Impacts of private investment on sustainable development in developing countries:

Session note on Energy – Clean Energy Transformation and Energy Access

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1. Introduction

Lack of access to reliable energy supply is a major constraint to economic growth and development in many developing countries. At the same time energy production and consumption is a major contributor to climate change. If the world is to meet the universally agreed UNFCCC Paris target of keeping global warming to less than 2 degrees, then much of this energy production and consumption will have to be clean. SDG 7, SDG 13 and the UNFCCC Paris agreement set out the action required. The investment needs to meet these goals are enormous. For example, data from the IEA, World Bank, IRENA, and the Climate Policy Initiative, UNDP and UN Environment (2018) report that between $1.1 trillion and $1.3 trillion[1] in financing is needed annually between now and 2030 to meet SDG 7[2] alone. Currently, annual financing levels are $514 billion per year; most of which is concentrated in developed and middle-income countries. Private investment will be key to meet SDG 7, SDG 13 and the Paris agreement and DFIs play a key role in incentivising and catalysing this private investment. For example, few clean energy generation project has been built in Sub-Saharan Africa (excluding South Afrcia) without the support of DFIs (Norfund),

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all

By 2030, ensure universal access to affordable, reliable and modern energy services

By 2030, increase substantially the share of renewable energy in the global energy mix

By 2030, double the global rate of improvement in energy efficiency

7.A By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

7.B By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

It is not surprising therefore that the power sector is the second largest investment sector in the combined EDFI investment portfolio, with the bulk of investment in renewable energy and efficiency projects. During 2017 EDFI members invested 2 billion Euros in the power sector and the combined EDFI investment portfolio in power totalled €8.2 billion at the end of 2017. Solar, wind and hydro accounted for 55% of the total climate finance investments.

1.1. SDG 7: Clean Energy

SDG 7 outlines that energy from renewable sources[3], or clean energy, must increase substantially by 2030. The UN (2019) noted in its most recent SDG progress report that the share of renewable energy in final energy consumption increased by 0.2% from 17.3% in 2014 to 17.5% in 2015 and that 55% was derived from modern forms of renewable energy.[4] Although SDG 7 does not specify what is meant by a substantial increase in share of renewable energy[5], the UN's report does state that the current trajectory of reaching 21% share of the global energy mix by 2030 falls short.

1.2. SDG 7: Energy Efficiency

Another issue raised by SDG 7 is energy efficiency. Progress on this element is measured by the rate of decline in the ratio between primary energy used and gross domestic product measured at purchasing power parity.[6] Primary energy includes

[1] All figures in US dollars unless stated otherwise

[2] Under a no-policy change scenario.

[3] Hydro, wind, solar, geothermal, tide, wave and ocean and biomass.

[4] The other 45% primarily consists of the residential use of fuelwood and charcoal (traditional biomass).

[5] The acceptable proportion should be what is necessary to deliver the Paris Agreement goals.

[6] While the World Bank admits it to be an imperfect proxy for energy efficiency, it remains the most robust metric for this element of SDG 7.

both non-renewable and renewable energy resources. The UN (2019) reports a decrease in energy intensity of 2.8% and that low- and middle-income countries are experiencing the fastest declines in energy intensity. This momentum needs to be sustained if the SDG target is to be achieved.

1.3. SDG 7: Energy Access

Crucial to SDG 7 is universal energy access. Progress in this regard is monitored by the proportion of populations with access to electricity, both in urban and rural areas, as well as the proportion of populations with primary reliance on clean fuels and technology.[7] The UN estimates that 40 countries have met the universal access target since 2010, but that another 98 countries will need to intensify their efforts to meet the 2030 commitments. Moreover, access to clean cooking fuels and technologies has only increased from 56% of the global population in 2010 to 59% in 2016.

