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The role of development banks for climate and green finance in Africa

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Outline

1. Themes and insights from the recent international debate to guide Italian development cooperation policy choices

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1. Introduction

Climate finance is at the heart of the strategy to transform the global political agenda. Quite simply, it is at the center of that agenda, because it cuts across both the 2030/Sustainable Development Goal (SDG) agenda[1] and the Paris/Conference of the Parties (COP) agendas, which are setting priorities for the future.

Current unanimous consensus around the importance of climate finance starts with the fact that the prevailing scientific literature daily reiterates the urgency of acting on the effects of climate change. According to the Sixth Assessment cycle of the Intergovernmental Panel on Climate Change (IPCC)[2], the intertwining of climate change and biodiversity loss poses the greatest threat to the global economy in the near future. Today, even the business world ranks it among the top risks to humanity in the next decade as recently emerged at the World Economic Forum in Davos, self-described as an interface between governments and the global business world[3].

Of course, this does not mean that things are going in the right direction and on schedule.

At the COP 27 of the United Nations Framework Convention on Climate Change (UNFCCC) that met in Sharm-el-Sheikh, Egypt, from 6 to 18 November 2022, the Egyptian presidency proposed an additional 'loss and damage' financing facility to compensate vulnerable countries deserving reparations for irreparable loss and serious damage due to climate impacts. It was decided to set up the fund, without stating how and how much the resources would be[4].

This, while not even the modest climate finance pledges made in 2009 to provide USD 100 billion per year to help vulnerable developing countries have been fulfilled, and especially the wealthier OECD countries are asking for further talks until 2024 to work out the details of the financing. According to an OECD report, climate finance reached just USD 79.6 billion in 2019[5], and these figures are contested and defined as 'creative accounting' or 'inflated' by charities such as Oxfam[6]

[1] SDG 13 aims to combat climate change and its impacts; at the same time SDG 7is a specific goal on energy and SDG 17 calls for a global partnership for sustainable development by emphasizing the need to mobilise financial resources for developing countries from international and domestic sources.

[2] IPCC (2019), *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*, IPCC; IPCC (2022), *The Sixth Assessment Report, Climate Change 2022: Impacts, Adaptation and Vulnerability. The Working Group II contribution*, IPCC; IPCC (2022), *The Sixth Assessment Report, Climate Change 2022: Mitigation of Climate Change. The Working Group III contribution*, IPCC. See: https://www.ipcc.ch

[3] World Economic Forum (2022), *Global Risks Report 2022*, 17th Edition, Cologny Geneva.

[4] https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries. Key elements to be negotiated at the next COP include the quantity of financial resources, their quality, scope, access features and sources.

[5] OECD (2021), *Climate Finance Provided and Mobilised by Developed Countries: Aggregate Trends Updated with 2019 Data*, Paris.

[6] T. Carty, J. Kowalzig & B. Zagema (2020), *Climate Finance Shadow Report 2020*, Oxfam, London.

and journalists[7], because these funds are not really additional as they include blended finance and Official Development Assistance (ODA) funds, which are criticized for being over-counted and misused to subsidize 'green' public-private partnerships - e.g. 'de-risking' private for-profit investments presented to the public as 'climate-friendly'.

This informational opacity is also criticized for being linked to a culture on the corporate behavior front that is generally inattentive and unfocused on the importance of the issue, even on the part of public supervisory authorities. This is evidenced by the fact that, when it comes to climate, the U.S. federal authority in charge of supervising the stock exchange, the U. S. Securities and Exchange Commission (SEC), has so far not encouraged uniformity and integration, resisting calls for consistent and mandatory information that would provide investors with a basis for judging the impact of the climate crisis on a company's business model. This is what Samantha Ross, a former special counsel at the U.S. Securities and Exchange Commission, firmly denounces[8].

And it should also not be overlooked that since the Paris Climate Agreement in 2015, JP Morgan Chase had financed the fossil fuel industry by over USD 315 billion, and many other banks are not far behind[9]. According to OECD and IEA, fossil fuel subsidies for 51 major economies amounted to USD 6.8 trillion between 2011-2020, 40% more than climate finance[10].

Of a completely opposite sign, as is clear from the chronicles of practically all OECD countries, is the insistence by climate justice youth movements, such as 'Fridays for Future'. They criticize decision makers for the slowness and inadequacy of financial and political commitments. In 2017-18, the US disbursed only USD 10 billion out of the USD 100 billion per year promised annual climate funding, whereas considering its national income and cumulative emissions justice would require the US to provide at least USD 43-50 billion a year in climate finance[11], while some US environmental and international development groups insist that the US should disburse at least USD 800 billion in international climate finance contributions between 2021-2030, equally split among finance for mitigation[12], adaptation[13], and the loss and damage caused by irreversible climate change (USD 267 billion each)[14]. But, in September 2021, US President Joe Biden said he would ask Congress just to

[7] J. Timperley (2021), "The broken USD 100-billion promise of climate finance — and how to fix it", *Nature*, N. 598, 20 October, pp. 400-402.
[8] https://www.americanprogress.org/article/role-accounting-auditing-addressing-climate-change/
[9] https://www.ran.org/wp-content/uploads/2021/03/Banking-on-Climate-Chaos-2021.pdf
[10] OECD-IEA (2022), "Support for fossil fuels almost doubled in 2021, slowing progress toward international climate goals, according to new analysis from OECD and IEA", OECD-IEA. https://www.oecd.org/newsroom/support-for-fossil-fuels-almost-doubled-in-2021-slowing-progress-toward-internationalclimate-goals-according-to-new-analysis-from-oecd-and-iea.htm
[11] S. Colenbrander, Y. Cao, L. Pettinotti, A. Quevedo (2022), *A fairshare of climate finance? Apportioning responsibility for the $100 billion climate finance goal*, ODI Working Paper, London. See: https://cdn.odi.org/media/documents/ODI_WP_fairshare_final0709.pdf
[12] 'Mitigation' means making the impacts of climate change less severe by preventing or decreasing the emission of greenhouse gases (GHGs) into the atmosphere. Mitigation is achieved by reducing the sources of these gases (e.g. by increasing the share of renewable energy or creating a cleaner mobility system) or by increasing their storage (e.g. by increasing the size of forests). In short, mitigation is a human intervention that reduces the sources of greenhouse gas emissions and/or strengthens sinks.
[13] 'Adaptation' means anticipating the adverse effects of climate change and taking appropriate measures to prevent or minimise the damage it may cause, or to take advantage of opportunities that may arise. Examples of adaptation measures are large-scale infrastructural changes, such as building defences to protect against rising sea levels, and behavioural changes, such as reducing food wastage by individuals. In essence, adaptation can be understood as the process of adjusting to the current and future effects of climate change.
[14] Friends of the Earth U.S. and others (2021), *United States of America Fair Shares Nationally Determined Contribution*, Washington, D. C. See: ine at: https://foe.org/usa-fair-shares-ndc

double the current USD 11 billion a year US pledges in climate finance by 2024[15] and the US Congress approved just USD 1 billion in international climate finance for 2022, falling far short of Joe Biden's request and being only USD 387 million above the Trump-era spending[16]. At the global level, according to other estimates, the gap between resources in the field and the amount deemed necessary to tackle the crisis between now and 2050 is approximated at USD 4.1 trillion[17].

It is clear that private interests have gained considerable influence and governments always take sides, they are never neutral. And it would be wrong to dismiss the matter as a physiological clash between hard-hearted (for profit companies and banks) and soft-hearted (Civil Society Organizations (CSOs) and young people). Above all, young people should not be dismissed by talking about generic utopian ambition and wishful thinking because, as set in stone in the words of Ernesto Sabato, "only those capable of embodying utopia will be ready to recover the humanity we are in danger of losing". The transformation required for a deep transition - it should not be hidden - has utopian implications compared to a business as usual path.

There is a huge gap to bridge or accept in the context of a polarization of political positions. In fact, the issue of climate finance is linked to that of the transformation of the development model at local, national and international level, which can be schematically translated, updating a map based on one made 15 years ago, into three main positions.

First, the *status quo*, which supports economic growth more or less tempered by rules and techniques for environmental protection and a certain level of social peace; second, the reformist one, which promotes changes in lifestyles and the political, economic and social system, while not questioning their basic order; and third, the one for the radical transformation of the capitalist model, considered to be the main cause of the unsustainable exploitation of the ecosystem and, at the same time, of growing social inequalities.

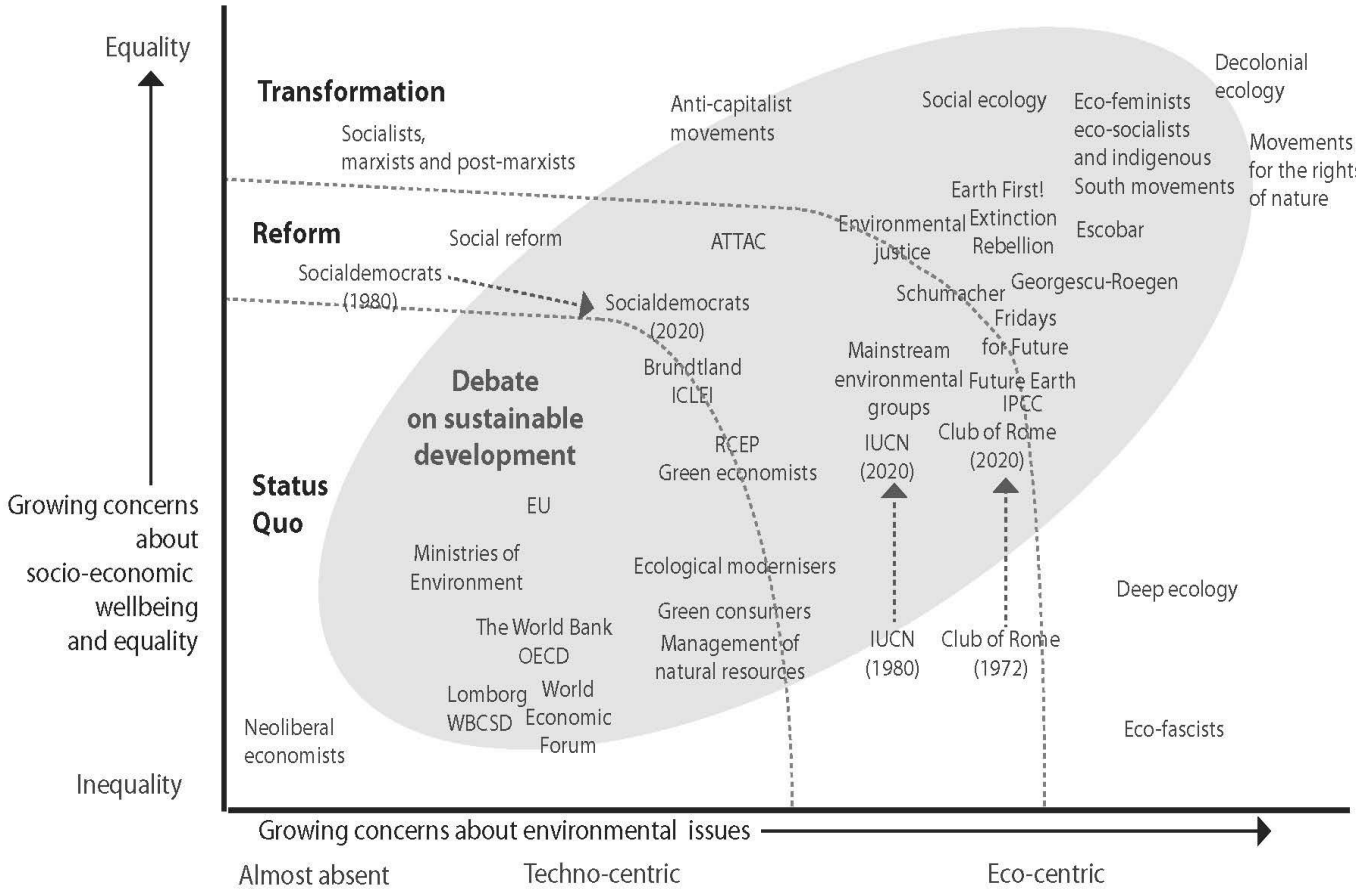
Around the balance to be found in the map of the tripartition of field positions on sustainability as a satisfactory point on the plan defined by a pair of values relative to the two reference axes (concern for Nature on the horizontal axis of the abscissas and concern for Socio-economic justice on the vertical axis of the ordinates), approaches and positions on sustainability, understood in 'strong' or 'weak' terms, have been compared for decades and represent typically distant, if not opposing, polarized interpretations encountered in discussions on sustainability and sustainable development. This polarization of the climate and environmental debate on the level of scientific and popular culture is a reality that inevitably has important consequences on the sphere of politics.

[15] https://www.reuters.com/business/environment/us-seeks-double-climate-change-aid-developing-nations-biden-2021-09-21/

[16] https://www.climatechangenews.com/2022/03/11/betrayal-us-approves-just-1bn-climate-finance-for-developing-countries-in-2022/

[17] United Nations Environment Programme (2022), *State of Finance for Nature in the G20*, Nairobi.

Fig. 1 - Map of the tri-partition of field positions on sustainability



Source: Author's update (2021)[18] of the map by B. Hopwood, M. Mellor, G. O'Brien (2005)[19]

2. Much more than more of the same

The topic of climate finance combines domestic resources (savings by the household sector, the business sector and the government) and many kinds of supplementary external resources (remittances, ODA, external debt, foreign direct investment and portfolio investment).

Therefore, an important aspect of climate finance has to do with the role of the banking sector, as well as domestic and International financial institutions (IFIs), in promoting and financing climate investment.

As the awareness of the relevance of climate finance has grown, so has the attention within the scientific community. A bibliometric study published in 2021 by the Swiss journal Mathematics[20] on

[18] M. Zupi (2021), *Economia e politica per i cambiamenti climatici*, CesPI, Rome, april.
[19] B. Hopwood, M. Mellor, G. O'Brien (2005), "Sustainable Development: Mapping Different Approaches", *Sustainable Development*, Vol. 13, pp. 38.52.
[20] R. Cai, J. Guo (2021), "Finance for the Environment: A Scientometrics Analysis of Green Finance", *Mathematics*, Vol. 9 (13), 1537. See: https://doi.org/10.3390/math9131537

texts classified in the Scopus database, which collects more than 36,000 titles from thousands of international sources, showed an acceleration in the production of studies with Green finance as their subject, which has almost been doubling on year-over-year average since 2017. From the results of the analysis, the growing interest of the Asian academic sector stands out, with China leading the way in terms of number of titles, followed by the UK and the US, while Japan and India occupy the fifth and the seventh position, respectively. China's sensitivity is evidently linked to the role that the topic has taken on in the country, which has been particularly active within the G20, favoring its inclusion on the agenda for the first time during its presidency in 2016 and promoting the establishment of the G20 Green Finance Study Group.

This exceptionally increasing pace is an indication of something that cannot be underestimated and is an indicator of some underlying issue. It would be limiting to think that the problem is only about the quantity of funding, because its quality also matters a lot.

It should be obvious that 'business-as-usual' is no longer an option. The 2030 and Paris agendas should represent a transformative tool for all the countries and actors. Therefore, climate finance should represent an increase of the ambition in terms of scale, speed, aspiration and vision, and match it with concrete strategies to reach the SDG targets. We should not ignore the nexus between climate change and development paradigm transformation.

The Human Development Report 2011 by UNDP, entitled "Sustainability and Equity: A Better Future for All"[21], argued that: «*many debates about sustainability neglect equality, treating it as a separate and unrelated concern. This perspective is incomplete and counterproductive*» ... «[in] *many instances there will be trade-offs. Measures to improve the environment can have adverse effects on equity - for example, if they constrain economic growth in developing countries*».

The inescapable question is whether we will be able to transform the goals from a ritualistic to a substantial and cogent prerequisite to development, by adopting a comprehensive approach to combine the three intertwined dimensions of development: social, economic and environmental. This should also imply the adoption of a combination of technological, socio-political, cultural and financial initiatives and mechanisms.

Thus, climate and green finance embody several cross-cutting concepts. Even if we adopt a narrow definition and circumscribe the conceptualization within the specific scope of climate finance associated with the annual COPs – mitigation, adaptation, loss and damage compensation – we know that the achievement of climate goals implies the orientation of existing industrial processes towards sustainable energy. But it is easy to encounter the presence of the unwillingness to invest for the climate, which may stem from an assessment of the risks and the opportunity costs involved, or simply from cultural attitudes.

As a factual starting point, most of the climate funding has been earmarked for mitigation[22]. But this ignores the needs and priorities of developing countries, who need help to adapt to climate change and to cope with the losses and damage.

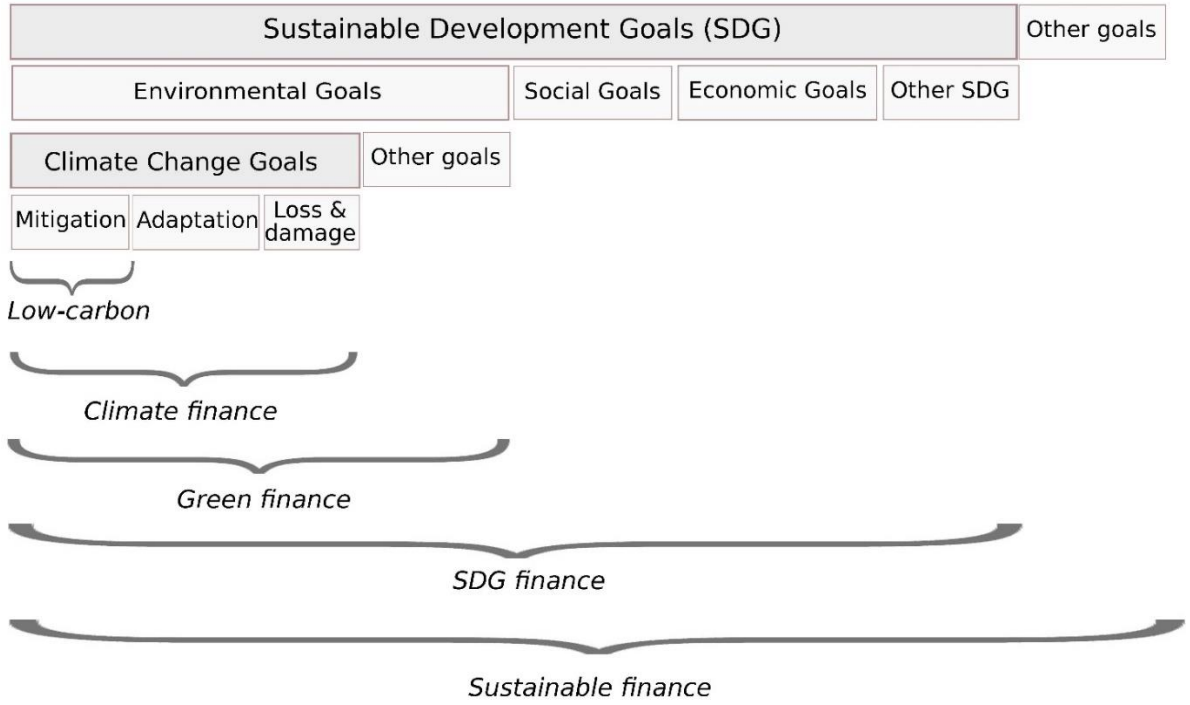
And, as a second factual key point, the majority of Multilateral Development Banks (MDBs) Climate Finance is invested in low- and middle-income economies by using investment loans as a main

[21] UNDP (2011), *Human Development Report 2011. Sustainability and Equity: A Better Future for All*, New York, pp. 1-2.
[22] OECD (2021).

instrument, for which repayment is required[23]. This implies a risk of increasing the high cost of climate finances and worsening debt burden for recipient countries, despite the existence of alternative instruments, such as equities, guarantees, green bonds, among others.

This becomes much more complicated if we then adopt a broader definition, based on a Note published by UNEP Inquiry[24] to which we refer here, updating a conceptual schematization in the figure. The resulting schematization proposes a kind of pyramid that orders terminology based on its relationship to goals.

Fig. 2 - Scope of Sustainable Finance and its Components



Source: Author's update of: (i) European Commission's High-Level Expert Group on Sustainable Finance (2017), *Financing a Sustainable European Economy. Interim Report*, July; (ii) M. Migliorelli (2021), "What Do We Mean by Sustainable Finance? Assessing Existing Frameworks and Policy Risks", *Sustainability*, 13(2), 975. See: https://doi.org/10.3390/su13020975

There is a *de facto* coexistence in international technical and political language of different concepts referring to the same perimeter that include green finance, together with sustainable finance, climate finance and low carbon finance. These terms are conceptually intertwined and we need a coherent overall framework for better use of existing policies and instruments in support of it, clarifying that the impact of financial products and practices do or do not consider environmental, social, economic and governance issues and effects.

This is an important issue, and not only of a terminological nature, because the absence of an agreed definition is a major obstacle to the development of green and climate finance[25].

[23] The AfDB, ADB, AIIB, EBRD, EIB, IDBG and IsDB (2022) *Joint Report on Multilateral Development Banks Climate Finance*, Luxembourg, October.
[24] M. Forstater, N. N. Zhang (2016), "Definitions and Concepts: Background Note", *UNEP Inquiry Paper*, Nairobi.
[25] G20 Green Finance Study Group (2016), *G20 Green Finance Synthesis Report*. See: http://www.g20.utoronto.ca/2016/green-finance-synthesis.pdf

3. Climate finance. The role of MDBs and NDFIs

Wealthier countries must fulfil their commitments to deliver on the goal of jointly mobilizing "new and additional" USD 100 billion per year urgently by 2020 and through to 2025 to support developing countries, that would help in fulfilling the objectives of the UNFCCC and the implementation of the Paris Agreement. These USD 100 billion per year are not sufficient, but they are complementary to national efforts and should create this momentum and a signal that wealthier countries are committed to climate justice.

In this context, the governments of wealthier countries call for new forms of international public-private partnerships to deliver blended finance[26] for reducing global greenhouse gas (GHG) emissions, enhancing carbon sinks and reducing the vulnerability of populations and ecosystems to a changing climate. They call for enhancement and expansion of mandates of IFIs and for strengthening of the MDBs, too. However, there is an element of tension between the parties involved in this specific call and the objectives to be achieved.

On the one hand, it should not be forgotten that climate finance for poor vulnerable countries can be interpreted as an instrument for climate justice, with the principles of historical responsibility and of financial capacity as a criterion for distributing the differentiated duties to fund climate finance. The wealthier countries have historical responsibilities because they have generated much more GHG emissions than others in the past and, therefore, they should pay for the climate change mitigation and adaptation of developing countries[27]. The wealthier countries have also the financial resources (higher Gross National Income, GNI) and the capacity to mitigate and adapt to climate change because this capacity was acquired as a result of past pollution; hence, they should share their resources with those countries that cannot afford the costs of this transition on their own.

On the other hand, the persistent demand to mobilize private climate finance on a voluntary basis poses a serious problem because it is outside the logic of distributive justice and the very modest results so far determine that it remains at the center of the debate. So far, private involvement has fallen below expectations[28] and without foreshadowing a form of compensation for the negative environmental externalities produced (such as a commitment by fossil companies might be). Governments of wealthier countries have used the instrument of Official Development Assistance (ODA) policy as leverage to mobilize climate finance, with the idea that they could attract and involve the private sector by reducing business risk, through direct investment in companies and special purpose vehicles (SPVs) as well as guarantees. This creates further criticisms, because climate finance should be new and additional to ODA flows, and the export credits or market-based loans, as well as the support to for-profit private firms from the wealthier countries to sell their products and green technologies in developing countries, should not be included in the USD 100 billion goal.

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[26] See the OECD Blended Finance Principles: OECD (2021 b), *Investing in the climate transition: The role of development banks, development finance institutions and their shareholders*, OECD, Paris.

