

Infrastructure



Sector strategy

Investments in infrastructure make up approximately 30 per cent of CDC Group's portfolio. The following pages give an insight into why this sector matters for us and what our investment priorities are.



Infrastructure is the foundation of economic development. Without reliable electricity, clean water supplies, efficient transport infrastructure and widespread access to communications networks, productivity is stifled and incomes remain low.

In South Asia and Africa, underdeveloped infrastructure keeps hundreds of millions in poverty. Their populations are also disproportionately vulnerable to acute and chronic climate shocks brought about by climate change. Dramatically increasing the quality, reach and resilience of infrastructure in these regions, in a manner that is consistent with the Paris Agreement and a just transition to net zero carbon emissions, is a prerequisite for achieving the United Nation's Sustainable Development Goals.

Meeting this challenge requires massive investment. The Global Infrastructure Hub (a G20 initiative) estimates that the "infrastructure funding gap" amounts to at least \$100 billion a year in Africa and \$60 billion a year in South Asia. Development finance institutions such as CDC, the private sector and other non-governmental entities can play an important role in addressing this gap. CDC has a longstanding commitment to infrastructure in these regions. Our investments help to extend access to electricity, water, transport and communications technology. And, through our activities, we increase the willingness of private sector investors to participate in challenging markets.

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01

The problems we are trying to solve

A decent standard of living for the growing populations of sub-Saharan Africa can be achieved only if 20 million additional jobs are created each year. In South Asia, 14 million new jobs are needed annually. The rapid economic growth on which these new jobs depends cannot be achieved without accessible and dependable infrastructure, delivered at an affordable price to end users. Today, however, infrastructure in South Asia and, especially, in Africa falls well short of what is required.

In both regions, businesses cannot rely on an uninterrupted supply of electricity. Seventy-eight per cent of firms in sub-Saharan Africa and 66 per cent in South Asia experience power outages, costing them on average eight per cent and 11 per cent of revenues, respectively. The unreliable supply of electricity in sub-Saharan Africa has been estimated to reduce employment prospects by 35 per cent.

African businesses are further hindered by poor transport infrastructure. There are only 2km of paved road per 100 square kilometres of land area in Africa, compared to 3km in Latin America, 25km in Asia and 122km in Europe. Intra-regional trade costs in Africa are thus the highest in the world, and 50 per cent higher than in East Asia. International trade is similarly hampered by poor infrastructure. In Africa, the largest ports handle less than 45 per cent of the hourly volume of shipments transiting through Europe.

The “connectivity” of African business is also restricted by internet access that is both limited in scope – with only 25 per cent of businesses and households having access – and costly. At \$20 per gigabyte on average, Africa has the most expensive data access in the world.

Besides stifling the economic growth on which prosperity depends, poor infrastructure directly degrades living standards. Electricity in Africa costs households three to six times the global average, and 57 per cent of households (or 600 million people) do not have electricity at all. Also lacking access to gas, two thirds of Africans and 60 per cent of South Asians burn solid fuels for cooking, contributing to 3.8 million deaths a year from inhaling smoke.



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Less than a quarter of sub-Saharan Africans have access to clean water and, as a result, about 10,000 die every day from water- and sanitation-based diseases. The situation is better in South Asia. Nevertheless, 133 million people there lack clean water, and more than five million Indians are exposed to arsenic in their drinking water.

Africans and South Asians are disproportionately vulnerable to climate change. This is primarily because poor countries cannot bear the cost of adaptation, but also because many live in areas that are already vulnerable to acute and chronic climate shocks. The fight against climate change is thus crucially important for economic development in Africa and South Asia.

The absence of reliable infrastructure often hits women harder than men. In Tanzania, for example, women spend four times longer on transportation-related tasks than men do and, in Niger, women spend up to 13 days a year fetching water. Women spend more time than men on household chores, which are more laborious when electricity and running water are unavailable. And women are subject to higher risks of gender-based violence and harassment when public lighting is not guaranteed and transportation is difficult to access.

