APPROACH PAPER

Solar Power Projects

Regional

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EBRD EVALUATION DEPARTMENT
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1. Introduction

1.1 Scope and nature of the evaluation

This paper outlines the proposed approach to an evaluation of a sample of solar power operations, which would be presented in the wider context of the Bank’s gradual scaling up of financing for renewable energy – a key element of its Green Economy Transition approach.

The evaluation will provide a short background, presenting the evolution of the Bank’s approach to financing renewable energy sources (RES) and briefly describing selected early projects and frameworks in this sub-sector, as well as an analysis of the structure of the solar energy project portfolio. It will then examine how the sample projects fitted into the Bank’s selected country strategies, energy sector policies/strategies, and the Bank’s special initiatives, as well as to the national energy strategies of relevant countries. The Bank’s cooperation with other IFIs and international organisations in this sub-sector will be examined.

During the second part of this review, eight evaluations of a sample of 10 solar energy projects (four of them bundled in two pairs) will be completed. They will cover operations with six sponsors in six countries (see section 3.2 for the sample projects selection approach). The sample projects will be evaluated according to the main evaluation criteria of relevance, effectiveness and efficiency. Detailed evaluations of each project will be presented in the annex; they will also be summarised in the main report, where their common features and issues will be highlighted. The results of earlier validations of four additional solar energy project self-evaluations will be taken into account in the overall assessment of the Bank’s activities in this sub-sector.

The evaluation of the sample projects will be based on a review of the relevant Bank documents, strategies and data, as well as interviews with clients, regulators, consultants and representatives of industry associations. These interviews and site visits have been scheduled for the latter part of the year, when it is expected that travel restrictions will be removed (should they still be in place, EvD will try to conduct some interviews remotely).

Overall, the review will examine and present the Bank’s activities (policy dialogue, investments and TCs) in support of solar power/RES in selected countries and identify common (and to the extent possible, strategic) issues in the Bank’s solar power projects. The aim is to provide the Board and Management with useful information on the Bank solar power projects’ key achievements, relative to their stated objectives and institutional commitments, as well as contribute to strengthening the design and implementation of such future projects. It is also expected that selected findings of this evaluation will contribute to the Bank’s thinking on the ways to scale up the Bank’s investments in the solar power sector.

1.2 Rationale for inclusion in the work programme

For years the Bank has been supporting its COO in their energy transition in response to climate emergency. More recently these efforts have been stepped up. In October 2020 the Board of Governors approved the Bank’s Strategic and Capital Framework (SCF) for 2021-2025 (BDS20-
030), in which support for transition to a “green”, low carbon economy (through GET 2.1 Approach 2021-2025, BDS20-082) is one of three central themes.

The SCF commits the Bank to align its operations with the principles of the Paris Agreement and sets targets to raise the share of “green” finance to at least 50% and reduce CO₂ by 25 to 40 million tonnes by 2025. The Bank’s support for the transition of its countries of operation’s (COOs) energy systems from high to low carbon-based, will be critical for the achievement of these ambitious goals. It will require substantial scaling up of investments into renewable energy sources (RES). Solar energy generation became the lowest cost new energy source in vast majority of countries and is expected to play a key role in the transition to net zero economies.

The Bank’s Green Economy Transition Approach 2021-2025 (BDS20-082, GET 2.1) singles out solar energy as a particularly promising sub-sector among RES, for a relatively large group of the Bank’s COOs, whose climatic conditions and levels of irradiation support development of this type of energy generation (SEMED, Turkey, Central Asia, South-Eastern Europe). It also notes the potential of this relatively new sub-sector to have a positive impact on job creation and inclusion in COOs, which may follow the patterns observed in developed countries, saying: “between 2010 and 2013 jobs in the solar energy in the U.S grew at 17 times the rate of the economy”.

Globally, installed solar (photovoltaic or PV) panel capacity shot up 14x between 2010 and 2019, mainly due to the drop in their cost (which more than halved), as well as incentives supporting RES/solar introduced by many countries. Since the Bank’s first solar project (2012) the number and volume of Bank-supported projects of this type grew exponentially, reaching 69 operations signed by the end of 2020 (see the next section for more details). Yet, none of them has been evaluated (unlike those related to wind energy, see section 1.4). So far, EvD has only completed two validations of self-evaluations covering four solar energy projects. Moreover, certain aspects of two additional solar projects were assessed as part of broader sectoral or thematic studies (see section 1.4). This is insufficient, given the large portfolio and the importance of this sub-sector for the Bank’s future operations.

In conclusion, the Bank’s investments in solar power have grown significantly in the past decade and with advances in solar PV technology (and under the new SCF), it is reasonable to expect that the Bank’s financing of this sub-sector will continue to grow fast over the next decade. Therefore it is deemed important to take stock of the Bank’s achievements in solar power to date – in physical, financial, environmental and particularly transition/policy dialogue terms, to draw lessons for the design and implementation of future projects of this type.

1.3 Background to this evaluation

The Bank has been supporting RES since the late 90s, focusing initially on financing hydropower projects, particularly in Georgia (see EvD study “Hydropower, Georgia”, PE18-603). Investments into other types of RES only took off in the late 2000s, with support for wind, biomass, biogas and
geothermal projects. Solar energy was a relative latecomer due to initially high cost of PV. The Bank’s first solar energy project was the Porogi Solar Energy in Ukraine, signed in October 2012, financed under the Ukraine Sustainable Energy Lending Facility (USELF). This framework (with its two subsequent extensions) turned out to be a particularly useful conduit for scaling up the Bank’s investments in solar and other types of RES there. It provided consultant support for project preparation and regulatory policy dialogue, as well as an investment grant – an approach which proved to be very effective in generating new projects.

Since this first project, the cost of producing solar energy has dropped on average by 63% and now in most of our COOs it is below the cost of producing on/off shore wind or hydro energy. This, combined with RES-supportive incentives, the needs to comply with the Paris Agreement-related commitments and the increasingly well-understood urgency to limit global warming, has fuelled a profusion of Bank solar energy projects in recent years.

During the nine years from 2012 – 2020, the EBRD financed 69 solar energy projects in 13 countries, for a total of almost €1.3 billion. The annual portfolio grew quickly during this period, from three projects signed in the first two years of this period, to 23 signed in the last two years. Overall, solar projects account for 29% of the total number and 31% of the total volume of the Bank’s RES portfolio in these nine years.

Based on preliminary analysis, the main characteristics of the Bank’s solar energy portfolio were as follows:

(i) Unsurprisingly, projects in SEMED dominated, accounting for almost 40% of the number and volume of all solar projects. Central Asia followed in volume (30%), while Eastern Europe and the Caucasus followed in the number of projects (26%). In total, these three regions accounted for 87% of the solar projects’ number and 85% of their volume.

(ii) Within these regions, four countries clearly dominated the portfolio in both project number and volume terms, as illustrated by figure 1 and 2 below.

*Figure 1. Volume of the Bank’s solar energy projects*
(iii) Although the Bank’s operations in Egypt seem the most numerous (18), it should be pointed out that 16 of them relate to one large solar power site project in Benban, southern Egypt. These 16 operations were signed with six different clients/sponsors and processed as six operations (two of these 16 operations, both with one client - Infinity SEA, are among the sample projects proposed under this evaluation).

(iv) The Bank financing for projects in Kazakhstan was characterised by a higher average value (€24.6 million), due to three larger projects, where the Bank provided €38 million to €50 million loan for each of them (Burnoye, SES Saran and M-KAT Green Solar). Overall, an average Bank financing (on its own account) of a solar project amounted to €18.6 million. Parallel co-financing (sometimes with other IFIs) was commonplace. Moreover, most solar power projects benefited from some kind of concessional financing (see below).

(iv) In addition to these four leading countries, only Poland (three) and Cyprus (two) had more than a single solar energy project in the Bank’s portfolio (one of the former was classified as “Regional” but financed mainly Polish investments, while two others were classified as “wind” but financed solar). In the remaining seven countries the Bank supported only one solar project per country. In EvD’s view, there have been some notable absences from this portfolio, e.g. Morocco, Tunisia or Lebanon, while the Bank financed only one solar project in Turkey and one in Greece. The reasons behind such a strong concentration of Bank financing for solar projects in selected countries and the relatively low number or lack of projects elsewhere (despite favourable climatic conditions), will also be investigated under this review;

(v) The rapid increase in the Bank’s provision of financing for solar energy may be illustrated by the increased share of this type of energy generation in the total volume of the Bank’s
RES projects during different periods. While they accounted for 10% of the Bank’s total cumulative financing of RES during the five years from 2012-2016, their share jumped to 50% in the last four years (2017-2020). However, the trend has not been a steady year-on-year growth. 2017 stands out as an extraordinary year for the volume and number of solar power projects, mainly due to the signing of 16 Benban site projects in Egypt – one of the largest solar power developments in the world. After that, the annual volume of solar power financing stabilised at about €200 million - 230 million, while the number of projects fluctuated between eight and 15 per annum. Figure 3 illustrates the annual volume and number of solar energy projects.

**Figure 3. Annual volume and number of the Bank’s solar energy projects**

A relatively large number of the solar power projects have been executed with the same clients, often in different countries. For instance, the Bank financed 12 operations with Scatec Solar in Egypt (six), Jordan (three) and Ukraine (three), providing a total of €193 million in loans. There were also five projects with ACWA in Egypt and Jordan for a total of €103 million. Some of these were phases of one large project in the same location (e.g. Benban in Egypt), others were investments by the same sponsor in different locations. They had separate borrower SPVs but as their sponsor was the same, they were bundled together for approval;

All 69 solar power projects borrowers were private sector and for all of them the Bank provided debt financing. Nevertheless, EvD notes that the Bank made some equity and capital market debt investments (which are not on the Banking team’s list of solar energy projects), which might have benefited the solar power sub-sector. In particular, in December 2019 the Bank invested €39 million in a 20% stake of Infinity Solar S.A.E. in Egypt. The use of proceeds from this investment was described as “new wind or solar projects, as well as electricity transmission network expansion and electricity trading”.

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Other examples include a €65 million equity investment into IC ICTAS Renewable of Turkey, which primarily operates wind farms but might also include solar among their future investments. Similarly, investments in the Eurobonds of GEK Terna (€15 million) and Hellenic Petroleum (€28.3 million), both in Greece, were to be used for “renewable energy projects”, which could include wind, as well as solar power developments. These investments are not classified as solar power by the Banking team as the clients have some discretion in the application of their proceeds, however some of their capital might ultimately be contributed to the expansion of solar energy generation.

(viii) The Bank’s total €1.3 billion loans have co-financed on average 42% of the €3.1 billion total costs of 69 solar energy projects. Under many projects, particularly under frameworks, 15-20% of the total costs were financed by concessional or semi-concessional financing from the Clean Technology Facility (CTF), the Global Climate Fund (GCF) or the Global Environmental Fund (GEF);

(ix) This financing supported the installation of 2,974 Megawatts of peak capacity (MWp), i.e. on average, an installation of one MWp cost €1.04 million. Costs per MWp in different projects, in different countries will be compared under the review;

(x) Almost all solar power projects have been preceded by the Bank’s relatively intensive policy dialogue, aiming at the development or improvement of the RES regulatory frameworks and designing of bankable Power Purchase Agreements (PPAs). The main themes of such policy dialogue related to specific countries (implemented as part of RES financing frameworks) are presented in table 1 below and its key achievements are described in section 2.1. The assessment of the degree of policy dialogue’s integration and its results will be at the heart of this evaluation (see more in section 3).