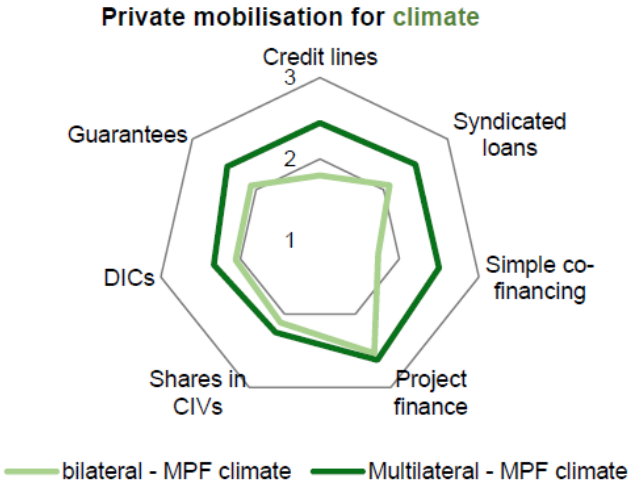
[27] A. Gajevic Sayegh (2019), "Climate finance. Moral theory and political practice", in T. Jafry (ed.), *The Routledge Handbook of Climate Justice*, Routledge, London. See also S. Colenbrander, Y. Cao, L. Pettinotti, A. Quevedo (2022). In particular, the ODI authors talk of 'fair shares' and say: «The US is overwhelmingly responsible for the climate finance gap having provided just 5% of its fair share in 2020. Although its economy is 40% larger than the European Union's, it provided only one-twelfth as much climate finance» (Colen-brander et al., 2022: 10).

[28] USD 13.1 billion in 2020, out of 83.3 billion (including export credit – criticized as a component to be included –, multilateral and bilateral public). See: OECD (2022), *Climate Finance and the USD 100 Billion Goal*, https://www.oecd.org/climate-change/finance-usd-100-billion-goal/

In an ideal world, public and private actors, bilateral and multilateral would embed climate action and biodiversity objectives across all of their operations, investments and frameworks, by adopting a whole-of-institutions approach to climate, and applying a 'do no harm' principle to all investments and approved projects in a coherent way, stopping the financing of fossil fuels. Today's reality, however, is far from an ideal system, and the normative framework that defines the duty-bearers of climate finance is not sensitive to multi-level agency, while the private sector is very generically asked to participate, without detailing conditions, the nature of commitments and contribution modalities; moreover, a practical market mechanism such as the EU carbon pricing mechanism is very controversial, as it does not contribute to accelerating progress on removing carbon and is not based on the principles of historical responsibility and capacity.

According to a recent OECD survey[29], with a focus on the use of leveraging mechanisms by ODA providers – both bilateral and multilateral – to mobilize private finance and on the main incentives and obstacles they encounter to scale up private finance for sustainable development and climate action, USD 15.5 billion was mobilized for climate finance from the private sector by ODA finance interventions in 2018-20. MDBs result key players in mobilizing private finance, having mobilized 69% of the total in 2018-20[30]. The remaining part is attributed to bilateral providers – in particular, the United States, France and the United Kingdom[31] – through their National development finance institutions (NDFIs).

Fig. 3 - Providers' use of leveraging mechanisms for mobilizing private climate finance (2018-20)



Source: OECD (2023).

Most of the climate finance component (USD 15.5 billion in 2018-20) went to mitigation (USD 12.2 billion), while only a small part went to climate adaptation (USD 1.8 billion, highly concentrated in a single country – Mozambique[32] – and from a single donor – USA – among the bilateral ones and

[29] OECD (2023), *Private finance mobilised by official development finance interventions*, Development Co-operation Directorate, OECD Publishing, Paris.

[30] In particular, the International Finance Corporation mobilised the largest volumes of private finance for climate projects in 2018-20, followed by the European Bank for Reconstruction and Development, IBRD/IDA and the African Development Bank.

[31] Canada and Sweden provided the largest shares of their private mobilisation for climate action in 2018-20 (respectively, 93% and 80%).

[32] The most financially relevant projects are activities aimed at gas exploration, exploitation, processing and transportation negotiated with financial and risk participation by both development and export credit agencies, with the involvement of

the African Development Bank, the European Bank for Reconstruction and Development, the Global Environment Facility among the multilateral donors) and the remaining part went to both mitigation and adaptation (USD 1.5 billion). Financing for loss and damage is even more critically inadequate[33].

Therefore, most climate finance is concentrated in mitigation, and mitigation finance has been dominated by initiatives for energy, in particular renewable energy[34]. Public sector support is a key ingredient for scaling renewable energy investment by supporting and enabling technology cost reduction, by addressing the three challenges of climate finance, technology transfer and capacity building at the same time. This is certainly an important area because, as emphasized by the UN Secretary-General's remarks to High-Level opening of COP-27, on 7 November 2022, it is urgent to accelerate the transition from coal towards renewables, and wealthier countries and IFIs must provide financial and technical assistance to help developing countries speed their own renewable energy transition[35].

Nevertheless, there are many other critical sectors that reduce the sources of greenhouse gas emissions and/or strengthen sinks, such as agriculture, forestry, land use and fisheries; mining and metal production; power and manufacturing; transport; buildings sector; water supply and wastewater. The quantity and quality of adaptation finance initiatives supported by bilateral and multilateral actors on these critical sectors of mitigation fall far short of needs, even more so in the case of adaptation and loss and damage interventions.

What appears to be an indisputable fact is that the for-profit private sector does not take significant action on its own for climate finance, it does not follow the principle of historical responsibility, and requires action and/or incentives of a public nature, with the use of leveraging mechanisms to mobilize funds.

In general, for-profit private sector actors do not consider this climate finance 'market' particularly attractive for four reasons: (1) high risk perceived, (2) low level of returns on investment portfolios, (3) lack of project pipelines and bankable/sizeable investment opportunities in very thin markets, (4) lack of financial innovation in institutions' portfolios[36].

It is in the light of these considerations that the use of mobilization instruments and blended finance solutions, with a catalytic role of financial leverage by IFIs, MDBs and NDFIs, becomes crucial[37].

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energy transnational corporations and International development actors through debt financing or political risk guarantees. These initiatives have been criticized by environmental associations and movements that have reported the presence of numerous human rights abuses by the army and the negative climate impacts. See: https://friendsoftheearth.uk/climate/whats-happening-mozambique

[33] See: C. Cash, L. A. Swatuk (eds.) (2022), *The Political Economy of Climate Finance: Lessons from International Development*, Palgrave MacMillan, London.

[34] From a global perspective, see: Climate Policy Initiative (2022), *Global Landscape of Climate Finance: A Decade of Data 2011-2020*.

[35] https://www.un.org/sg/en/content/sg/statement/2022-11-07/secretary-generals-remarks-high-level-opening-of-cop27-delivered-scroll-down-for-all-english-version

[36] OECD (2023).

[37] On the side of international organizations, see: UNEP (2021), *State of Finance for Nature 2021: Tripling investments in nature-based solutions by 2030*, UNEP, Nairobi; IUCN (2016), *Defining Nature-based Solutions Global Standard for NbS*, WCC-2016-Res-069-EN, IUCN, Gland.

On the G7 side, The Group of G7 Development Finance Institutions working together under the DFIs+ Adaptation and Resilience Collaborative put forward a plan to the G7 on actions to accelerate investments in adaptation and resilience in 2021.

On the G20 side, see: G20 Sustainable Finance Working Group (2021), *Synthesis Report*, 7 October.

On maximising the involvement and empowerment of the private sector and a new, more focused commitment on the part of public institutions, see: World Economic Forum's Global Future Council on Nature-Based Solutions (2022),

For the same reason, multilateral development finance has grown into a complex ecosystem in the last two decades, with the setup of earmarked financial intermediary funds and so-called Vertical Funds – such as the Green Climate Fund (GCF), the Adaptation Fund (AF), the Climate Investment Fund (CIF), the Special Climate Change Fund (SCCF), the Least Developed Countries Fund (LDCF) - as dedicated climate finance funds and initiatives as well as Regional risk pooling mechanisms – such as the African Risk Capacity (ARC) and the Caribbean Catastrophe Risk Insurance Facility (CCRIF).

The for-profit private sector is invoked as a key partner, but it is not involved in a structured method and with a strong commitment to replenish climate finance resources through a fair distributive mechanism. Forgetting that there are distinctions not only between countries but also between actors within each country, a significant portion of climate finance is channeled through multilateral institutions and funds, which must be financed ad hoc by wealthier member countries.

In practice, the goal of mobilizing jointly USD 100 billion a year by 2020 to address the needs of developing countries should involve a wide variety of sources, public and private, bilateral and multilateral, which should reflect the 'common but differentiated responsibilities and respective capabilities' (CBDR-RC) principle in the framework of the UN Framework Convention on Climate Change (UNFCCC). The interpretation of the principle of equity adopted is thus reduced to the terminal of the beneficiaries (to accelerate the transition towards a climate-neutral economy, leaving no one behind) and not also to the co-responsibility of the funders.

In sum, a narrower approach, focusing entirely on public finance commitments to mobilize USD 100 billion per year, prevailed.

In this framework, the key intermediary institutions to channel climate finance are MDBs, NDFIs, IFIs and ad hoc funds. When it comes to mobilizing private capital, the ambition is also to attract institutional investors (pension funds, sovereign wealth funds, insurance companies, mutual funds,

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Scaling Investments in Nature. The Next Critical Frontier for Private Sector Leadership. White Paper, World Economic Forum, Cologny Geneva.

On the specific topic of the opportunities offered by blockchain systems as a new source of resources, which is particularly interesting due to the boost that can be derived from its highly decentralised nature, see: G. Dorfleitner, D. Braun (2019), "Fintech, Digitalization and Blockchain: Possible Applications for Green Finance", in M. Migliorelli, P. Dessertine (eds) (2020); J. C. Castilla-Rubio, N. Robins, S. Zadek (2016), *Fintech and Sustainable Development: Assessing the Implications. UNEP Inquiry for Design of a Sustainable Financial System*, Geneva; D. Nassiry (2018), "The Role of Fintech in Unlocking Green Finance: Policy Insights for Developing Countries", *ADBI Working Paper*, N. 883, Asian Development Bank Institute, Tokyo.

Regarding the debate among scholars about the lack of take-off of the process of channelling financing, persistent distrust on the part of the banking sector and the need for greater participation of non-banking financial institutions, such as insurance and pension funds, see J. D. Sachs, W. T. Woo, N. Yoshino, and F. Taghizadeh-Hesary (2019), "Why Is Green Finance Important?", *ADBI Working Paper*, N. 917, Asian Development Bank Institute, Tokyo.

On new financial mechanisms and instruments, see: UNEP (2021), *Changing Finance to Catalyze Transformation: How financial institutions can accelerate the transition to an environmentally sustainable economy*, UNEP, Nairobi.

On the importance of the central banks' role, see: N. Stern (2016), "Climate Change and Central Banks", Presentation at a Bank for International Settlements event, 29 February; S. Dikau and U. Volz. (2018), "Central Banking, Climate Change and Green Finance", *ADBI Working Paper*, N. 867, Asian Development Bank Institute, Tokyo; The FSB Task Force on Climate Related Financial Disclosures (2016), "Phase I Report of the Task Force on Climate-related Financial Disclosures", Presented to the Financial Stability Board, 31 March.

On the specific contribution of national and multilateral development banks see: S. Griffith-Jones and J. A. Ocampo (eds.) (2019), *The Future of National Development Banks*, Oxford University Press, Oxford; E. Fernández-Arias, R. Hausmann, U. Panizza (2020), "Smart Development Banks", *Journal of Industry, Competition and Trade*, Vol. 20. See also the "Realizing the Potential of Public Development Banks for Achieving Sustainable Development Goals" research program's outputs aimed at improving functioning and effectiveness of Public Development Banks, by mobilizing 20 institutions around the world: https://www.afd.fr/en/carte-des-projets/realizing-potential-public-development-banks-achieving-sustainable-development-goals.

charities), important sources of capital in financial markets that hold more than USD 180 trillion but are reluctant to adhere to climate finance pool initiatives launched by IFIs, MDBs and NDFIs because of their lack of trust in public sector institutions' governance structure.

In the case of Italy, *Cassa Depositi e Prestiti* (CDP), the major Italian institution for economic development through long-term investments at local, regional and national level, also acting, at the same time, as the government's arm for executing public policy mandates at international level, represents an extraordinary case of NDFI in its uniqueness. In fact, on the international side, CDP combines the objectives of the following three pillars: (1) to serve as development bank in the context of development cooperation (operating on behalf of the overall strategy defined by the Ministry of Foreign Affairs and Development Cooperation); (2) to manage the Italian Climate Fund, on behalf of the Ministry for the Environment and Energy Security, to provide direct and indirect financing, to co-finance interventions together with international organizations, and to take on risk capital without the direct acquisition of shares; (3) to own and control the Italian hub for exports and internationalization, the export credit agency SACE-SIMEST, offering a complex range of instruments for credit insurance, investment protection, provision of securities and financial guarantees.

The great challenge is to adopt an integrated approach which accounts for the interconnected nature of the three above-mentioned pillars, despite the persistent tendency to operate by silos, as is also demonstrated by current monitoring and tracking systems.

4. The standardized methodologies for tracking climate finance

The adoption of appropriate standards to track the use of climate finance is a prerequisite for accountability and transparency. In fact, the presence of standardized indicators to provide a simple and reliable way to measure, monitor and evaluate the specific focus of financial initiatives in addressing the various priorities of climate finance is essential. Unfortunately, standardized information on climate finance focus and results remains questionable[38].

Since 1998, the OECD-Development Assistance Committee (DAC) has monitored development cooperation finance flows targeting the objectives of the Rio Conventions on biodiversity, climate change and desertification through the Creditor Reporting System (CRS) using the so called "Rio markers".

The OECD-DAC Statistical system oversees the alignment of the Rio conventions and environmental objectives in development cooperation activities through a set of five policy markers, which include four Rio markers on biodiversity, climate change adaptation, climate change mitigation, and desertification, as well as one policy marker on ODA to the environment. Therefore, the OECD-DAC

[38] To identify "finance to support sectors or activities that contribute to the achievement of, or the improvement in, at least one of the relevant sustainability dimensions", see: United Nations Environment Programme-Financial Initiative (UNEP-FI) (2017), *The Principles for Positive Impact Finance: A Common Framework to Finance the Sustainable Development Goals*, UNEP-FI, Nairobi; UNEP-FI (2019), *Principles for Responsible Banking*, UNEP-FI, Nairobi.
On the EU side, see: *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088*; EU Technical Expert Group on Sustainable Finance (2020), *Taxonomy: Final report of the Technical Expert Group on Sustainable Finance*, March; European Commission (2022), *Commission Delegated Regulation (EU) amending Delegated Regulation (EU) 2021/2139 as regards economic activities in certain energy sectors and Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities*, Brussels, XXX C(2022) 631/3.

has five statistical policy markers to track external development finance for environmental purposes, namely the Environment marker introduced in 1992 and the four Rio markers that cover the above-mentioned areas:

- Biodiversity (introduced in 1998)
- Climate Change Mitigation (introduced in 1998)
- Climate Change Adaptation (introduced in 2010)
- Desertification (introduced in 1998)

A scoring system of three values is used, in which development co-operation activities are marked as targeting the environment or the Rio Conventions as the "principal" objective or a "significant" objective, or as not targeting the objective. In practical terms that means:

- A score of 0 indicates that there is no explicit intent to contribute to the given Rio Objectives.
- A score of 1 indicates that the given Rio objectives are important but are not one of the principal reasons undertaking the action.
- A score of 2 indicates that the given Rio objectives are the principal motivation for the action. Without this objective the action would not have been undertaken.

For a Rio theme to be considered as principal objective of an action it must be explicitly targeted as fundamental in the design of, or the motivation for, the activity, while in order to be considered as significant objective it must be explicitly targeted without being the fundamental driver for undertaking and/or designing the activity.

The climate Rio marker specifies whether a project would have climate-change mitigation/adaptation[39] as a 'principal' (marker value 2), 'significant' (marker value 1) or 'absent' (marker value 0) objective[40].

Climate Rio markers should be applied to all bilateral ODA and non-export credit Other official flows (OOFs), excluding general budget support, imputed student costs, debt relief except debt swaps, administrative costs, development awareness and refugees in donor countries. Multilateral contributions should not be marked by members individually; instead, international organizations report on the actual allocation of their funds ("multilateral outflows"), and the climate-related share of their portfolio is determined on that basis.

In general, it should also be considered that a large share of international climate finance is labelled as ODA, but this is highly problematic, as climate change mitigation is normally not a development priority of a recipient of ODA[41] and the unmet pledge of climate finance should be additional to traditional ODA, which is in turn well below the target of 0.7% of GDP.

In contrast, a Joint Climate Finance Tracking Group of MDBs[42] and a group of representatives of the International Development Finance Club (IDFC) report on components, elements or proportions of climate finance based on the Joint MDB reporting approach for tracking climate change adaptation

[39] Assigning a double principal score (e.g. to both mitigation and adaptation) to the same activity should be considered only upon explicit justification.
[40] OECD (2016), *OECD DAC Rio Markers for Climate Handbook*,
[41] K. Michaelowa and C. Namhata (2022), "Chapter 2: Climate finance as development aid" in A. Michaelowa, A. K. Sacherer (eds.), *Handbook of International Climate Finance*, Edward Elgar Publishing, Cheltenham.
[42] the African Development Bank; Asian Development Bank; Asian Infrastructure Investment Bank; European Bank for Reconstruction and Development; European Investment Bank; Inter-American Development Bank Group; Islamic Development Bank; New Development Bank; and the International Bank for Reconstruction and Development, International Development Association, International Finance Corporation, and Multilateral Investment Guarantee Agency of the World Bank Group.

and mitigation finance[43], without so far having a dedicated focus to address 'loss and damages' due to developed country emissions effects, a component which found a specific new finance mechanism just at COP 27. In particular, these MDB reporting approach is based on three overarching principles:

1. Conservativeness: where data are unavailable or there are uncertainties about the data, it is preferable to underreport rather than overreport climate change mitigation finance. In order to avoid double counting, where the same project, sub-project or project component contributes to both climate change mitigation and climate change adaptation, the tracking institution's individual processes will determine what proportion is identified as climate change mitigation or climate change adaptation finance.
2. Granularity: mitigation activities must be disaggregated from non-mitigation activities as far as reasonably possible. When disaggregation is needed but not possible using project-specific data, a more qualitative assessment must be used.
3. Complementarity: to ensure that only climate change mitigation activities that neither conflict with nor undermine the wider objectives of the SDGs be considered and reported.

After a second version of the common principles[44], on the 18 October 2021 the MDBs published a third version of the common principles[45]. This new version of the common principles, including the list of eligible activities, was developed over a period of two years, taking particularly into account the following two aspects:

i. Consideration of new mitigation activities[46] that are required in order to achieve the structural changes in the economy pointed out by the IPCC as necessary to achieve the goals of the Paris Agreement.
ii. Identification of activities that, despite reducing GHG emissions in the short term, risk a long-term lock-in of emissive technologies, thereby undermining the long-term temperature goal of the Paris Agreement. Such activities cannot be considered as climate mitigation finance.

According to the Joint MDB reporting approach, climate change mitigation activities can be classified into three alternative categories:

i. Negative- or very-low-emission activities: These result in negative, zero or very low greenhouse gas emissions and are fully consistent with the long-term temperature goal of the Paris Agreement, for example carbon sequestration in land use or some forms of renewable energy.

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[43] See: https://www.ifc.org/wps/wcm/connect/18bdaa03-cc93-43c7-8fe9-06b81753aaf5/MDB-IDFC+Common-principles-for-climate-mitigation-finance-tracking.pdf?MOD=AJPERES&CVID=lCfjFNG

[44] See: https://www.idfc.org/wp-content/uploads/2020/08/idfc_mdb_common_principles_mitigation_finance_tracking_2015.pdf

[45] the Joint Climate Finance Tracking Group of MDBs and IDFC (2021), *The Common Principles for Climate Mitigation Finance Tracking – Version 3*, 18th October. See: https://www.idfc.org/news/publication/idfc-mdbs-commom-principles-for-climate-mitigation-finance-tracking-october-2021/

[46] The list of categories includes the following: (1) Energy (Renewable energy generation; Lower-carbon fuel; Energy efficiency; GHG-emission reduction (Carbon capture); Energy storage, Energy transportation; Reduction of fugitive GHG emissions); (2) Mining and metal production for climate action; (3) Manufacturing (Energy and resource efficiency; Electrification; GHG-emission reduction; Resource demand management; Energy storage; Lower-carbon fuel and generation); (4) Agriculture, forestry, land use and fisheries (energy efficiency; carbon sequestration; GHG-emission reduction; resource use efficiency); (5) Water supply and wastewater (Energy and resource efficiency and demand management); (6) Solid waste management (Waste collection and transport; storage and transfer; Product reuse; Material recovery, Treatment); (7) Transport (urban and rural; Low-carbon mode and efficiency improvement;…); (8) Buildings, public installations and end-use energy efficiency; (9) Information and communications technology (ICT) and digital technologies; (10) Research, development and innovation; (11) Cross-sectoral activities.

ii. Transitional activities: They are still part of greenhouse gas-emissive systems, but are important for and contribute to the transition towards a climate-neutral economy, such as energy efficiency improvement in manufacturing that directly or indirectly uses fossil fuels.
iii. Enabling activities: They are instrumental in enabling other activities to make a substantial contribution to climate change mitigation, such as manufacture of very-low emission technologies.

The methodology adopted allows a comparison between adaptation and mitigation finance tracking:

i. Adaptation finance: This tracking is incremental (component-based: only a component or element of a project contributes to resilience - including socioeconomic resilience - or adaptation to climate change). It only considers those activities that specifically address vulnerability to climate change.
ii. Mitigation finance: This is typically a project (or component thereof) that avoids, reduces or sequesters greenhouse gas emissions, or promotes efforts to achieve these goals. Mitigation finance tracking is either project- or component-based.

At the same time, other MDBs adopted their own methodologies for calculating the climate-related benefits of funds. This situation creates inconsistency across MDBs and, related to it, during the summit in Elmau in June 2022, the G7 called on MDBs to finalize their methodologies for Paris alignment of both direct and indirect operations before COP27[47] and to review the methodologies for calculating the climate-related benefits of MDBs funding in order to achieve consistency across MDBs[48].

Accounting for and reporting international climate finance remains difficult as long as there is no common definition[49], and disputes arise around narrow or broad interpretations of climate finance and corresponding multiple metrics, in the absence of a UNFCCC operational definition for measuring and recording climate finance flows. Moreover, the methods of tracking funds is still contested among researchers[50] and CSOs[51], with reference to the problem of 'double counting', 'inflated' climate finance and the inclusion of private funds that should not be counted because they can be a tool for 'greenwashing', thus exaggerating the real value of climate finance mobilized. These criticisms are the consequence of the fact that, reflecting the emphasis on public-private partnerships, statistics on mobilized private finance became an integral component of the new, broader measure of Total Official Support for Sustainable Development (TOSSD)[52] and are now included in the SDG

[47] A. C. Gebel (2022), "Multilateral Development Banks Must Deliver on Climate. The G7 Communiqués' References to MDBs, Why They Are Important, and What They Mean in Practice", *GermanWatch Policy Brief*, Bonn.
[48] A. C. Gebel, A. Kachi, L. Sidner (2022 b), "Chapter 11: Aligning finance flows with the Paris Agreement: the role of multilateral development banks", in A. Michaelowa, A. K. Sacherer (eds.), *Handbook of International Climate Finance*, Edward Elgar Publishing, Cheltenham.
[49] M. Migliorelli (2021), "What Do We Mean by Sustainable Finance? Assessing Existing Frameworks and Policy Risks", *Sustainability*, Vol. 13 (2), 975; M. Migliorelli, P. Dessertine (eds.) (2020), *Sustainability and Financial Risks. The Impact of Climate Change, Environmental Degradation and Social Inequality on Financial Markets*, Palgrave Macmillan, Springer, Cham.
[50] A. CHowdhury and J. K. Sundaram (2022), "The Climate Finance Conundrum", in *Development*, Vol. 65, N. 1.
[51] T. Carty, J. Kowalzig, B. Zagema (2020), *Climate Finance Shadow Report 2020: Assessing progress towards the $100 billion commitment*, Oxfam International, October.
[52] TOSSD is an international standard to measure all officially supported resources to promote sustainable development in developing countries. TOSSD (2022), *Total Official Support for Sustainable Development (TOSSD): data visualisation tool*, https://tossd.online/

indicator framework under SDG indicator 17.3.1 "Additional financial resources mobilized for developing countries from multiple sources"[53].

5. The main contents of the report

There is a huge amount of grey literature on international climate finance published by think tanks, multilateral development banks and international organisations. Nevertheless, no document provides a full overview of all key aspects of appropriate and/or innovative climate finance delivery channels, instruments and mechanisms spread all over the world.

In general, the blending of various finance sources has been proposed by many to enable public climate finance to achieve a broader reach, but the evidence does not indicate that any acclaimed experience implemented in wealthier countries can achieve significant results in the context of developing countries, with fragmented institutions, markets and technologies.

