank, the Caribbean Development Bank, the Central American Bank for Economic Integration, the Development Bank of Latin America, the European Investment Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank, the Islamic Development Bank and the New Development Bank.

The qualitative discussion of the findings presented in Chapter 5 was drawn from a synthesis of key reports that tended to focus on infrastructure development more broadly. Most evaluative work found focuses on Africa and, to a lesser extent, Asia, and it is possible that our analysis may be biased towards findings from those regions due to the limited availability of detailed information.

Data analysis

The paper analysed each identified PPF based on the following:

- The structure of the PPF. Examples include government departments, standalone companies and facilities that provided support via specific and often ongoing programmes within larger institutions that are usually already carrying out similar work ('programmes') or via fixed-term disbursal periods that may be affiliated with later-stage project financing ('funds').
- Whether the PPF was publicly or privately hosted and funded.
- The amount of financial resources made available to the PPF (small: <$5 million; medium: $5 million–$25 million; large: >$25 million).
- The countries or regions covered by the PPF and its geographic scope (a single country, a few countries, a region, or multi-regional or global).
- Whether the PPF was specifically focused on clean energy or whether the PPF had general focus with clean energy as one of several target sectors.
- Whether the PPF provided support in each of the stages of the project development cycle described above (i.e. defining, designing, financing) as well as helping to shape the enabling environment.

These categories were assessed for each PPF using information provided in the original sources as well as information available on the PPF's homepage.[25] All of this data and links to the source material are available in the online version of the database published alongside this report.

25 In areas where we were unable to definitively map PPFs, these were marked as 'unknown'. In some cases, no recently updated data was found making it difficult to ascertain whether the PPF was still active.

Annex 3 Illustrative analysis and characterisation of selected PPFs

Their diversity and overlapping mandates make it difficult to categorise PPFs without some overlap. Instead, this subsection provides the following illustrative groupings as well as examples:

- Sector-specific facilities
- Global multi-sector facilities
- Integrated models
- Programmatic approaches
- Government public–private partnership (PPP) units

Sector-specific facilities

Niche facilities prepare projects for a specific sector or subsector of clean energy infrastructure. Examples include:

- The **Scaling Solar initiative** is led by the World Bank Group and supported by the Dutch, Danish, and UK governments, Power Africa and DevCo (the Infrastructure Development Collaboration Partnership Fund). The initiative was launched in 2015 to compensate for the lack of capacity and enabling environment to develop grid-scale solar plants in Africa. Scaling Solar works with governments and developers to prepare projects, adopt standardised bids and design the transactions required to achieve financial close within two years. The initiative also makes use of financing and credit-enhancement tools from the World Bank to pass on decreased costs as lower tariffs that off-takers pay as part of the related PPP arrangements. Four countries (Zambia, Senegal, Madagascar and Ethiopia) have signed on to the programme so far with projects targeting the development of over 1.3 GW of solar photovoltaics. An example of project preparation support is the $2.1 million the International Finance Corporation (IFC) has provided to Ethiopia to support the project and bid preparation activities for adding 500 MW to the grid. The IFC also provide loans to developers.[26]
- The UK Department for International Development's (DFID) **Green Mini-Grids Africa** project represents another niche example. The overall project is valued at £75 million and set to run from

26 See https://disclosures.ifc.org/#/enterpriseSearchResultsHome/scaling%20solar for a list of IFC support to Scaling Solar.

2014 to 2019. Funding includes £15 million for regional capacity development activities and £30 million each for project development and implementation in Kenya and Tanzania. Of these in-country totals, 20% (£6 million) is dedicated to technical assistance (TA) and project preparation. The focus of the TA is adaptive and decided based on an initial appraisal of the skills gap in the specific context. Project preparation is tasked with the development of sufficient projects so that the project leverages in private capital double the total invested by DFID. An appraisal of other on-going projects aims to ensure that new mini-grid projects work with existing projects, rather than duplicating work in the sector. The project also has a number of specific objectives, including the installation of 135 mini-grids (44 MW installed capacity) and spurring investment programmes in two further African countries. The project also aims to provide at least 1.1 million people, enterprises and community services with access to sustainable energy and create 500 jobs (DFID, 2015; 2017).

Global multi-sector facilities

Facilities in this group have a global focus and provide support to developers across a range of infrastructure sectors. The Global Infrastructure Facility (GIF) and Green Climate Fund (GCF) detailed in the next sections could also be included here alongside the following example.