(xi) 52 (75% of all) solar projects, accounting for almost €0.8 billion, were financed under various frameworks and processed under Delegated Authority. This approach was based on an earlier Integrated Approach to Polish Renewables, which itself did not finance any solar projects (mainly wind), however it provided a model for subsequent RES frameworks, which did finance mostly solar sub-projects. The Ukrainian Sustainable Energy Lending Facility (USELF), approved in 2009 (and twice extended since) financed all 17 solar energy projects in Ukraine. Subsequently, the Bank set up similar facilities to support RES projects in Kazakhstan, SEMED, Egypt and Greece. Also, three solar loans were financed under the Bank’s long-established Direct Financing Facility (DFF) framework (for SMEs). In general, the purpose of the frameworks was often described in their Board reports as “to kick-start the markets of independent RES project developers and move towards the sustainability of the RES market by creating a pool of projects”.

Table 1 below presents the financing facilities, under which the Bank financed the solar energy projects.
### Table 1. Frameworks supporting solar energy projects

<table>
<thead>
<tr>
<th>Facility</th>
<th>Facility financing envelope (€m)</th>
<th>Concessional financing (€m) provider</th>
<th>TCs (€m) and contributors</th>
<th>Number of solar projects and value of solar financing (€m)</th>
<th>Solar share of the facility’s total volume (%)</th>
<th>Main policy dialogue objectives of the facility (abbreviated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukrainian Sustainable Energy Lending Facility (USELF), 3 iterations 2009, 2014, 2018</td>
<td>350</td>
<td>60 CTF</td>
<td>15.1 GEФ, SIDA, Japan</td>
<td>17/180.8</td>
<td>51</td>
<td>New legal and regulatory framework for competitive RES auctions and transition from FIT</td>
</tr>
<tr>
<td>Kazakhstan Renewable Framework (KAZREF) 2 iterations 2016 and 2019</td>
<td>500</td>
<td>117 CTF, GCF</td>
<td>11 GCF, CTF</td>
<td>13/188</td>
<td>37</td>
<td>Drawing upon earlier PD but ultimately support for change to auction system</td>
</tr>
<tr>
<td>SEMED Private Renewable Energy Framework (SPREF) 2015</td>
<td>227.5</td>
<td>46.7 CTF, GEF</td>
<td>0.8 + 0.7 EU-NIF</td>
<td>2/16 (1 in Jordan, 1 in Egypt)</td>
<td>7</td>
<td>Elimination of barriers preventing the development of private renewable energy markets in SEMED</td>
</tr>
<tr>
<td>Egypt Renewable Framework (ERF) 2017</td>
<td>456</td>
<td>135 GCF</td>
<td>7.8 GCF, SSF, EU-NIF, SEMED Multi-donor Account</td>
<td>16/320</td>
<td>70</td>
<td>Drafting of the solar grid code, with characteristics required for PV plants to connect safely and reliably to the high voltage network; SESA Benban</td>
</tr>
<tr>
<td>Greek Renewable Energy Framework (GREF) 2017</td>
<td>300</td>
<td>0</td>
<td>0</td>
<td>1/75</td>
<td>25</td>
<td>Promotion of green economy (RES) investments in Greece, as a means to increase its energy security and sustainability.</td>
</tr>
<tr>
<td>Direct Finance Framework (DFF)</td>
<td>250</td>
<td>0</td>
<td>0</td>
<td>3/11.4 (2 in Cyprus, 1 Egypt)</td>
<td>4.5</td>
<td>None</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,083.5</td>
<td>358.7</td>
<td>35.4</td>
<td>52/791.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
One of the reasons why frameworks dedicated to RES were so successful in scaling up the Bank’s financing in this sector was that they took a holistic (almost “integrated”) approach to this new technology – they employed consultants (under TCs), who provided project screening, appraisal, preparation, implementation monitoring and policy dialogue support. Combination of technical and policy support in the context of such a new technology (in most COOs) turned out to be of critical importance. The evaluation will review and briefly present the results to date of the key Bank frameworks supporting solar power.

Cooperation with other IFIs and organisations appears to have been intensive under most of the solar power projects/frameworks, including with IRENA, EU, WBG. Co-financing has been mainly with the BSTDB, IFC, ADB, IsDB, FMO and Proparco. For instance, in Egypt, the EBRD cooperated on the RES legal framework development and co-financed with GCF, IsDB, ICD and ICBC. The Bank also cooperated and co-financed with IFC and ADB in Uzbekistan, while in Jordan it supported the PPA draft, working with DFC, FMO and Proparco.

The main TI quality targeted by solar projects was “Green” - the expansion of renewable energy generation, helping a country to fulfil its Intended Nationally Determined Contribution (NDC) pledged to COP21. More widespread private ownership, demonstration effect and framework for markets (through policy dialogue) were also targeted, particularly by earlier projects (in would qualify under Competitive TI quality now).

Electricity tariffs payable to solar power plants operators under PPAs varied widely (e.g. in sample projects they ranged from €8.7 – 9.0 per kWh in Cyprus to $12-15 per kWh in Ukraine). The solar power concessions granted following auctions had much more competitive tariffs than those granted through tenders based on FiT. Most projects benefited from tariff adjustment mechanism due to local currency devaluation. This adjustment was often partial (e.g. 30% increase if KZT devalues more than 30% to USD, or covering 70% of EGP devaluation against USD). Tariffs paid under the Bank’s projects in different countries will be analysed and compared.

The number of the Bank’s solar projects during the last nine years was roughly equal to the number of its hydrocarbon projects (oil, natural gas and coal) signed during that time, although the volume of the latter was almost four times larger (see “Evaluation of Hydrocarbon Projects", SS20-159 for more information).

This evaluation will analyse the Bank’s solar energy portfolio in more detail and its changing structure, comparing different periods of the Bank’s activities in this sub-sector. The reasons for the concentration of projects in certain countries, as well as the nature of the barriers to a larger geographical diversification will be explored.

Until 2013 all of the Bank’s solar energy projects were developed and implemented by the Power and Energy Utilities team and the Energy Russia, Caucasus and Central Asia (ERCCA) team, which both were part of the Bank’s Energy Business Group. However, in 2013 these teams were
restructured into the Energy Eurasia and Energy Europe, Middle East, Africa (EMEA) teams, which formed part of the newly created Sustainable Infrastructure Group (SIG). Starting from 1 April 2021, the responsibility for the SEMED projects have been transferred from Energy EMEA (renamed Energy Europe) to Energy Eurasia (renamed Energy Eurasia MEA).

The Bank’s solar operations during the last nine years were guided by the following strategies and initiatives:

- **2006 Energy Operations Policy**, stated under “EBRD approach: The Bank will support all forms of renewable energy technology and will adopt a formal target for investment in the renewable energy and energy efficiency sectors”. It then specified that wind and hydro present the best immediate opportunities, however “in other renewable technologies, principally solar, good potential exists in many countries of the Bank’s Region but the markets are largely undeveloped. In the absence of a high level of regulatory and/or grant support it is unlikely the outlook will improve in the near future, although there is scope for solar thermal technologies to penetrate water heating markets”.

- **2013 Energy Sector Strategy**, it stressed the growing climate challenge and declared that support for renewable energy is “central to the Bank’s approach”. It made numerous references to solar energy, as a technology that is “coming of age”, presenting a particular opportunity to the Bank, to scale up its financing in RES, which to date had relied mainly on wind and hydro technologies. It noted that “the Bank expects to see major growth in the role of solar power over the Strategy period. This principally reflects the dramatic, and continuing, decline in recent years in solar photovoltaic costs. It also reflects the start of operations in the SEMED countries, where solar resources are exceptional”.

- **2015 Green Economy Transition Approach** – similarly, it noted: “There is potential for increased RES financing in the COOs, for instance, there is significant potential for solar energy in SEMED where the Bank can play an important role in supporting both the transition to a lower carbon economy and a higher share of private sector power generation”.

- **2018 Energy Strategy for 2019-23** – pointed to the fast growth of the solar portfolio in 2017, led by large operations in Egypt and Jordan. It presented a Performance Monitoring Framework in which “share of intermittent solar and wind in electricity generation” was proposed as one of six context indicators.

The evaluation will verify the alignment of the Bank’s solar energy operations (particularly the sample projects) with these strategies and initiatives, as well as with the country strategies.

### 1.4 Other relevant evaluation work

So far, EvD has validated two self-evaluations of four solar projects: Scatec Solar portfolio in Jordan, covering three projects (EJRE, Greenland and Oryx – PEX18-732), and Burnoye Solar in
Kazakhstan (PEX18-733). EvD also conducted a review of two other solar projects’ OPAs (EDPR Solar in Romania and Ma’an Solar in Jordan).

The validation of the Scatec Jordan portfolio highlighted some project design shortcomings, such as weak links between outputs and outcomes, as well as an inadequate monitoring framework for some indicators, making it difficult to measure its contribution to expected outcomes. The OPAV also raised some operational issues, such as disagreements between the shareholders on who was to cover specific construction costs, as well as excessive panel soiling, issues with tracking system, issues with inverters and high temperatures, which resulted in slightly lower production. However overall, the projects were assessed as successful, achieving most of their performance indicators and demonstrating successful PPP under the first bankable PPA in Jordan, developed with the Bank’s assistance.

The validation of the Burnoys Solar project was largely complimentary about this first large-scale solar project in Kazakhstan. However, it pointed to the importance of a robust FX and irradiation sensitivity analysis, as well as mitigation of environmental risks. Kazakh Tenge devalued by 63% during the evaluation period, resulting in the client breaching some financial ratios. However the situation could have been much worse. Fortunately, before the project, the Bank engaged in policy dialogue with the Kazakh authorities to introduce 70% FX indexation of RES tariffs to the USD/KZT exchange rate movements (and 30% to movements in the domestic CPI).

Findings from these validations of the Bank’s early solar projects will be incorporated in the review.

Moreover, EvD has previously completed two thematic/sector studies, which include case studies covering some specific aspects of solar projects:

Policy Dialogue in Ukraine, April 2014 (PE13-577S), contained two case studies, one of which related to energy efficiency and covered the Bank’s policy dialogue in the RES sub-sector, including that conducted under the first USELF. Although at the time of this review USELF has financed only three small solar projects, the Bank’s contribution to the legal and regulatory framework in Ukraine was critical for paving the way for its more substantial financing of solar projects in the future. The evaluation praised USELF, noting that it “accelerated the development of the renewable energy sector in Ukraine, through an innovative combination of EBRD commercial financing, dedicated technical assistance support, and concessional grant co-financing”. It observed that in the RES sector “unlike in most other areas, Ukrainian authorities are generally pro-reform. As being relatively new sector it did not suffer from any legacy issues, nor, initially at least, did it suffer from anti-competitive behaviour and integrity concerns that continue to be endemic in the more well-established sectors.”

However, it also pointed out that “although the Bank’s policy advisers/consultants have been doing a great job in building capacity of Ukrainian regulatory bodies, they sometimes too easily succumbed to the demands of the beneficiary to change scope of work without comprehending the real drivers of these changes or analysing their long-term consequences”. It cited that the case of “green tariff legislation, where the consultants’ efforts, while being generally positive, led to significant changes in the policy context and market configuration. Such changes now limited or
precluded the EBRD and other IFIs from working on large-scale RES projects due to integrity issues”. However, its overall assessment of the Bank’s policy dialogue in the Ukrainian RES sector was positive. It stressed that an inclusive approach to legal drafting gained trust and support for the EBRD from government beneficiaries and other IFIs/donors, whose approach is different with sometimes mixed results.

