

Brief

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# Innovative financing to scale renewable energy for off-grid communities

The role and potential of Decentralise Renewable Energy Certificates (D-RECs)



Transforming  
Energy  
Access



TRIPLELINE



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## Summary

Increasing access to finance for decentralised renewable energy has the potential to improve access to clean and affordable energy, but also to catalyse wider social impact. With support from Shell Foundation, (UK registered charity), UK's Foreign, Commonwealth and Development Office and a broad range of funding and financial partners<sup>1</sup>, the D-REC Initiative is creating a new global mechanism for the certification of distributed renewable energy. This brief explores how Decentralised Renewable Energy Certificates (D-RECs) work, and their transformative potential. D-RECs could be key in unlocking investments in Decentralised Renewable Energy technologies by facilitating access to loans, and improving the efficiency of existing Result-Based Financing (RBF) programmes. They can also constitute a practical and cost-effective way to measure the wider social impact of energy access projects.

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<sup>1</sup> The D-REC Initiative is a not-for-profit, multi-stakeholder, industry-led initiative. The initiatives' funding and financial partners are Shell Foundation, EnAccess Foundation, Good Energies Foundation, Signify Foundation, GIZ-DeveloPPP, the UK's Foreign, Commonwealth and Development Office (FCDO), the Swiss Agency for Development and Cooperation (SDC), UNDP, the IFC, ResponsAbility, Persistent and Roots of Impact. The funding partner appointed secretariat is made up of South Pole and Positive Capital Partners.

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## 1 Introduction

The [IPCC Sixth Assessment Report](#) makes it abundantly clear that we need to dramatically ramp up global climate action immediately. It also underscores the relevance of climate action to achieving the UN Sustainable Development Goals (SDGs). One of the most closely linked SDGs is to ensure access to affordable, reliable, sustainable, and modern energy for all, and especially for the [759 million people](#) who still lack access to electricity (SDG 7). Clean, safe, and affordable energy is central to empowering communities and improving the lives of those most vulnerable to the impacts of climate change. In particular, renewable energy solutions, like solar mini grids, hold near limitless development potential for communities living off-grid and in great need of energy access. However, it is estimated that meeting universal energy targets will require [more than \\$500 billion annually until 2040](#).

To help address this financing gap, Shell Foundation (UK registered charity) and UK's Foreign, Commonwealth and Development Office are supporting the development of the [D-REC Initiative](#), a multi-stakeholder platform launched in January 2021 by [South Pole](#) and [Positive.Capital Partners](#). The transformative new platform aims to create a global market for distributed renewable energy by designing, delivering and demonstrating new ways to certify and value distributed renewable electricity attributes through the creation of a new, internationally recognised market instrument called the Distributed Renewable Energy Certificate (D-REC).

This brief aims to explain how this innovative instrument can unlock finance to improve access to clean and affordable energy, and catalyse impact beyond SDG 7.

## 2 A new innovative tool to track Decentralised Renewable Energy

### 2.1 What are decentralised renewable energy certificates?

Investments using D-RECs are, in essence, investments into renewable energy projects with high climate impact and social benefits. The concept of a D-REC is based on 'regular' [Renewable Energy Certificates \(RECs\)](#) - electronic records that verify the source of electricity used. These certificates allow electricity buyers to make reliable claims about their energy usage by transparently tracking a unit of electricity from where it is generated through to where it is used. Companies like [Microsoft](#), [Tetra Pak](#) and [Google](#) use RECs. The tracking process for these RECs takes place for electricity within the grid, but until now the concept has not been applied to off-grid systems.

Set up by the D-REC Initiative, D-RECs expand on this tested market instrument and present a new way to certify the value of distributed renewable electricity, with a real focus on emerging markets and communities based far away from any grid connection. This means focusing on renewables that are not connected to the grid, like solar mini-grids, in places that are desperate for energy access. Through D-RECs, companies can invest in renewable energy in rural communities near environmental commodities such as precious metals for technology products or agricultural products like coffee beans or cocoa.