- The **Private Finance Advisory Network (PFAN)** has been in operation since 2006. PFAN mainly provides business-related support to smaller project developers through its extensive expert network and then helps them pitch their projects at investor forums around the world. PFAN is now jointly hosted by the United Nations Industrial Development Organization (UNIDO) and the Renewable Energy and Energy Efficiency Partnership (REEEP), and receives funding from a range of governments and international institutions. The PPF focuses on clean energy projects. It currently has 360 projects in its development pipeline spread across Africa, Asia, Latin America and the Commonwealth of Independent States (The Russian Commonwealth). If fully realised, together these projects would represent nearly $7 billion in investment. As of April 2018, 87 projects have reached financial close, raising a combined investment of $1.2 billion. The PFAN website does not appear to quantify project-based support. The 2017 REEEP Annual Report notes that for every $1 of donor funds PFAN leverages $80–$100 in private investment in clean energy, energy efficiency and adaptation projects in LICs and MICs (REEEP, 2017).

Integrated models

A number of PPFs are attached to funds as a step to preparing projects that the fund will then finance. Examples include:

- **Climate Investor One (CIO)** combines three connected but separate funds and is led by the Dutch Government via the Netherlands Development Finance Company (FMO) and the South African investment firm Phoenix Infraworks. In addition to the larger construction and refinancing funds, each of which was launched with a target of $500 million, CIO includes a donor-funded $30 million development fund. The development fund can provide projects with a 50% development loan to help developers prepare projects to attract construction finance. The construction fund is tiered with donor capital hoping to attract commercial and institutional investors. Once construction is complete, construction loans are refinanced by the third fund. CIO was designed to reflect the three distinct risk-return profiles that projects face during development

and to attract appropriate investors to each stage (see Appendix 1).[27] Linking the facilities may also help maintain momentum for projects and shorten the time to starting operation. The revolving nature of the funds offers the opportunity for public investments to leverage private, particularly institutional, capital as the refinancing fund invests in operational liquid assets. In June 2018 CIO announced its third close at $535 million. The fund focuses on wind, solar and hydro projects totalling 1.1 GW of new additional capacity in Africa, Asia and Latin America.[28]

- The **Green Climate Fund (GCF)** provides a full-spectrum approach to delivering renewable energy infrastructure projects through several distinct initiatives. The Readiness Programme works with national development plans such as Nationally Determined Contributions (NDCs) to identify projects that are aligned with a country's priorities. Project proposals can only be submitted by Accredited Entities. These projects are then passed to the GCF's own Project Preparation Facility, which can provide a range of technical assistance, such as pre-feasibility, feasibility and ESG studies, risk analyses and transaction preparations. The GCF PPF also prepares the project for entry into the GCF's funding pipeline by, for example, identifying project indicators that align with the Fund's management framework. The GCF PPF and the Readiness Programme both work upstream of the project to strengthen the enabling environment.

  PPF funding for each project is limited to $1.5 million or 10% of the total funding requested from the GCF (whichever is lowest) from a total pot of $40 million.[29] Support is provided as grants or repayable grants to public clients, and as equity to private clients (i.e. the fund is designed to be partially revolving). The PPF's original operational guidelines suggested a focus on medium-sized infrastructure projects, though the facility's website now suggests the PPF also supports much smaller-scale projects.[30] Insufficient publicly available data meant it was not possible to identify the range of projects carried out by the PPF, or record the amount of private funds mobilised by GCF funding.

Programmatic approaches

Programmatic approaches tend to involve PPPs and alter the role of PPFs compared to the preparation of individual projects. For example, PPFs supporting programmatic investments may be involved upstream of the project design stages in project definition and ensuring a supportive enabling environment (e.g. robust PPP legislation). If sufficient investments are made in these upstream areas, project developers may then feel more comfortable taking on the later-stage preparation activities themselves, as was the case with the South African Renewable Energy Independent Power Producer Procurement Program (REI4P).

For example, the recently established **Global Infrastructure Facility (GIF)** is a multi-sector programme hosted by the World Bank. It is funded by MDBs and governments and is advised by experts from the public and private sectors, including commercial banks and institutional investors. The GIF is tasked with supporting complex infrastructure projects in emerging economies and, like other MDB-hosted PPFs, appears to favour programmatic clean energy projects, such as the following:

27 Part of the rationale behind Climate Investor One is to give developers line of sight to follow-on funding, from early stage to construction through refinancing. However, this may also be seen as a drawback to the extent that donors may be worried about the alignment of interest across the three funding buckets in Climate Investor One.

28 See www.climatefundmanagers.com/nl/about.

29 See www.greenclimate.fund/gcf101/funding-projects/project-preparation.

30 www.greenclimate.fund/gcf101/funding-projects/project-funding.

- In Colombia, the GIF is working with the government and a local financial institution to mobilise $1 billion in private investment in renewable energy and energy efficiency. The purpose of the project is to create frameworks attracting private investors to small-scale renewable energy generation, industrial and commercial businesses to invest in energy efficiency, and finance for utility-scale renewable energy projects.
- In Brazil, the GIF is supporting a World-Bank-led PPP energy efficiency project to replace existing streetlights with low-energy LEDs. The project is funded by a range of public investors, including the GCF, and has reportedly raised $400 million from private investors.[31] The GIF is tasked with identifying projects (cities), carrying out feasibility studies and designing and structuring the PPP deals. A $0.5 million grant for project definition activities will be followed by $2.0 million for project structuring (GIF, 2017).

