



D-RECs

An economic assessment

Introduction

Renewable energy and energy efficiency can meet 90% of the decolonization efforts and initiatives needed by 2050¹. It is critical that renewable energy deployment occurs in all corners of the world, not just in developed markets such as the USA and Europe. A new IEA report² has stated that emissions from emerging and developing countries are set to grow by 5 gigatons over the next two decades. For us to reach our global climate targets, investments in clean energy in emerging economies need to grow to \$1 trillion per year by 2030, which requires a 7X increase on existing investment levels.

So how do we drive investments into these economies at the rate we need? To answer this question, this paper seeks to explain how the D-REC instrument can provide a unique procurement model for clean energy in emerging economies and to elaborate on the total anticipated market impact that will be unlocked.

The Business Case for D-RECs

Corporations and the private sector have a critical role to play in this challenge. Corporations are becoming increasingly aware of their obligations around emission reductions, and they are actively deploying capital into this space for viable solutions. This is evident through the exponential rise in signatories to climate commitments such as RE100, The Science Based Targets Initiative, and The Climate Pledge. Currently, corporations meet their renewable energy targets through purchasing Renewable Energy Certificates (RECs) or through Purchase Power Agreements (PPAs). However, REC frameworks are more geared towards larger scale renewable energy projects rather than the smaller scale solutions which are needed for many of the lower income communities that lack energy access. Many developing and emerging markets also do not have well developed legal frameworks to properly facilitate traditional corporate power agreements.

The political and economic environment of many of these countries also means that investing in renewable energy projects can carry very high risk, some of which include currency risks, developer risks, financing risk, and end-user payment and credit risks.

In response, the D-REC initiative was founded to address these market gaps. A Distributed Renewable Energy Certificate (D-REC) is a certified, verifiable and non-tangible environmental attribute that can be traded as a commodity and which will allow distributed renewable energy (DRE) projects to monetize the environmental benefit associated with low carbon energy generation. The D-REC instrument will provide system developers and operators with a new capital stream while allowing the purchasers of D-RECs (mostly global corporations) to achieve their emissions reductions targets.

¹ Global energy transformation: A roadmap to 2050, IRENA, <https://www.irena.org/publications/2019/Apr/Global-energy-transformation-A-roadmap-to-2050-2019Edition>

² Financing Clean Energy Transitions in Emerging and Developing Economies, World Energy Investment Special Report 2021, International Energy Agency in collaboration with the World Bank and the World Economic Forum

The following table outlines specific risks which DRE projects - in some cases utility-scale renewable projects as well - face in emerging markets, and how D-RECs may address them:

Challenge	How D-RECs can help
Uncertain project revenues	Long term purchase agreements from credit worthy buyers (e.g. multinational corporations) can help bring revenue certainty to high-impact investors DRE projects
Foreign exchange risks	Sale of D-RECs to global buyers could provide new hard currency revenue streams, mitigating some of the FX risks from global investors
Aggregating small systems and projects for climate investors	The D-REC platform, which will be open source, will lower the transaction costs of aggregating large numbers of small systems and projects and engaging with environmental markets
Mobilizing domestic lending	Improved project economics, combined with lower risks, could help mobilize more domestic lending.

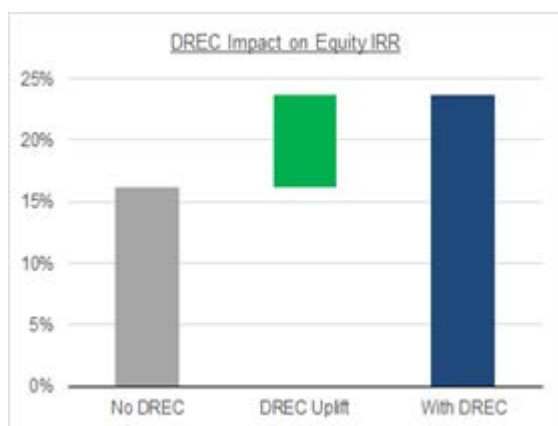
The risk environment of many emerging markets can be a significant deterrent for investors. Overcoming the aforementioned set of barriers is critical in order to drive and scale investments in renewable energy deployment. Through two primary purchase mechanisms, D-RECs can significantly improve project economics, de-risk the investment from other financiers, and provide an additional revenue stream.