The problem of generalisability and applicability of the experience from one specific case, its results and lessons learnt to other contexts and settings, with different characteristics, cannot be underestimated. The good experience of Switzerland as a key climate finance provider regarding appropriate climate finance delivery channels cannot be applied to other contexts still facing challenges to access funding.

However, international multi-, bilateral and national development agencies can provide inspiring key solutions, innovations, methodologies to be replicated in other contexts by different actors. Based on these assumptions, the preparation of this report activated a consultative process to review the literature, involving telephone and e-mail interviews to partners in various institutions and countries to deepen: (1) the role of National and Multilateral Public Development Banks, as well as International Financial Institutions in Africa; (2) the study and monitoring of some significant national and international good practices in the field of climate finance. In particular, two case studies were identified for in-depth study in order to outline their salient features, strengths and weaknesses, and formulate a set of specific recommendations (defining a strategic approach with country/sector priorities and operational tools for intervention) to strengthen the operative role and presence in Africa of a bilateral development bank such as CDP.

The first case-study, analysed by Alberto Mazzali, presents the case of Rwanda, where the national environmental fund, the Rwanda Green Fund (FONERWA), serves as the key intermediary between international climate finance inflows and local beneficiaries. Low electrification rate has been widely recognised as one of the main hindrances to economic development of Rwanda. In fact, the Energy Sector Strategic Plan (ESSP) and the Rwanda Energy Policy have the objective of increasing electrical generation capacity and achieving universal access to electricity for households and productive users through the expansion of grid and the implementation of Solar Home Systems (SHS) and micro-grid as an interim solution for settlements in peripheral areas. The Rwanda Renewable Energy Fund (REF) project has been implemented by the Government of Rwanda through the Development Bank of Rwanda (BRD), with management support from the World Bank and financing

[53] UNSD (2022), *SDG indicator metadata (Harmonized metadata template - format version 1.1)*, https://unstats.un.org/sdgs/metadata/files/Metadata-17-03-01.pdf

from the Climate Investment Funds' (CIF) Scaling Up Renewable Energy Program (SREP). The REF constitutes a pilot project that addressed the theme of the development of off-grid system responding to the market needs as they unfold through learning by doing approach. The core of the intervention is the provision of local-currency lines of credit, direct loan financing and partial grants for Rwanda off-grid market by the REF financed with a grant contribution of USD 45.94 million. The REF started its activities in 2017 by setting up four distinct windows at BRD for the provision of resources through differentiated funding channels on 'first-come-first-serve basis' with the aim of mobilising all key market enablers at the same time. An additional fifth window was opened in 2020 BRD offering results-based partial grants to solar companies passing the funds on to customers to facilitate the sale of solar-home systems and after sale services to less affluent households.

The analysis of the critical points highlighted during the REF start-up and implementation, of the adaptive measures taken and of their outcome provides a basis of great interest for the planning of initiatives with similar objectives, reference contexts and change mechanisms that they envisage to trigger. The key generalizable indications for external reproducibility can be summarised as follows:

- The efficiency and accuracy of real-time market monitoring with the use of reliable data and extensive and continued consultations with market participants must be combined with the adoption of flexible mechanisms to respond to market developments and concerns are essential to ensure private sector participation and foster sustainable market development.
- The plurality of financing channels adds penetration capacity to the project: it maximizes the reachability of the beneficiary targets and the mobilization of segments of the socio-economic fabric.
- The continued dialogue among the actors participating in the financing supply chain and governmental institutions to timely address every challenge stemming from policies and regulations changes must be ensured on the basis of sincere recognition by all stakeholders of the relevance of the initiative and the need for an ongoing and result-oriented commitment.
- Complementarity between sectoral project and policy interventions is paramount and must orient the proactive continued dialogue between donors, national and local governments fostering participation of civil society organisation and other local stakeholders in direct connection with the public institutions responsible for defining, updating and managing regulations.
- Pilot multi-stakeholder projects characterized by a high level of complexity and with objectives that include the mobilization of private actors, must rely on adaptive management and consider an initial learning curve to pay meticulous and comprehensive attention to the day-to-day implementation details, monitoring the correspondences between the theory of change and dynamics detected on the ground, which must be associated with a project structure capable of promptly implementing requests for revision, even profound, of the project structure.

Several themes remain open and prompt an in-depth reflection. Among these:

- the placement of experiences such as REF in the context of the evolution of the role of development banks in financing ecological transformation and environmental and social sustainability of development processes;
- the specific complex architecture of projects that strive for impacting both the population welfare and the local actors involved in the project implementation;

- the calibration of tools put in place to stimulate the growth of local financial systems and the mobilization of national savings for local investment through appropriate scouting and deal origination tools;
- the accurate sharing and management of risk among the private financial and industrial stakeholders involved in the processes initiated by the project and the related guarantee mechanisms;
- the tailoring of interventions considering critical local specificities such as market development, institutional framework, pattern of key stakeholders and their mutual relationships.

The second case-study, analysed by Maria-Despoina Argyrou, presents the first commercial investment vehicle dedicated to expanding globally the availability of technologies and solutions for climate change adaptation and climate resilience, the Climate Resilience and Adaptation Finance and Technology Transfer Facility (CRAFT).

CRAFT aims to mobilize public and private capital to invest in companies that provide solutions for climate change adaptation and resilience. The Fund focuses on bringing existing technologies and solutions into new sectors and regions, with a particular focus on developing countries. It invests in private companies offering climate resilience solutions with the aim of mitigating the impacts and risks exacerbated by climate change, while it also provides technical assistance to support these companies in expanding into new geographic markets and sectors.

CRAFT uses a blended finance approach to attract commercial capital for investing in privately-held companies with strong growth potential that offer climate resilience solutions. The fund's unique structure includes concessional equity, commercial equity, and a Technical Assistance Facility (TAF).

Its long-term goal is to achieve a ratio of 3.3:1 of commercial capital to concessional capital. CRAFT could lead to increased investment in climate-smart infrastructure projects and create a model for blending concessional and commercial capital that could be replicated in other sectors and regions.

The analysis starts by setting the project's background and continues by explaining the design of the Facility in terms of its main idea, theory of change, key characteristics and structure. Then, the analysis describes the financial aspects of the project, the main risks and challenges faced during the implementation of the project. Finally, the analysis summarizes the main takeaways that can be drawn by CRAFT for other financial institutions, such as CDP.

Give that CRAFT is still in its early stages, having been launched in 2019, there are just some potential lessons that can be learned so far and and this is what is at stake for the core strategy of blending mechanisms at global level:

- Public-private partnerships can be effective in mobilizing private capital towards climate adaptation and resilience solutions.
- Concessional financing can be an effective tool for attracting private investment in climate adaptation and resilience.
- There is a need for more investment in climate adaptation and resilience in developing countries, and private capital can play an important role in filling this gap.
- Investing in climate adaptation and resilience solutions can be financially attractive for investors, with potential for both financial returns and positive environmental and social impact.

- There is a need for increased collaboration and coordination among investors, governments, and other stakeholders to ensure that investments are targeted and effective in addressing climate change challenges.

The potential impact of CRAFT may increase investment in climate-smart infrastructure projects, providing much-needed funding for adaptation and resilience in developing countries. This can lead to the development of new infrastructure projects, such as water management systems, clean energy solutions, and resilient transport networks. CRAFT's ambition is to create a model for blending concessional and commercial capital that could be replicated in other sectors and regions. CRAFT provides technical assistance to help project developers identify, design, and implement climate-resilient infrastructure projects to achieve its objectives. Technical assistance is certainly essential, but additionally the success of a facility like CRAFT will also depend on factors such as effective governance, risk management, and monitoring and evaluation frameworks.

The key lessons learnt from the CRAFT initiative that the analysis suggests include:

- Addressing adaptation finance: CRAFT demonstrates that there is a significant gap in adaptation finance, and development banks can play a crucial role in mobilizing private capital for adaptation and resilience.
- Blended finance: The use of concessional capital alongside private capital to mobilize additional investment is an effective approach to blended finance, which can be applied to other sectors beyond climate adaptation.
- Private sector engagement: CRAFT has successfully engaged with the private sector, including institutional investors and impact investors, demonstrating the importance of private sector engagement in mobilizing finance for development.
- Partnerships: CRAFT has developed partnerships with regional organizations and governments, which have been critical in identifying investment opportunities and building local capacity. Development banks can learn from CRAFT's approach to building partnerships to strengthen their own operations.
- Innovation: CRAFT has demonstrated the importance of innovation in developing new financial instruments and investment opportunities. Development banks can apply this approach to other sectors and develop new products and services to meet the evolving needs of their clients.

2. The case of the Rwanda Renewable Energy Fund's (REF) project

Alberto Mazzali

1. The background

Rwanda is one of the most dynamic economies in Africa with an average growth that has exceeded 7% per year in the last two decades. Social indicators have been improving with poverty headcount ratio at national poverty line declining from 77% to 55% between 2001 and 2017 and life expectancy at birth increasing from 50 to 69 years in the first two decades of the new millennium[54].

The latest *Doing Business Report* released by the World Bank in 2020, ranked Rwanda 38th out of 190 countries and second among African countries after Mauritius[55]. After the COVID-19 outbreak had driven the country into its first recession since 1994 plunging the GDP by 3.4% in 2020, the vaccination rollout, that involved 7.9 million people (61% of the population) by March 2022[56] and allowed a relative easing of restrictions, together with a sustained fiscal stimulus buoyed a consistent reaction accelerating GDP growth that reached 10,9% in 2021[57]. However, despite the excellent economic performance consistently above the Sub-Saharan Africa average and the increasingly diverse economy, Rwanda remains among the 25 countries with the lowest GDP per capita[58] and its human development index is 165th out of 191 countries[59].

In 2017, President Kagame, after his re-election for a further seven years at the helm of the country, relaunched his development strategy that aims to transform Rwanda into a middle-income export-oriented economy operating as a knowledge-based regional service hub. The new objectives have been set in the 7 Years Government Programme: National Strategy for Transformation (NST 1) 2017–2024, which considers what was established with the new Vision 2050. From an implementation perspective, the NST1 aligns with the Sustainable Development Goals (SDGs), Africa Union Agenda 2063 and its First 10-Year Implementation Plan (2014-2023) and the East African Community (EAC) Vision 2050 focusing on initiatives for job creation and employment. The role of private investments is one of the core strategies. According to the *2021 World Bank Rwanda Economic Update*[60], an increase of the official funding sources to their maximum level based on likely donor decisions, debt sustainability and fiscal domestic revenues would provide approximately only 45% of the resources required to fill the infrastructure gap, while private financing is estimated to build up just a third of total commitments.

[54] https://data.worldbank.org
[55] World Bank (2020), *Doing Business 2020*, Washington D.C.
[56] African Development Bank (2022), *Rwanda Economic Outlook*, https://www.afdb.org/en/countries/east-africa/rwanda/rwanda-economic-outlook, accessed November 2022.
[57] IMF, (2022), *World Economic Outlook*, Washington D.C., October.
[58] IMF (2022), *World Economic Outlook Update*, Washington D.C., July.
[59] United Nations Development Programme (2022), *Human Development Report 2021-22: Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World*, New York.
[60] World Bank (2021), *Rwanda Economic Update. The Role of the Private Sector in Closing the Infrastructure Gap*, The World Bank Rwanda, Kigali.

The energy sector plays a pivotal role in the development strategy. Rwanda's low electrification rate (10% of population had access to electricity in 2015[61]) has been widely recognised as one of the main hindrances to economic development. With the adoption of the Energy Sector Strategic Plan (ESSP) for 2013-2017 and the Rwanda Energy Policy (REP) in 2015, the government established that access to modern, sustainable, and affordable energy services is integral to Rwanda's economic development, poverty eradication and socioeconomic transformation. The priorities and goals included:

- the raising of the electric power system equivalent installed capacity to 563 MW and 70% electricity access based on differentiated grid and off-grid strategies by 2018,
- the security of oil supply through the upgrade of the storage infrastructure and strategic reserves,
- the sustainable use of biomass ensuring that 80% of all households employ clean cooking energy technologies[62].

Privates participation has been encouraged by measures aimed at improving the investment environment, such as the Public Private Partnership Law introduced in 2016. PPPs in the energy sector have been facilitated through the possibility for private companies producing energy to sell the energy to the Energy Utility Corporation Limited (EUCL), which is the main country energy utility provider and that has been allowed to act as off-taker.

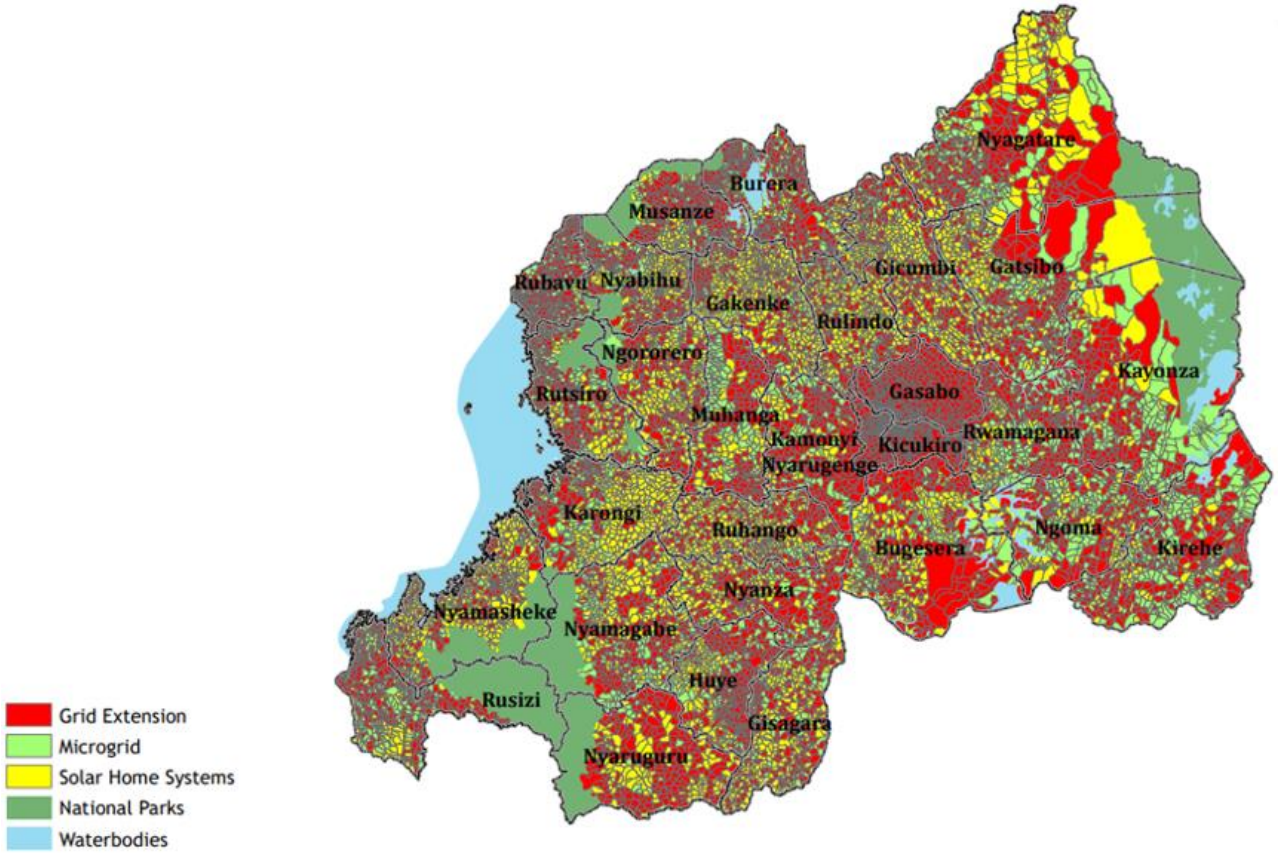
The ESSP was updated in 2018 for the next six-year period. The revised high-level target objectives (HLTOs) include:

- the improvement of the reliability of electricity supply reducing the number of power interruptions per year,
- to halve the number of households using traditional cooking technologies and augment the petroleum strategic reserves to cover three months' supply,
- the increase of electrical generation capacity in order to meet demand and maintain a 15% reserve margin with a projection between 282 MW and 376 MW by 2024.

The HLTOs comprise the achievement of universal access to electricity for households and productive users through the further expansion of grid access to cover 52% of end-users with priority given to settlements within defined distances of the grid. The remaining 48% of end-users access will be granted through the implementation of Solar Home Systems (SHS) and micro-grid as an interim solution[63].

[61] https://data.worldbank.org
[62] Republic of Rwanda Ministry of Infrastructure (2015*), Rwanda Energy Policy*, 17th March; Republic of Rwanda Ministry of Infrastructure (2015), *Energy Sector Strategic Plan 2013/14 - 2017/18*, 17th March.
[63] Republic of Rwanda Ministry of Infrastructure (2018), *Energy Sector Strategic Plan 2018/19 - 2023/24*, September.

Fig. 1 - Map of systems designed for the National Electrification Plan in Rwanda



Source: Ministry of Infrastructures, Rwanda Energy Group (2019*), TASK 2 Report. Design of the National Electrification Plan in Rwanda*, Rev 8.0 June 2019, Prepared by consortium of Tata Power Ddl, Mit–Comillas Uea Lab & EcoSecure Holding and REG.

In the last decade the Government of Rwanda has engaged in a governance reform of the energy sector by separating it from water operations and adopting the corporatization model as a vehicle to implement the modernization process[64]. In 2014 the Rwanda Energy Group Limited (REG) was incorporated with 100% government shareholding.

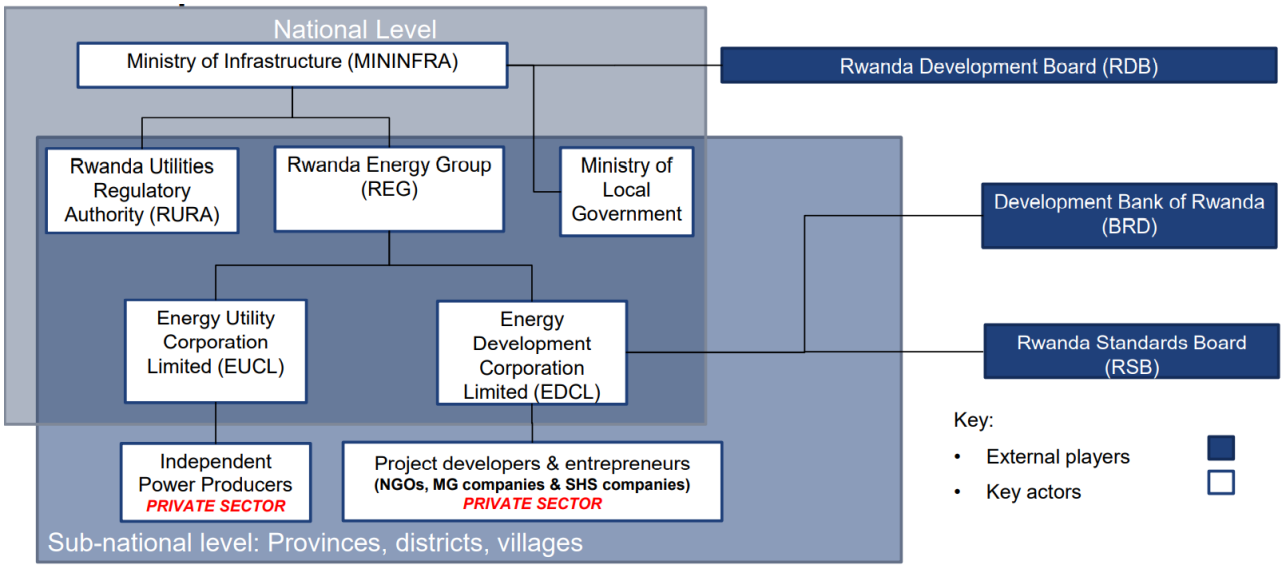
Two subsidiaries were created decoupling energy development management and implementation and utility service delivery. The Energy Utility Corporation Limited focus on operations and maintenance of existing generation plants, transmission and distribution network and retail of electricity, while the Energy Development Corporation Limited (EDCL) were entrusted with increasing investment in new energy generation projects in a timely and cost-efficient expansion of supply.

Other government bodies with different competences and responsibilities also contribute to the governance and development of the system. Among the most relevant players the Ministry of Infrastructures (MININFRA) Energy Division is responsible for governmental energy strategies and activities and the Ministry of Finance for the financing arrangements for investments and subsidies, the Rwanda Utilities Regulatory Authority (RURA) establishes and enforces regulations and set

[64] Law n°97/2013 of 30/01/2014 repealing law n°43/2010 of 07/12/2010 establishing Rwanda energy, water and sanitation authority (EWSA) and determining its responsibilities, organisation and functioning, transferred the responsibilities and property of EWSA as well as claims and debts of EWSA to two commercial companies (Energy Company and Water and Sanitation Company) to be set up within the following 6 months.

tariffs, licensing, and permitting, the Rwanda Standards Board (RSB) sets up standards and ensures conformity, the Rwanda Development Board (RDB) is the key institution for facilitating private sector investment.

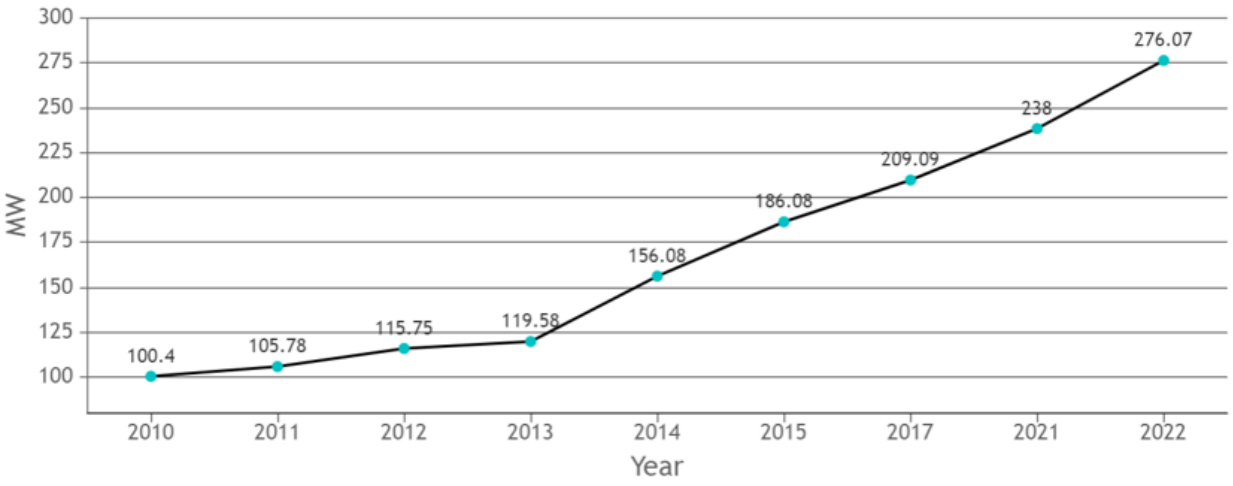
Fig. 2 - Key actors in Rwanda's power sector



Source: Agutu C.O. (2020), *Off-grid electrification: Opportunities and challenges for key players in Rwanda's off-grid power sector*, Eidgenössische Technische Hochschule Zürich.

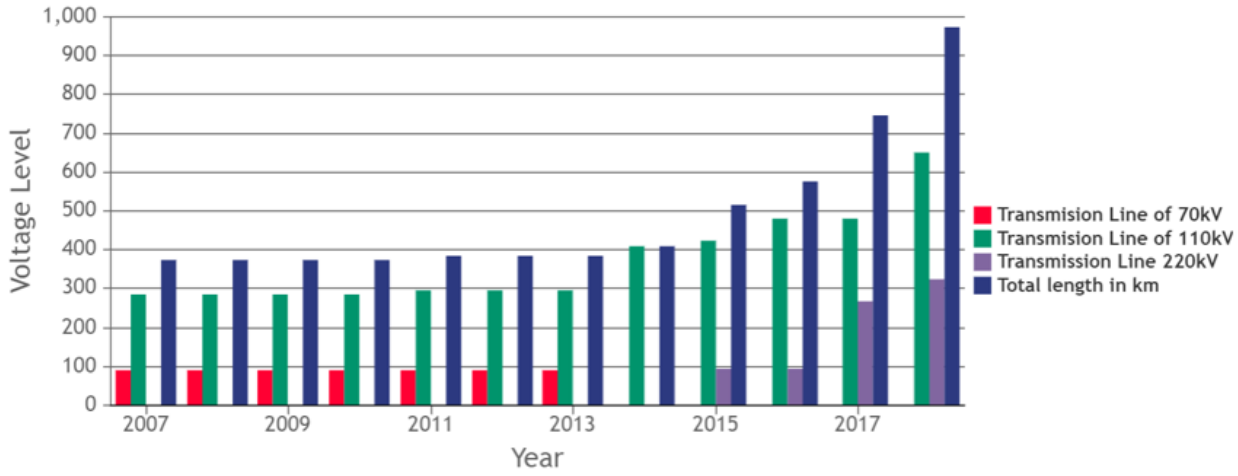
According to REG statistics, installed capacity exceeded 276 MW in 2022, marking a 130% increase over 2013. In the same years, the total length of the lines making up the distribution network was increased by 155% reaching almost 1000 km. The modernization included the dismantling of the 70 kV lines and the installation of 324 km of 220 kV lines.