Energy Sector Strategy Review, April 2018 (SS17-105) – this evaluation was focused on broader, strategic issues related to the Bank’s operations in this sector. It contained two country case studies, one of them being Kazakhstan, which provided an evaluation of the Bank’s energy project portfolio there. One of these projects was Burnoye Solar plant. EvD visited the project site and interviewed the client. A brief evaluation repeated the issues raised in the project validation, i.e. the importance of FX indexation for projects with mismatched loan and revenue currency. It noted that the plant has been working well, offsetting carbon emission of around 60,000 tonnes of CO₂ annually. A successful CSR programme was developed for local communities, assisting in their development. Construction was about to start on the project extension for a further 50MW.

The findings from EvD’s evaluation of other RES projects might also be relevant for the solar sub-sector, particularly those which “clustered” several such projects in an attempt to identify larger trends and commonalities, such as Four Wind Energy Projects (PE15-593) – which assessed four wind farm projects in Poland, Bulgaria, Estonia and Mongolia, and Hydropower Projects, Georgia (SS18-137), which evaluated a portfolio of the Bank’s hydropower projects in this country. Key findings and lessons from these evaluations are presented in annex 3.

In terms of solar energy evaluations completed by other IFIs, the World Bank’s Group’s IEG has recently published the Renewable Energy – Evaluation of the World Bank Group's support for energy supply from Renewable Energy resources 2000-2017, October 2020. It presents an extensive review of the WBG’s financing of RES, including solar energy. This evaluation analyses a portfolio of €22 billion with over 160 projects. It notes the uneven performance of solar projects, with the private portfolio (IFC-financed) at about 50% success rate, as opposed to 66% for the whole WBG RES portfolio. It observed that hydropower and multi-technology projects dominated this portfolio, although there has been a surge in the share of wind and solar projects in recent years.

The WBG’s core contributions in RES were: helping remove barriers to RE, using convening capacity to mobilise financing through partnerships, disseminating global knowledge and experiences, systematically engaging with clients, and effectively coordinating within the WBG and with external partners.


These and other relevant IFI evaluations of solar energy projects will be analysed as part of this review. The most interesting findings will be showcased in the report.
2. Monitoring and self-assessment

2.1 Monitoring reports

Seven of the projects proposed for this evaluation are framework sub-operations, while three are stand-alone. However, even the framework sub-operations have dedicated PMMs and are subject to semi-annual or annual PMM reviews. Recent (mostly 2020) PMM monitoring reports for nine projects were obtained, providing (more or less detailed) information on their status. One stand-alone project (Nur Navoi in Uzbekistan) was signed only in 2020 and will be completed at the end of 2021, thus no PMM has been produced yet (the rationale for its inclusion in the sample is explained in section 3.2).

Annex 2 provides brief information on the current status of each cluster project based on the most recent PMM reports. EvD’s preliminary review of these and other monitoring reports noted a generally positive picture – most projects have been completed largely as planned and are in operation. However, it has not been all “plain sailing” as some projects experienced issues ranging from delays in payment or partial payment of amounts due under PPAs by off-takers (most transmission companies, who are off-takers are not creditworthy), regulatory risk related to the possibility of unilateral reduction of tariffs by regulators/governments (some tariffs are considered relatively high), risk of curtailment of energy intake by off-takers, to inadequate power transmission infrastructure, delaying connection of completed generating facilities.

EvD also notes potential conflicts of interest (as some of the shareholders are also PV panel producers or EPC contractors), subsidisation (of financing and consumer energy tariffs), tariff affordability and exposure to currency and political risks. There have been also technical hiccups related to panel soiling, malfunctioning of tracking system, issues with inverters, etc., which resulted temporarily in slightly lower production than planned in some cases.

Although, in most countries, the legal and regulatory frameworks for RES seem more mature and solid than those on which the Bank’s earlier wind and hydro projects had to rely (see annex 3), there are still gaps and uncertainties. The COVID-19 pandemic substantially limited demand for electricity in certain countries, resulting in a number of the Bank’s solar projects experiencing financial difficulties. E.g. those in Ukraine were recently transferred to Corporate Recovery.

However, long-term prospects seem positive. Most of the projects are operating as planned and contributing to the energy transition and GHG emission reduction in their countries. A preliminary review indicates that many TI benchmarks in terms of power generation, GHG emission reduction or implementation of corporate governance standards, have been claimed achieved. Also, the Bank’s policy dialogue in selected countries seems to have contributed to an improved legal and regulatory environment for RES (e.g. Egypt, Uzbekistan, Kazakhstan, Cyprus), more transparent and fair PPAs (Jordan, Egypt) and to the transition from a feed-in tariff system to a new mechanism.
based on competitive auctions (Ukraine, Kazakhstan, Egypt) and improved environmental. Policy dialogue results will be examined under this review and showcased in the report.

2.2 Transition monitoring

Dedicated, project-specific TIMS are available for only two stand-alone projects (FRV Mafraq and Al Safawi, both in Jordan). Moreover, the PMM for the Yavoriv (facility) project provides ample information on the status of achievement of its TI benchmarks. Benchmarks for the remaining sample projects are set and monitored at facility level, i.e. – EREF, KAZREF. No TI monitoring reports have been identified for Cyprus projects (which should have been included under the DFF TIMS, however it does not cover them). EPG advised that the first monitoring review for these project is due in Monarch by late April. The standing of TI benchmarks varies, with the Jordan projects and Egypt framework reporting that most have been largely achieved. This evaluation will clarify status of all relevant TI benchmarks.

2.3 Self-evaluation

Self-assessments are not envisaged. EvD will rely on interviews with OLs, project monitoring bankers in relevant Resident Offices and clients/consultants/stakeholders/government representatives to obtain relevant information and data.

3. Evaluation methodology

3.1 Evaluation questions

The key questions to be answered by this evaluation are as follows:

- How has the Bank’s approach to solar energy evolved, particularly in the context of its support for RES and the Bank’s wider strategic objectives? To what extent has the Bank’s past experience with other RES shaped its approach to solar energy? Why has the Bank been prolific in certain countries but absent from others with solar potential?

- To what extent has the support for solar energy been reflected in the Bank’s country strategies (those relevant to the cluster projects and those for a few additional countries with high solar potential)? Have the Bank-financed projects fitted into the strategic objectives of relevant countries in terms of supporting their own economic/energy strategies, energy security and their international climate commitments? How, in the countries’ view, did these projects contribute to advancing the meeting of such commitments?

- Has the Bank had a well-defined policy dialogue strategy/approach in solar/RES consistent with the broader energy sector policy dialogue? What results did the Bank achieve in the solar (and broader RES) sector in the sample project countries through its policy dialogue, e.g. in terms of promoting auctions/competitive bidding for RES capacity, bankable PPAs, helping governments define their priorities or advancing relevant legal
and regulatory reforms? Has it achieved any wider impacts, e.g. helped attract more FDIs/local private investments into solar, or increased share of RES?

- What results did individual projects achieve, for example in terms of (i) promoting competition in power generation; (ii) limiting environmental, social and climate impact, (iii) improvement to corporate governance, the adoption of international standards and practices, as well as the transparency of the sector, (iv) the project's or the sponsor's efficiency, including financial performance, as well as investment costs per kWh.\(^1\) What value do they represent for consumers (tariff per kWh)? How these results compare with the results of other RES and non-RES projects?

- What common themes and issues can be discerned in the solar power projects? What lessons can be derived from the Bank's activities in this sector to date, including policy dialogue, design and implementation of the cluster projects, to strengthen the impact of the Bank's future solar energy projects?

### 3.2 Methodology

Although this review is intended as an evaluation of a “cluster” of ten solar energy projects, it will be presented within the broader context. The first part of the report will start with a brief background, which will present the evolution of the Bank’s approach to RES and the solar sub-sector in particular. It will include a brief description of selected early RES and solar projects financed by the Bank. Importantly, it will review and briefly present the results to date of the Bank’s key financing frameworks supporting solar power. It will also analyse how relevant country and sector strategies treated RES and specifically solar power operations, whether the Bank’s overarching strategy in respect of such support has been sufficiently clear and whether it was supported by appropriate diagnostics. Any major changes in strategic direction and the application of lessons learned from other earlier RES sub-sector projects will be examined. This part of the study will also contain an analysis of the structure of the Bank’s portfolio of solar power operations, from its start in 2012 to the end of 2020.

The second part of the study will consist of an evaluation of the cluster of ten projects, including two pairs of projects (largely with the same sponsors but with separate SPV borrowers). Moreover, two additional pairs of sample projects have the same sponsor but supported different solar plants in different locations, built at different times. Therefore effectively, the review will consist of eight evaluations of ten projects, supported by six different clients in six countries. Please see annex 1 for the list of the sample projects and their current status.

\(^1\) These categories are mentioned, as based on a preliminary review of the transition objectives of 10 cluster projects, they are the most frequent of such objectives. However the TI of each project will be assessed based on its specific targets set at approval (taking into account unintended benefits, if any).
Moreover, the following types of analysis (not explicitly referred to elsewhere in this Approach Paper) will be included in this review:

- The impact of the Bank’s investments and policy dialogue in support of infrastructural capacity (energy transmission grids) to accommodate solar/RES generation in the sample evaluation countries;
- Comparative analysis of tariffs achieved under FiT and though auctions in the sample and selected non-sample solar projects and their impact on consumers’ affordability;
- Analysis of Bank resources and time used for development and processing of selected solar projects (especially comparison of framework and non-framework projects);
- Comparative analysis of projects in the countries with high and low irradiation (including level of subsidies needed to sustain the latter);
- Comparative analysis of solar projects costs in different countries (per MW) and costs overruns (including for projects where shareholders were contractors or PV panel producers);
- Comparative analysis of operating costs of selected solar and other RES projects;
- Impact on jobs and inclusion of sample solar projects;
- The extent of the demonstration effect of selected single Bank-financed solar projects in a country (including e.g. Uzbekistan, Armenia, Northern Macedonia);

Sample projects selection approach: The sample projects were selected based on a preliminary analysis of the Bank’s solar energy portfolio (where projects in Egypt, Ukraine, Kazakhstan and Jordan clearly dominate). Specific project in these countries were then selected following discussions with the relevant Portfolio Managers, sector Country Directors and OLs. Larger and fairly typical projects were given preference. To expand the sample, two projects in Cyprus and one large stand-alone project in Uzbekistan were added. Both have been landmark projects in their own right. The former completed in a market, from which the Bank has been recently withdrawing and therefore taking stock of its achievements there would be congruent.

The Nur Navoi project in Uzbekistan is on the other end of the spectrum – it is the Bank’s first solar project in a relatively new market, which has been emerging as promising for the Bank in general and solar energy in particular. EvD believes that Nur Navoi’s innovative financing structure (equity bridge loan) and the Bank’s involvement in extensive policy dialogue in the energy sector in Uzbekistan could be of particular interest to the Board and Management. Therefore this relatively large (100MW) and landmark solar power project was included in the sample, although it is expected to be completed only in 4Q of 2021 (likely coinciding with the time of its review). Thus its evaluation will be mostly “preliminary” and will focus on the assessment of the Bank’s policy dialogue achievements in the Uzbek energy sector and its potential contribution towards a larger share of RES in this country. Moreover, EvD will evaluate the project’s relevance, additionality, physical completion, adequacy of its innovative financing structure, related IFI cooperation (IFC and ADB provided debt financing), as well as the early operational results of the solar plant (although the latter would be rated only as “preliminary/potential”) -see section related to Nur Navoi in Annex 2 for a more detailed list of categories and issues, which would be
evaluated in relation to this project. Nevertheless, in EvD’s view the inclusion of this project provides an opportunity to examine and showcase in the report the Bank’s activities in the energy/RES sector in a country where the Bank has recently restarted its operations after a long break and in which the Bank’s achievements have not been evaluated for more than a decade. The remaining nine sample projects have been in operation for several years and are expected to provide ample findings related to the operational and financial performance of solar power projects.