While individual contracts between DRE developers and buyers / intermediaries will vary, there are two conceptual purchase approaches: the first is a transactive model, while the second involves an upfront component. In the transactive model, a corporate buyer agrees to purchase D-RECs from a project as they become available. In its simplest form, such an agreement may be that the corporate buyer makes a spot market purchase after a DRE developer has posted it for sale. In the upfront model, a corporate buyer will provide money to a project upfront in exchange for the D-RECs and as well as possibly a financial return. In practice, such an arrangement likely would involve a financial intermediary rather than a corporate buyer, as companies are more comfortable paying upon D-REC delivery. A combination of both an upfront and transactive model may also be possible.

This very scenario is illustrated in the following example, in which a corporate buyer both provides capital upfront as well as purchases D-RECs as they are generated. The resulting cash flow below indicates how the DRE project developer first receives cash from the corporate buyer - equivalent to two years' worth of D-RECs at \$0.02/kWh. The DRE developer can use such a commitment to close project financing and commission the system; after the two years' worth of D-RECs are transferred to the buyer, the corporate buyer then purchases D-RECs as they are generated at \$0.03/kWh.



The resulting impact on project internal rate of return (IRR) to equity investors as a result of the D-REC purchase is a 750 basis point improvement in project IRR, as noted in the graph below:



Multi Stakeholder approach

The D-REC initiative takes a multistakeholder approach, reflecting the collaborative approach that is needed when it comes to the global energy transition. To be successful, the instrument has to address the needs of a wide range of audiences, namely DRE project developers, providers of capital, energy attribute standards organisations and the global corporations who are going to be the main buyers of the renewable energy attributes. Engagement with each of these stakeholders is critical to the long term success and scale-up of this initiative, and each stakeholder has played an important role of providing key insight and assistance to the development of D-RECs.

Of these key stakeholders, two in particular stand out: DRE project developers and global corporations seeking to expand their renewable energy support or procurement. The way that each of these stakeholders interacts with the D-REC instrument illustrates the unique case for the instrument and how it can have a strong market impact by enabling greater renewable energy development and access.

Profiling a developer

A typical DRE developer is often a small- or medium-sized business with experience and operations in a country or region, often located in Sub-Saharan Africa. While developers are generally acutely aware of local circumstances and business considerations, their smaller size also means that they often don't have significant capital to spare for new projects, while the projects they are already involved with typically carry a high level of risk. Many of these businesses are highly capital intensive and require a constant flow of capital in order to scale their operations. Most DRE project developers are therefore limited in their ability to pursue new projects for all but the most surefire projects and are attracted most to those projects that maximize financial return above social or other benefits. Therefore, developers would hugely benefit from corporate investors to scale projects and meet universal electrification targets.

Profiling a corporation

Global corporations have the resources and power to implement sustainable solutions and address climate change. A typical global corporation seeking to expand its renewable energy support and procurement is usually rather large and located in the United States or Europe. These corporations already use standard procurement models for buying energy, such as power purchase agreements (PPAs) or other well-established market instruments. In response to growing concerns about climate change along with growing pressure from investors and consumers, the last five years have seen a boom in corporations responding by setting their own climate targets and identifying ways to meet these targets. Most carbon reduction efforts focus first on "quick wins" that can achieve the greatest impact, and many corporate strategies therefore prioritize switching to or supporting greater renewable energy within corporate operations.