Fig. 3 - Evolution of the installed capacity (MW)



Source: Rwanda Energy Group Limited, https://www.reg.rw

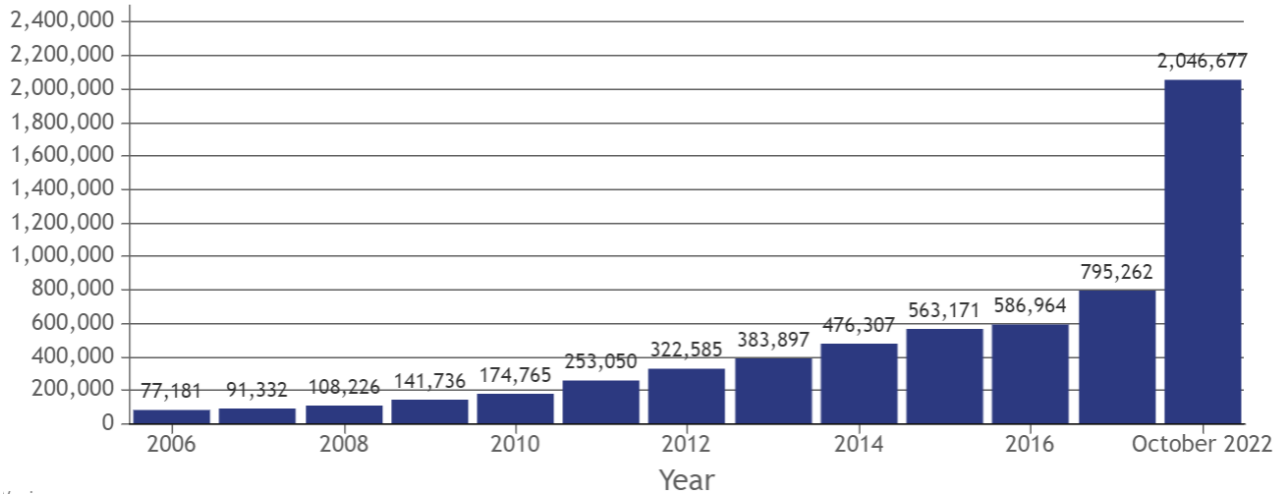
Fig. 4 - Evolution of the power transmission network (Km)



Source: Rwanda Energy Group Limited, https://www.reg.rw

The number of households accessing electricity has increased from 10% in 2010 to 75.3% as of October 2022 with 50.9% accessing through the national grid and 24.4% through off-grid solutions, mainly solar energy and mini-grids. In the first week of November, the passing of two million households with access to electricity was celebrated.

Fig. 5 - Households with access to electricity



Source: Rwanda Energy Group Limited, https://www.reg.rw

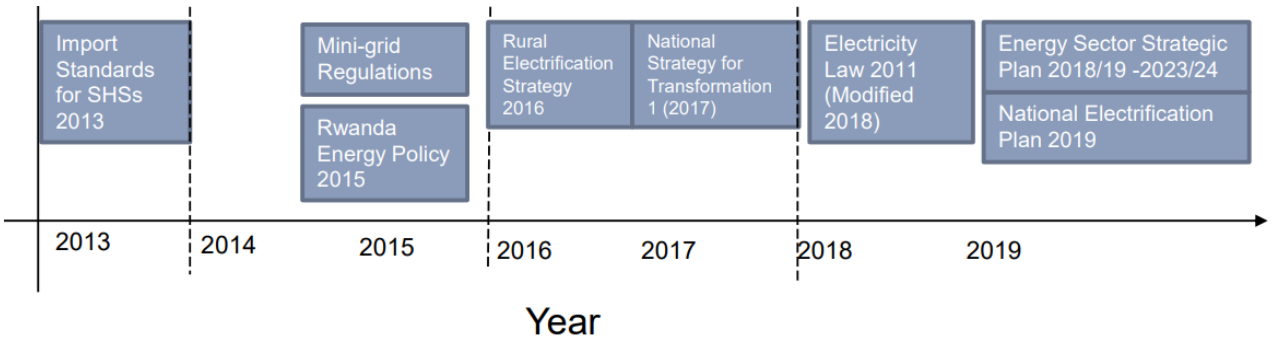
The territorial disparity is still very sensitive: while universal access has been achieved in some districts, in the less advanced ones half of the households are still not connected to any source of electricity. In this framework, the off-grid solar energy sector plays a central role to accelerate the inclusiveness of the electrification strategy with wide-ranging benefits. A study identified synergies and trade-offs between the expansion of off-grid solar energy in Rwanda and 16 out of the 17 SDGs and with 80 of the 169 Targets of the UN 2030 Agenda evidencing the key role that the

provision of electricity to off-grid households and communities can play in diverse sectors such as water, agriculture, education and health[65]. Grid extension to reach less populated peripheral areas with very low total demand results cost ineffective, whereas steep cost reductions in off-grid solar systems provide an important interim solution for households with basic electricity needs and difficulties affording even a subsidized grid connection fee[66].

A National Electrification Plan (NEP) was put in place in 2018 and twice updated in 2021[67] and in 2022[68] after checking the status of electricity connection in all villages across the country in a consultative process with central and local Government entities up to village level.

According to the last assessment, On-Grid zone counts for 13,116 villages (comprised of Grid Extension and fill in connections) among which 961 villages will be temporarily supplied by SHS, whereas 1,641 villages are in Off-Grid zones of which 1,442 are demarcated in villages where access is covered by SHS and in 199 villages by micro-grid technology.

Fig. 6 - Promulgation of off-grid sector most relevant policy and regulatory frameworks



Source: Agutu C.O. (2020).

Government policies for the expansion of off-grid systems have been developed in a market embedded in a regional system dominated by international companies such as BBOXX[69], Engie-

[65] Iwona Bisaga, Priti Parikha, Julia Tomeib, Long Seng Toc (2021), "Mapping synergies and trade-offs between energy and the sustainable development goals: A case study of off-grid solar energy in Rwanda", *Energy Policy*, Vol. 149, February.

[66] De Abajo C., Díaz-Pastor S., González A., Pérez-Arriaga I. (2020), "A business plan to achieve full electrification in Rwanda under the Integrated Distribution Framework (IDF), Global Commission to End Energy Poverty (MIT Energy Initiative)", *Working Paper*.

[67] Energy Development Corporation Limited (2021), *A Concept Note on the Rwanda National Electrification Plan (NEP) -2021 Revision*, Kigali.

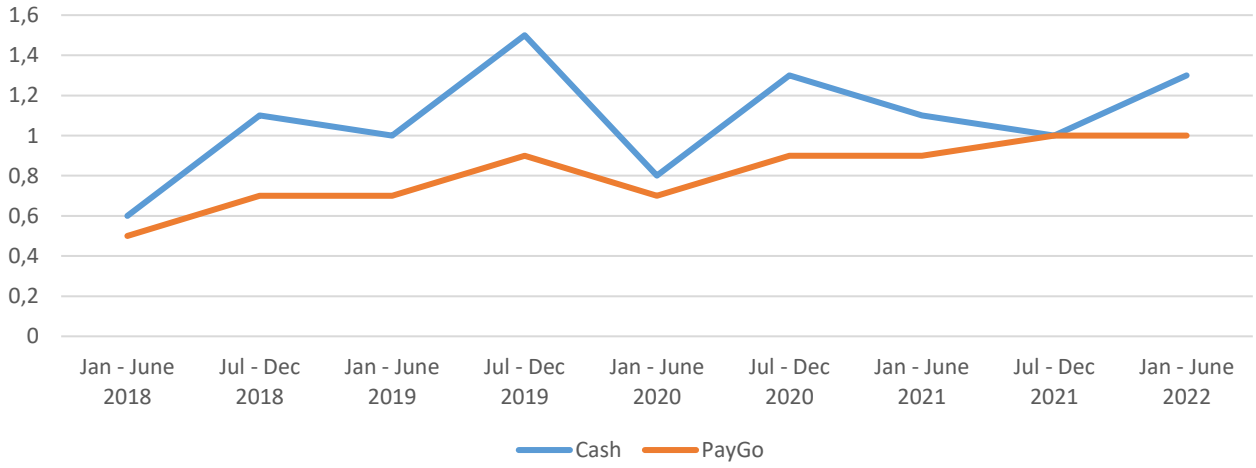
[68] Energy Development Corporation Limited (2022), *A Concept Note on the Rwanda National Electrification Plan (NEP) -2022 Revision*, Kigali.

[69] BBOXX is a UK company founded in 2010 designing, manufacturing and distributing solar systems throughout Africa and expanding on this mission by creating innovative methods to enhance access to energy throughout developing world. BBOXX consolidated its market leading position in Rwanda by acquiring solar energy frontrunner PEG Africa.

Mobisol[70], Zola[71], and Ignite[72] that have access to funding from both Development Finance Institutions (DFIs), and from the private sector, which includes equity and impact investors, and specialized investment funds[73]. The dominance of large players in the market was further strengthened in 2016 when the government aligned national regulation to the Lighting Global Quality Standards[74] in order to ensure that only high-quality products could be sold or qualify for Government support[75].

At the other end of the supply chain, the spread of mobile telephony and the possibility of using relatively new remote technology has allowed the introduction of the PAYGO contract alongside the cash purchase. The innovative credit system removes the initial financial barrier to solar energy access by allowing consumers (who cannot afford or are not willing to buy products in cash) to pay a modest amount upfront and proceed by paying per small monthly instalments through a platform of the mobile network operator. Available options include the possibility of equipping the solar system with a SIM card that allows the company to remotely control it and switched it off when customer don't respect the instalment payment schedule. With a second formula, upon receipt of the instalment payment, the solar company sends to the customer a token code by text message that must be entered into the solar home system to maintain it in service. The available data disaggregated at the regional level testify to the growth in the use of the PAYGO formula in the specific sector.

Fig. 7 - Sales volumes of Solar Energy Kits in East Africa (millions)



Source: GOGLA (2021), *Global Off-Grid Solar Market Report. Semi-Annual Sales and Impact Data. January - June 2020*, Amsterdam; GOGLA (2022), *Global Off-Grid Solar Market Report. Semi-Annual Sales and Impact Data. January - June 2022*, Amsterdam.

[70] Mobisol was a leading German-based international company engineering, developing and delivering rent-to-own solar home and business. Founded in 2010 has sales centres in Kenya, Rwanda and Tanzania. In 2019 Mobisol has been taken over by French energy giant Engie reinforcing its commitment to renewable energies through strategic investments (Bboxx, PEG) and the complete takeover of Simpa Networks in India and Fenix / Mobisol in Africa. In the Mini-Grid segment, Engie is also active in Africa with its own company PowerCorner.

[71] Zola electric is a 2011 founded developer of smart storage solar power systems designed to offer clean and affordable power. Founded in 2011 as Silicon Valley startup is headquartering in Amsterdam and based in San Francisco, Arusha, Lagos, Accra and Kigali.

[72] Ignite power is a developer of solar systems operating since 2014 with head office in Abu Dhabi and branches in United Kingdom, Rwanda, South Africa, Sierra Leone and Mozambique.

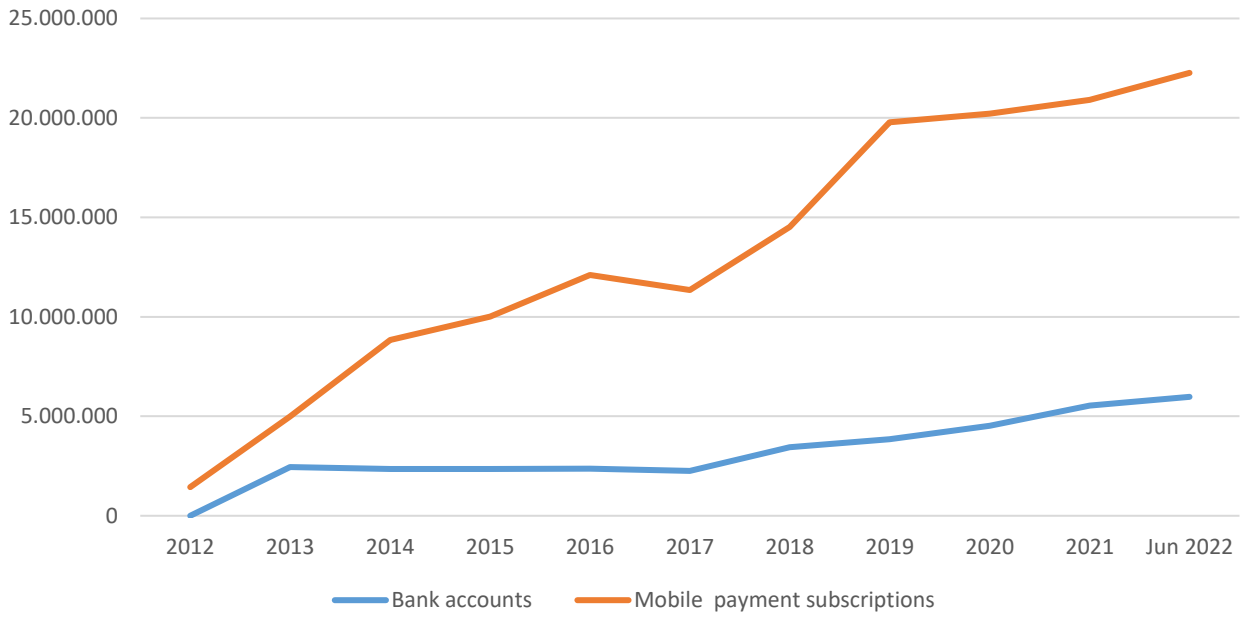
[73] USAid Power Africa Off-grid Project (2019), *Off-grid Solar Market Assessment – Rwanda*, https://www.usaid.gov.

[74] Lighting Global Quality Standards are a set of off-grid lighting benchmarks that set a baseline level of quality, durability, health and safety, warranty, truth-in-advertising, labelling and performance information to protect consumers.

[75] Lighting Global, GOGLA, ESMAP (2020), *Off-Grid Solar Market Trends Report 2020*, International Finance Corporation, Washington, D.C., March.

In particular, in Rwanda the PAYGO contracts share on total sales volume of off-grid solar lighting products (systems that include a solar panel, a battery and at least one light source) was one of the highest of the continent already in 2018[76]. The consistent spread of mobile money has vigorously facilitated its use. The FinScope Rwanda 2020 survey evidenced a notable contribution of the diffusion of mobile telephony to the process of financial inclusion. About 87% of Rwandan adults (6.2 million) have access to a mobile phone with just a relatively disparity between women (84%) and men (90%) and 61% use mobile money (males 68% and females 56%)[77].

Fig. 8 – Number of bank accounts and mobile payment subscriptions in Rwanda



Source: National Bank of Rwanda - Financial Sector Development & Inclusion Department (2022) *Bank Outreach & Usage of Financial Products*, https://www.bnr.rw.

2. The project outline

In 2017, a specific intervention was launched to accelerate off-grid access to electricity in rural areas focusing on the financial constraints relenting the development of the off-grid system market where local financing only makes up a small percentage of the overall funding for the companies.

The Rwanda Renewable Energy Fund (REF) project has been implemented by the Government of Rwanda through the Development Bank of Rwanda (BRD), with management support from the World Bank and financing from the Climate Investment Funds' (CIF) Scaling Up Renewable Energy

[76] GOGLA, Lighting Global, World Bank Group, Efficiency for Access, & Berenschot. (2019). *Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data, GOGLA*, Utrecht.
[77] Access to Finance Rwanda (2020), *FinScope 2020 report*, AFR, Kacyiru, October.

Program (SREP). The REF constitutes a pilot project that addressed the theme of the development of off-grid system in Africa responding to the market needs as they unfold through learning by doing approach. The REF experience has been taken into consideration by about 20 Countries in Sub-Saharan Africa that have developed off-grid market promotion schemes through the improvement of the access to finance credit lines.

The initiative design considered how the remarkable rise of electricity access in Rwanda, which according to the Project Appraisal Document grew from 6% to 24% of population between 2009 and 2016, had been strongly concentrated among grid-connected urban households in the top income quintile with the bottom 40% of the population remaining almost entirely excluded. The spread of off-grid systems, regarded as the most efficient solution in government strategies to speed up the process in peripheral areas, appeared drastically hampered by affordability problems for the poorest segments of the population who represented the core target[78].

Although the evolution of the solar systems market had produced a significant drop in prices, for lower-income households, coping with the upfront costs remained well beyond the availability of resources. On the other hand, the signals coming from the national reality, where the lowering of costs and the emergence of the PAYGO model had stimulated the development of a specific sector with about twenty active companies, pushed forwards the project strategy centred on supporting the private sector through the implementation of specific financial instruments and addressing key barriers and commercial constraints. The nascent sector was facing technical standards issues linked to the needs of a clear specification of equipment quality consistent with the 2016 adopted Lighting Global Standards and of a related effective enforcement mechanism, shortage of qualified technicians and uncertainty on the socioeconomic and geographic targets of governmental policies. On the side of mini grids development, the lack of experienced companies and of reference experiences to corroborate the regulatory framework for setting tariffs or the terms of the interconnection to the main grids was an additional constraint.

The core of the intervention is the provision of local-currency lines of credit, direct loan financing and partial grants for Rwanda off-grid market by the REF financed with a grant contribution of USD 45.94 million made available by the CIF-SREP. A second grant component financed with USD 3.00 million SREP funds cover technical assistance, capacity building to BRD, Savings and Credit Co-Operative Societies (SACCOs)[79], banks, and Off-grid Solar Companies (OSC), and project implementation support to BRD as host of the REF.

Based on the Financing Agreement between World Bank and the Ministry of Finance and Economic Planning (MINECOFIN) and the Subsidiary Agreement between MINECOFIN and the Development Bank of Rwanda (BRD), the SREP funds denominated in USD are provided by to MINECOFIN that takes the currency risk and on-lend local currency to the BRD.

[78] The World Bank - Rwanda Renewable Energy Fund (2017), *Project Information Document/Integrated Safeguards Data Sheet (PID/ISDS) P160699. Concept Stage*, Date Prepared/Updated: 13-Feb-2017, Report No: PIDISDSC18937.

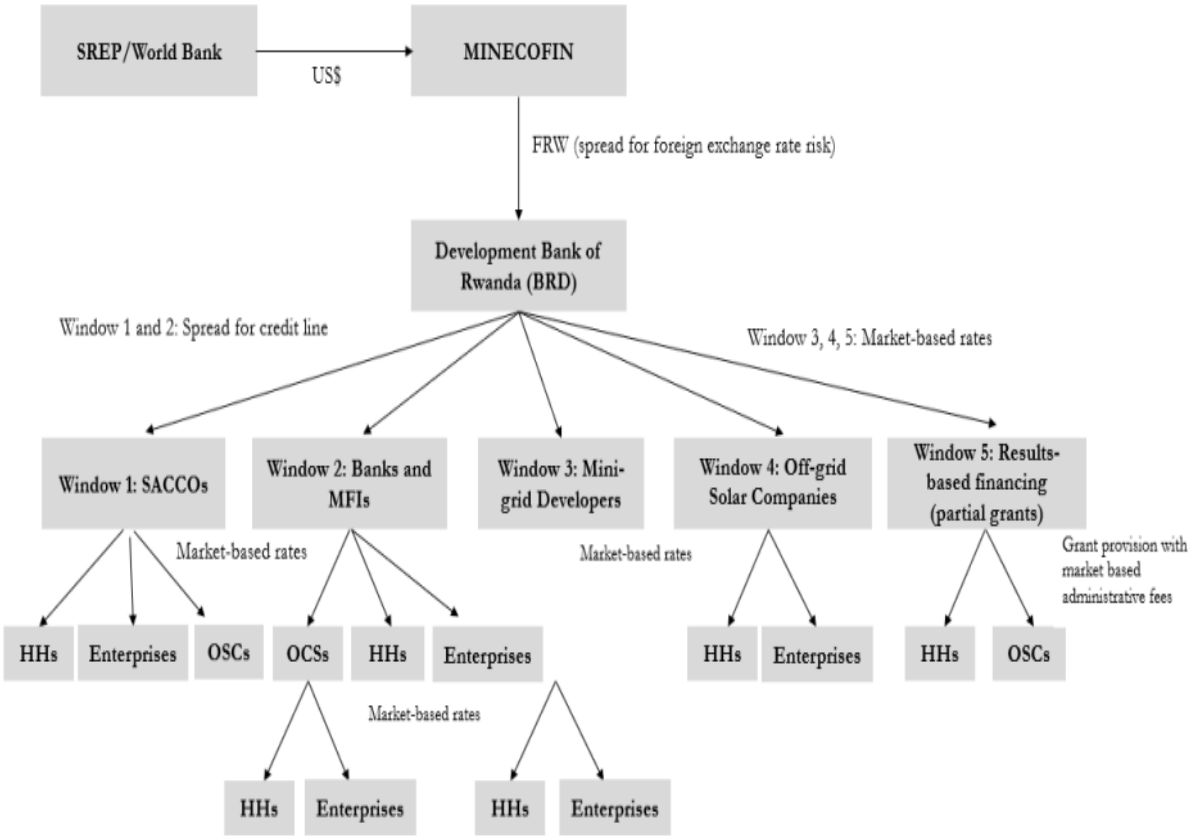
[79] SACCOs are financial service providers owned by members - united by social bond such as employment, income source or economic activity - to which services are commonly targeted and on whose savings funding normally depends. Rwanda's SACCOs system mainly consist of Umurenge SACCOs, formed with the support of the government in each of the 416 Sectors (third territorial administrative level), in the framework of the National Savings Mobilisation Strategy and in 2008 with the aim to boost up rural savings and provide all the population with loans and enhance their livelihoods. The National Bank of Rwanda reports 423 Licensed Deposit-Taking Microfinance Institutions - Umurenge SACCOs and 23 Non Umurenge SACCOs as of 31-July-2022.

The REF started its activities in 2017 by setting up four distinct windows at BRD for the provision of resources through differentiated funding channels on 'first-come-first-serve basis' with the aim of mobilising all key market enablers at the same time.

A Project Implementation Unit (PIU) hosted by BRD is responsible for monitoring indicators, supervising the credit lines, direct loans, and partial grants, as well as implementation of the necessary technical assistance to the beneficiaries.

The planned closing date is September 2023, however a follow-on World Bank IDA-financed initiative, named Rwanda Energy Access and Quality Improvement Project, was launched in March 2021 with activities up to end-2026, including feeding the REF with additional finance to REF to maintain the supply of results-based grants for solar home systems.

Fig. 9 - Project structure



Source: The World Bank/ Development Bank of Rwanda (2021), *Renewable Energy Fund Project. Operations Manual*.

2.1 - Window 1

The first Window makes a wholesale line of credit available to the BRD for on-lending to SACCOs based on their compliance with the established eligibility criteria. These criteria include: compliance

with prudential regulations issued by the National Bank of Rwanda (BNR) and adequacy in terms of capital, organization and governance, liquidity, profitability, credit portfolio structure and portfolio quality, internal controls, accounting and book-keeping and Management Information System with adequate internal controls and appropriate implementation capacity. Furthermore, BRD will continuously monitor each SACCO following financial performance indicators.