Government PPP units

Government PPP units carry out similar work to, and sometimes alongside, donor-funded PPFs that focus on programmatic projects built around PPPs but seldom receive as much attention as non-government facilities. Nevertheless, ASI (2014) notes the need to 'give more explicit and formal consideration to opportunities for public–private partnerships (PPPs) during project preparation and also to provide support to governments of developing countries where the framework and systems to support private sector participation are weak.' Similarly, Chaponda and Lishman (2013) focus specifically on project preparation funding within the ambit of PPPs.

Although in some countries the PPP units may appear to play no role in developing individual projects, these units typically carry out much of the upstream preparation work (e.g. pre-feasibility studies) and through accompanying policy (e.g. feed-in-tariffs or power purchase agreements) can help to decrease the amount of preparation work for developers. PPP units can also often provide links to government finance ministries that bring to bear financial tools to help projects achieve bankability.

A comprehensive mapping of PPP units would represent an important public good in the future. Currently, the World Bank provides a list of over 100 government- and MDB-hosted PPP units around the world .[32]

Table A3.1 includes examples of PPP units with project preparation roles that could relate to clean energy infrastructure projects.

31 Of the total project investment of $1.3 billion, private investors, the Central Bank of Brazil (CEF) and the GCF are providing loans of $400 million, $180 million and $186 million, respectively. The concessionaires hold $330 million in equity and the World Bank is providing a $200 million loan guarantee. The GCF and World Bank are also providing $10 million in grants between them. See www.greenclimate.fund/-/financial-instruments-for-brazil-energy-efficient-cities-finbrazeec-.

32 See http://ppp.worldbank.org/public-private-partnership/overview/international-ppp-units.

Table A3.1 Illustrative examples of government-hosted PPP units with project preparation mandates

Name	Country/region	PPF activities
PPP Unit[a]	Kenya	In 2013 the PPP Act established a PPP Project Facilitation Fund that, among other things, supports contracting authorities in preparation, appraisal and tendering of PPP projects.
Infrastructure Concession Regulatory Commission (ICRC)[b]	Nigeria	The ICRC's roles include promoting, facilitating, supporting and coordinating implementation of a sound PPP process; providing guidelines and transaction support and building capacity in all federal government ministries, agencies and departments (MDAs) for project development, tendering, negotiation and contract execution; and building a pipeline of public infrastructure investment projects that can attract private sector investment.
Public–Private Partnerships Centre[c]	China	The PPP Centre provides consultancy and training to offer technical support for the government in such stages as identification, evaluation, bidding and procuring, and contract management with respect to PPP projects.
Public– Private Partnership Authority[d]	Bangladesh	The PPP Authority works with sector line ministries and implementing agencies, augmenting their efforts with external professional resources, to pre-develop shortlisted PPP projects to a standard attractive for international competitive bidding and in a form that creates value for the people of Bangladesh. The Authority also facilitates financing for PPP projects by supporting early-stage project development financing and, as needed, capital support to help achieve financial close of awarded projects.
PPP Center[e]	The Philippines	The Center champions the country's PPP programme by enabling implementing agencies in all aspects of project preparation, managing of the Project Development and Monitoring Facility (PDMF), providing projects advisory and facilitation services, monitoring and empowering agencies through various capacity building activities. The PPP Center also provides technical assistance to national government agencies, government-owned and -controlled corporations, government financial institutions, state universities and colleges, and local government units as well as to the private sector to help develop and implement critical infrastructure and other development projects. The PPP Center also advocates policy reforms to improve the legal and regulatory frameworks governing PPPs in order to maximise the great potentials of these infrastructure and development projects in the country.
Corporación Nacional para el Desarrollo (CND)[f]	Uruguay	The CND's Projects and Services unit offers services for the planning, direction and management of public works and infrastructure and the development of structuring activities, design, engineering and construction. The CND analyses and prepares investment projects and identifies areas of opportunity in public infrastructure.

Source: [a]www.pppunit.go.ke/news/view/draft-ppp-project-facilitation-fund-pff-regulations-2015;
[b]www.icrc.gov.ng/about-icrc/what-we-do/;
[c]www.cpppc.org/en/about/index.jhtml;
[d]www.pppo.gov.bd/what_we_do.php;
[e]https://ppp.gov.ph/?page_id=8;
[f]www.cnd.org.uy/index.php/institucional/quienes-somos.