The overall, sub-sector level review will also take into account the results of four solar energy project validations, which will bring the total number of the projects assessed to 14. This will constitute 20% of the Bank’s total cumulative financing signed for solar energy – a sample size considered sufficient for such evaluation.

The EvD team will start with the first, more general part (see above) and then move to the project-focused second phase. The evaluation matrix is presented in annex 1. It indicates types of evaluation criteria, indicators and likely sources of data, which would be used to answer the evaluation questions listed in section 3.1. In the preparatory phase, EvD will build a results framework/Theory of Change for individual or pairs of projects and will review relevant Bank documents and external sources. It will request updates on key issues, benchmarks and performance indicators (e.g. financial statements, project monitoring and TC completion reports) from the OLs. Subsequently, the team will prepare a list of issues for each project, to be clarified first with the relevant OLs and then during the interviews with the clients and stakeholders.

It is currently envisaged that this review would entail three field missions (each combining two countries) to interview project stakeholders - clients and TC consultants, to explore and clarify key issues related to each project and to identify common themes. In some cases, other stakeholders, e.g. regulators, TC beneficiaries, local government, industry associations, NGOs and/or co-financiers, would be also interviewed, depending on the issues. Finally, it is envisaged that EvD would also hold brief meetings with relevant government representatives to establish how the projects fitted into their own economic and energy strategies and what impact they made (from the government’s point of view). All site visits would take place in the latter part of the year, when it is expected that travel restrictions will have been removed. Should they still be in place, EvD will try to communicate remotely with selected clients (by video conference or by emailing questions directly to the clients)².

The evaluation will also explore the experience of IFIs co-financing the sample projects, both in terms of the implementation issues (including coordination with the EBRD) and their own approach to financing RES and solar power in particular.

² However, it is noted that this approach proved sub-optimal last year (under the Hydrocarbons review) as the clients were preoccupied with addressing urgent operational and financial issues related to the Covid-19 epidemic. Thus the responses to EvD’s written questions were incomplete and often unclear, requiring several iterations and repeated requests for clarifications.
This part of the review will identify and assess results achieved by the sample projects in relation to their stated objectives. Nevertheless, the focus of this evaluation will be on the integration and the results of policy dialogue conducted and TCs implemented by the Bank, usually prior to the investment projects. The evaluation will also comment on the project design features, such as clarity and evaluability of their transition objectives, as well as on sample projects’ other benefits referred to in the Board Reports, such as increase of employment during and post construction. Issues related to PV panels procurement, origination and their potential subsidisation will be examined. Tariffs payable under different projects, their structure and adjustment mechanisms will be compared. Impact of concessional financing will be investigated. Degree of the external finance mobilisation will be reviewed as part of the Bank’s additionality assessment. Finally, an attempt will be made to relate the older projects’ transition objectives to the Bank’s new transition qualities (although without formally evaluating such “shadow” transition objectives if they have not been set as such).

The evaluation will also attempt to identify broader impacts and long-term outcomes (e.g. on a country’s energy security, achievement of its climate-related targets, economy, environment or industry practices, laws or regulations adopted).

To ensure a focused evaluation, three main performance categories will be assessed for each project: relevance (including additionality), effectiveness (achievement of physical and transition-related outputs, outcomes and impacts) and efficiency (financial performance and contribution to the Bank’s P&L). An overall performance rating for each project will be also provided, in accordance with EvD practice. The assessment will derive a set of key findings from each project, which will be presented in a concise format and will focus on selected practical issues.

The main report will present a wider, cross-cutting strategic-level assessment, as well as common operational-level findings and recommendations, taking into account the sample project evaluations, portfolio analysis, and the results of earlier validations of selected solar power projects, to present a cohesive picture of the Bank’s performance in this sub-sector.

### 3.3 Potential problems and limitations

Availability and adequacy of information and data is the main challenge for this review because most of the solar power projects were processed under facilities and have been monitored only at the framework level. It is also likely to be more difficult to gather information as, due to the Covid-19 pandemic, it might not be possible to properly interview and/or to reach all relevant stakeholders.

Moreover, some of the projects have a vintage of five or more years and their original OLs are no longer with the Bank, while local counterparts might have also changed, which could make it challenging to obtain full and reliable information on the evolution of these projects.
Conversely, one project (Nur Navoi) will have just been completed at the time of its review, thus its operational record will be limited and only certain aspects of its performance will be ready for full evaluation.

It might also be challenging to obtain country-level, reliable and up-to-date data on RES and solar share in electricity generation and the overall energy sector performance for certain countries.

Finally, some sample projects are only a part of very larger solar energy generation developments (e.g. in Jordan or Egypt, where the Benban site has been one of the largest solar power developments in the world), thus it might be difficult to attribute higher-level impacts to any particular sub-project. Similarly, many solar projects were co-financed or co-developed with other IFIs, while EBRD was sometimes part of a larger IFIs group conducting policy dialogue in this sector, thus precise attribution of outcomes and impacts in such cases will constitute a challenge.

4. Administrative arrangements

4.1 Evaluation team

This evaluation will be led by Tom Bartos, Senior Evaluation Manager. Theo Sands, Principal Evaluation Manager will be a key member of the team, contributing to selected chapters and project evaluations. Natalia Lakshina, Analyst will provide research, data compilation and administrative support, while Stephanie Crossley, Analyst, will act as the report’s editor. An EvD peer reviewer of the draft report will be identified. An external panel member (to be also identified) may be requested to review the draft report.

4.2 Timetable

Due to current travel restrictions and uncertainty related to the Covid-19 virus epidemic it is difficult to properly plan all activities, particularly those related to field work. For now, activities such as writing the first part of the report (evolution of the Bank’s approach, portfolio analysis, links to country strategies, etc.), as well as the preparation of result frameworks, questions, data requests and issues to be clarified, are scheduled during April-July and any field work is scheduled for September-November, when it is hoped the situation might become clearer. If travel is not possible, telephone interviews and email exchanges with selected stakeholders will have to suffice.
## Solar Power Projects (Regional)

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach paper prepared, circulated and approved</td>
<td>March-April 2021</td>
</tr>
<tr>
<td>Background documentation review, Results Framework preparation x8</td>
<td>March-May 2021</td>
</tr>
<tr>
<td>Internal and external data collection and internal interviews, drafting of part 1 of the report</td>
<td>April-July 2021</td>
</tr>
<tr>
<td>Field work (three trips, each covering two countries)</td>
<td>Sept-Nov 2021</td>
</tr>
<tr>
<td>Drafting of the part 2 of the report (including eight evaluations)</td>
<td>Sept-Nov 2021</td>
</tr>
<tr>
<td>Draft submitted to CE</td>
<td>Early Dec 2021</td>
</tr>
<tr>
<td>Draft circulated for Management Comments</td>
<td>By the end of Dec 2021</td>
</tr>
<tr>
<td>Final editing and final distribution</td>
<td>Jan 2022</td>
</tr>
</tbody>
</table>

### 4.3 Budget

Provisional travel budget of up to £16,000. No consultancy budget required.
Annex 1: Evaluation matrix

The evaluation matrix presented below relates mainly to the more strategic issues to be reviewed as part of this evaluation. In addition, for most sample projects EvD will prepare Theory of Change organigrams, specifying their inputs, outputs, outcomes and impacts. Point 3 of this matrix gives examples of issues which might be encountered and relevant evaluation criteria, indicators and sources of data, which could be applied in the process of evaluating the sample projects.

<table>
<thead>
<tr>
<th>Evaluation questions</th>
<th>Evaluation criteria</th>
<th>Indicators</th>
<th>Sources of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How has the Bank’s approach to solar energy evolved, particularly in the context of its support to RES and the Bank’s wider strategic objectives? Why has the Bank been prolific in certain countries but absent from others with solar potential?</td>
<td>N/A</td>
<td>N/A</td>
<td>Management/ OCE/EPG and other memos. Subsequent energy policies/strategies. Relevant countries’ regulations on RES market entry. -consultations with SIG teams -interviews with government representatives of selected COOs</td>
</tr>
<tr>
<td>2. To what extent has the Bank’s past experience with other RES shaped its approach to solar energy financing?</td>
<td>- extent of changes/improvements in the Bank’s approach to RES</td>
<td>- evidence of using experience from early wind/hydro/etc projects when structuring and preparing subsequent solar projects - evidence of improvement to the Bank’s operations (in terms of higher TI, quality of projects) due to changes in institutional set up</td>
<td>-Board reports, interviews with the OLs and Bank’s Management</td>
</tr>
<tr>
<td>3. To what extent has support for solar power been reflected in the selected Bank’s country strategies, as well as sector strategies and strategic initiatives?</td>
<td>- extent of coverage of RES and solar in relevant strategies -existence of meaningful diagnostics supporting the Bank’s involvement (or otherwise) in solar power</td>
<td>- adequacy of the description of RES issues, e.g. competition, access to network, regulatory and legal frameworks, transparency of auctions, environmental issues, energy security, etc. - improvements in recent strategies presenting RES</td>
<td>-Country strategies (Ukraine, Egypt, Jordan, Cyprus, Kazakhstan, Uzbekistan + Morocco, Tunisia, Turkey, Greece) -Sector strategies (Energy) Initiatives (Green Economy Transition Approach)</td>
</tr>
<tr>
<td>Evaluation questions</td>
<td>Evaluation criteria</td>
<td>Indicators</td>
<td>Sources of Data</td>
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<tr>
<td>4. Have the Bank-financed projects fitted into the strategic objectives of relevant countries in terms of supporting their economic, environmental and energy security objectives, as well as international commitments? How, in the countries' view, did these projects contribute to such strategic objectives?</td>
<td>- existence and adequacy of relevant strategy related to RES, and solar in particular, for each country</td>
<td>- evidence of a positive impact from the Bank's projects</td>
<td>- relevant countries’ own energy and other strategies</td>
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<tr>
<td></td>
<td>- COP21 commitments to scale up RES</td>
<td></td>
<td>- interviews with country governments,</td>
</tr>
<tr>
<td></td>
<td>- change in given country’s share of RES in energy generation, improvements in energy security</td>
<td></td>
<td>- country-specific data</td>
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<td></td>
<td></td>
<td></td>
<td>- interviews with private sector/industry associations/NGOs representatives</td>
</tr>
<tr>
<td>5. Has the Bank’s policy dialogue been planned or reactive/ad hoc? What results did the Bank achieve in the solar (and broader RES) sector in the sample project countries through its policy dialogue, e.g. in terms of promoting auctions/competitive bidding for RES capacity, bankable PPAs, helping governments define their priorities or advancing other legal and regulatory reforms? Has it achieved a wider impact?</td>
<td>- evidence of the Bank’s RES/solar PD strategy/action plan/approach</td>
<td>- clarity and completeness of RES/solar PD strategy/action plan/approach</td>
<td>- Bank documents, internal interviews</td>
</tr>
<tr>
<td></td>
<td>- evidence of auctions/biddings for RES capacity (following Bank’s intervention)</td>
<td>- size (MW) and number of RES capacity/lots auctioned/tendered</td>
<td>- national regulator’s reports/websites</td>
</tr>
<tr>
<td></td>
<td>- new institutions created or improved, capacity of staff improved</td>
<td>- new institutions’ impact on sector’s transparency, competition, etc.</td>
<td>- consultant and client interviews, consultants reports, site visits</td>
</tr>
<tr>
<td></td>
<td>- new standards, practices, laws, or regulations related to RES being adopted and utilised</td>
<td>- the number of new institutions’ staff trained</td>
<td>- interviews with government, lawmakers, clients, industry associations, NGOs</td>
</tr>
<tr>
<td></td>
<td>- FDIs in solar/RES private sector</td>
<td>- high competence of staff in the opinion of market participants</td>
<td>- countries’ data – from ROs, interviews with government reps or from the web</td>
</tr>
<tr>
<td></td>
<td>- prevalence of RES in the energy mix of relevant countries</td>
<td>- evidence of a link between the growth of FDIs in solar/RES and the Bank’s projects</td>
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<tr>
<td></td>
<td>- demonstration effect in other countries</td>
<td>- extent of the Bank’s project’s contribution to the growth of RES in a relevant country’s energy mix/other countries</td>
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<tr>
<td></td>
<td>- other impacts (job creation, PV industry development)</td>
<td>- number of new jobs</td>
<td></td>
</tr>
<tr>
<td>Evaluation questions</td>
<td>Evaluation criteria</td>
<td>Indicators</td>
<td>Sources of Data</td>
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<tr>
<td></td>
<td></td>
<td>created in construction and operation.</td>
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<tr>
<td></td>
<td></td>
<td>-new PV production facilities created and jobs added</td>
<td></td>
</tr>
<tr>
<td>6. What results did individual projects achieve, for example in terms of (i) promoting competition in power generation; (ii) limiting environmental, social and climate impact, (iii) improvement to corporate governance, the adoption of international standards and practices, as well as the transparency of the sector</td>
<td>increased competition (evidence of more private companies local and foreign participating in auctions/bids)</td>
<td>-pre and post project data on market structure, private participation in energy sector, quantity of CO2 emission avoided, pollution reduction, changes in employment, etc.</td>
<td>data from Bank reports and clients' stakeholders' interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-reduction of SOE share of power generation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-increased diversification of electricity supply,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-improved corporate governance, business conduct, H&amp;S</td>
<td></td>
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<td></td>
<td></td>
<td>-increased employment in private RES</td>
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<tr>
<td></td>
<td></td>
<td>-evidence that the use of new standards, practices, laws, or regulations improves competition, access to market, transparency, etc.</td>
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<tr>
<td></td>
<td></td>
<td>(e.g. PPAs, introduction of auctions for RES capacity)</td>
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</table>
### Evaluation questions