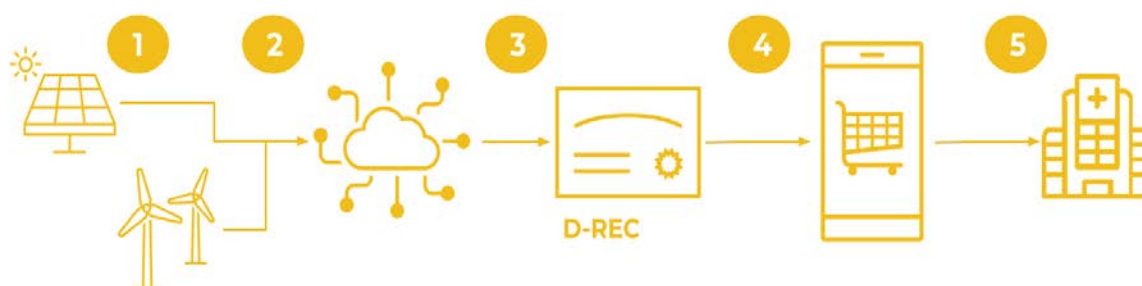
As pressure to reduce corporate emissions continues to increase, however, corporations are now setting even more ambitious targets and searching for more impactful methods for them to reach these targets.

The role of D-RECs

As corporations pursue ever greater climate impact from their investments in order to reach their targets, many are discovering that when it comes to turning to renewable energy as a solution, not all renewable energy has the same climate impact. Traditional corporate PPAs that add new renewables will displace, on average, 402 gCO₂e/kWh in the United States, or just 255 gCO₂e/kWh in Europe, while DRE projects in southern Africa that displace coal-fired grid electricity or small-scale diesel generators can achieve 3-6 times the climate impact.

Yet for corporations seeking to have their investments support impact of this magnitude, there has been a distinct lack of avenues for investors to identify and transact with DRE project developers. It is here where the D-REC instrument comes in to act as an intermediary. Such a function is already commonplace with other environmental commodities, such as carbon brokers who connect carbon reduction or removal projects, like REDD+ projects in the Global South, with investment from corporations seeking to offset their emissions by purchasing carbon credits derived from these projects.

Procurement Model



The basic procurement model of the D-REC instrument is as follows:

1. A project developer installs a distributed renewable energy system, such as a solar home system, commercial rooftop system, community mini-grid, or campus microgrid.
2. Electricity is generated and data from the renewable system is transmitted to the D-REC monitoring and tracking platform.
3. Generation data from multiple DRE systems are aggregated to create a D-REC in accordance with international standards.
4. A corporation buys the D-REC as part of their CO₂ emissions reduction targets; this in turn provides revenue to the local DRE system provider, attracting new capital to the project.
5. Community infrastructures benefit from affordable, clean, reliable electricity, for example health centres that currently have unreliable access to energy supply.