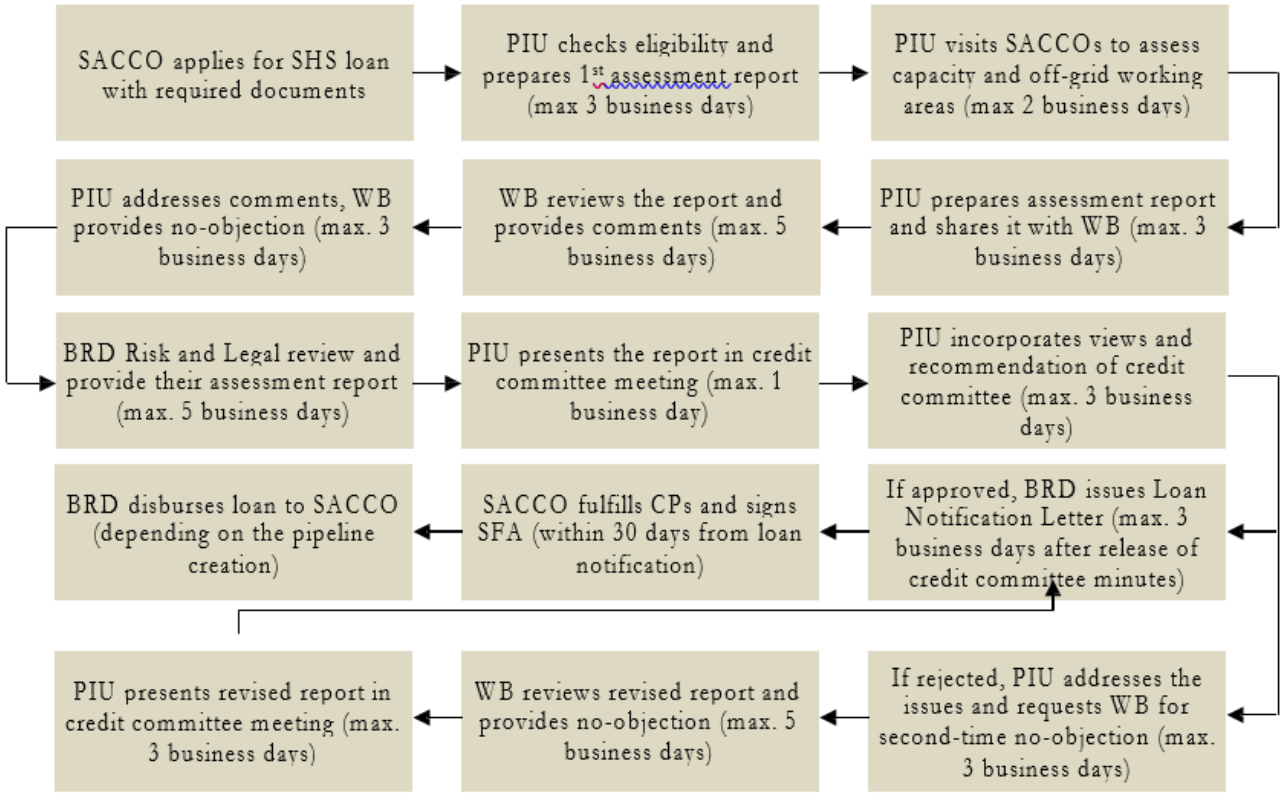
Tab. 1 - Ongoing SACCO's Financial Performance Criteria

Standard in current regulation	Limits	Formula definition
Capital Adequacy Ratio	Min 15%	Total equity/ total assets. Every SACCO is required to maintain an equity corresponding to a minimum of 15% of total assets.
Liquidity Ratio	Min 30%	Cash and cash equivalent/ sight deposits and contingent liabilities. SACCOs must maintain a liquidity ratio of at least 30% at all times. It must constitute a reserve equivalent to one half of this ratio in the form of treasury bills or term deposits with commercial banks.
Fixed Assets/Equity	Max 75%	Net fixed assets/ equity. Every microfinance institution, union or federation must at all times cover the medium and long-term uses of funds with stable resources. Medium and long-term uses of funds are loans with remaining tenors longer than one year and net capital assets. Stable resources are deposits, borrowings and other liabilities with remaining terms longer than one year and equity. A SACCO is not authorized to utilize more than 75% of its equity.
Insider Loans/Equity	Max 20%	Loans to staff and directors and related parties/equity. The total amount of commitments by a SACCO for all its directors and employees may not exceed 20% of its equity as established in the most recent financial statements.
Total Net Loans/Total Assets	Max 80%	Total loans/total resources. The total amount of commitments made by a SACCO cannot exceed the minimum of 80% of the volume of its resources. Resources are deemed to include equity capital, deposits, subsidies and long and medium-term borrowings.
Total Equity Investments/Equity	Max 40%	Equity investment/total equity. A SACCO is requested to: • hold equity in enterprises up to, for each participation, either 15% of the amount of its equity or 20% of the capital of the enterprise, whatever limit is lower; • For all its participations, 40% of its own equity.
Single Borrowing/Total Deposits	Max 5%	Loans to single borrower/total deposits. A SACCO may not grant loans, including overdrafts or credit facilities to the same natural person or legal entity or group for an amount exceeding 5% of its total deposits or the maximum allowed as per BNR requirements, whichever is lower.
Single Borrowing/total equity	Max 10%	Loans to single borrower/equity. A SACCO may not grant loans, including overdrafts or credit facilities to the same natural person or legal entity or group for an amount exceeding 10% of its total equity or the maximum allowed as per BNR requirements, whichever is lower, as established in its most recent financial statements.
Provisioning practices (days)	Overdue up to 3 months 25%, 6 months 50% and 12 months 100%. For overdrafts SACCOs should make provisions as follows: overdue up to 3 months 75% and 6 months 100%.	

Source: The World Bank/ Development Bank of Rwanda (2021).

BRD and each eligible SACCO sign a Subsidiary Financing Agreement that governs the on-lending arrangement according to the financing process schematized below. BRD lending starts with a sub-loan up to Rwanda Francs (RWF) 20 million extended for up to 36 months, with 3 months of grace period. SACCO can apply for an additional tranche once it has used 90% of the first one including a detailed funds utilization reporting. For each SACCO subsidiary finance is available without limit. Interest rates consider BRD's cost of funds, operating costs and an appropriate credit risk margin.

Fig. 10 - SACCO Lending Process



Source: The World Bank/ Development Bank of Rwanda (2021).

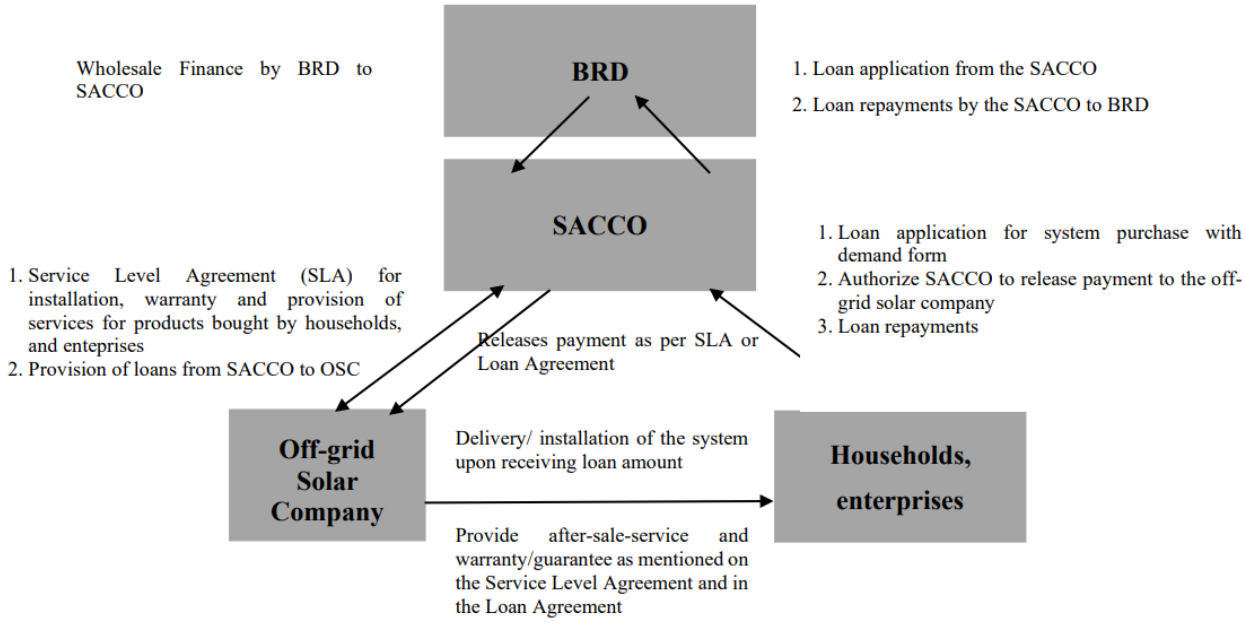
In accordance with their own credit policies, SACCOs further finance OSCs for the purchase and distribution qualifying solar systems of Tier 1[80] and above and households and enterprises as final users. Types of finance include three possible sub-loans in local currency:

- to households of up to RWF 1 million with up to 36 month- maturity under monthly/bi-monthly/weekly repayment system and up to 3 months' grace period;
- to enterprises of up to RWF 5 million with up to 36 months- maturity and up to 3 months' grace period under quarterly or monthly repayment system;
- to OSCs in accordance with BNR prudential regulations on single borrower limits, and in accordance with SACCOs credit policy, with up to 36 months-maturity and up to 3 months' grace period under quarterly or monthly repayment system.

[80] Tier 1 systems are defined by the SE4All MTF initiative launched by the Secretary-General of the United Nations in 2011, as providing access to energy up to four hours per day and at least one hour at night and can be used for basic applications such as task lighting and phone charging.

After collecting the request from the potential households and enterprises, SACCO place a purchase order on behalf of the beneficiary with 25% advance money as first instalment, while the second one can be requested by the OSC once the system has been installed with payment release authorization or no-objection letter from the household/enterprise. Interest rates are set on market terms and are expected to cover cost of funding, operational costs and a credit risk premium that considers the final borrower credit assessment.

Fig. 11 - Partnership Model for SACCOs Operations



Source: The World Bank/ Development Bank of Rwanda (2021).

2.2 Window 2

Window 2 establishes a wholesale line of credit to BRD for on-lending to eligible commercial banks and microfinance institutions (MFIs) that further extend sub-loans to the same final beneficiaries as for Window 1, thus households who are bank clients and OSCs or enterprises which meet the eligibility criteria for the purchase and distribution of solar systems of Tier 1 and above. The eligibility criteria for the participation of Banks and MFI include the compliance with prudential regulations issued by the National Bank of Rwanda (BNR), “fit and proper” owners, adequate Board composition and practices, competent management with managerial autonomy, independent internal audit, MIS system and well-organized IT support and conformity to the established financial performance criteria.

Tab. 2 - Ongoing Bank's Financial Performance Criteria

Standard in Current Regulation	Limits
Capital Adequacy Ratio	>= 15%
Tier Capital	>= 12.5%
Leverage ratio	>= 6%
Liquidity Ratio	>=20%
Liquidity coverage ratio	>=100%
Net stable funding ratio	>=100%
Insider Loans/Net Worth	<=25%
Total Equity Investments/Equity	<=60%
Single Borrowing/Net Worth	<=25%
Loan Classification and Provisioning	Substandard 90 - 179 days – 20%; Doubtful 180 - 364 days - 50%; Loss >= 365 days - 100%

Source: The World Bank/ Development Bank of Rwanda (2021).

Bank and Microfinance Institution lending process as well as the partnership model with BRD, Off-grid Solar Companies and final users are basically following the same pattern described for the Window 1 case (Figure pattern described above).

The established limits of a drawdown tranche are RWF 5 billion for commercial banks and RWF 500 million for microfinance banks, extended for 72 months and a 3 months of grace period. The application for additional tranches follows the same rules of Window 1.

Interest rates applied by BRD consider the minimum BRD's cost of funds, operating costs and an appropriate credit risk margin up to a maximum set at 5% p.a. and subject to adjustment based on market conditions. The Five-Year Treasury Bond serve as a benchmark, taking into consideration the tenor of 6 years extended to banks and MFI. Compared to the set benchmark, a maximum spread of 7% to on-lend to final beneficiaries has been considered adequate to allow the banks and MFIs a marginal return.

Sub-loans up to RWF 1 million with up to 36 months maturity and up to 3 months grace period can be granted to households who are bank clients, while eligible off-grid solar companies or enterprises can obtain sub-loans of up to RWF 5 billion equivalent with maturity of up to 60 months and up to 6 months grace period.

2.3 Window 3

The third Window is specifically designed to directly finance mini-grid developers. The construction of renewable-energy based mini-grid systems can be financed by BRD using its own credit risk appraisal and due diligence up to 70% of total investment amount. Where parallel funding from other programs is available, Mini Grid Developers can apply for a co-financing by REF that may also provide 'bridge loan' financing until grant funding from the other donor becomes available, as well as long-term financing beyond commissioning.

The appraisal of licensed mini grid developer's eligibility considers ownership structure, "fit and proper" owners and managers, prior operating experience, adequate financial commitment, while

projects qualifying criteria concerns the type of mini-grid and the respect of technical, regulatory, environmental and social requirements.

The loans are directly provided by BRD according to its own credit risk appraisal and due diligence, and the conditions schematized below.

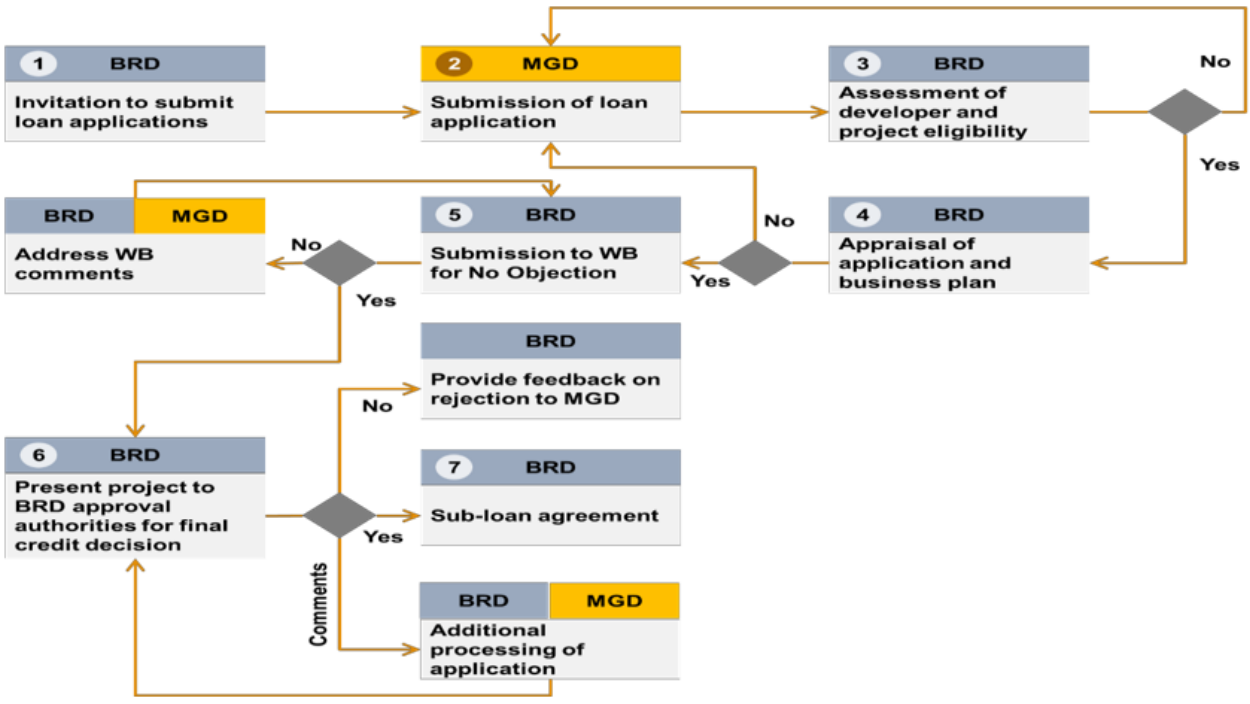
Tab. 3 - Terms of Direct Lending to MGDs

Amount	Maximum initial loan size is equivalent to RWF 500 million or larger depending on business case; loan size cannot exceed 70% of investment without BRD consent
Maturity	Up to 15 years, dependent on business case
Grace Period	Up to 24 months dependent on business case and construction period
Repayment	Monthly, Quarterly or semi-annually dependent on business case
Interest Rate	Commensurate with cost of capital and administrative expenses (not higher than 3.5%), and project risk
Conditions	BRD loans to be repaid prior to any disbursement of dividends, or sale of shares with no prepayment penalty. If required, the MGDs are also subject to adhere with BRD's general credit policy.

Source: The World Bank/ Development Bank of Rwanda (2021).

The financing process follows seven main steps.

Fig. 12 – Mini-grid developers' financing process

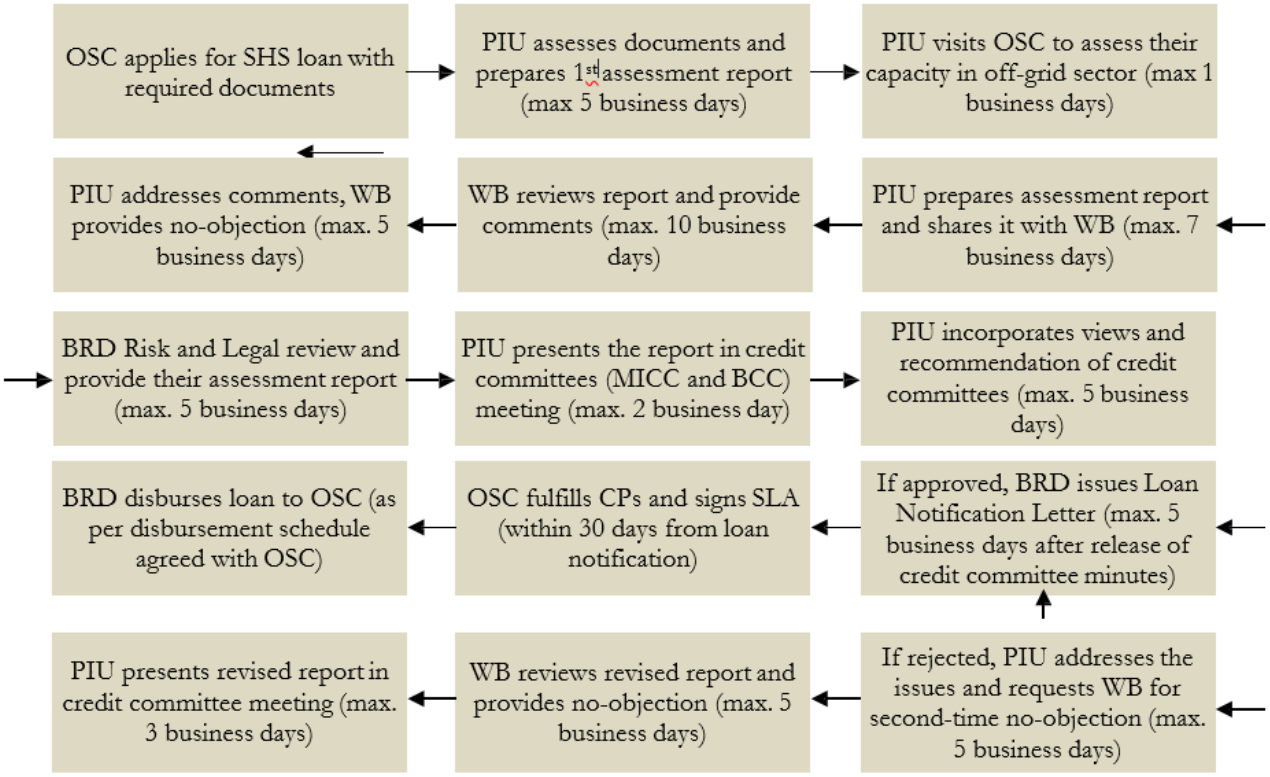


Source: The World Bank/ Development Bank of Rwanda (2021).

2.4 Window 4

The forth Window provides direct loan financing to locally-registered OSCs supporting Tier 1 or higher solar systems or serving poor households under the government's programs. The funding is used for allowing households to acquire solar home systems through cash and carry transactions or delayed payments business models. Companies need to leverage REF financing no less than 7:3 and achieve an average leverage ratio of 2:1 or higher for every transaction. The REF eligibility criteria consider ownership structure, profitable and creditworthy, adequate funding, quality of operations, collateral and warranty, quality of products, warranty and after-sales service, collections and portfolio management, accounting systems and management information, recycling schemes. The draw-down tranche will be up to RWF 5 billion equivalent, extended to an off-grid solar company for up to 42 months, with up to 6 months of grace period. Loans are provided at market-based interest rates following the procedure synthetized in figure 16.

Fig. 13 - Off-grid Solar Company Lending Procedure



Source: The World Bank/ Development Bank of Rwanda (2021).

2.5 Window 5

An additional fifth Window was opened when in 2020 BRD and the World Bank formally restructured the project introducing a subsidy scheme to improve the affordability of solar home

systems for the less affluent households. Window 5 offered results-based partial grants ("RBF Grants") to OSCs passing the funds on to customers to facilitate the sale of Tier 1 and above solar-home systems and after sale services to qualifying households.

The REF Window 5 follows and scales up the Pro Poor Result Based Financing (RBF) launched in 2019 and funded by DFID and USAID Power Africa while Endev, represented by GIZ, provided Technical Assistance (TA) on RBF structuring to EDCL and Urwego Bank. The pilot program with a 2,3 million euros budget ended in March 2021. The funding scheme was structured as the above-mentioned Window 5 to reduce the end-user price of SHS through a subsidy granted to households via OSCs on the basis of Ubudehe category.

The end-user eligibility criteria refer to the Rwanda's Ubudehe system that classify households in categories according to their welfare level and is applied in social protection programs[81]. Subsidies to purchase solar systems are granted to the households belonging to first three Ubudehe categories that benefit of a percentage coverage of final price that depends on the Ubudehe level as follows:

- Ubudehe 1 – Up to RWF 100,000 or 90% of the SHS price
- Ubudehe 2 – Up to RWF 80,000 or 70% of the SHS price
- Ubudehe 3 – Up to RWF 50,000 or 45% of the SHS price

Companies check for eligibility and subsidy level of a potential customer by a specific software that considers the location of the area concerned and connects to Rwanda's national ID database that provides the Ubudehe household categories and to the database of previously connected off-grid households. EDCL off-grid department verifies all claims, ensuring 5% of verifications on the field and another 5% over the phone, while the rest are subjected to desk check. The checks consider among other things whether the eligibility criteria and the corresponding subsidy levels are met and whether the installation has been completed. A progressive system provides for a warning to companies after 10 failed checks and the possibility of being disqualified after two warnings.

The RBF model is also aimed at committing solar companies to ensure after-sales service through a three years long reimbursement schedule. In the case of PAYGO contracts, companies receive 45% of the amount after sale and installation are verified, 45% after a year upon the verification of payment made by the customers, and the final balance after three years upon verification that the system is operational. In the case of cash sales, 80% is reimbursed upon the verification of the sale and installation, whereas the final 20% is transferred after three years. With regard to this specific aspect, concerns have been raised about the possibility that companies can only accept customers willing to sign cash contracts and then settle for the guaranteed 80% after installation, saving on the provision of after-sales services[82].

[81] Ubudehe categories are revised every three years, and cover more than 2.7 million households. The classification criteria updated in 2020 considers 5 Categories of households as follows: Category A: income of more than RWF 600, 000 per month, over 10 hectares of land in the rural area, more than one-hectare plot in urban centres; Category B: income between RWF 65,000 and RWF 600,000 monthly, between one and 10 hectares for rural areas, between 300 square metres and one hectare in cities; Category C: income of between RWF 45,000 and RWF 65,000 per month, from 0.5 hectare to one hectare in rural areas, 100 square metres to 300 square metres in urban areas; Category D: income below RWF 45,000 a month (casual workers), less than half a hectare in the rural areas, less than 100 square metres in urban areas; Category E: people out of the labour force as a result of age, major disabilities or incurable diseases, yet they do not own other assets or other sources of livelihoods, including those where the head of household and their spouse is at least 65 years old and have no source of income.

[82] Heltberg R. (2022), *Rwanda Renewable Energy Fund Project. Engaging the private sector in off-grid solar electrification*, Climate Delivery Initiative Series, Case Study, CIF Program: SREP, June.