The indirect partnership between the D-REC buyer and the community through D-RECs is part of a positive feedback loop where project developers have a stronger income stream to de-risk investments in more communities, while greater prosperity in the community results in more customers reliably purchasing power. This leads to more renewable energy rollout, and all the while the buyer has verifiable results to point to as a result of its investment.

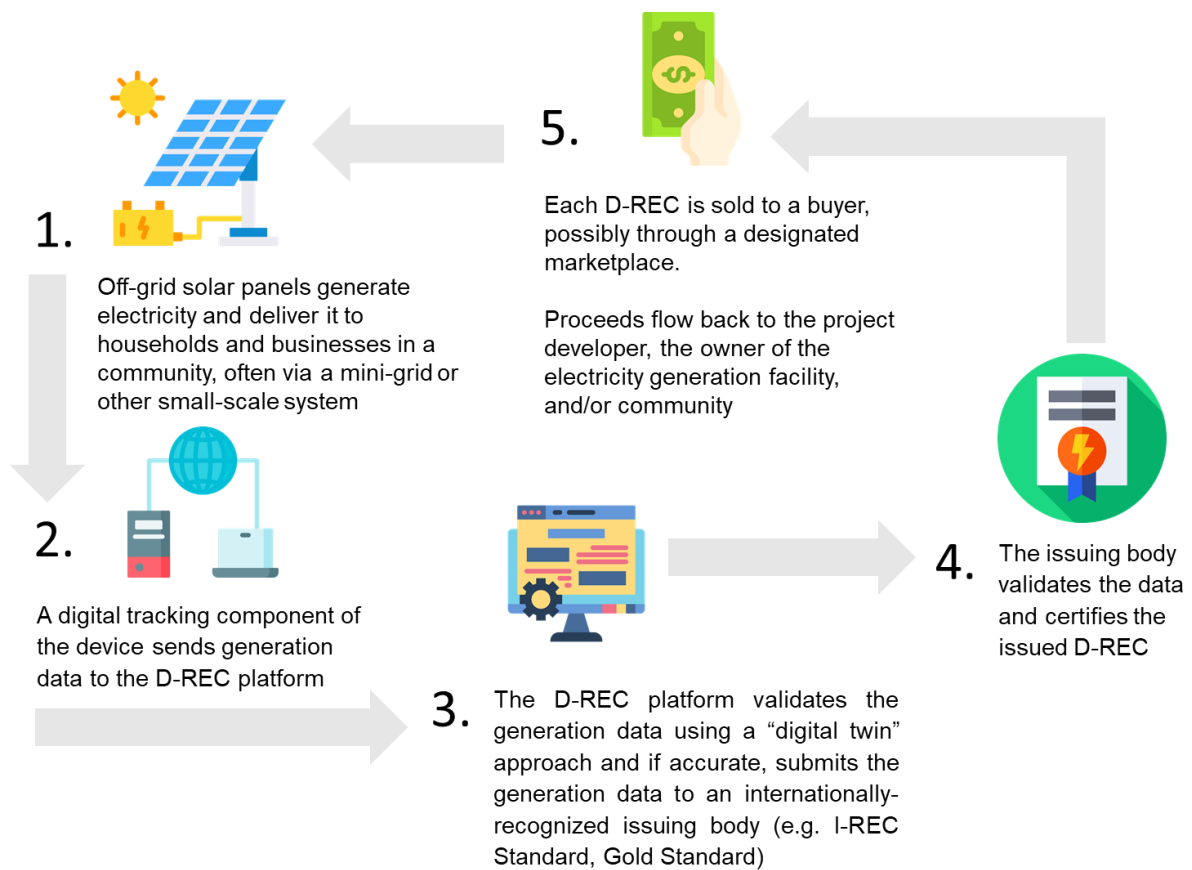


Figure 1: The technology making D-REC possible

## 2.2 How do D-RECs work in practice?

For those wishing to dive into the technical details, there are [resources available](#) that go into greater detail about *how* exactly D-RECs work. In this piece we will further explore the *why* and the way that D-RECs seek to fundamentally change renewable energy development through the theoretical example of Company X.