SDG 13: Take urgent action to combat climate change and its impacts

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.A Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

13.B Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

1.4. SDG 13: Tackling Climate Change

SDG 13's focus on climate change dovetails with the progress on SDG 7; and, at least for EU countries, is linked to implementation of United Nations Framework Convention on Global Climate Change (UNFCC) commitments (Eurostat 2018). A cornerstone of the Paris Agreement is the reduction of greenhouse gases (GHGs) (United Nations 2015). Therefore, while much of SDG 13 seems to focus on national policies, there is a significant role for private investors and DFIs to ensure that their foreign investments are aligned with Paris Agreement commitments. Moreover, private investors and DFIs are among those best-placed to have impact on the commitment to mobilise $100 billion annually by 2020 to address the needs of developing countries in the context of meaningful climate change adaptation and mitigation actions. Although specific data for bilateral DFIs are not available, a recent joint report by the MDBs stated that, in 2017, $35.2 billion in climate finance from MDBs was co-financed[8] with $51.7 billion thereby demonstrating the efficacy of DFIs to address climate change (African Development Bank et al. 2018).

2. Private and DFI Contributions to SDG 7 and SDG 13

2.1. DFI Energy Investment and Climate Change Policies

Most EDFI members have made policy pledges and created investment targets to support SDG 7 and the implementation of the Paris Agreement under the UNFCC but have done so at varying levels of commitment. For example, CDC's (2017) investment strategy states that CDC will always prefer to invest in renewables where they make sense from a cost and grid perspective and that they aim to provide least-cost power, while always evaluating the potential climate impact. Although this commitment is not a stringent target, CDC has committed a new Resource Efficiency Facility that aims to decouple economic growth from excessive natural resource

[7] This latter indicator is a direct response to the lack of access to clean cooking fuels for many in the developing world.

[8] This report uses the term "co-financed" which includes resources mobilised from other public institutions as well as private financing.

consumption (CDC Group 2018). This investment mechanism that focuses solely on improving energy efficiency is unique among DFI offerings.

While also not setting exact energy investment targets for its total portfolio, Swedfund (2017) stated that increasing the production of, and access to, energy from more sustainable, energy sources is crucial to the goal of poverty reduction. Investments in the energy sector should focus on renewable energy, thereby precluding investments in fossil fuel. Since 2014, Swedfund only invests in renewable energy projects.

Employing a targeted approach, OeEB (2013) committed in its 2013 to 2017 strategy that 75% of its portfolio would be distributed to renewable energy, resource efficiency, and MSMEs. BIO (2014), in its most recent strategy, pledged to increase its investment in the energy sector to 20% of its portfolio. Given the size of its portfolio, BIO disclosed that, in most cases, it will be a follower on energy projects and that although it would focus on renewable energy, it is also open to projects that increased energy efficiency.

Having a more aggressive orientation toward tackling SDG 7, Norfund (2016), believes lack of access to reliable electricity is a large constraint for business development in poor countries. It has targeted 50% of its allocated capital to be dedicated to renewable energy investments. Norfund recognizes that one of the key barriers to wider deployment and diffusion of clean and renewable energy in developing countries is inadequate supply of well-prepared, 'bankable' projects available to investors. Norfund has therefore established a project development facility to increase support available to early-stage renewable energy project development.

IFU (2019), for its part, has committed to one-third of its new SDG Investment Fund to renewable energy projects; this is in addition to the Danish Climate Investment Fund that has been in operation since 2014.

Commitments to SDG 13 and the UNFCCC have been equally popular among DFIs. The focus of these commitments is twofold: i) to invest in climate change mitigation and adaptation strategies, and ii) to catalyse other investment in climate change mitigation and adaptation. For example, as part of Proparco's (2017) Objective 2020, Proparco announced that it was earmarking €2 billion from 2017 to 2020 for investment in projects that contribute to the fight against climate change as their total portfolio annual commitments increase from €1.05 billion in 2015 to €2 billion in 2020. Moreover, Proparco committed to supporting the mobilisation of private sector funds to fight climate change through the creation of renewable energy equity investment vehicles and by developing syndication capacity. To this idea of new, innovative financing mechanisms, Finnfund (2018) stated that it will develop new instruments and structures to channel private and institutional investors' investments to climate change projects.