<table>
<thead>
<tr>
<th>Evaluation questions</th>
<th>Evaluation criteria</th>
<th>Indicators</th>
<th>Sources of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. What was the project’s efficiency, including financial performance and cost of investment? What value for consumer did it bring?</td>
<td>- project’s (or sponsor’s) financial performance data</td>
<td>- alignment with the project’s financial projections</td>
<td>- project’s/sponsor’s financial statements, Board reports, consultant reports, Board and monitoring reports from the Bank’s selected RES and non-RES projects</td>
</tr>
<tr>
<td></td>
<td>- financing terms and evidence of their fulfilment by the sponsor</td>
<td>- adequacy of PPA strength assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- investment cost per kWh</td>
<td>- creditworthiness of the off-taker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- tariff per kWh</td>
<td>- comparison of investment costs among the sample, other selected RES and non-RES projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- comparison of tariffs among sample, other selected RES and non-RES projects</td>
<td></td>
</tr>
<tr>
<td>8. What common themes and issues can be discerned in the solar power projects?</td>
<td>patterns in the occurrence of issues specific to RES, particularly solar projects</td>
<td>N/A</td>
<td>- all of the above, web pages and internal documents of the relevant IFIs, interviews with relevant staff</td>
</tr>
<tr>
<td>9. What lessons can be derived from the evaluation projects to strengthen the impact of the Bank’s future solar power projects?</td>
<td>N/A</td>
<td>N/A</td>
<td>- all of the above</td>
</tr>
</tbody>
</table>

The performance of projects will be assessed in accordance with EvD’s standard evaluation methodology. The projects will be evaluated based on three key criteria:

(i) **relevance** – alignment of the project’s objectives with the relevant country and sector strategies, the Bank’s strategic initiatives and the country’s own strategies and commitments. The strength of the additionality case;

(ii) **effectiveness** – achievement of the projects’ operational and transition objectives to date;

(iii) **efficiency** – achievement of the financial objectives to date and contribution to the Bank’s P&L.

Ratings for each of the above categories will be based on EvD’s current scale of: Excellent – Fully Satisfactory – Partly Satisfactory – Partly Unsatisfactory – Unsatisfactory. The overall performance rating scale is: Outstanding – Good – Acceptable – Below Standard – Poor – Very Poor.
Annex 2: Sample projects – their current status

Table below lists the sample projects. Their current status is summarised in the next section.

<table>
<thead>
<tr>
<th>OpId</th>
<th>Project Name (framework if any)</th>
<th>Country</th>
<th>EBRD loan €m</th>
<th>Signed</th>
<th>Short description (capacity, location, main sponsor, co-financing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49211</td>
<td>EREF: Infinity / Ib Vogt Solar PV 1 - 30 MW</td>
<td>Egypt</td>
<td>14.2</td>
<td>10.2017</td>
<td>30 MW solar power plant, part of one of the largest solar developments in the world – Benban in the Aswan province of Egypt, with the total 1.8GW capacity. Local sponsor (Infinity), teamed with a German PV developer. EBRD mobilised co-financing from FMO and GCF. This and 49302 project approved and monitored together.</td>
</tr>
<tr>
<td>48153</td>
<td>FRV Al Mafraq</td>
<td>Jordan</td>
<td>30.8</td>
<td>12.2016</td>
<td>50MW solar power plant, 70 km north of Amman, one of the first PPAs awarded through an auction rather than based on FiT. FRV (the main sponsor) owns 70% of the project while Hareon Swiss Holding AG retains the remaining 30% ownership stake. Proparco (the French development financier) provides parallel loan of the same amount.</td>
</tr>
<tr>
<td>49072</td>
<td>Al Safawi Solar</td>
<td>Jordan</td>
<td>28.1</td>
<td>09.2017</td>
<td>51MW solar power plant in the Safawi area, 150 km east of Amman. The sponsor is FRV (as above) teamed with ATC – a Jordanian private conglomerate operating in various industries. The EBRD is providing a senior secured A/B loan of USD 64.5 million in partnership with FMO.</td>
</tr>
<tr>
<td>47520</td>
<td>DFF: CYPV Energy</td>
<td>Cyprus</td>
<td>6.7</td>
<td>7.2016</td>
<td>Three smaller solar power plants with a total capacity of 7.4MWp located in Famagusta and Nicosia districts. The sponsor is a Russian ICT and RES entrepreneur, teamed with a local partner. No co-financing.</td>
</tr>
<tr>
<td>47697</td>
<td>DFF: TPT</td>
<td>Cyprus</td>
<td>4.1 (1.5 pre-paid)</td>
<td>6.2016</td>
<td>Two smaller solar power plants with total capacity of 4.5MWp: Paliometoch (1.5 MW) and Malounta (3 MW), both located in Nicosia region. Both sold in 2019 - the Paliometoch tranche was prepaid before the plant was sold to a new owner. The Malounta tranche remains with the EBRD.</td>
</tr>
<tr>
<td>49664</td>
<td>USELF: Yavoriv Solar I&amp;II</td>
<td>Ukraine</td>
<td>23.1</td>
<td>12.2017</td>
<td>72 MW solar power plant constructed and financed in 2 phases (2017 and 2019), each at 36MW capacity (72MW in total), developed by a local oil and RES entrepreneur and natural gas exploration, located near Lviv in western Ukraine. CTF provided co-financing.</td>
</tr>
<tr>
<td>5002</td>
<td>KAZREF: Risen Solar</td>
<td>Kazakhstan</td>
<td>19.1</td>
<td>6.2018</td>
<td>40MW solar power plant led by Risen Energy, a major Chinese private sector solar developer, in the Karaganda region in South-Eastern Kazakhstan. The EBRD provided local currency financing alongside co-financing from the CTF and the GCF.</td>
</tr>
<tr>
<td>50218</td>
<td>KAZREF: Chulakkurgan</td>
<td>Kazakhstan</td>
<td>35.1</td>
<td>1.2019</td>
<td>50MW solar plant in South Kazakhstan led by Risen Energy, the same project sponsor as Risen Solar. The EBRD provided local currency financing with co-financing from the GCF.</td>
</tr>
<tr>
<td>51454</td>
<td>Nur Navoi</td>
<td>Uzbekistan</td>
<td>52.2</td>
<td>12.2020</td>
<td>100 MW solar plant located in Nur Navoi region, central Uzbekistan. The EBRD provides an innovative equity bridge loan to the sponsor Abu Dhabi Future Energy Company PJSC – Masdar, while IFC and ADB provide senior debt to an SPV. This is the Bank’s first solar power project in Uzbekistan.</td>
</tr>
</tbody>
</table>

Current status of sample projects

Infinity/Ib Vogt Solar (Benban), Egypt

Benban is the largest solar power complex in Africa and one of the largest in the world (1.8 GW). It consists of 32 separate plants of 20 to 50 MW50MW, of which the EBRD was the largest financier and co-financed 16. The two Infinity/Ib Vogt projects are part of this group. Under this project, the Bank provided two loans to two SPVs - one to MMID 30 for Renewable Energy SAE (SPV 1), and one to Infinity Benban Park Solar EnergyEnergy (SPV2). Infinity Solar Energy SAE,
an Egyptian RE platform controlled by the Mansour family, is the largest Sponsor of both projects (owning 31% and 53% of SPV1SPV 1 and SPV2SPV 2 respectively). Other shareholders are ib vogt a German RES developer which owns 14% in each SPV and BPE a large Egypt focused private equity firm which owns 30% in each SPV.

are which owns 14% in each SPV and BPE, a large Egypt focused private equity firm which owns 30% in each SPV. In December 2019 the Bank invested $60 million equity for a 20% stake of Infinity Solar SAE.

The plants were completed in early 2019. The EPC contractor was one of the shareholders (ib vogt). The construction was completed on time and on budget. Plant 1 reached its commercial operation date (COD) in February and plant 2 in April 2019. The Bank’s loans were almost fully disbursed with a small amount eventually cancelled due to savings in the total project costs. Parts of both original loans were syndicated to FMO via an A/B loan structure, while another portion was mobilised from GCF which provided non-concessional financing. The plants are performing as expected (each plant has 17 employees, plus security guards). The PPA is based on FIT fixed at $c 0.84/kWh, which is 70% indexed to $/EGP exchange rate (thus effective price is lower now due to EPG depreciation). Reportedly, the loans have been repaying without delays.

However, a CRS dated May 2020 indicates that there are two important matters that are impacting all the entities in Benban (including this project):

“- the EETC (the off-taker) and all the projects operating in the Benban complex (32 in total) are currently in dispute regarding cost sharing arrangements (CSA), related to the sharing of an additional $121 million ($4.2 million per 50 MW) interconnection costs. As of the reporting date, the team has indicated that the anticipated settlement scheme includes paying a lower amount of $3.6 million per 50 MW that will be payable 50% upfront and 50% over five years with interest accruing only for the last three years. This proposal has been accepted by the EETC.