### 2.2.1 The issue

Let us assume that Company X is a large player in the global technology industry, one of many whose industrial production and related facilities make up the [largest share of emissions from energy end-uses](#). The company is responsible not only for emissions from its *direct* energy usage (e.g. from using coal or diesel on site, referred to as [scope 1 emissions](#)) but also from its *indirect* energy usage. This includes energy from things like electricity or heat that is generated off-site but procured and used by them ([scope 2](#)), and from activities along their goods' value chains ([scope 3](#)). In the case of company X, part of their scope 3 emissions includes emissions generated through the extraction of raw materials in Village A, located in East Africa.

Many of the community members of Village A belong to the [759 million people](#) that still lack access to electricity. There has been some success with renewable energy rollout in their country, but it has occurred mostly through grid-tied utility-scale projects. Village A, however, is far from the grid, and this means that in most homes light is provided by candles or dirty-burning kerosene, while some of the other facilities such as schools, hospitals, and businesses, rely on imported diesel.

Access to healthcare has been a particular issue in the village. The local clinic relies on a diesel generator that is unreliable and unhealthy. Vaccines have gone bad due to refrigeration going offline, and the noise and fumes are disturbing to patients. It is one of over [70% of health facilities](#) in Sub-Saharan Africa that lacks access to reliable electricity.

The key challenge to reach Village A with reliable energy is to overcome the affordability challenge. Pay-As-You-Go or Pay-As-You-Use systems - instrumental in overcoming this challenge in other areas - could be a key mechanism to make these systems a practical and affordable option.

### 2.2.2 The solution

Like [other leading companies](#) in the same industry, Company X has become increasingly conscious about their energy usage and the impact on carbon emissions that can be realised by switching to renewables. The company has also come to realise how access to renewable energy can catalyse social and economic development in low-income communities - those communities that produce the company's raw materials and make their entire industry possible in the first place. Company X decides to make a commitment to source 100% renewable energy across their operations. But company X wants to go further, focusing on D-RECs to target emissions and generate social benefits across their supply chain that access to energy will unlock. Company X makes an up-front purchase of D-RECs, one of several ways D-RECs can drive capital flows.

Due to this upfront commitment for D-RECs, a DRE project developer is now able to obtain the financing needed to develop a mini-grid system for Village A. The solar array is located next to the clinic, ensuring reliable access to electricity and better health outcomes. Homes in the village have access to electricity, meaning children can do homework at night and new businesses are able to open. In addition to the social benefits unlocked, the new alternative to diesel generators and kerosene lanterns will contribute to emission reductions for the country's greenhouse gas (GHG) inventory.



Figure 2: The journey of Company X

### 3 Unlocking additional finance to improve access to clean and affordable energy

#### 3.1 What is the potential of D-RECs in facilitating investments?

Corporate renewable energy procurement is becoming a dominant global force when it comes to increasing renewable capacity. Many companies are looking beyond their headquarters for opportunities to support renewable energy deployment. This approach offers great potential to reduce GHG emissions by displacing dirtier forms of energy, incentivise new renewable capacity, and avoid emissions that would have taken place in the future. The IFC estimates that there are 20-30 million diesel generators in 167 developing countries with an installed capacity of 350-500 GW, while displacing coal-fired grid electricity or small-scale diesel generators can achieve 3-6 times the climate impact compared to investing in renewables elsewhere.

Recognising this, many multinational companies, such as the members of RE100 Initiative, are committing to using 100% renewables to drive down their carbon footprint. This includes, companies like Microsoft and Google broadly focusing on renewables, or Oracle focusing on renewables while pressuring suppliers to reduce supply chain emissions as well. Apple played a driving role to make RECs available in Taiwan so their supplier can credibly procure renewable energy. In 2019, the corporate demand for renewable energy has already helped install 19.5 GW of capacity in 23 countries that would not have been installed otherwise, and in 2020 corporations bought almost 24 GW of clean energy. But most of this renewable energy development and procurement is limited to North America and Europe.