FMO (2017) has placed SDG 13 as one of three SDGs guiding its strategy and has committed to doubling the expected amount of avoided greenhouse gas (GHG) emissions per annum by 2020. While other DFIs capture these GHG data, FMO is unique in setting a target. Moreover, as part of its investment strategy, FMO also has committed to "greening' its portfolio by targeting 30% of new investments to green investments. FMO is also a seed investor in Climate Investor One, an innovative mechanism to finance renewable energy projects at specific stages of the project lifecycle. Most recently and setting the standard in terms of ambition FMO (2018) has adopted a more stringent approach to climate change and is implementing a climate investment strategy in line with a 1.5˚C pathway.

2.2. Impact Measurement

The measurement for investor impact on SDG 7 and SDG 13 is centred on the number of gigawatt hours (GWh) produced and GHG avoided resulting from investments. With respect to GWh measures, all EDFI members report GWh to EDFI. Companies and projects currently financed by all EDFI members generated at least 67 TWh of electricity in the last financial year for which data is available, (EDFI, 2017).[9] Most DFIs individually publicly report on the amount of energy supplied, but reporting on whether this energy is derived from renewable or non-renewable sources is inconsistent across DFIs. Some DFIs report on the total energy produced by their investments, while others state the amount of energy produced by investments in renewable production; but the focus remains on the total amount of energy supplied. Other publicly reported metrics capturing impact on SDG 7 and SDG 13 include the number of kilometres of high voltage lines that investments support (COFIDES 2017). FMO estimates that its operational energy projects supported access by 33 million people (FMO 2018a).[10]

While DFIs report on how they are increasing the supply of renewable energy and improving energy infrastructures in developing countries, there is little mention of how people in these countries can access this energy. Some DFIs with investments in distributed generation report on the number of clients provided with solar home systems etc. A handful of DFIs publicly release their estimates of the number of people affected by its energy investments, but these estimates have been challenged when they have been scrutinised. For example, in their evaluation of FMO's Access to Energy Fund (AEF), Slob et. al. (2017) estimated that AEF's portfolio of projects may have reached 3.8 million people; FMO had originally reported the reach to be to 27 million people, but later revised this figure to 5.3 million people. The disparity in the reported numbers was based on how the increased access to electricity was being attributed to FMO's investment and estimates regarding how much of the catalysed investment was attributable to FMO's investment. Perhaps, given the complexity of these decisions on estimation inputs, investors tend to err on the side of including anecdotes or case studies and leave calculations of how investments may increase the number of people with access to energy or may increase the resilience of energy supply unreported.

Aside from issues of attributing which investments in renewable energy were responsible for the various impacts, the methodology underlying impact measurement is also open for critique. Studies that link access to energy to GDP growth or employment are reliant upon econometric predictions and input-output tables that are based on past data and do not take into consideration how the economic dynamics of the region/country may change over the lifetime of energy investment.[11] Moreover, given the relatively small number of direct jobs created by energy investments, investors are incentivised to report on indirect and induced employment to demonstrate impact. While these estimates may indeed be accurate, there has yet to be a study confirming the robustness of these second-order impact estimates despite its widespread acceptance. In theory it should be possible to come up with a ratio of investment to jobs, which can be used in different contexts, if there are enough studies undertaken.

[9] This data was provided by EDFI from internal EDFI reports.

[10] FMO calculates equivalent number of people served via power generation by dividing the annual amount of electric energy delivered to off takers during the reporting period by the power consumption per connected capita. The power consumption per connected capita is calculated as the electric power consumption per capita divided by the electrification rate.

[11] Methodologies used to estimate indirect and induced employment effects are discussed in more detail in the job creation session note.