Annex 4 Initiatives to strengthen the enabling environment

Previous studies focusing on PPFs have highlighted the need to provide resources for the enabling environment to strengthen capacity and develop better projects. The defined scope of this paper precludes a comprehensive and systematic review of initiatives in shaping the enabling environment. However, we note that, for clean energy, key elements of a supportive enabling environment include: transparent, consistent and long-term policy; a stable regulatory framework; a solvent and reliable off-taker; the capacity to collect revenue from off-takers or end-users, where applicable; maintenance of transmission and distribution networks; and reliable and independent rule of law.

Despite the existence of many capacity-strengthening initiatives, more needs to be done to improve the enabling environment. Table A4.1 provides examples of the range of initiatives included in USAID's Power Africa Project Preparation Toolbox that specifically focus on supporting the enabling environment.[33] InfraDev provides a further database of organisations that offer upstream technical assistance.[34]

33 These are not counted as PPFs as they do not provide support to any of the stages of project development (i.e. defining, designing, financing).

34 See www.globalclearinghouse.org/InfraDev/content.cfm?id=33.

Table A4.1 Example initiatives for capacity building in Africa

Enabling initiative	Funders	Focus
Africa Legal Support Facility (ALSF)	Two MDBs, five governments.	Provides support to governments and utilities to strengthen their legal expertise and negotiating capacity.
Clean Energy Solutions Center (CESC)	Clean Energy Ministerial, four governments	Provides assistance to policy-makers to help with design of policy that enables the deployment of low-carbon technologies.
Commercial Law Development Program	US Department of Commerce	Provides support to governments and utilities to strengthen their legal expertise and negotiating capacity.
Cooperation on Framework Conditions for Private Sector Development	Norwegian Agency for Development Cooperation (NORAD)	Building capacity of institutions and private sector actors.
East Africa Regional Regulatory Partnership	United States Agency for International Development (USAID)	Capacity building to assist national energy regulators with regional energy trade.
EI Membership of the Council of European Energy Regulators (CEER)	Swedish Energy Markets Inspectorate	International cooperation to assist energy regulators.
Energy Sector Technical Leadership	USAID	Capacity building. Includes workshops, training programmes, online courses and study tours for in-country energy professionals.
Energy Utility Partnership Program	USAID	Facilitates executive exchanges between power utilities in developing countries and those in the US to share best practices.
Enhancing Sustainable Utility Regulation	USAID	Exchange programmes for utility regulators to discuss challenges and share best practices.
Global Procurement Initiative (GPI)	USTDA	Training to boost capacity in public procurement processes for government departments and government-owned entities.
Increasing Adoption of Renewable Energy	USAID	Technical assistance and activities to promote an expanded supply of RE technologies.
International Business Partnership Program	USTDA	Reverse trade missions to the US, conferences, training and workshops for exporters and importers.

Source: USAID (2018).

Annex 5 Project preparation tools

Many tools are available to project developers and PPFs that can help accelerate the successful development of clean energy infrastructure projects. Table A5.1 provides illustrative examples of these tools that can be directly employed during the project preparation process.

Table A5.1 Examples of project preparation tools available to developers and PPFs

Tool	Funders	Focus
International Infrastructure Support System (IISS)/SOURCE[a]	Sustainable Infrastructure Foundation (SIF)	Online platform that gathers and synthesises information and data on all aspects of development of infrastructure on a project-by-project basis.
Power Africa Tracking Tool[b]	USAID	Makes details of all power transactions across Africa publicly available (via an app) to boost transparency and investor confidence.
PPP in Infrastructure Resource Center[c]	World Bank	Provides sample legal materials to assist project (particularly PPP) planning, design and legal structuring.
Renewable Energy Financial Instrument Tool (REFINE)[d]	World Bank	Interactive tool focussing on financial instruments to scale up renewable energy technologies. Helps identify financial instruments that can boost a project's bankability.
Global Infrastructure Hub (GIH)[e]	Launched by the G20, now supported by several governments.	Variety of knowledge sharing and public–private and developer–investor networking tools.
SuRe® – The Standard for Sustainable and resilient Infrastructure[f]	Global Infrastructure Basel Foundation	Voluntary standard for sustainable, resilient infrastructure. GIB also provides number of related tools.
Project Navigator[g]	IRENA	Online database of tools, data and guidance for building bankable renewable energy projects.
ClimateScope[h]	DFID/BNEF	Country-specific analysis of the investor and policy environment for renewable energy.

Source: [a]Nassiry et al. (2016);
[b]www.usaid.gov/power-africa/newsletter/jan2016/powerafrica-tracking-tool;
[c]http://ppp.worldbank.org/public-private-partnership/sector/energy;
[d]https://olc.worldbank.org/content/renewable-energy-financial-instrument-tool-refine;
[e]www.gihub.org/about/about/;
[f]www.gib-foundation.org/instruments;
[g]www.irena.org/navigator;
[h]http://global-climatescope.org/en/about.

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