In 2018, REF have been further supported by the Swedish International Development Cooperation Agency (SIDA) signing with BRD an agreement spanning a period of eight years and setting up an eight-year USD 20 million portfolio guarantee facility for energy loans, including those under REF. The facility guarantees 50% of potential losses that scale up to 70% in case of female borrowers. A quarter of the total guarantee amount (USD 5 million) is available for direct lending from BRD to qualified borrowers, while USD 15 million is the guarantee amount available for in-direct lending through the on-lending institutions in order to consent to the private energy companies to apply for the second category of guarantee through commercial banks, micro-finance institutions and SACCOs. For each borrower, a USD 1 million maximum loan amount was set under both guarantees. SIDA's will share up to 50 per cent of the risk of BRD's or the on-lending institutions' net losses, but in case of female borrowers the share goes up to 70%[83].

Other international cooperation programs supporting the development of electricity access in Rwanda through off-grid systems include the three years African Development Bank Scaling Up Electricity Access Program (SEAP II)[84] aimed at increasing off-grid and grid energy access through an RBF scheme and the KawiSafi Ventures Technical Assistance Facility (KSV TAF)[85] launched in April 2020 and financed with US$5 million from the Green Climate Fund (GCF). The five-year program aims to address off-grid market failures and externalities supporting communities, consumer protection, gender inclusion and knowledge creation.

In December 2021 BRD launched a social media campaign called 'Cana Challenge' to provide solar home systems to some 10,000 families in the first Ubudehe category through donations by private entities and individuals. BRD integrates with RWF 100,000 every RWF 15,000 pledged by donors. Thanks to the contribution of partners including the diaspora organisation Rwanda Community Abroad (RCA) and MTN Rwandacell Plc, the largest telecommunications company in Rwanda, in June 2022 the initiative had exceeded 24,000 beneficiary households.

2.6 Rio Markers

The REF projects objectives and expected results don't explicity mention environmental benefits and climate concerning effects.[86] Nonetheless, the project documents consider the provision of positive environmental and social impacts since solar systems would replace lighting systems that are based on fossil fuel such as diesel generators, on kerosene lamps or on biomass. GHGs and other air pollutants emission will be consequently reduced. Also risks to landscapes and ecology during

[83] Bizimungu J. (2018), "BRD secures $20m to fund renewable energy projects", *The New Times Rwanda*.
[84] https://projectsportal.afdb.org/dataportal/VProject/show/P-RW-FA0-015
[85] https://www.kawisafi.com/taf
[86] The REF's Project Development Objective is "to increase electricity access in Rwanda through off-grid technologies and facilitate private-sector participation in renewable off-grid electrification" while the expected key results and associated indicators are: People provided with access to electricity by household connections using standalone solar PV systems (of which percentage of women) (number); People provided with access to electricity by household connections using mini-grid systems (of which percentage of women) (number); Formal and informal enterprises provided with access to electricity (of which percentage of female-led enterprises) (number); Annual electricity output from renewable energy (MWh/yr); The World Bank - Rwanda Renewable Energy Fund (2017), Project Information Document/Integrated Safeguards Data Sheet (PID/ISDS) P160699. Concept Stage, Date Prepared/Updated: 13-Feb-2017, Report No: PIDISDSC18937.

operation have been excluded. The only project environmental concerns have been associated with recycle and disposal of spent batteries at the end of their useful lives. To address the challenges associated with recycling and disposal issues, the prepration of appropriate safeguard instruments has been triggered according to the World Bank's Environmental Assessment operational policy and the Rwanda Environmental Management Authority (REMA) has been involved to develop a project-specific environmental code of practice (ECOP) to approach the collection, transport, storage and disposal of spent batteries.

In terms Rio markers scoring, none of the Rio themes can be considered explicitly targeted among the principal objective of an action nor can they be considered as fundamental in the design or motivation for the activity, while climate change mitigation can be considered as explicitly stated in the project design in association with the provision of emission and biomass consume reduction outcomes.

Tab. 4 - Rio Markes in the case of the Rwanda Renewable Energy Fund's (REF) project

Marker	Score		
	0	1	2
Biodiversity	✓		
Climate Change Adaptation	✓		
Climate Change Mitigation		✓	
Desertification	✓		

Source: Created by author.

3. The implementation results

In the first three years since its launch in June 2017, the project has shown substantial start-up difficulties. In March 2020, only 2,853 people had gained electricity access through the REF activities, that was only 1% of the target for the second year and 0,2% of the final goal. The funds disbursed to BRD were 12% of the total (USD 5.65 million). Some of the shortcomings has been directly tackled during the first years also in accordance with solutions built into the project design to address the challenges of pilot actions. A formal revision of the project was initiated by BRD, PIU and WB in 2019 leading to relevant changes showing effective from the end of 2021.

According to the last World Bank data, project implementation has gained significant momentum over the following year. The Implementation Status & Results Report publicised by the World Bank on 14 November 2022 considers as moderately satisfactory both the progress towards achievement of the project objectives and the overall implementation progress, while the overall risk rating is still assessed as substantial.

With regard to some objectives relating to operational aspects, the indicators are encouraging, while the achievement of the main final outcomes is still partial. In November 2021, the end target of 30 districts covered by participating market enablers was already met and 56 SACCOs were participating in exceeding the target set at 30. Also, the goal concerning the banks participating as on-lenders in the Window 2 framework had almost been achieved with 8 out of 10 expected banks already involved in November 2021.

In September 2022, the number of people who gained access to new or improved electricity service exceeded 880,000, equal to almost half of the target set by the project, and the same percentage is also confirmed for the female share. The number of companies benefiting from new opportunities to access energy was however still much lower than the target set at 27,500, and the percentage of achievement is still of only 8%.

Even in terms of mobilization of the private sector, the achievement of the project goals at the time of the last indicators survey was still a long way off. In September 2022, investments from the private sector increased by about USD 12.5 million, equal to about 30% of the end target set at USD 41 million. Resources leveraged by the facility from private and other sources, while showing a clear growth trend over the reporting period, are still much lower than the end target of USD 79 million, reaching just under USD 19 million, equal to 24% of the target, in September 2022.

Fig. 14 - People provided with new or improved electricity service and % of end target

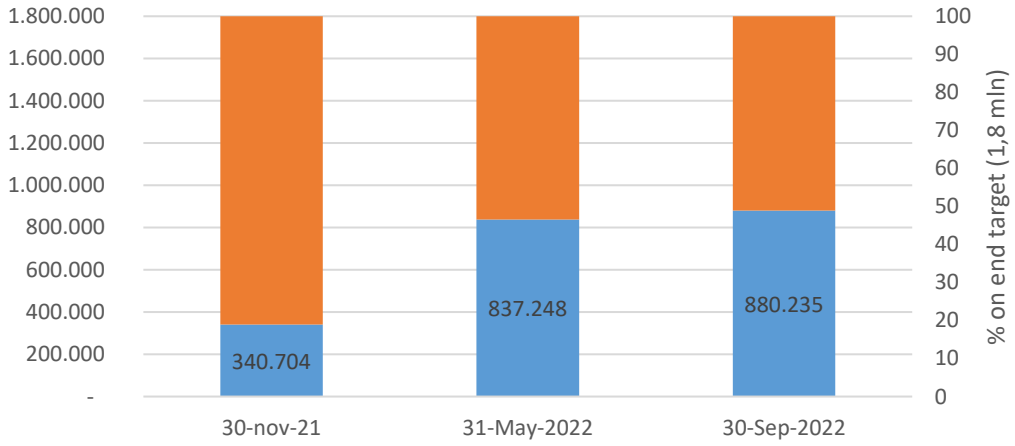


Fig. 15 - Women provided with new or improved electricity service and % of end target

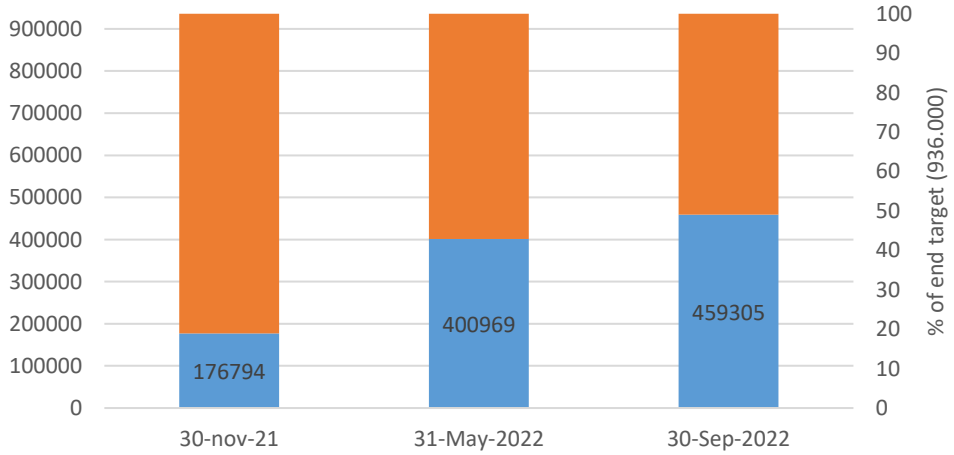


Fig. 16 - Enterprises provided with access to electricity and % of end target

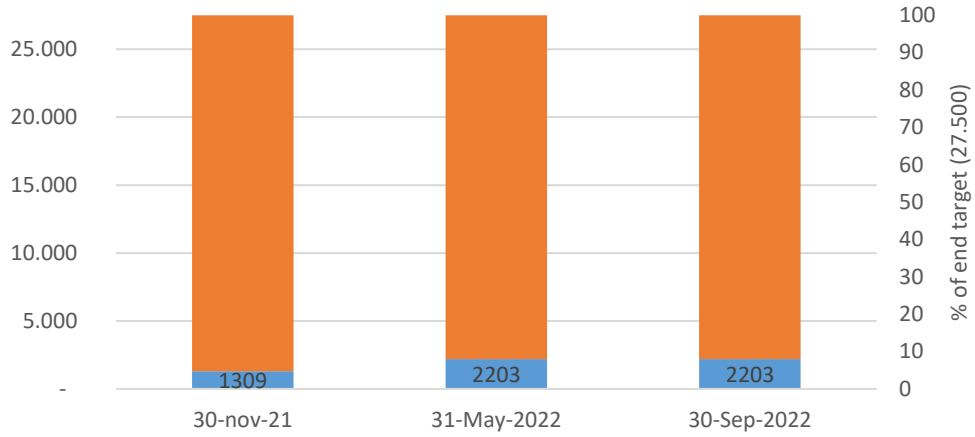


Fig. 17 - Increased private sector investment in renewable energy electrification (USD) and % of end target

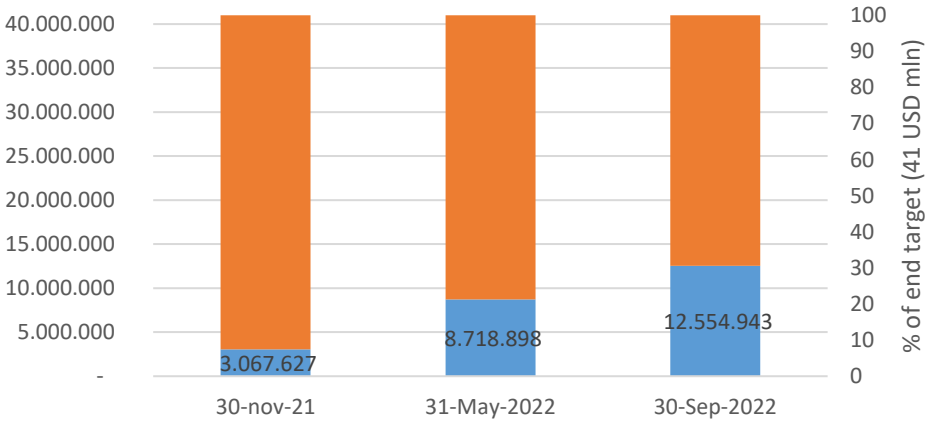
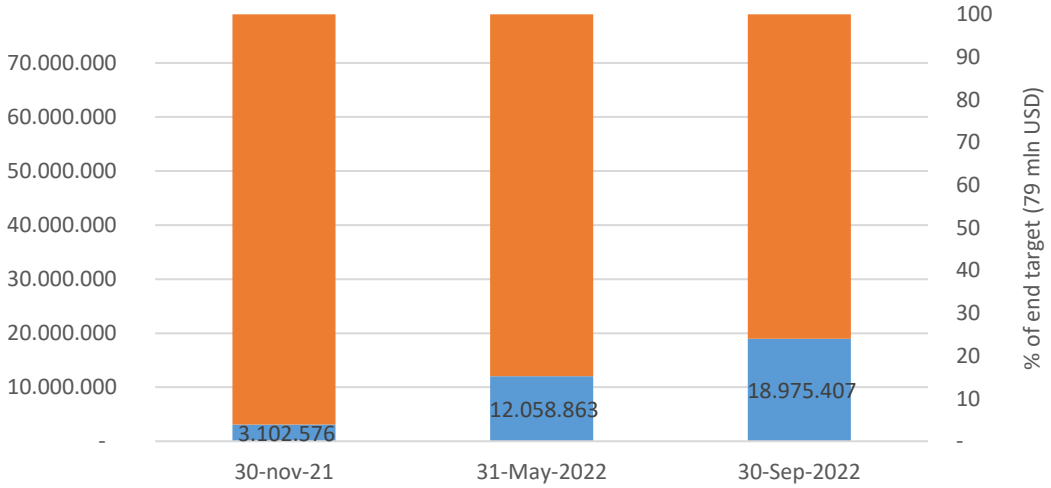


Fig. 18 - Total financing leveraged by the facility from private and other sources (USD) and % of end target



The different speed in the relaunch of the project also emerges if the data on the use of resources through the various channels that refer to the 5 windows are considered.

The funds disbursed through Window 1 dedicated to SACCOs are still far from the set target. Although the SACCOs drawdown over 45% of the total endowment of 4 million dollars from the facility, the amount disbursed to final beneficiaries in September 2022 remained below 10% of the total withdrawable amount.

The banking channel has been more effective in terms of use of funds. At the same date, the banks had disbursed well over three times the funds disbursed by SACCOs, reaching almost a third of the final target, not too much below the quota withdrawn of the entire endowment (37,3%).

The implementation of the funding for the development of mini-grids, to which window 3 is dedicated, remained substantially unchanged. The data published in the November 2022 report show that, despite an end target set at USD 5 million, resources had not yet been on lent to mini-grid developers and consequently no household had been provided with access to electricity by mini-grid connections.

With regard to the disbursement of grants to households through the result-based scheme linked to window 5, the reported achievements result more encouraging, with 54% of the endowment already disbursed had been used with a promising continuity in the growth of allocations.

Fig. 19 - Total funding drawdown by SACCOs from the facility and on-lent to households and enterprises (USD) and % of end target

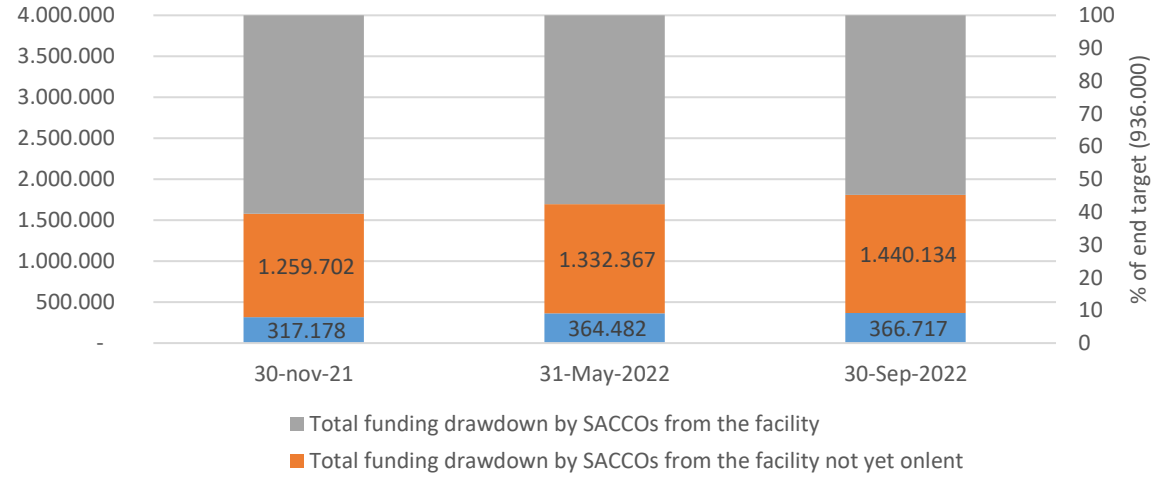


Fig. 20 - Total funding drawdown by banks from the facility and on-lent to households and enterprises (USD) and % of end target

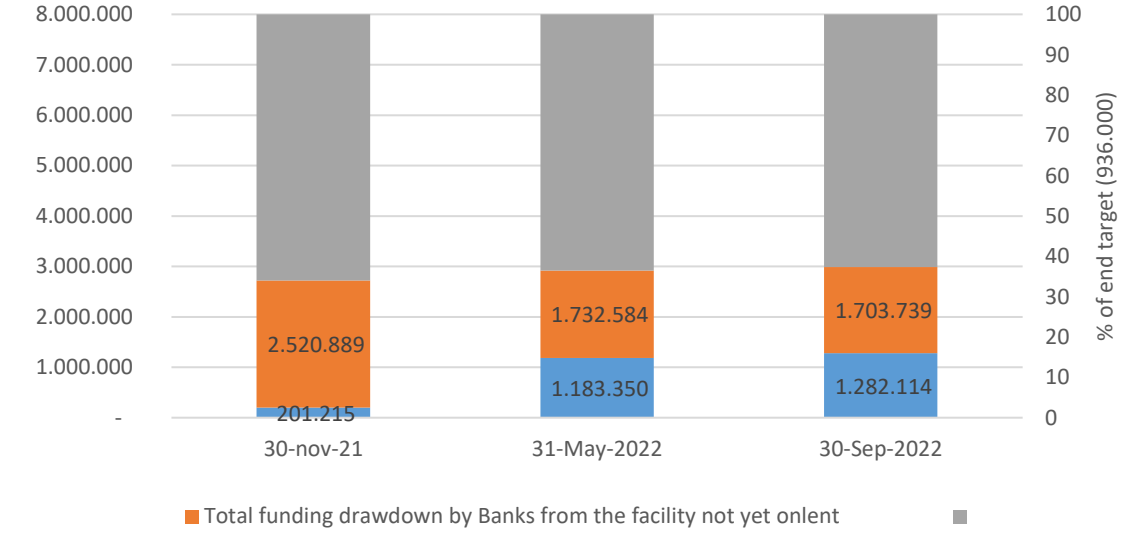
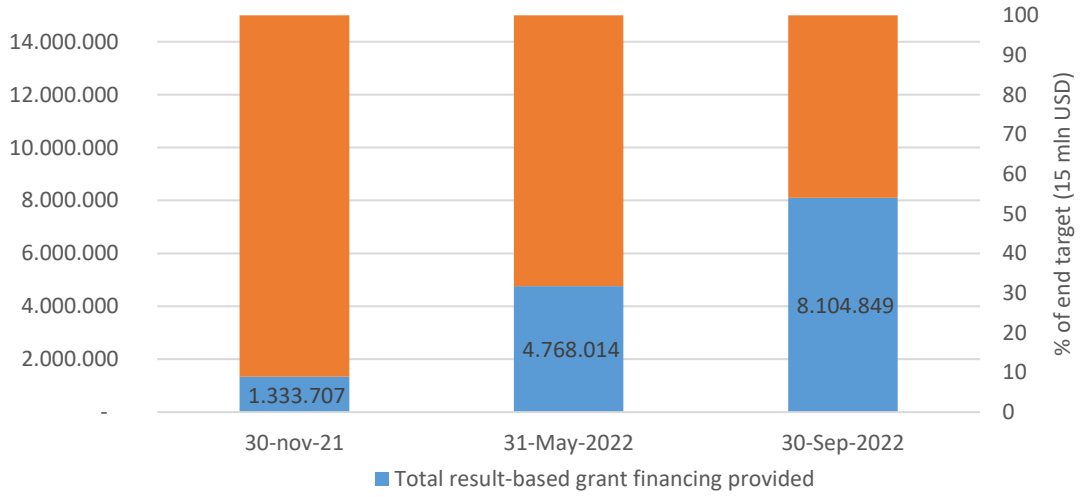


Fig. 21 - Total result-based grant financing provided (USD) and % of end target



4. The indications drawn from the adaptive revisions of the project

Two years after the launch of the project, an analysis of the constraints and bottlenecks hindering the taking off of the process was carried out. The PIU supported by team of World Bank staff and consultants has further addressed the challenges highlighted in a proactive way initiating some interesting processes of realignment to objectives[87].

[87] The World Bank Renewable Energy Fund (2020), *Restructuring Paper on a Proposed Restructuring of the Rwanda Renewable Energy Fund Project (P160699) Approved on June 20, 2017 to the Government of Rwanda*, Report No: RES38459.

The results and the countermeasures adopted[88] build up a set of indications of great interest for the development of initiatives with similar scope, thus bringing together objectives such as boosting green economy and abridging social and territorial inequalities, focusing on access to credit, local financial system engagement and the private sector role. The lessons learned are of particular value in this case as they are supported by the two-step process that combines ongoing assessment, corrections and assessment of the results of the corrections.

A first drawback highlighted by the REF performance scrutiny regards the misalignment of available skill and human resource involved in the implementation process. Main critical points highlighted by the assessment are the scarce familiarity of the BRD officials with the WB procedures that, together with a lack of experience of the PIU in managing off-grid energy projects, slowed down the boot processes.

Two main actions were put in place and contributed to overcoming the specific obstacles. On one side, specific training in WB procedures had been convened and experienced human capital was hired to address some of the technicalities involved. On the other side, an ongoing and structured dialogue has been put in place between PIU and the WB, with the provision of weekly calls for monitoring, coordination and problem-solving.

A second obstacle to the development of the project was soon identified in the mechanisms for the delivery of the resources initially provided. In the initial phase the project had set the opening of only windows 1,2 and 3, centred on the role of financial intermediaries in order to encourage the development of the sustainability of the domestic finance system oriented to support the activities of the off-grid solar sector. The direct supply of funds to businesses through window 4 remained inactive, pending the evaluation of the performance of the first three windows, which took place one year after the launch. The strategy encountered two main pitfalls both related to the relative newness of the off-grid sector. In the case of the SACCOs this has accentuated the problem of insufficient endowment of human capital with specific capacity to manage untraditional customers. With regard to commercial banks, the main problem was traced back to the perception of a greater risk for the nascent sector compared to established customers, with solid collateral (property and land) and long credit history.

The adjustment of the level of capacity of SACCOs was focused by a specific training program launched in the second half of 2019 at regional and local level as part of the activities already envisaged by the project aimed at ensuring that the SACCOs achieved adequate awareness of the REF financial instruments and were able to manage a lending pipeline in the REF framework.

The passive attitude of the banking sector, inclined to stand by and observe any positive dynamics in the new sector before entering it, was overcome by the opening of Window 4 in March 2019. The new BRD funding channel, directly accessible by the suppliers of off-grid systems, contributed to overcoming the standstill, on the one hand providing liquidity to the sector and on the other piloting useful practices for the banking sector, such as the possibility of using the receivables as part of the collateral. The introduction of the aforementioned guarantee system financed by the SIDA with USD 20 million for the de-risking of off-grid market lending was a further important contribution to the participation of all REF domestic financial intermediaries. The simplification of the eligibility requirements and the revision of the applications and negotiating loan terms, introduced by the PIU also thanks to the dialogue started both with the solar companies themselves and with the WB improved the access of companies to funds.

[88] Heltberg R. (2022).

The affordability constraints of Tier 1 off-grid solar systems in relation to the targeted population represents a further main hindrance observed during the start-up phase. The problem emerged in 2019 after the persistence of low sales data was observed despite the opening of window 4 which had made the financing of companies fully operational to propose PAYGO contracts.

According to the expectations underlying the REF, the expansion of innovative business models should have scaled up the off-grid market. However, the policy dialogue involving PIU, WB and the same solar companies adhering to the project highlighted a substantial standstill. While the market for high income households appeared substantially saturated, in 2018 only 8% of the sales of off-grid solutions concerned the first Ubudehe population segment. Many of the areas demarcated to be electrified thanks to the expansion of off-grid systems were inhabited by a population mainly occupied in subsistence farming with consequent prospects to face the affordability issue even in the long run.

In 2019, with the aim of responding to the constraint, the Government of Rwanda introduced a framework to provide partial grants for the purchase of solar off-grid solutions directly to lower income consumers through a Results Based Financing (RBF) scheme prepared by the Ministry of Infrastructure, EDCL and development partners. In November 2019, Energising Development (EnDev)[89] in collaboration with EDCL launched the Pro-poor pilot, co-financed by Power Africa[90] and iterating the 2014 Department for International Development (DFID)[91]-funded RBF, managed by the local micro-finance institution, Urwego Bank, providing financial incentives to private solar companies upon verified delivering results.