In terms of action on SDG 13, several EDFI members report GHG avoided but not all. Where this is case, measurement is not standardised among investors and how DFIs calculate their results is not always clear. Most annual reports of these DFIs state that their methodology is adapted from international best practices such as the Global Greenhouse Protocol or AFD Carbon Footprint Tool, but actual transparency in calculating this avoidance measure is lacking. This is not to imply that these calculations are not undertaken; just that the step-by-step methodology is not publicly available. Without knowing the assumptions employed in calculations, comparisons among investors are difficult given that these assumptions can have a significant impact on the GHG avoided calculation. For example, if a renewable energy project is being built rather than a coal power plant, the GHG avoided calculation will be different than if the renewable energy project was being built rather than a natural gas plant. The robustness of this calculation is further complicated by the possibility that the coal power plant or the natural gas power plant was never going to be built; that the only way a power generation project was going to receive investment was because it was renewable thereby undermining the actual 'avoidance' calculation. This raises a question about the usefulness of a GHG metric and a more useful measure maybe a metric on carbon intensity.

FMO's (2018b) Impact Model document is an exception to this observation. By stating how the input/output dimensions of GHG emission intensities are calculated from the GTAP database and which countries are proxied for others, as well as outlining how FMO also calculates indirect emissions caused by the purchase of energy by FMO clients, FMO has set the standard on how DFIs should disclose avoided GHG emissions.

Swedfund, diverges from other DFIs, by reporting an estimate of the GHG emissions from their portfolio companies, not GHG avoided.

A key action in SDG 13 is the implementation of the UNFCCC commitment to jointly mobilise USD100 billion annually by 2020 from all sources. While a couple of EDFI members individually track and report total private finance catalysed as a result of their overall investment activities, no member publicly tracks and reports systematically climate finance catalysed.[12]

Investments in SDG 7 and SDG 13 also have impacts on other SDGs. The World Bank (2018) has declared access to energy to be at the heart of development and access to energy as a key part in eradicating poverty (SDG 1) and promoting shared prosperity (SDG 8 and SDG 10). This sentiment has been echoed by many DFIs; most forcefully by Norfund and Swedfund stating that they see their investments in access to energy as promoting economic growth, job creation and poverty reduction. A recent study of DFI investment in the Lake Turkana Wind Project indicated that aside from the increased jobs associated with the construction and operation of the project, other required infrastructure investments led to lower food prices in the surrounding region (QBIS Consulting 2018). In addition to these direct effects, Steward Redqueen (2016a, 2016b) has developed a model using input-output models to estimate the impact of more resilient power supplies on GDP per capita gains and increased employment due to decreases in outage time and lower end-user tariffs for electricity. Although the model is prone to variation based on the issues facing the

[12] EDFI members individually report mobilisation of private finance to the OECD, although the level of disaggregation that is publicly available is limited. Collectively EDFI has adopted the MDB methodology for reporting the mobilisation of private finance, see MDB Joint Report (2018). In this report EDFI collectively reported a total mobilisation of $1.3 billion in infrastructure, of which 70% was mobilised in the power sector according to EDFI.

usage of input-output models outlined above, it does provide a framework from which actual impact can be measured against *ex ante* predictions.

3. State of Knowledge and Opportunities to Strengthen Evidence Base

3.1. What do we know?

In some impact areas the evidence base is clear. We know from a review of the literature[13] that investment in renewable energy has several positive impacts on the SDGs. The literature indicates that renewable energy investment has:

- ***has had a positive impact on job creation and economic growth.*** Direct impacts relate to the construction and operation of renewable energy projects which creates jobs and value added. Indirect impacts stem from increased energy availability and reduced energy prices which, in turn, increase firm output with positive impacts on growth and indirect job creation. The literature also indicates that indirect job creation is significantly larger than direct job creation. However, as highlighted above several methodological issues exist which primarily concern the issue of attribution (e.g. how much of the installed capacity can be attributed to DFI investment) and the potential over-estimation of indirect employment effects.
- ***has contributed to the installed energy base.*** It is clear that DFI investments in energy all contribute to additions to the installed energy base capacity, however there are still issues regarding how much of the installed capacity can be attributed to DFI investments.