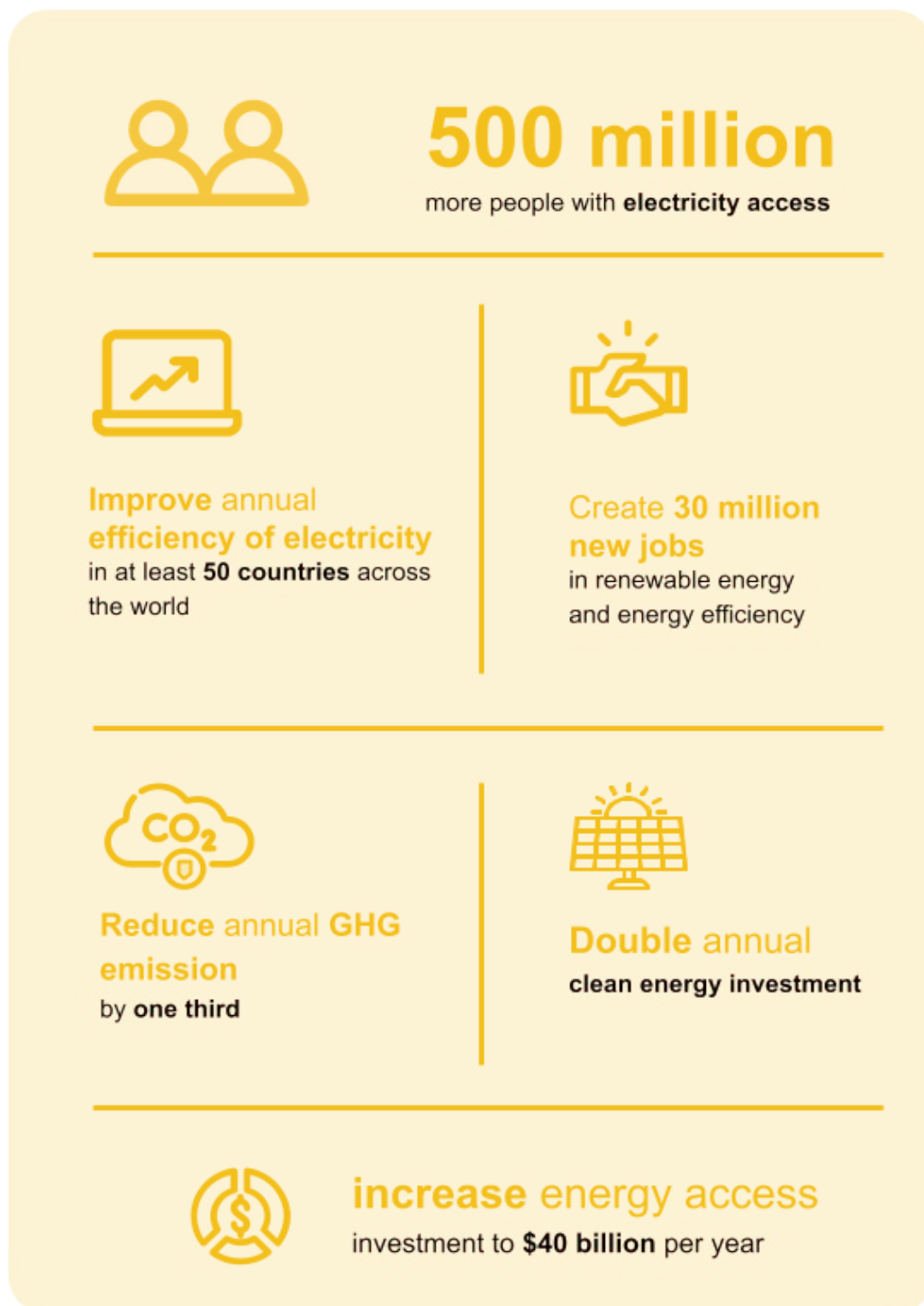
Market Impact

Working alongside developers and corporations that procure D-RECs, the D-REC Initiative intends to have a large impact within regional/local economies, the DRE market, and the global renewable energy market more broadly.

For corporations investing in D-RECs, the additional return on investment compared to existing renewable procurement models is expected to be delivered not only in the social benefits described above, but primarily in terms of additional climate impact, with 3-6 times

better carbon reduction potential when displacing dirtier forms of electricity production in target communities.

The D-REC Initiative is a signatory of the UN Energy Compact which is dedicated to bringing together voluntary commitments from governments, business, international organizations and multi stakeholder organizations. The diagram below illustrates the intended impact that D-RECs hope to help achieve within the UN Energy Compact³.



³ The UN Energy Pledge <https://www.un.org/en/energycompacts/page/registry>

Conclusions

How do we drive renewable energy investments into emerging economies at the rate we need to make a strong climate impact, while simultaneously providing strong social impact?

Through the D-REC instrument, an intermediary is provided whereby global corporations can make investments in renewable energy that have a greater return on investment in terms of climate impact than existing options. Project developers that are normally constrained in their ability to pursue new projects are given additional liquidity to develop new DRE projects. And local communities benefit from the social impacts unlocked by energy access, along with subsequent economic growth that would otherwise be difficult to achieve without expanded local energy access.