- in 2020 EETC sent a letter to each project in the Benban complex declaring a precautionary force majeure (FM) event following the Covid-19 outbreak. The letter notes the anticipated delays in collection and reduced tariffs because of government action. EETC is now current in its payments. According to the initial legal analysis the team reports that EETC should not be able to stop payments or delay them as a result of FM (as ’payment of money’ is explicitly carved-out in the definition of FM), although in practice there are delays. Some additional comforting factors include the presence of an MoF guarantee and fully funded DSRAs.”

According to the most recent information from the OL these issues have been resolved (EETC has agreed with the cost sharing settlement proposal and it did not reduce or delayed its payments under the PPAs). As part of the evaluation, EvD will confirm these issues have been resolved.

TI is monitored at framework level (all 16 Benban projects have the same benchmarks, to be achieved collectively). TIMS (2020) reports that five out of eight benchmarks have been achieved. As all 16 plants (and the other 16 plants not financed by the Bank) are completed and operational, the number of private investors in solar, the solar power capacity of Egypt, as well as the adoption of a bankable framework for FiT, were achieved. Moreover, a strategic environmental and social assessment of a potential site for a similar plant on the eastern bank of Nile was also completed (under the Bank’s TC). Finally, an additional 700MW RES capacity tendered under FIT reached financial close (200 MW targeted). However, only 250 MW (target 500MW) of solar capacity was commissioned outside of the Framework/Benban (although offset by an acceleration of wind
projects), while the results related to CO2 emission savings stemming from the complex are to be confirmed as Benban’s impact will only be measured in 2021.

**Policy dialogue** – prior to the project/framework, the Bank was engaged in preparing a solar grid code. It also provided support to Egypt’s New and Renewable Energy Authority in preparing the Strategic Environmental and Social Assessment for the Benban solar complex and helped in developing PPA. According to TIMS the former was completed, while the successful contracting of 16 Benban’s companies indicates that the latter was completed as well.

Moreover, the GCF was to provide advice in structuring the regulatory framework for the next phase of RES development, covering the period up to the 2022 renewable energy target. The expectation was that this would entail the use of competitive tender mechanisms, following the example of other countries, including Jordan, that have used feed-in tariff schemes to create a new industry and then competitive tenders to ensure maximum efficiency. This TC had an estimated budget of US$ 7 million (financed mainly by GCF). The results of the Bank’s policy dialogue and its cooperation/coordination with other IFIs/organisations will be a focus of this evaluation.

**FRV Al Mafraq Solar, Jordan**

The Borrower is ultimately owned 70% by Fotowatio Renewable Ventures B.V (FRV) with HQ in Spain, and 30% by Hareon Swiss Holding AG. FRV are in the process of acquiring the 30% stake owned by Hareon. The Bank’s loan is co-financed with Proparco, the French government’s development bank, on a parallel basis and for an equal participation. The project site is the King Hussein Bin Talal Development Area (KHBTDA), near the city of Mafraq, 70 km northern of Amman.

COD was reached in September 2018 (eight months later than planned due to delays in mechanical and electrical works, specifically delays with trackers procurement that led to late signing of supply and sub-contracting contracts). The project experienced minor cost underruns of around 5%. Also, the plant’s performance is in line with the P75 scenario for the second year of operations with energy generation amounting to 141MWh. This resulted in performance ratios that are 5% higher than the guaranteed level as reported by the Lenders’ Technical Advisor. The project achieved Final Acceptance under the BOS contract in December 2020 and is expected to achieve Final Completion under the Financing Agreements in Q2 2021.

The first five repayments successfully took place between February 2019 and February 2021. During the Covid-19 lockdown NEPCO (the sole off-taker) paid only 75% of its February to June 2020 invoices to all RES producers in Jordan. This resulted in a historical DSCR (1.06x) that is slightly below the EoD level of 1.075x in August 2020. The matter has now been resolved with NEPCO and the overdue payments are to be made in 2021. The overdue payments were settled between January and April 2021. Following the last debt service in February 2021, DSCR stood at 1.23x, which complies with the debt sizing level under the P90 case.

The project Labour and Employment Plan has been developed, with recruitment targets for Jordanian nationals and ensuring due consideration has been given to potential social conflicts arising from perceptions of unequal employment opportunities within nearby communities,
specifying measures to avoid and address these potential conflicts, whilst ensuring compliance with Jordanian government policy and commitment on employment opportunities for Syrian refugees. Moreover, the ESDD was also prepared and assessed the social investment needs of the local community and required stakeholder engagement. It recommended implementing a specific Corporate Social Responsibility (CSR) programme and Stakeholder Engagement Plan (SEP). A Non-Technical Summary (NTS) was prepared for the project and was posted on the company’s website in English and Arabic, as well as made available as hard copies locally to facilitate information disclosure in the neighbouring community. Moreover, FRV signed an agreement with a number of development banks (including the EBRD) as well as one of the most prestigious universities in Spain (IE University) to introduce the ‘Young Talented Leaders’ scholarship, which supports students from the local community in pursuing their undergraduate studies. Upon completion of the project construction, the scholarship was awarded to a Jordanian student for a four-year undergraduate programme.

The project’s TI arises from the demonstration of new replicable activities through the successful transition from a feed-in tariff model to a competitive tender process; more widespread private ownership which increases the share of privately owned generation capacity in Jordan; and a reduction in Jordan’s carbon intensity, with expected CO2 emission reductions of approximately 90,000 tCO2e annually. In In 2020, all benchmarks have been achieved.

The Bank’s policy dialogue on RES regulatory and legal framework was held well before the project. The Bank helped develop the contractual framework under the FiT scheme and this led to the successful financing in 2014 of 12 first round projects totalling 200 MW (the EBRD financed four of these projects, totalling 60 MW, which began generation in 2016). In the second round MEMR invited bidders to propose solar PV projects of 50 MW capacity. Twenty-four companies submitted technically acceptable offers, and pricing for the four accepted ranged from 6.1 USDc/kWh to 7.66 USDc/kWh. This was the first tender of its kind in the region to feature a competitively-set tariff.

Al Safawi Solar, Jordan

The project comprises the development, construction and operation of a 51 MWp solar PV project located in Al Safawi area of Jordan. The Borrower is owned 70% by Fotowatio Renewable Ventures B.V (FRV) with HQ in Spain while Arabia Trading And Consulting Company Ltd (ATC) retains the remaining 30% stake. The EBRD provided US$ 64.5 million of which 50% was later syndicated to FMO. FRV The project achieved minor cost savings of US$ 65,000. Although the Bank had provided significant policy dialogue in Jordan on solar sector reforms prior to this project, there was no policy dialogue or associated TC as part of this investment.

Al Safawi became commercially operational on April 2019, against the target set in the Board Memorandum of March 2019. As indicated above, the project cost was less than initially forecast, with a revised budget of US$ 86.12 million versus an initial estimate of US$ 90.42 million. In 2020,
the first full year Al Safawi was operating, energy generation amounted to c. 144GWh. This was slightly above the P90 projection of 143.1GWh from the Board Memorandum.

Issuance of the Provisional Acceptance Certificate (PAC) confirming satisfactory completion of the construction has, however, been delayed due to damage to trackers resulting from a storm in 2018. After negotiations between the project sponsor and the EPC, an agreement was reached in June 2020 on a strategy to address the weaknesses within the trackers. Engineering & Procurement for the trackers solution was finalized in September and construction completed in November 2020. The works underwent some inspections and the Project is undergoing the process to issue PAC (expected by 30 April 2021). Moreover, the LTA confirmed that all structural works for dampers installation is complete and the trackers solution is providing further stabilisation to the trackers. The implementation of the trackers solution resulted in an improvement in the plant’s performance in Q4 2020 & Q1 2021.

The Board Memorandum identified the “creditworthiness of NEPCO as the long-term off-taker” as the “principal risk to the Project”. As a mitigation measure, the project secured an agreement under which NEPCO’s payment obligations are fully guaranteed by the Jordanian Government. Despite that, the project has faced issues in receiving timely payments in full from NEPCO. Between February and June 2020, NEPCO only settled 75% of invoices relating to February to June 2020, citing COVID-19 as a force majeure. However, after negotiations, NEPCO resumed full payment in September 2020 and settled all arrears over January- April 2021.

The project has also been affected by government-imposed lockdowns in response to the COVID-19 pandemic. A 40-day lockdown imposed in March 2020 temporarily affected ongoing operations and maintenance, although there is no indication of any longer-term consequences from that period.

Revenue from energy generation in 2020 amounted to US$ 9.18 million, versus a forecast of US$ 9.50 million within the Board Memorandum. The 2020 DSCR stood at 1.35x, higher than figures presented at Board assuming P50 scenario (1.26x) and the debt sizing level under the P90 case (1.15x). This is attributed to the project receiving delay liquidated damages of US$ 1.3m under the EPC contract.

The project was subject to a Jordanian Environmental and Social Impact Assessment and permitting process, as well as independent due diligence to assess compliance with the EBRD Environmental and Social Policy requirements. An Environment and Social Action Plan agreed between EBRD and the project company is being implemented by the project company, enabling EBRD to monitor compliance with environment and social standards. Moreover, a Community Investment Plan was established by the project company and the EPC contactor, which addressed sourcing of local community labour as a preference and extending employment opportunities to refugees. The plan was also extended to cover the project’s operations phase and its recommendations will be implemented by the O&M Contractor. In addition, FRV signed an agreement with a number of development banks (including EBRD) as well as one of the most prestigious universities in Spain (IE University) to introduce the ‘Young Talented Leaders’
scholarship, which supports students from the local community in pursuing their undergraduate studies. Upon the completion of Project construction, the scholarship was awarded to a Jordanian student.

In terms of Transition Impact, the project contributed to improving the share of privately-owned power generation in Jordan. Moreover, the project was awarded under a competitive tender process (fixed tariff of 6.3 US$c/kWh which the second cheapest tariff in the second rounds tender) after the country shifted away from the administration of feed-in tariffs. This demonstrated the value of following a more market-oriented approach to secure renewable energy and resulted in much cheaper tariffs for the offtaker. In addition, the project exemplifies the effectiveness of mobilising private sector expertise to promote sustainable energy and reduce the country’s dependence on imported fossil fuel energy as well as to address carbon intensity of its power sector. Finally, the project provided employment opportunities in an area facing significant challenges due to refugee influx.

The project achieved all of the Transition benchmarks set. The project had three benchmarks, tracking the energy capacity installed, the annual energy generation, and the annual contribution to reduction of CO2 emissions. These benchmarks were all achieved in the first full year that the plant was operational, in 2020, in line with the original timing targets.

**CYPV Energy, Cyprus**

The construction works at all three PV plants were completed in March-July 2017 (Nisou (1.5MW), Dhali (1.5MW) and Frenaros (4.4MW)). Two smaller plants were connected to the grid in May 2017 and Frenaros in September 2017. The Bank’s loan of €6.7 million was fully disbursed. The project was completed with savings €0.6 million (below the budget of €10.1 million). D/E is 75:25.

The plants started generating revenues about a month after connection to the grid. The project is in compliance with the agreed ESAP.