In 2020, in order to tackle the affordability gap, REF adopted the mentioned restructuring plan establishing the fifth Window (Window 5). The new facility provides an RBF subsidising low-income households with partial grants. As described in the previous part of this chapter, the allocation of subsidies follows a progressive scheme, guaranteeing the less well-off Ubudehe segments a coverage of higher cost quotas. The new Window became effective in October 2021 recording good uptake as evidenced by the project reports and by information collected among the operators[92].

Among the difficulties encountered in the implementation managed by the ongoing project, an important role was played by the uncertainties of the under construction national regulatory and policy framework which in the last years has undergone changes potentially relevant for the activity of companies in the sector and the profitability of their activities and investments.

The aforementioned 2021 amendment to the National Electrification Plan, having noted the different speed of development of access to electricity sources through connection to the main grid compared to what was achieved thanks to off-grid and mini-grid solutions, had revised the share of villages destined to be covered by off-grid systems downwards. The resizing of the areas and of the share of the population potentially interested in installing off-grid systems has been interpreted as a possible

[89] Energising Development (EnDev) is an international flagship programme for providing energy access driven by the partnership of Germany, the Netherlands, Norway and Switzerland and coordinated by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Netherlands Enterprise Agency (RVO), https://endev.info.
[90] Power Africa is a U.S. Government-led partnership, launched by Barack Obama in July 2013, aiming at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa, https://www.usaid.gov/powerafrica.
[91] The Department for International Development (DFID) was a ministerial department of the British Government responsible for administering foreign aid from May 1997 to September 2020 when it merged with the Foreign and Commonwealth Office to create the Foreign, Commonwealth & Development Office (FCDO).
[92] Heltberg R. (2022).

factor in reducing the expectations of companies and potential investors in the sector and, consequently, its development prospects.

In the same year, the Government, engaged in the construction and modernization of the legislation, started the introduction of national quality standards in order to protect end users and block the importation of unreliable systems. In the early stages of the process, however, the government guidelines integrated some specifications that turned out to be more demanding than common international standards with the risk of excluding a large number of products from the market and causing uncertainty among operators and a drop in imports.

Both snags were overcome through the dialogue between stakeholders, which characterized the implementation of the project. By maintaining its pilot character, it gave continuity to the problem-solving consultation between partners to adapt to the evidence emerging along the way and to the changing context.

As regards the review of the potential expansion market of off-grid systems, the dialogue developed above all within the Technical Working Group on Off-grid Electricity in which the Government and the major donors involved in initiatives in the sector participate. This dialogue contributed to deepening the analysis of data and estimation methods, leading to a readjustment of the targets for national policy, confirming a promising market dimension for the expansion of the sector.

In the second juncture, two main elements contributed to the solution of the complication. On the one hand, a data-driven process was launched using data collected by PIU from companies which highlighted a drop in inventories due to the uncertainties regarding the correspondence between technological standards of imported products and new national regulations. On the other hand, an active technical collaboration between the World Bank Group's lighting global team and the Rwanda Standards Board developed and led to the definitive alignment of Rwandan standards with international ones, the restoration of importers' confidence and the re-establishment of stocks.

Finally, as regards the stalemate in the implementation of supplies through Window 3 financing systems based on mini-grids, no countermeasures have been reported. The scarce economic viability of mini-grid can be identified as an impediment factor, suffering electricity tariffs that hardly ensure the profitability of investments and considering the location of potentially interested areas in remote regions where the demand is mainly formed by the less profitable household consumption rather than productive uses. The REF provides a line of credit for mini-grid developers with a view to supporting them in the phase prior to commissioning, after which they are entitled to receive the donor support provided by the EnDev Rwanda Village Grid Results-based Financing (VG RBF), active from 2013 to 2020. The synergy between the two programs, to favour which EnDev and BRD signed a Memorandum of Understanding, did not reached concrete effects mainly due to the misalignment of timelines between the effective launch of Window 3 and VG RBF. No mini-grids developer managed to received REF funding before the closure of VG RBF in 2020 also due to the outbreak of the COVID-19 pandemic[93].

[93] Kesrelioglu Costa S. (2020), *Enhancing energy access in rural Rwanda. Village Grid Results-based Financing Project Closing Report*, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Eschborn.

Tab. 5 - Key points highlighted and main contents of the proposed responses

Implementation drawbacks	Adaptive management measures
Skill and human resource misalignment	Hiring of appropriate skills by BRD
	Weekly calls for closer project monitoring and communication between the Project Implementation Unit (PIU) and the World Bank
Domestic financial sector shortcomings	Technical assistance to the financial institutions
	Direct financing vs. on-lending through the activation of Window 4
	Provision of a donor-funded guarantee facility
Unaffordability to target population	Substantial policy dialogue and engagement considering multiple perspectives and multiple sources of data and knowledge
	Progressivity of the subsidy scheme tied to the welfare level of the household
	Adoption of a results-based financing model for the subsidy scheme with payments to the OSCs upon the verification of system installation and operation
	Introduction of a Subsidy scheme bringing in the new Window 5
Ongoing regulatory changes	Multi-stakeholder dialogue toward win-win solutions providing clarity to the market after the 2020 revision of the original National Electrification Plan
	Data-driven dialogue to align with international benchmarks overcoming the regulatory uncertainty linked to the adoption of new national quality standards for solar home systems

The analysis of the critical points highlighted during the REF start-up and implementation, of the adaptive measures taken and of their outcome provides a basis of great interest for the planning of initiatives with similar objectives, reference contexts and change mechanisms that they envisage to trigger. The key generalizable indications for external reproducibility cab be summarised as follows:

- The efficiency and accuracy of real-time market monitoring with the use of reliable data and extensive and continued consultations with market participants must be combined with the adoption of flexible mechanisms to respond to market developments and special attention should be paid to ensure private sector participation and foster sustainable market development.

- The plurality of financing channels adds penetration capacity to the project: it maximizes the reachability of the beneficiary targets and the mobilization of segments of the socio-economic fabric.
- The continued dialogue among the actors participating in the financing supply chain and governmental institutions to timely address every challenge stemming from policies and regulations changes must be ensured on the basis of sincere recognition by all stakeholders of the relevance of the initiative and the need for an ongoing and result-oriented commitment.
- Complementarities between sectoral project and policy interventions is paramount and must orient the proactive continued dialogue between donors, national and local governments fostering participation of civil society organisation and other local stakeholders in direct connection with the public institutions responsible for defining, updating and managing regulations
- Pilot multi-stakeholder projects characterized by a high level of complexity and with objectives that include the mobilization of private actors, must rely on adaptive management and consider an initial learning curve to pay meticulous and comprehensive attention to the day-to-day implementation details, monitoring the correspondences between the theory of change and dynamics detected on the ground, which must be associated with a project structure capable of promptly implementing requests for revision, even profound, of the project structure.

5. Challenges still at stake

The identification of critical points that help define the challenges for the initiative aiming at promoting sustainable development by injecting financial support to the local private sector is crucial. Several themes remain open and prompt an in-depth reflection. Among these:

- The placement of experiences such as REF in the context of the evolution of the role of development banks in financing ecological transformation and environmental and social sustainability of development processes;
- The specific complex architecture of projects that strive for impacting both the population welfare and the local actors involved in the project implementation;
- The calibration of tools put in place to stimulate the growth of local financial systems and the mobilization of national savings for local investment through appropriate scouting and deal origination tools;
- The accurate sharing and management of risk among the private financial and industrial stakeholders involved in the processes initiated by the project and the related guarantee mechanisms;
- The tailoring of interventions considering critical local specificities such as market development, institutional framework, pattern of key stakeholders and their mutual relationships.

3. The Climate Resilience and Adaptation Finance and Technology Transfer Facility (CRAFT)

Maria-Despoina Argyrou

1. The background

At present, significant amounts of money are being invested by governments, businesses, and consumers in order to mitigate various risks and impacts associated with climate and weather events. Factors such as weather volatility, physical damage, and resource scarcity are increasingly affecting economies and societies. The impacts of climate change are exacerbating these risks and making them more severe.

From 2003 to 2013, natural disasters resulted in a total of $1.5 trillion dollars in global economic damages, with $550 billion occurring in developing nations (FAO, 2019). As climate change worsens, these challenges are expected to increase. Consequently, industries such as agriculture, water, energy, and financial services are exploring strategies to diminish their vulnerability to climate change. There is an opening in the market to provide services and solutions to assist clients in evaluating and managing their climate risks and reducing costs. It is especially important to invest in bringing existing technologies and solutions to new sectors, regions, and users, particularly in developing nations.

To mitigate the impacts of climate change, significant investments in adaptation are required. According to the United Nations Environment Program (UNEP), adaptation costs in developing countries alone could reach up to USD 300 billion per year by 2030. However, currently, less than 7% of public climate finance is allocated to adaptation or resilience.

There are several significant obstacles that prevent private capital from investing in climate adaptation and resilience, including:

- Private capital faces barriers to investing in climate adaptation and resilience due to a perceived lack of investment opportunities in technologies, companies, or infrastructure projects.
- Low awareness about climate resilience and adaptation solutions, which hinders investment.
- Companies may lack the operating and financing capacity to expand their climate adaptation and resilience-related business lines, including into adjacent sectors and geographies.
- A lack of actionable, asset-specific information about climate risks and impacts
- Perceived risks of investing in developing countries, as well as difficulties in transferring technologies and solutions from developed to developing countries create barriers to market entry and deployment.

Furthermore, there is a lack of private sector capital mobilization to address climate adaptation and resilience, with only CRAFT identified as a private equity investment vehicle focusing exclusively on adaptation and resilience. Additionally, no other investment vehicle identifies climate resilience intelligence as an investment opportunity.

To facilitate the transition of various sectors, such as agriculture and land use, there is a need to mobilize increased investment in clean technology solutions in developing countries. The CRAFT

Fund aims to play a significant role in stimulating private funding for clean technology solutions in the developing world, and proving the feasibility of this strategy.

CRAFT operates on the assumption that significant amounts of public and private capital can be mobilized to address the pressing need for climate adaptation. In particular, there is an opportunity to invest both financial and intellectual resources to expand and scale up companies that currently provide technologies, products, and services to evaluate and manage the risks and effects of climate change. These market-driven solutions include tools for climate risk analysis that can assess and predict localized climate risks in a useful way (known as "resilience intelligence") and products and services that can manage and mitigate these risks and impacts while also enhancing climate resilience ("resilience products and services"). The objective is to invest in order to bring these existing technologies and solutions into new sectors, geographies, and users, with a particular focus on developing countries.

The Fund aims to tackle the challenges faced by developing countries in building resilience to climate change, both in the public and private sectors, across all economic sectors. Developed countries also lack services, such as consultancy, IT, and technological developments, to support climate-resilient pathways. However, this lack is more severe in developing countries.

The Fund's main goal is to address this deficit of tools and services by investing specifically in private companies providing solutions to enhance adaptation and resilience to climate change, particularly in developing countries and their vulnerable populations and livelihoods. The Fund is a generalist in terms of sectors and includes investments in or benefiting projects in Asia, Africa, and Latin America.

The Fund's objectives align with the EU Climate Policies, the European Consensus on Development, and the 2030 Agenda for Sustainable Development. Its activities will contribute to the objectives under SDG 13, as well as improve resilience in land and water use, adaptation in urban areas, and support SDG 2, SDG 6, and SDG 11.

Improving climate resilience is a crucial aspect of most developing countries' national plans and is often included in their Nationally Determined Contributions (NDCs) under the Paris Agreement. Thus, this operation supports both the SDGs and the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement. The proposed operation is aligned with the current External Lending Mandate (ELM) Climate Strategy and the African, Caribbean Pacific (ACP) and OCTs Climate Strategy, and EU priorities for the affected regions, as it supports resilience to climate change throughout Latin America and Asia, and Africa. The Fund is expected to have strong positive environmental and social impacts and may also have positive impacts on climate change as some foreseen investments will support both adaptation and mitigation.

2. Design

2.1 Overview

CRAFT is a mechanism designed to provide financial and technical assistance for the transfer of knowledge, skills, and technologies related to climate resilience and adaptation in developing countries. The facility was established by the UNFCCC in 2019 to address the critical need for climate

change adaptation in developing nations. These countries are disproportionately affected by the negative impacts of climate change, even though they have contributed little to its causes. CRAFT is the first ever commercial investment vehicle to focus on expanding the availability of technologies and solutions for climate adaptation and resilience.

The facility aims to help developing nations in obtaining the financial resources and technologies necessary to improve their resilience to the adverse impacts of climate change, such as floods, droughts, and other extreme weather events. The facility offers a variety of support, including project preparation, financing, technical assistance, and capacity building. CRAFT also strives to encourage private sector investment in climate resilience and adaptation while forging collaborations between governments, the private sector, and civil society to accomplish its objectives.

CRAFT's objective is to invest in private companies offering climate resilience solutions to mitigate the impacts and risks exacerbated by climate change. Although the fund's investment strategy is worldwide, it allocates at least two-thirds of its resources to developing countries, where most of the demand and growth potential exists. CRAFT's strategy highlights precise impact assessment and monitoring, excellent management of environmental, social, and governance issues, and gender equality integration in all operations.

The CRAFT concept, developed by The Lightsmith Group[94], is based on the idea that there are many companies globally providing "climate resilience solutions" in the form of technologies, products, and services to manage climate risks and impacts. Lightsmith has identified 20 market segments (see Table below) with companies that offer climate resilience solutions, such as risk and weather analytics, catastrophe risk modeling, agricultural analytics, and distributed water solutions. These segments are already experiencing rapid growth with annual rates of 20-30%, and it is expected that global spending in these areas was expected to increase to over USD 275 billion per year by 2022.

Tab. 1 - Market Segments and Market Sizes for 2017 (in USD billions)

Resilience Services	USD
Coastal and shore protection	5
Climate risk, adaptation & resilience consulting	2
Disaster recovery & business continuity	2
Natural assets for resilience services	1

Risk & Weather Analytics	USD
Business risk analysis	8
Geospatial imagery analytics	3
Weather forecasting systems, services	3

Agriculture	USD
Greenhouses & vertical farming	12
Precision agriculture systems and analytics	5
Soil treatments and amendments	5
Seed treatment	6

Water	USD
Smart water management	9
Desalination equipment	9
Efficient irrigation systems	3
Water harvesting	1

Energy	USD
Microgrids, distributed generation & storage	17
Demand response	11
Smart grid systems and software	10

Transportation	USD
Logistics software and IoT	10
Cold chain equipment (Emerging Markets)	8
Supply chain analytics software and services	3

Source: The Lightsmith Group, 2017

[94] https://lightsmithgp.com/

As a growth equity fund, CRAFT intends to provide investment to 10-20 companies of the above-mentioned market segments situated in developed and developing countries. These companies must possess established technologies and solutions for climate resilience, along with demonstrated market demand and revenue. The fund, along with an accompanying Technical Assistance Facility, supports companies, such as weather analytics, catastrophe risk modeling services, and drought-resistant seed companies, among others, to expand into new geographic markets and sectors.

The facility aims to focus on companies located in countries that are already facing significant economic losses as a result of climate change. By deliberately including technology transfer from developed to developing countries in the fund, CRAFT seeks to enhance the capabilities of developing nations. As the demand for CRAFT's services grows, the companies that receive investment can also begin to expand into less affluent nations.

The expected positive impacts and results that the CRAFT Fund is anticipated to achieve through its investment strategy focused on climate adaptation and resilience solutions are:

- A diversified investment portfolio in climate resilience solutions and demonstration effect of profitable private investments in climate resilience.
- Outcomes are tracked in the context of Adaptation and Climate Resilience, Climate Mitigation Co-benefits, Gender Equality, Biodiversity and Economic Development.
- CRAFT is expected to contribute to the following SDGs: Zero Hunger (SDG 2), Clean Water and Sanitation (SDG 6), Industry, Innovation and Infrastructure (SDG 9), Sustainable Cities and Communities (SDG 11) and Climate Action (SDG 13).

2.2 Theory of Change

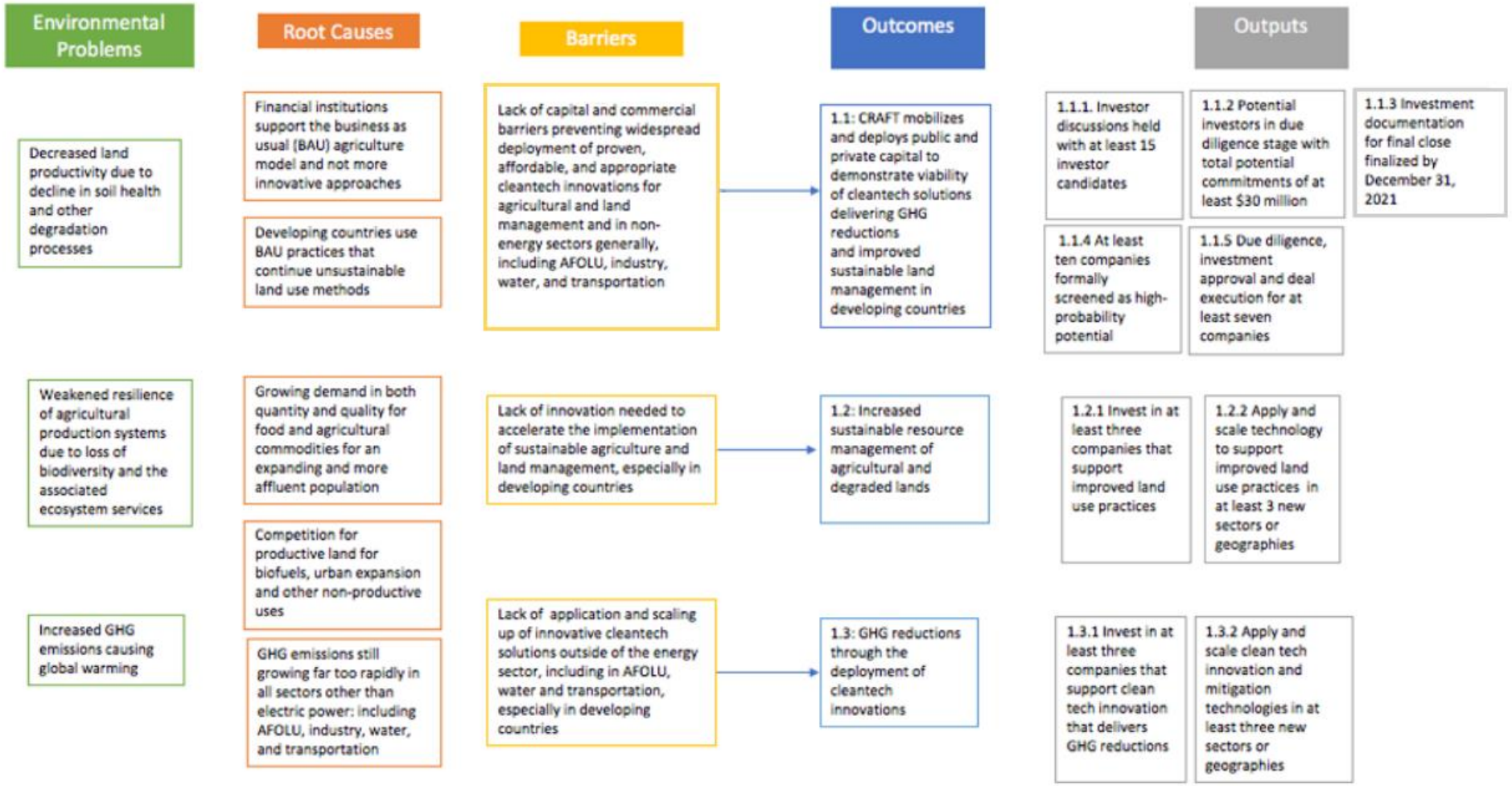
CRAFT's main objective is to invest in climate resilience solutions that can be scaled up and applied to different economic sectors and countries. This will lead to direct impacts by improving businesses and communities' understanding of climate risks and helping them reduce their vulnerability to these risks. Additionally, CRAFT's investments in resilience solutions can help reduce the vulnerability of people, livelihoods, physical assets, and natural systems to the impacts of climate change, leading to a decrease in expected socio-economic losses. By demonstrating the effectiveness of these solutions, CRAFT can also catalyze a larger global market for resilience investments, thereby creating a ripple effect.

A crucial aspect of the change theory for CRAFT is its alignment with and contribution towards the implementation of essential components of the Paris Agreement's Global Goal on Adaptation, which include:

1. Mobilizing financial resources from developed countries, both public and private, to support climate adaptation in developing countries.
2. Developing and distributing tools for climate risk assessment, modeling, and forecasting to enhance resilience-building efforts.
3. Supporting capacity building in developing countries, including adaptation planning and implementation of adaptation measures.

The theory of change of CRAFT is illustrated in Figure below.

Fig. 1 - Theory of Change



Source: Global Environment Facility (2021),. *Scaling Up CRAFT: Mobilizing Private Capital to Mitigate Climate Change and Reduce Land Degradation through Resilience Investments (PIF)*

2.3 Key characteristics[95]

Innovation

The project's uniqueness lies in its backing of a novel financing mechanism that has not yet been developed or implemented. It seeks to foster innovation by introducing a fresh domain for private sector investment, specifically in the realm of climate adaptation and resilience. Additionally, the project aims to establish the first-ever private investment fund concentrating solely on climate adaptation and resilience, which provides growth equity for the expansion of existing solutions in this domain, rather than supporting early-stage technologies or financing infrastructure projects.

Furthermore, the project's innovativeness extends to its facilitation of a blended finance approach that leverages concessional capital to attract commercial capital for investing in a broader range of developing nations. To address these challenges, the project provides crucial structural components for the Fund, such as a unique legal framework and distributions waterfall. While there are some existing examples of blended finance vehicles that the Fund draw inspiration from, such as the Danish Climate Investment Fund[96] and Climate Investor One[97], the project aids in designing innovative elements tailored to the Fund's objectives and investment mandate.

The Fund's distinctiveness also lies in its emphasis on investing in climate "intelligence" solutions, which encompass data analytics, modeling, forecasting, and engineering to generate practical, location-specific insights into the hazards and effects of climate change. The Fund's adaptation and resilience strategy is based on the fundamental notion that actionable information serves as the initial safeguard against the perils and consequences of climate change.

The project is demonstrating innovation through the development of a new technical assistance (TA) facility aimed at addressing obstacles to implementing climate adaptation and resilience solutions in developing nations. The TA Facility, similar to the clean energy TA facilities previously launched by Lightsmith partners, offers support for project preparation, market development, and capacity

[95] See: Climate Finance Lab (2017), *Climate Resilience and Adaptation Finance & Technology Transfer Facility (CRAFT): Global Lab Instrument Analysis*, https://www.climatefinancelab.org/wp-content/uploads/2017/09/Global-Lab-Instrument-Analysis-CRAFT-2.pdf; Climate Policy Initiative (2020), *CRAFT: Climate Resilience and Adaptation Finance & Technology Transfer Facility: Overview*, https://climatepolicyinitiative.org/wp-content/uploads/2020/07/CRAFT-Overview.pdf; Climate Resilience and Adaptation Finance and Technology Transfer Facility (CRAFT) (n.d.), *Nordic Development Fund*, retrieved February 19, 2023, from https://www.ndf.int/what-we-finance/projects/project-database/climate-resilience-and-adaptation-finance-and-technology-transfer-facility-craft-c114.html; Global Environment Facility (2023), *Scaling Up CRAFT: Mobilizing Private Capital to Mitigate Climate Change and Reduce Land Degradation through Resilience Investments*, retrieved February 19, 2023, from https://www.thegef.org/projects-operations/projects/10765; Global Environment Facility (2021), *Scaling Up CRAFT: Mobilizing Private Capital to Mitigate Climate Change and Reduce Land Degradation through Resilience Investments (PIF)*, retrieved February 19, 2023, from https://www.thegef.org/projects-operations/projects/10765; Nordic Development Fund (n.d.), Climate Resilience and Adaptation Finance and Technology Transfer Facility (CRAFT), https://www.ndf.int/what-we-finance/projects/project-database/climate-resilience-and-adaptation-finance-and-technology-transfer-facility-craft-c114.html; Nordic Development Fund (2019), *NDF supports new climate resilience fund*, 14 October, https://www.ndf.int/newsroom/ndf-supports-new-climate-resilience-fund.