If even a fraction of this amount were to be installed in emerging markets with energy deprived societies, the resulting climate and accompanying social benefits would be enormous.

**By tracking the generation of decentralised renewable energy, D-RECs have the potential to enable companies to finance solutions to address their indirect emissions and improve access to clean and affordable energy.** Indeed, for companies wishing only to meet their commitments to shift their own energy demand towards renewable energy, power purchase agreement (PPAs) or RECs have allowed this to happen. But targeting indirect emissions can be challenging, because their suppliers are often in markets where there is no local renewable energy capacity.

Despite the private sector's willingness to provide financing, few mechanisms have existed to enable investment to connect a company's ambitions with the most vulnerable and disadvantaged (and often off-grid) regions where the bulk of the 759 million people without access to electricity live. One of the more common approaches to indirectly address these emissions to date has been through financing [nature-based solutions](#), or to source carbon credits from projects with specific community impacts, such as the [Kariba project](#) in Zimbabwe. To complement this approach, D-RECs come in to provide a robust way for companies to address the actual emissions in their own supply chains, while also accelerating the energy transition in developing and emerging markets.

Many conversations with the energy access sector have revealed the current rules around GHG accounting for Scope 2 to be rather limiting with respect to incentivising investment in high-impact transformative energy projects. The D-REC Initiative will enable corporate buyers to go above-and-beyond existing accounting rules, and allow them to support high climate impact renewable energy rather than continue to place more renewables on developed grids.

### 3.2 Through which mechanisms can D-RECs leverage climate finance?

**D-RECs can be leveraged as securities to enable companies to invest in DRE energy solutions.** Companies and developers are not starting from scratch with D-RECs. [RECs](#), [Guarantees of Origin \(GOs\)](#), [Tradable Instruments for Global Renewables \(TIGRs\)](#), and other such electricity market instruments have become powerful catalysts driving investment into renewables in many markets, and D-RECs make use of this type of tested mechanism to target investment to meet needs in remote communities, while helping companies address indirect emissions. Ultimately, D-RECs are a way to unlock capital by connecting emerging markets and the higher risk of the distributed renewable energy (DRE) sector with more mature markets of investors seeking environmental and social impact. This unleashes emissions reduction and social development potential at the same time.

**The most promising commercial model to leverage D-RECs is an upfront loan where the debt payments are supported by the additional revenue stream that D-RECs provide.** For most DRE developers, raising capital for new projects can be incredibly challenging not only because these projects are highly capital intensive, but also because of the high risk involved. One of the main reasons a D-REC offtake contract is able to unlock finance is that it makes DRE projects look particularly attractive to debt financiers, who tend to be relatively risk-averse. With the upfront loan, a DRE developer is able to show a better rate of return for new projects, which in turn helps attract financing from funding institutions. Indeed, they bring an additional revenue stream that lowers project risk in a number of different ways. Specifically, there is no price risk, foreign exchange risk, or credit risk with the D-REC revenue stream. This is because D-RECs are contracted for in the form of a long-term contract either with an intermediary or with a corporate itself, and denominated in a hard currency. In addition, this model guarantees that the funds obtained through the sale of D-RECs are dedicated to decentralised renewable energy provision, and are not spent for other purposes. Other commercial models exist including one-off D-REC sales or incorporating a D-REC offtake agreement into an asset leasing agreement in exchange for upfront financing.

**But by engaging with corporate buyers, we have also learnt that even though an upfront D-REC purchase will provide the most impact to project financial returns, corporate buyers are hesitant to provide money upfront.** Rather, D-REC buyers would like to pay upon delivery, aligned with existing unbundled REC purchase processes. Therefore, there is a need for financial intermediaries to translate corporate purchase agreements - which will be paid upon delivery - to upfront catalytic capital.