Energy yields have been consistently in line with or above the energy simulation models (P50). FY2019 electricity generation reached 12,623 MWh, or 4.6% above P50 estimates, translating to €1.1 million revenues, yet EBITDA margin contracted to 54% (vs. 82% in 2018) on the back of €286,000 one-off impairments related to licencing expenses of other projects owned by the Borrowers’ shareholders (before being transferred to new SPVs). In 2019, CFADS amounted to €936,000 vs. €662,000 debt service bringing DSCR to 1.41x comfortably above the covenanted level (min 1.1x). However, in Mar-2020, on the back of low electricity demand amid Covid-19 restriction measures, EAC sent a precautionary notice to the borrowers of potential curtailment on the grounds of maintaining grid stability. By March 2021 no curtailment has taken place.

In Credit’s view, retroactive tariff reduction is a key risk, although moderate as the project’s off-take prices look attractive when compared to other RES in Cyprus under earlier FiT schemes.
(wind power FiTs at 14.5–16.5 €c/kWh, biomass FiTs above 13.5 €c/kWh and earlier solar PV FiTs ranging from 16 to 30 €c/kWh). The project’s FiT ranges from €8.2c to €9.9c /kWh.

**TPT Solar, Cyprus**

Two plants were completed in 2017 with €0.6 million budget savings (as compared to €5.8 million budgeted). The EBRD loan amounted to €3.6 million (compared to the committed €4.1 million) resulting in a D/E ratio of 67:33. The commercial operation date and the project cluster completion date were achieved in January and March 2018 respectively.

However, there has recently been an ownership change. The 3.0 MW Malounta plant operated by TPM Abitenergy Ltd was sold in 2019 to Luglio Ltd, a company fully owned by the Polish investor Sebastian Kulczyk, while the 1.5 MW Paliometocho operated by Conbetter Ltd has been sold to a Russian investor Mr. Stopnevich. Luglio Ltd retained the EBRD as lender to the SPV, while the latter tranche was prepaid in full (€1.13 million) in September 2019, prior to change of control. The new owner of the borrower, Luglio Ltd, is a successor (son) of the late Jan Kulczyk, a Polish entrepreneur already well known to the Bank through the Polenergia Wind and Serinus Energy projects. Kulczyk Investments effectively runs the project, so far to the satisfaction of the Bank.

Despite the project having experienced some delays to construction mainly due to (a) strikes at the Limassol Port in previous months, and (b) delays in the completion of connections to the grid, the construction works at both parks were completed and plants connected to the grid in April 2017 and May 2017 for Paliometocho and Malounta respectively.

The project has been in compliance with the ESAP, however the 2019 E&S is currently overdue due to the lockdown restrictions in Cyprus in 2020 due to COVID-19. No E&S issues have been identified in this low-risk project.

Energy yields have consistently been in line with or slightly above the energy simulation models (P50). FY2019 electricity generation reached 4,985 MWh, fully in-line with P50 estimates at approval (4,980 MWh), translating to €451,000 revenues and €394,000 EBITDA (87.3% margin) overshooting like-for-like (i.e. excluding the 1.5MW Paliometocho plant) approval projections - €432,000 revenues, €337,000 EBITDA and 78% EBITDA margin. For 2019, project cash flows remained strong (€380,000 CFADS vs. €221,000 debt service), bringing DSCR to 1.63x, well above min 1.1x.

Similarly to the CYPV project (see above), in March 2020, on the back of low electricity demand amid COVID-19 restriction measures, EAC sent a precautionary notice to the borrower regarding potential curtailment on the grounds of maintaining grid stability. So far, no curtailment has taken place and is judged unlikely due to low FiT. The effect of COVID-19 is also judged moderate.

**TI and policy dialogue under both projects:** The projects aimed to increase private sector participation in energy generation and increase the share of energy mix generated from RES. There were three TI benchmarks for both projects: (i) generation of electricity min. 19.4 GWh per annum; (ii) min. 13,140 t CO2 reduction per annum and (iii) addition of 15 MW solar capacity in
Cyprus by another private sponsor by 2018. As projects were completed, they arguably increased private participation in electricity generation in Cyprus and they added 12% to Cyprus’s installed solar power generation capacity, contributing to the growth of RES in the country’s energy mix.

Also, monitoring reports confirm that all solar power plants have been operating above projections, therefore it is likely that the electricity generation and CO2 reduction targets have been achieved. However, exact results are unknown as these projects were processed under DFF (47420) and should have been monitored as part of this framework. However EvD was not able to locate any information on these projects when reviewing the latest (24.6.2020) TIMS Review for this DFF. The issue of TI monitoring and actual status of TI benchmarks will be addressed during the evaluation.

The Banking Team for these projects is not aware of any policy dialogue. However, the Bank’s “Country Results Snapshot for Cyprus” claims that the Bank was engaged in extensive policy dialogue in respect of the renewable energy market in Cyprus. A summary “Our Policy Engagement”, on the front page of this publication, points to four types of the Bank’s policy work in Cyprus, two of which were:

- Facilitating investments in energy efficiency and renewables
- Promoting renewables in the domestic electricity market

Also, the text further down (“Our Approach”) talks about Bank assistance provided to national authorities in the “transfer to greener economy and in energy policy reform”. The Bank was apparently “promoting an improved regulatory framework for an increased share of renewable energy in electricity production through policy advice to the Energy Regulatory Authority and the electricity market operator”, as well as: “advising on the much-needed reform of the energy market; and working closely with the electricity market operator to assess the new electricity arrangements and market rules being proposed to promote investment in renewables”.

However there are no records of this policy dialogue. These two solar projects were the Bank’s only engagements in RES in Cyprus. Clarifying what exactly the Bank has achieved through its policy dialogue in promoting RES, will be an important part of this evaluation.

Yavoriv Solar, Ukraine

Commissioning the Yavoriv-1 Plant for 36.8 MWp was achieved in November 2018, faster than expected. Loan 1 was almost fully disbursed, with €0.6 million of unspent contingency funding cancelled, thus reducing the final EBRD loan to €16.8 million and CTF loan to €6.7 million. The Borrower has also benefitted from an unexpected accelerated VAT reimbursement of €4.8 million due to improving local tax regulations, of which €3.3 million was applied towards the early prepayment of the EBRD/CTF loans per the existing loan agreement.

The Bank began evaluating a second phase expansion in early 2019, which the Sponsor began constructing on equity alone later that year. The existing loan documentation was amended and restated in late 2019, with EBRD committing a further EUR 18.3 million via an A/B loan to finance...
a second stage at the plant, bringing the total capacity to 72 MWp. Construction was completed at the end of 2019, partially relying on infrastructure constructed as part of the first phase. The Plant is now fully operational and has been generating energy in excess of the Bank’s original projections.

While the Plant’s operational performance has been excellent, its revenue generation has been impacted by the deteriorating sector environment. The Ukraine renewable energy sector has been in turmoil since the market was partially liberalised and rapidly restructured in July 2019, with the introduction of the Guaranteed Buyer (“GB”) as the single state off-taker for all renewable energy power production in Ukraine. The GB partially defaulted on payments to renewable energy producers in the summer of 2020, primarily due to the failure of the Transmission System Operator, Ukrenergo, to downstream funds collected from consumers combined with an inadequate tariff regime as well as overall lower economic activity arising from the COVID situation. The Government approved a new law in July 2020 which reduced the FiT for solar projects, including Yavoriv, by 15% and established a payment plan to repay the summer arrears. Full payment discipline was restored in August 2020, albeit at the reduced tariff. The reduction in the Project’s FiT rate will reduce expected DSCRs over the project life, but is not expected to have an impact on the Project’s ability to service debt.

The Bank remains heavily engaged in policy dialogue with the authorities and other international partners including the European Commission, the Energy Community Secretariat and the World Bank. Key activities include discussing possible solutions to alleviate the liquidity pressures facing the GB and improve payment discipline to renewable energy producers, as well as looking to longer-term solutions, including implementing a major donor-funded TC assignment to support the Ukrainian authorities in implementing these auctions, (contracted in June 2019).

**Risen Solar, Kazakhstan**

Risen Power Plant has been operational since April 2019, in line with the timelines set out in the Board Memorandum. The project sponsor, Risen Energy, is a Chinese-based private sector company with significant experience in the manufacturing, construction, and operation of solar plants. The EBRD provided US$ 22 million equivalent in Kazakh Tenge, for 14 years with a two year grace period. In addition, the CTF provided co-financing of EUR 4.9 million (20 year loan with a nine year grace period) and the GCF provided US$ 4.2 million (matching the Bank’s tenor loan) – these two loans had slightly lower margins than commercial loans would have had. This project
was financed under the Kazakhstan Renewable Energy Framework Phase 1, and the loan has been fully disbursed.

The Final Review also approved €100,000 of TC for the “performance of technical, environmental and legal due diligence and project preparation” on a co-funding basis with the project sponsor.

Power generation from the facility during March-December 2019 and January-August 2020 exceeded the P90 projections used for the baseline forecast projections. In the more recent time period, Risen generated 47,187MWh, versus a P90 forecast of 43,076MWh.

The project’s revenue was based on a FiT via a 15-year PPA with the Financial Settlements Centre, a subsidiary of the national transmission grid operator, KEGOC. The initial tariff was set at KZT 34.61/kWh, with an inflation escalator. Following the 15-year PPA, the tariff would revert to lowest electricity production costs (currently 27/kWh). To protect against exchange rate fluctuation, the FiT includes a 30% indexation which triggers if the KZT depreciates against USD by over 25%.

As the Risen project was supported under the Kazakhstan Renewable Energy Framework, monitoring benchmarks were set in relation to the wider framework objectives. Key benchmarks included supply of 40MW of solar energy into the national grid, annual savings in excess of 50,000 tCO2, commercial viability, and participation in Bank-led workshops on developing bankable RES projects in Kazakhstan. The latest available monitoring report does not indicate whether any of these have been achieved, although with the exception of the benchmark around commercial viability the timings for all of them were end-2020.

The KAZREF I Board report (2016) indicated that the “existing CTF and potential GCF contributions will be also used to develop a Policy Dialogue/Technical Cooperation program to resolve barriers to renewable energy investments, by national and municipal governments and the private sector”. It also mentioned that “the Bank will keep close dialogue with the Government to monitor and support favourable regulatory framework to mitigate potential risks to RES projects”.

According to KAZREF II Board report (2019), in previous years the Bank has engaged with the Government of Kazakhstan (GoK) resulting in a Memorandum of Understanding (MOU) signed in June 2017 with the Ministry of Energy outlining cooperation areas regarding the development of renewable energy in the country. The MOU reaffirms the Bank’s commitment to support renewables in Kazakhstan and its support for the transition of the Kazakh RES system into a new
competitive tendering scheme. As part of the Bank’s policy dialogue with the GoK, at least five legislative/regulatory improvements have been introduced in Kazakhstan’s RES sector:

1) Creation of the Financial Settlement Centre (FSC) reserve fund (January 2017), which amounts to 3% of the total annual payments of the FSC to RES producers under the effective PPAs and is aimed at covering FSC’s unforeseen short-term liquidity needs.

2) Partial FX indexation law statute (May 2017): According to the amendments, a RES developer is entitled to partial indexation of the FiT provided that the project costs include liabilities in hard currencies in of the event of at least a 25% devaluation of Tenge against the USD.

3) the Ministry of Energy’s announcement of a series of competitive tenders for renewable generation capacity (auctions) 2018.

4) In May 2018, the Ministry of Energy’s change to the tariff indexation formula: under the new auction regime, the tariff levels for electricity generated from renewable sources will be indexed 70% to movements in the USD/KZT exchange rate, and 30% to movements in the domestic CPI.

5) In Q2 2019 the Ministry of Energy introduced a new form of PPA for renewable energy projects to be auctioned this year which includes the provision of: a) step-in rights and b) international arbitration at the Astana International Financial Centre (AIFC) platform.