[96] The Danish Climate Investment Fund (*Klima-investeringsfond*, KIF) was established in 2012 by the Danish state and The Danish Investment Fund for Developing Countries (*Investeringsfonden for udviklingslande*, IFU) established to attract institutional capital to investments in low-carbon and climate-resilient projects in developing countries, by utilizing blended finance. See: https://guidebookforjustfinancing.com/wp-content/uploads/2022/11/12_Danish-Investment-Fund.docx.pdf

[97] https://climatefundmanagers.com/project-type/climate-investor-1/

building. However, the TA Facility's primary objective is to facilitate market entry and the application of climate resilience solutions in developing countries, rather than supporting the creation of clean energy infrastructure projects. With the assistance of the TA Facility, a more extensive range of developing nations, including low-income countries, can access climate resilience solutions and develop local capacity than would otherwise be possible.

Promoting ESGs

CRAFT also supports the development of its environmental, social, and governance (ESG) policy and processes, while it also foresees the usage of metrics to measure the adaptation impacts of the climate adaptation and resilience solutions supported by the facility. Each Fund investment tracks 3-5 key performance indicators (KPIs) related to the adoption and impact of the solutions. The investment and company activity is expected to be financially sustainable, and to invest in entities serving wider sustainability and resilience needs, since the Fund is focused on commercial returns and high-growth market opportunities.

Rio Markers

Regarding CRAFT, its fundamental idea is that there exists a timely opening to gather significant amounts of public and private funds to meet the demand for climate adaptation. Although the Fund's actions primarily aim to generate substantial environmental and social benefits, it is anticipated that some of its investments will aid both adaptation and mitigation efforts, resulting in positive outcomes on climate change mitigation as well. Additionally, the project may have a favorable but unintended effect on biodiversity and desertification, as it was not explicitly intended to contribute to this field during its development. As a result, the subsequent chart summarizes the hypothesised Rio Markers rating based on the key characteristics.

Tab. 2 - Rio Markes in the case of the Climate Resilience and Adaptation Finance & Technology Transfer Facility (CRAFT)

Marker	Score		
	0	1	2
Biodiversity	✓		
Climate Change Adaptation			✓
Climate Change Mitigation		✓	
Desertification	✓		

Source: Created by authors.

2.4 Structure

CRAFT is an investment fund aimed at private companies that offer solutions for climate resilience to promote adaptation to the impacts of climate change. These companies either operate in developing countries or develop climate solutions specifically for such countries. While its investment strategy is global, it directs at least two-thirds of investments towards developing countries where substantial demand and growth opportunities exist.

It represents the inaugural commercial investment vehicle that exclusively focuses on enhancing the availability of technologies and solutions for climate change adaptation and climate resilience worldwide. The Fund invests in privately-held companies offering climate resilience solutions and exhibiting strong growth potential.

CRAFT is designed with a blended structure resembling a private equity fund, consisting of a layer of concessional equity, a layer of commercial equity, and a complementary Technical Assistance (TA) Facility. The TA Facility offers grant financing to support the implementation of CRAFT's portfolio companies' technologies and solutions in lower-income countries.

The Fund's structure merges a conventional growth equity investment fund with technical assistance to facilitate the implementation of climate resilience services and technologies in developing nations. The framework comprises:

1. **The Fund features two sleeves for investment in developed and developing countries**, which are legally and financially independent. This division allows for a clear differentiation of risk profiles. Although both sleeves aim to secure a total funding commitment of USD 250 million each, the sleeve focused on developing countries pursues USD 150 million in commercial funding and USD 100 million in concessional funding to mitigate investment risk.
2. **The Fund also offers technical assistance to aid resilience companies in expanding their operations in developing country markets**. Alongside financing and strategic guidance, the TA Facility provides grants for technical support to help companies penetrate and grow in developing markets. This includes funding for market studies, preparation and implementation support, as well as knowledge and capacity building. The TA Facility aims to secure USD 20 million in grant-based funding and operates under a distinct governance structure from the Fund.
3. **The Fund employs a waterfall structure to minimize the risk of private investment, offering commercial investors an anticipated 20-25% gross return rate**, which aligns with typical growth equity expectations. Both the developed and developing country sleeves incorporate a 6% preferred return threshold for commercial investors. Returns beyond this are allocated to limited partners and the Sponsor in an 80/20 ratio. The developing country sleeve also features an additional concessional equity layer.

The Fund utilizes its capital to invest in a diversified portfolio of aproximately 20 companies in the climate adaptation and resilience sector, split evenly between the two capital sleeves. These investee companies would typically provide proven resilience technologies and business models, demonstrating market demand and revenue while requiring further financing in the form of growth equity to advance their expansion plans.

The Fund does not only provide financing but also an extensive range of strategic support to the investee companies, helping them expand into new sectors and geographical markets. The Fund aims to assist investees in broadening the sectors they target, enhancing their products or services, reaching

out to developing countries, and establishing connections with development finance institutions, governments, and corporate customers demanding climate resilience solutions and projects. Additionally, the Fund provides strategic business development support by engaging with investee companies' boards. Furthermore, the Fund enables investee companies to obtain grant funding through the TA Facility to support their expansion into developing countries.

CRAFT anticipates taking minority stakes in investee companies, with the possibility of a range of stakes. It aims to achieve 20-25% gross returns, with a 10-year lifespan, 5-year investment period, and 3-5 year holding period before exit, which could be extended by 2 years. The Fund's management fee is 2.5% on committed capital for the first 5 years and on net invested capital thereafter. Both sleeves of the Fund includes a 6% preferred return threshold. Returns above the threshold are distributed to limited partners and the Sponsor at an 80/20 ratio, similar to other private equity funds. The developing country sleeve also includes a concessional equity layer. The Fund is managed by the Lightsmith Group, a Sponsor entity with experience in private growth capital and investments in both developed and developing countries. Additionally, the Fund assesses its impact on resilience both at the fund and individual investment levels.

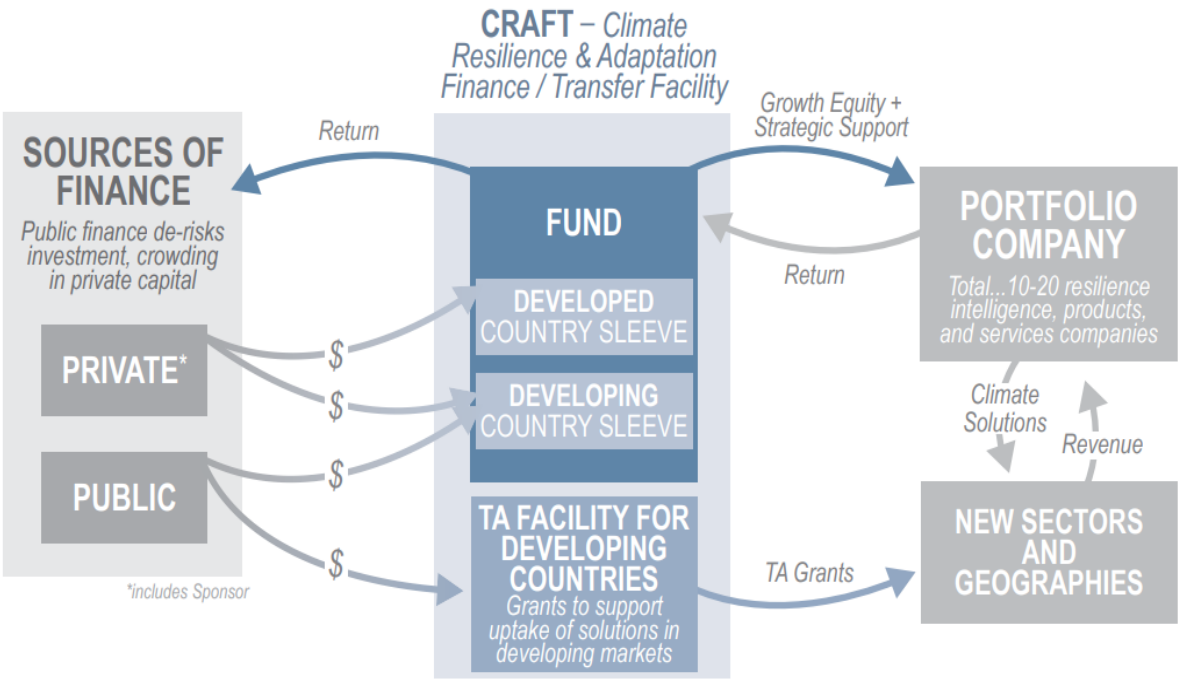
The Fund is governed by two committees:

- the Investment Advisory Committee (IAC),
- the Limited Partner Advisory Committee (LPAC).

The IAC is composed of at least three and up to four members, with one independent member being mandatory. The current IAC members are Jay Koh, Sanjay Wagle, and Richard Kauffman as the independent member. Proposed investments are evaluated by the IAC, and they must receive majority votes from the committee members, with at least one affirmative vote from an independent IAC member.

On the other hand, the LPAC is made up of representatives from at least three and no more than six investors, chosen by the General Parthnership. The LPAC has the responsibility to review the Fund's asset valuations, address any conflicts of interest concerning the Fund, and provide advice upon request or as stipulated in the Limited Partnership Agreement. The LPAC holds meetings at least twice a year, and decisions require approval from the majority of its members.

Fig. 2 - Summary of CRAFT's structure



Source: Climate Finance Lab. (2017).

The Fund, which has a target size of USD 250 million, is domiciled in Luxembourg and managed by Lightsmith Climate Resilience, which is the company designed and developed CRAFT with the support of the Global Innovation Lab for Climate Finance, Nordic Development Fund, the Global Environment Facility, Conservation International, and the International Climate Finance Accelerator (Luxembourg).

The Fund has attracted a group of prominent investors from various parts of the world, including the PNC Insurance Group, The Rockefeller Foundation, Kinneret Group, and Caprock Impact Partners, in addition to the Green Climate Fund ("GCF"), European Investment Bank, Asian Infrastructure Investment Bank, KfW on behalf of the German Ministry for Economic Cooperation and Development (BMZ), Nordic Development Fund, the Government of Luxembourg, and several other investors. Lightsmith Resilience Partners manages the Fund.

3. Project's financing

CRAFT aims to increase financing for adaptation and resilience efforts. The Fund's full development is expected to mobilize USD 150 million in private financing and USD 100 million in concessional funding from public sources for developing countries. The Fund's equity investments could catalyze

additional financing from both private and public sources beyond the initial USD 250 million. This will expand opportunities for investing in climate adaptation and resilience solutions and attract more private capital in the future. The project also seeks to raise USD 20 million specifically for adaptation and resilience efforts in developing countries. By scaling up climate adaptation and resilience information, products, and services, the project creates markets for climate adaptation and resilience technologies. This will enable a greater investment in climate-smart infrastructure projects.

CRAFT aims to leverage every dollar of concessional financing and technical assistance grants to attract an estimated 3.3 dollars of direct commercial investment, thus enhancing the resilience of communities, businesses, and critical infrastructure. By demonstrating the economic benefits of investing in climate resilience, the Fund aims to stimulate a global market for climate-resilient products and services, foster climate-resilient development, and contribute to the development of resilience standards and metrics. The investment team forms partnerships with regional entities to aid in investment origination and due diligence.

Its long-term goal is to achieve a ratio of 3.3:1 of commercial capital to concessional capital by collecting USD 100 million of concessional equity capital and USD 20 million of TA Facility grant funding, which will be paired with USD 400 million of commercial capital. The commercial capital is expected to come from fully private investors or development finance institutions, such as the International Finance Corporation, investing on a commercial basis. Further analysis of a sample investment indicates that additional capital leveraged by the Fund, including co-investments, follow-on investments, and company-level debt, could increase the overall leverage ratio of the Fund to over 6:1. This highlights the potential for the Fund to attract significant private capital, enabling it to make a substantial impact on climate adaptation and resilience in developing countries in the near future.

The CRAFT facility is primarily financed through grants and investments from various organizations, including development finance institutions and private investors. The following are some of the sources of financing for the CRAFT facility:

- Nordic Development Fund (NDF): The NDF has provided a grant of EUR 500,000 to the Lightsmith Group, which is one of the investors in the CRAFT facility.
- Global Environment Facility (GEF): The GEF is preparing a grant of USD 1.0 million for the CRAFT facility.
- Private investors: Private investors, including development finance institutions and impact investors, are expected to provide most of the financing for the CRAFT facility. These investors are attracted by the opportunity to invest in climate-resilient projects in developing countries and benefit from the potential financial returns.

Moreover, CRAFT's technical assistance facility is financed through grants from various organizations. Overall, the financing for the CRAFT facility is a combination of grants and investments from various sources, including public and private organizations.

In terms of profitability, the project's business plan indicates that the Fund is expected to generate a profitable return even without concessional capital, with an average expected net internal rate of return (IRR) of 17.1% for the Fund's commercial investors (15.7% and 18.2% for the developed and developing country sleeves, respectively). The provision of concessional equity, which has a lower level of priority on returns, means that concessional investors will only receive returns on their capital after the preferred return is met for commercial investors, reducing their risk of not meeting minimum IRR expectations by an average of 5-35%. However, these numbers cannot be confirmed, since there are no available data.

To date, CRAFT has invested in two companies: SOURCE Global and WayCool Foods, which focus on water harvesting technology and agriculture and food supply chain services, respectively. The Fund currently has 11 potential investment opportunities in its active pipeline, representing over US$200 million. They have also mapped over 1,000 additional target companies and continue to identify and consider new companies for the pipeline on a regular basis.

4. Risks and challenges

The main challenges faced during the implementation of CRAFT were as follows:

- The Fund's global scope - Most funders, whether public or private, usually distinguish between developed and developing countries, or even specific regions within these countries, for their investments. Development-oriented institutions usually require their funds to be invested solely in developing countries or specific regions within developing countries, and some may consider technology transfer investments. The Fund needs to develop governance mechanisms that meet the geographic requirements of the identified investors.
- The Fund's significant size - The Fund is larger than the average size of funds managed by first-time managers. Therefore, it has to convince investors of the need for a large fund size to make meaningful growth capital investments while ensuring sufficient portfolio diversification. Moreover, originating a pipeline across various geographies and sectors requires a relatively large team or strong partnerships with locally-based organizations. Some funds have addressed this issue by forming joint ventures with highly networked organizations.

In terms of ESG, given the size and nature of the investments to be made through the Fund, the Fund's environmental and social risks and impacts are expected to be minor. However, the mitigation of key risks and impacts derive from the Fund's capacity to identify and manage the potential environmental and social risks and impacts associated with the projects in the pipeline and operate an appropriate Snvironmental and Social Management System (ESMS).

ESMS is a framework that helps organizations identify, manage, and mitigate environmental and social risks and impacts associated with their operations and projects. ESMS provides a systematic and structured approach to assess potential risks and impacts and to develop strategies and plans to manage them in a way that is socially and environmentally responsible. ESMS can help organizations comply with environmental and social regulations and standards, improve their performance, and enhance their reputation. It is commonly used by development banks, private equity firms, and other organizations involved in financing and implementing projects.

Financing SMEs in sectors such as agriculture or agricultural services may lead to inadvertent negative effects on local communities and the environment. Therefore, the ESMS includes a thorough screening process and an evaluation, monitoring, and assessment process for each potential investment. This includes the use of a well-established tool to measure positive impact metrics. The Fund has also set up a grievance mechanism at the Fund level.

The ESMS system of the Fund focuses on assessing the engagement and consultation with local and indigenous communities in sub-projects that may potentially have adverse impacts. Additionally, it screens each sub-investment to identify opportunities to support climate-vulnerable communities and businesses by providing accompanying technical assistance. The ESMS system also has a proactive gender approach and reports on gender indicators.

The Fund encourages its portfolio companies to build collaborative relationships with communities and generate benefits such as employment opportunities. The Fund is committed to protecting the livelihoods and social fabric of local communities in areas where its portfolio companies operate. The investment agreements entered into by the Fund with underlying investees include the Fund's ESG Standards and sustainability targets as covenants and warrants, and the performance of the underlying projects is monitored against these targets.

Tab. 3 - Key project risks and mitigation actions

Risk description	Risk level	Mitigation action(s)
RISK 1 – Inability to identify appropriate investments: While the need for adaptation and climate resilience is significant, the field of private sector climate adaptation and resilience is still emerging, and there is a risk that the project may struggle to identify sound investments to build the pipeline within the timeframe of the project.	**Low**	(1) Lightsmith has already identified and mapped a pipeline of over 450 climate resilience companies and is engaged in active discussion with an actionable pipeline of 10+ promising potential investments; and (2) Lightsmith's partners have over 25 years of relevant investment experience directly applicable to the Fund.
RISK 2 – Ineffectiveness of technical assistance: There is a possibility that the project will fail to identify and structure an effective technical assistance program.	**Low to Modest**	(1) Lightsmith has already identified a pipeline of technical assistance opportunities directly related to the 10+ actionable investments; (2) Lightsmith has experience and track record in designing and implementing technical assistance programs directly applicable to the TA Facility, such as the USD 20 million Africa Clean Energy Finance facility (USD 400 million of private capital mobilized to date, a 20:1 ratio, and USD 1 billion expected ultimate mobilization, a 50:1 ratio) and a commercialization technical assistance program for USD 400 million of projects under Advanced Research Projects Agency – Energy (ARPA-E) (mobilized USD 1.8 billion of private follow-on investments to date).
RISK 3: Inability to raise capital for the Fund: Given that the emerging market and developing economy regions the Fund will be investing in are perceived as risky by a considerable proportion of investors, there is a risk that the amount of capital the Fund will attract will be less than estimated.	**Modest to Substantial**	(1) Lightsmith is actively engaged with several leading MDBs, DFIs, and institutional investors for investment into the Fund; and (2) Lightsmith has identified several other institutional investors, family offices, and foundations as well as national governments that could be potential capital sources.
RISK 4 – Failure to achieve developmental and climate resilience outcomes: The focus on commercially successful investment could detract from the goals of achieving developmental impact and greater climate resilience and adaptation in developing countries. In addition, it can be risky and difficult to transfer technologies and achieve successful market entry and uptake in developing countries.	**Modest**	(1) The design and funding of the TA Facility helps to ensure market entry and deployment of climate resilience and adaptation technologies and solutions into developing countries; (2) As described above, Lightsmith's partners have demonstrated prior success in designing and executing similar technical assistance facilities; (3) Lightsmith has already engaged with specific company CEOs and management teams to validate that the design of TA Facility will drive their solutions and technologies into emerging markets; (4) Lightsmith plans to track 3-5 KPIs per investment that can help measure results and inform stakeholders of the developmental and climate adaptation and resilience impacts. Lightsmith coordinates with the GEF Secretariat and others in the development of the impact metrics approach.

RISK 5 - Reputational risk: The project will receive public visibility and attention as a first of a kind initiative. CRAFT also involves investment in and technical assistance support to private companies. Demonstrating the public benefits and development impacts of developing the first climate adaptation and resilience investment fund with a complementary, dedicated technical assistance facility will be critical.	**Modest**	Lightsmith is developing clear communication lines that emphasize: (1) Meeting climate finance commitments: the project is specifically focused on mobilizing the private sector into adaptation finance, which is a key objective of the Paris Agreement (the Global Goals for Adaptation), and is centrally important to achieve the SDGs and GEF's own adaptation goals and objectives; (2) Private capital leverage: project funding will help mobilize USD 150 million of private capital and USD 100 million of public capital, as well as USD 20 million in technical assistance, into adaptation and resilience investments in developing countries; (3) Proven effectiveness of technical assistance: the project will structure the TA Facility based on the design of prior, well-reviewed programs (e.g., ACEF); and (4) A leading innovation in climate finance: the CRAFT concept was competitively selected by the Global Innovation Lab on Climate Finance out of 175 proposals in 2016 through a process involving many G7 and EU governments, NGOs, and private stakeholders, and CRAFT went through an intensive 9-month evaluation process for innovation, impact, and feasibility by the Lab Secretariat (Climate Policy Initiative) and its related working group of Lab members, and CRAFT received full endorsement of the Lab members in September 2017.
RISK 6 – Regulatory risk: Because the project involves the formation of an investment fund, various US and EU regulations will apply to the structuring and marketing of the fund. Specifically, it is prohibited to market investments to the general public. This prohibition may extend to discussions of the Fund's specifics at public events, conferences, on digital media etc. Breaching the regulations (which apply anywhere in the world) could result in criminal prosecution and a moratorium on the Fund's investment activities.	**Low to Modest**	Lightsmith will work with a leading fund formation law firm as well as with a leading regulatory advisor that have each advised and helped form many investment funds before.
RISK 7 – Lack of beneficiary country buy-in risk: Because there is limited formal participation of the beneficiary countries in the CRAFT Fund, there may be a lack of political buy-in, which could hamper efforts to invest in and develop markets for climate resilience solutions in those countries.	**Low to Modest**	(1) CRAFT refers to country NAPs, NAPAs, and NDCs to identify critical adaptation needs and opportunities and align its investment strategy with country needs. (2) In its investing, CRAFT coordinates with MDBs and DFIs operating in these countries, and with country governments and development banks directly.

Source: Global Environment Facility (2023)

5. Main takeaways from the CRAFT project

The CRAFT fund is a relatively new facility that was launched in 2019, so it may be premature to draw definitive lessons from it. However, there are some potential lessons that can be learned so far:

1. Public-private partnerships can be effective in mobilizing private capital towards climate adaptation and resilience solutions.
2. Concessional financing can be an effective tool for attracting private investment in climate adaptation and resilience.
3. There is a need for more investment in climate adaptation and resilience in developing countries, and private capital can play an important role in filling this gap.
4. Investing in climate adaptation and resilience solutions can be financially attractive for investors, with potential for both financial returns and positive environmental and social impact.
5. There is a need for increased collaboration and coordination among investors, governments, and other stakeholders to ensure that investments are targeted and effective in addressing climate change challenges.

Hence, the impact of CRAFT can be seen in several ways. Firstly, it may increase investment in climate-smart infrastructure projects, providing much-needed funding for adaptation and resilience in developing countries. This can lead to the development of new infrastructure projects, such as water management systems, clean energy solutions, and resilient transport networks.

Secondly, CRAFT would create a model for blending concessional and commercial capital that could be replicated in other sectors and regions. The success of CRAFT could encourage more private sector investment in climate resilience and adaptation, leading to greater resilience to climate impacts in vulnerable communities.

Finally, CRAFT would provide technical assistance to help project developers identify, design, and implement climate-resilient infrastructure projects. This could help to build local capacity and ensure that investments are tailored to the specific needs and contexts of each community.

Give that CRAFT is still in its early stages, and as such, it may take some time before specific projects supported by the facility are completed and reported. It’s worth noting that CRAFT is just one of several initiatives aimed at promoting climate resilience and adaptation in developing nations. Many organizations, both public and private, are working to provide funding and technical support to help communities adapt to the impacts of climate change. However, CRAFT provides a practical and effective solution to address a pressing area of uncertainty and demand.

The replication of the general concept and approach of CRAFT (that is to leverage private sector financing to address climate adaptation and resilience challenges in developing countries) can easily be replicated. However, replicating CRAFT exactly would depend on various factors such as the availability of public concessional funding, the interest and capacity of private investors, and the specific climate challenges faced by each country or region. Additionally, the success of a facility like CRAFT will also depend on factors such as effective governance, risk management, and monitoring and evaluation frameworks.

Nevertheless, CDP can learn several lessons from the CRAFT initiative, including:

1. **Addressing adaptation finance**: CRAFT demonstrates that there is a significant gap in adaptation finance, and development banks can play a crucial role in mobilizing private capital for adaptation and resilience.
2. **Blended finance**: The use of concessional capital alongside private capital to mobilize additional investment is an effective approach to blended finance, which can be applied to other sectors beyond climate adaptation.
3. **Private sector engageme**nt: CRAFT has successfully engaged with the private sector, including institutional investors and impact investors, demonstrating the importance of private sector engagement in mobilizing finance for development.
4. **Partnerships**: CRAFT has developed partnerships with regional organizations and governments, which have been critical in identifying investment opportunities and building local capacity. Development banks can learn from CRAFT's approach to building partnerships to strengthen their own operations.
5. **Innovation**: CRAFT has demonstrated the importance of innovation in developing new financial instruments and investment opportunities. Development banks can apply this approach to other sectors and develop new products and services to meet the evolving needs of their clients.

Overall, CRAFT provides a model for development banks to engage with the private sector and mobilize finance for sustainable development, particularly in areas such as climate adaptation and resilience.