In addition, D-RECs can also enhance existing results-based finance (RBF) climate finance programmes by harnessing a performance-based metric for the distribution of funding. This umbrella term which refers to any programme or intervention that provides rewards to individuals or institutions after agreed-upon results, are achieved and verified. This includes, for example, carbon credit schemes. Currently, these programmes tend to rely on non-performance-based indicators, such as "capacity deployed" or "connections installed", which often do not reflect the actual achieved impacts and can risk overstating them. Such indicators often do not take into consideration the number of systems that fall into disrepair, and in certain cases, could even skew the incentive for the developer and distributors to focus solely on deployment of new systems without maintaining a decent level of maintenance service. As a result, these assets rarely operate up to their maximum lifetime. D-RECs, on the other hand, precisely catalogue the energy that is generated and delivered, and only certify the actual metered electricity delivered. With this serving as a metric for RBF, there is an incentive to maximise the energy delivered, increasing the value for money of programmes.

## 4 Catalysing transformational impact beyond SDG 7

While D-RECs are showing great promise towards achieving increased access to affordable, reliable, sustainable, and modern energy, this market instrument can contribute to progress on many other SDGs. Aside from the climate impact, investing in renewable energy in countries where it is desperately needed brings with it a whole host of benefits, with electricity access standing out as the “golden thread that connects economic growth, social equity, and environmental sustainability”, according to UN Secretary General [Ban Ki-moon](#). As illustrated in Figure 3, progress to create more inclusive economies and stronger, more resilient societies could be supercharged by the rapid-roll out of distributed renewable energy. Simply put, access to energy can facilitate progress towards the achievement of many other development goals.



Figure 3: Link between SDG 7 and other SDGs

In addition, the D-REC platform also constitutes a useful tool to cost-effectively measure wider societal impact. While methodologies are currently being developed to account for the impacts of specific SDGs, D-REC can serve as a suitable proxy-metric in cases where the energy use is directly linked to concrete activities in health care, education, improving food security, and helping fight climate change, amongst others. For example, knowing how many students a school hosts or how many patients a healthcare facility caters to allows the electricity delivered to these institutions through D-RECs to be translated into education (SDG 4) and health-related (SDG3) impact measurements. So too, systems powering agricultural products such as grain mills or solar irrigation systems allow translating the amount of electricity used for these purposes into indicators related to food security (SDG2).



The D-REC platform could also be extended to record additional data fields per system connected, to feed accurate, remotely monitored data to whichever SDG methodology applies, which would reflect more accurately the system's (health, agriculture, education etc.) real-world impact. and thus translate more accurately to that system's impact. This would leverage the D-REC platform's capability to use digitisation and automatisisation to allow impact certification at the lowest transaction cost possible.

## 5 Conclusion

At the end of the day, investments using D-RECs are investments into renewable energy projects with high climate impact and social benefits. In the decentralised communities that D-RECs benefit, the impact of better access to healthcare, improved education, or new business opportunities can be significant for women, children, business owners, workers, and entire communities. The indirect partnership between the D-REC buyers and communities through D-RECs is part of a positive feedback loop. Project developers have a stronger income stream to work with to de-risk investments in more communities, while greater prosperity in these communities results in more customers reliably purchasing power. This all leads to more renewable energy rollout, and all the while companies have verifiable results to point to as a result of its investment.

The D-REC Initiative's engagement with the sector to date has shown that the concept of D-RECs is more than peaking the interest of stakeholders, with many recognising how truly game-changing this new market instrument could be for clean energy access (SDG7) and prevention of climate change (SDG13). The feedback loop is already beginning, and the D-REC Initiative is currently targeting new investment of USD \$100m/year by 2024, which would be about 0.2% of total corporate-driven renewable capacity annual installations. The initiative estimates that this would mean more than 100 MW of additional renewable capacity deployed, over 250,000 tonnes of carbon reductions, and over 500,000 sustainable livelihoods improved in underserved communities.

The potential for D-RECs as an instrument for transformative change is limited only by the corporate appetite in renewables, which at this point sees no signs of waning. While the platforms to enable D-RECs are currently being built and finalised, the chance to funnel investments is just around the corner.

**To help the D-REC Initiative seize this full potential, get in touch to learn how to make your own investment or to fund the Initiative and enable its development.**