In Q2 2018, Kazakhstan conducted its first round of competitive selection of RES projects with 194 MW awarded. In October 2018, a second round of auctions took place with a total of 400 MW of wind projects and 202 MW of solar projects awarded. The results of auctions have been very encouraging - compared to the FiT, the tariff levels are 11% lower for wind, 14% for small hydro, and 31% for solar. The downward trend in renewables auction prices is driven by the decreasing cost of equipment as well as the improved efficiencies and supply/demand balance in the industry. Notably, the cost of solar projects has gone down dramatically in recent years - by early 2018, the costs per MW of the Bank-financed FiT solar projects in Kazakhstan had dropped by approximately 50% from the 2015 levels.

The results of the Bank’s policy dialogue will be the focus of this evaluation.

Chulakkurgan Solar, Kazakhstan

The project sponsor for Chulakkurgan Solar is also Risen Energy, the developer behind Risen Solar. As with Risen Solar, Chulakkurgan was financed under the Kazakhstan Renewable Energy Framework Phase 1, and the business model was based on FiT with offtake through the Financial Settlements Centre via a 15-year PPA. The Bank provided a 13-year loan of US$ 32 million in KZT (of no more than KZT 12.87 bn), alongside US$ 8 million from GCF.

Both the size of the loan and the size of the plant were downsized in order to proceed with a cautious approach over “ambiguity in the KZ law in relation to AC and DC capacities that could be purchased under the PPA by the off-taker”. The Board had initially approved a loan of up to US$
40.4 million to finance a 63MW plant, but after the downsizing the Bank provided a loan of US$ 32 million for a 50MW plant. The ratio of energy generation to Bank financing remained constant. The final part of the loan, amounting to 15%, was due for disbursement in Q1 2020. Due to the devaluation of KZT, the team will decide how to proceed with disbursement in May 2021. The long-stop date for projection completion was 1 March 2021; and the SPP was commissioned in March 2020.

As with Risen Solar, monitoring benchmarks for Chulakkurgan were set in relation to the wider framework objectives. The monitoring benchmarks do not appear to have been updated following the decision to downsize the project (e.g. the power generation targets have not changed even though the plant is smaller than originally envisaged). As with Risen, benchmarks included commercial viability, power generation, CO2 savings, and participation in training workshops. The latest available PMM on this project is from January 2020. It reports that as of YE 2019, none of these targets have been achieved, as the plant was not yet operational.

Nur Navoi, Uzbekistan

The project is sponsored by Masdar, controlled by MIC Sovereign Fund of Abu Dhabi, which won the second competitive tender for an Uzbek solar plant with a record low tariff $c2.68/kWh, equal to user tariff (the first was Samarkand with a tariff at EURc 3.5/kWh also approved by the Bank for financing). The Bank provided innovative financing to the sponsor – an equity bridge loan ($60 million, with a six year tenor), while the long-term debt was provided by IFC and ADB to the SPV. They were able to “blend” their loans with concessional tranches (the EBRD was the only IFI not to offer concessional financing). The Bank’s loan was almost fully disbursed and was on-lent by the sponsor to the SPV.

The solar plant is currently under construction and is scheduled for completion in 4Q 2021, therefore this won’t be a standard evaluation of the project’s results (there won’t be any operational or financial data at the time of evaluation). Instead, the evaluation will focus on the following issues:

- the Bank’s policy dialogue in the Uzbek Power/RES sector, under which the Low Carbon Pathway was developed, a roadmap for attracting the energy sector investment in the power sector through corporate and structural reform, while Uzbekenergo (a state energy conglomerate) was unbundled. Benefits stemming from the Bank’s policy dialogue (particularly unbundling) for RES/solar will be examined. Moreover the Bank has been supporting the preparation of an Electricity Law and PPA. Early results from this work will be assessed.
- The adequacy of the project’s financing structure - how did it work in practice? (part of it was on-lent by the sponsor to SPV as a shareholder’s loan). Could it be a model for similar Bank financing of solar projects elsewhere in the future?
- how was the record low tariff (for Central Asia) achieved? - there could be important lessons for other countries.
relevance and additionality, how the project fitted to the Bank’s strategies and initiatives, as well as Uzbekistan’s own national strategy.

- cooperation /coordination among IFIs.
- project completion results - cost and timeliness of completion, early operational experiences and the project’s potential for achieving key operational objectives.
Annex 3: Findings and Lessons from past evaluations of cluster of RES projects:

Four Wind Farms:

Common themes:

- There has been a long period of policy and regulatory uncertainty in three EU countries. Such uncertainty was substantially reduced only in July 2014, when EU Guidelines on State Aid for Environmental Protection and Energy provided a clear reference for the new policy based on auction system. However, details of regulatory regime under this system are still being worked out and some uncertainty still exists;

- The projects generally missed most TI benchmarks (outcomes and impacts); however when policy dialogue is taken into account (which, with the exception of Mongolia, was initially largely unintended activity), overall impact appears stronger and more positive;

- The Bank’s policy dialogue work was sometimes viewed by policy-makers as being self-serving, particularly where the Bank had equity at stake;

- All projects underperformed financially, mostly due to the tariff structure. Particularly Mongolia and Bulgaria experienced a large disparity between feed-in tariffs (FiT) and end-user tariff levels, and were faced with a cost recovery tariff affordability issue;

- Regulatory agencies in three countries have recently been offered capacity building TCs by the Bank. However their view was that the demands of implementing the new regulatory regime may prevent them from accepting these TCs;

- Development of alternative RE technologies (e.g. solar, biomass), combined with inadequate pricing, adversely affected wind projects in Bulgaria and Estonia; coal-biomass changed the economics of RE investments in Poland;

- The relationship between RE generators and transmission companies played a key role in the performance of all projects.

Principal project-specific findings

- Renewable energy (RE) operations in the four projects’ countries would not be viable without non-market pricing elements, claiming public resources and susceptible to policy reversals. Disparities between relatively high RE feed-in tariffs and low end-user electricity tariffs have been at the heart of the problem in most countries. Highly politicised, the issue remains largely unresolved in many countries.
RE policies and regulation have been in constant flux. As maturing technologies reduce investment costs, while renewables reach a substantial share of the market, governments try to reduce their support, introducing market mechanisms and limiting the burden on the state (or transmission company) budgets.

All four projects have been adversely affected by policy changes (or gaps in the regulatory environment in the case of Mongolia), which had a strong impact on their financial underperformance.

Countries achieving or approaching their 2020 renewable energy targets agreed with the EU are likely to reduce their support most aggressively, often applying regulatory changes retroactively (i.e. to existing operations).

The Bank’s policy dialogue was in most cases not specifically planned. However, the Bank quickly reacted to policy changes in Poland, Estonia and Bulgaria, ultimately engaging in relatively active policy dialogue; in Mongolia, policy dialogue was more systematic from the outset. Such dialogue was initially focused primarily on protecting Bank client interests (and to certain extent its own) by conveying “best international practice” in order to prevent the retroactive application of regulatory changes, which in all cases were intended to reduce support to renewable energy generators. Later, the Bank expanded its policy dialogue, which focused on wider aspects of RE policy and regulation, often aiming at preventing or cancelling discriminatory fees or charges (Bulgaria). Some efforts were also directed towards developing legal arrangements, enabling RE projects (Mongolia). The Bank has also worked with state transmission companies, explaining the damaging effects of curtailing RE take-off or failing to pay invoices in full to RE generators.

The results of policy dialogue have been mixed. It has been most effective at the project level, for example, successfully amending the PPA in Mongolia and enabling the first RE project there. In most countries the Bank has been seen as only “one of many voices” (within the international community comprising other IFIs and organisations), warning against retroactive application of new policies. It is arguable that Bank engagement contributed to inclusion of the “grandfathering” clause in the new renewable energy law in Poland. However, the Bank was less successful in Estonia and Bulgaria in this respect, though its efforts in the latter contributed to revocation of some punitive charges imposed on RE generators. In some countries the Bank has been seen primarily as a financial investor in the RE companies and its policy advice consequently perceived as not entirely neutral.

Ultimately, it was the EU, rather than any of the IFIs, which provided clear guidance on the new renewable energy policy, which was accepted by all three EU countries. New EU Guidelines on State Aid for Environmental Protection and Energy (2014) aim to better integrate renewables into internal power markets, limiting support to what is necessary (see Annex 2).

All projects were affected by largely unanticipated regulatory changes. Additional unexpected risks affected selected projects, including development of new alternative RE technologies, new cross-border electricity connections, and poor creditworthiness of transmission companies.

Regulatory agencies and other governmental entities, to which the Bank has recently offered capacity building TCs, have limited staff resources and little available time due to the tight implementation schedule for the new EU (or national) regulations. This may prevent them from taking advantage of these TCs (that is, a lack of capacity to be trained in building capacity).
In Mongolia, the Bank adopted a successful “gradual approach”, initially providing a comprehensive TC to identify regulatory gaps and then small seed capital through the first transaction for project preparation. Only after preparatory work was completed, did the Bank provide capital investment loan and equity top up.

**Hydropower Projects, Georgia:**

**Lessons learned:**

The Bank’s experience in Georgia confirms some well-known lessons especially that the successful transformation of a power sector rests on government resolve and capacity. It took over 10 years for this condition *sine qua non* to be firmly in place. Consequently, power sector transformation takes time. The experience of Georgia shows that the successful transformation of the power sector takes at least a generation.

**IFI support is indispensable in the process.** The electricity sector is closely intertwined with the state and the private sector and capital markets are unable and often unwilling to provide long-term finance and bear the country risks. The international financial institutions thus fill this critical gap and provide much needed finance for the transformation of the power sector.

**For the EBRD to be effective, it needs a local presence and depends on a functional and stable state.** In the first half of its support, the EBRD undertook five projects; in the second half: 14 projects. It was only when (i) the EBRD established a field position covering the energy sector, (ii) a transparent, liberalized and uncontested market structure was in place; and (iii) the state had the capacity to apply the market rules that the EBRD could offer its full offering of services by leveraging private sector investments, facilitating Georgia’s reconnection to its neighbours for electricity trade, and further modernizing the power sector.

**Importance of throughout engagement with the government, both formally and informally.** The country strategies and project documentation do not capture the content, process and influence of this meaningful dialogue. It is therefore ambiguous what role the EBRD played in moving forward the reform agenda over time, how effective it was in this role, and what the possible success and failure factors were.

**Need to achieve full environmental compliance.** The EBRD does not yet achieve 100% compliance with its Environmental and Social Policy. Since the establishment of the Project Complaint Mechanism in 2010, complaints have been raised on all five major investments in Georgia’s hydropower sector (four large hydropower plants and the Jvari-Khorga Interconnection). For two of these projects, the compliance review is underway. Management posits that the complainants generally oppose hydropower and are predisposed to complain about such IFI/MDB investments. All three completed compliance reviews found some non-compliance with the Bank’s Environmental and Social Policy. Thus, vigilance in strict application of the Environmental and Social Policy to ensure EBRD is deemed compliant in all compliance reviews especially when the political stakes are high to ensure that the socio-economic benefits of the plants are in balance with its environmental and social footprint and that the EBRD contributes to sustainable development in all three of its dimensions: economically, socially and environmentally. If appropriate, an audit to ensure all upfront ESIA and due diligence procedures are implemented correctly may be in order. In addition, the EBRD faces responsibilities in funding larger communications campaigns and close monitoring and reporting to reduce the level of misunderstanding about EBRD and its clients’ activity.