3.2. What are the opportunities to strengthen the evidence base?

There are also some areas where the evidence base can be strengthened to further deepen our understanding of impact. These opportunities warrant further discussion, thinking and independent study.[14]

3.2.1 Opportunities for DFIs to strengthen reporting:

There are a number of obvious opportunities to standardise and/or harmonise the reporting and/or measurement of a number of impact metrics[15] as follows:

Reporting of contribution of renewble energy investment to GWH produced

EDFI members report GWh produced but do not break this down by GWh produced by renewable energy sources and non-renewable energy sources. EDFI members should strive to set targets to increase the share of GWh produced by their investments that is from renewable energy and track and publicly report this. For example, all EDFI members could consider reporting on GWh produced by grid-based energy investments and the share of which derived from renewable sources.

Reporting on access to energy

[13] See Annex 1 for a list of relevant literature.

[14] Much of the literature is grey (i.e. non-academic) and there is limited if any independent study of impact.

[15] Depending of course on whether these metrics are targeted ex-ante as part of the expected impact of the investments made.

A handful of EDFI members report access to energy figures. EDFIs should decide ex ante whether a particular investment will target increased access, set a target if it is and measure this ex post. For example, EDFI members could consider the possibility of reporting on the number of clients reached through off-grid investments[16].

Reporting the catalytic effect on climate finance

EDFI members do not publicly report how much climate finance they have catalysed, either individually or as a group. EDFI members could explore opportunities to harmonise tracking and reporting of climate finance mobilised, perhaps using the harmonised MDB climate finance mobilisation methodologies developed for climate adaptation and mitigation finance by the MDBs.[17]

Reporting GHG avoided

The majority of EDFI members currently track and publicly report GHG avoided, EDFI members that do not could consider doing so. As noted, measurement is not standardised among European DFIs and the methodologies employed by DFIs are not always clear. EDFI members could explore whether there is an opportunity to harmonise the tracking and reporting of GHG avoided by jointly adopting a common methodology and providing greater transparency about the methodology. For example, International Finance Institutions have adopted a harmonised approach for assessing GHG avoided, EDFI members could explore opportunities to harmonise using the IFI methodology.

Reporting Energy Intensity

SDG 7 focuses on energy intensity as a proxy for energy efficiency, at the national level. DFIs need to consider energy efficiency at the project/enterprise level (not just in power sector projects) which can be measured in kWh/$ output or (in the power sector) energy return on investment. At the national level, for power projects DFIs could look at the carbon intensity of electricity (kg CO2/kWh) and whether their investment reduces this.

3.2.2 Opportunities for Researchers:

Understanding of impact on universal access

Whilst we know the overall contribution of this investment to the renewable energy mix at the country level, our understanding on the impact on access to clean energy by both people and firms, a key SDG 7 target is much more limited, in particular our understanding of impact on household access and poverty issues concerning consumption and affordability. In the literature only two studies mention these household and affordability issues but the estimates are highly variable in one study and assertions are made about impact on consumer tariffs with little evidence presented. There is a clear need to improve our understanding of these issues. To some extent impact on access and affordablity will depend on whether the investment is made in energy generation, transmission, distribution or energy efficiency. Further research should be undertaken on access and affordability to better understand the effects of different levels of access (e.g. offgrid, minigrid, grid) and on different target groups (firms and households).

[16] The number of new connections as used in EDFI's ElectriFi Initiative may also be a useful outcome level metric.

[17] In this regard the fact that 12 out of 15 EDFI members have already adopted the MDB methodology for measuring and reporting total private finance co-financed suggests that there is appetite to report and adopt harmonised methodologies.

Understanding the additionality of DFI investments in clean energy

DFIs are involved in most new clean energy generation projects in capital constrained markets. Further knowledge on the roles DFIs play (e.g. project development, bringing projects to financial close, crowding-in private investors, providing risk mitigation products) would enhance the understanding of their financial and value additionality in the sector.

Understanding the link between reliable energy provision and growth and job creation.

As noted above there should be further independent research undertaken on the link between reliable energy provision and the indirect and induced employment effects of DFI investment in renewable energy. This issue is explored more fully in the session note on job creation.

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