Extending the reach and reliability of infrastructure is thus critical for meeting the United Nations Sustainable Development Goal (SDG) of “gender equality”. Indeed, none of the SDGs can be achieved without significant improvements in infrastructure, and several of the goals concern infrastructure directly: (6) clean water and sanitation; (7) affordable and clean energy; (9) industry, innovation and infrastructure; and (13) climate action.



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6 CLEAN WATER AND SANITATION



6. Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all

- Achieve access to safe drinking water
- Achieve equitable sanitation and hygiene
- Improve water quality through wastewater treatment

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



9. Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

- Develop quality, reliable, sustainable and resilient infrastructure
- Promote inclusive and sustainable industrialization
- Provide universal and affordable access to the Internet in least developed countries

7 AFFORDABLE AND CLEAN ENERGY



7. Affordable and Clean Energy

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

- Achieve access to affordable, reliable and modern energy services
- Increase the share of renewable energy in the global energy mix

11 SUSTAINABLE CITIES AND COMMUNITIES



11. Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

- Provide access to safe, affordable, accessible and sustainable transport systems
- Improve air quality and municipal and other waste management

8 DECENT WORK AND ECONOMIC GROWTH



8. Decent Work and Economic Growth

Promote sustained, inclusive and sustainable economic growth, full & productive employment and decent work for all

- Sustain per capita economic growth
- Achieve higher levels of economic productivity

13 CLIMATE ACTION



13. Climate Action

Take urgent action to combat climate change and its impacts

- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters
- Reduce and avoid greenhouse gas emissions



Massive investment in infrastructure is required to meet these goals. The Global Infrastructure Hub (a G20 initiative) estimates that the “infrastructure funding gap” amounts to at least \$100 billion a year in Africa and \$60 billion a year in South Asia.

This gap cannot be closed solely by the governments of African and South Asian countries, which face severe fiscal constraints. A large portion of the funding must come from non-governmental investors. CDC’s investments in infrastructure are aimed not only at helping to close the gap directly but at encouraging private sector investors to enter these markets.



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02

Our investment themes

The development needs of the countries we invest in give rise to our four “investment themes” – that is, to the specific aims of our infrastructure investments:

- 2.1 Create economic growth and jobs**
- 2.2 Tackle climate change**
- 2.3 Mobilise capital and catalyse private investments**
- 2.4 Improve access to infrastructure and quality of life**

2.1 Create economic growth and jobs

Infrastructure helps to provide jobs and lift the populations of Africa and South Asia out of poverty. It creates jobs directly, in the construction of the infrastructure and its ongoing operation and maintenance. However, it creates more jobs indirectly, by generating widespread economic growth through increased productivity and improved access to markets.

CDC's primary focus has been on energy, which is an essential component of economic development – required for industrialization, urbanization and improved living standards. CDC has a strong track record in developing least-cost utility-scale power generation capacity in Africa and South Asia. To date, we have provided debt or equity to 27 power projects. These provide over 3,500MW of generation capacity, which indirectly supports more than 800,000 jobs and livelihoods.

Rather than investing only in “one-off” projects, CDC has also funded businesses that develop and operate multiple power generation facilities. These include Globeleq (70 per cent CDC-owned), a developer of independent power producers (IPPs) operating 13 plants across five African countries; Ayana (49 per cent CDC-owned), an Indian renewables IPP developer with 1.1GW under development; and Gridworks (wholly-owned), established by CDC in 2019 to invest in on-grid and off-grid electricity network infrastructure (see Case Study 2).

CDC invests not only in power generation but right across the electricity value chain. We aim to strengthen transmission and distribution networks, which are critical to integrating renewable energy into the grid and giving consumers access to increased capacity. We support emerging off-grid energy solutions, which have a promising role to play in increasing access to underserved customers (see 2.4). And we invest in technologies that improve the quality, reliability, and viability of the electricity value chain, such as battery storage, smart meters, and prepayment or mobile payment mechanisms.

Nor are CDC's infrastructure investments restricted to power. We also increasingly invest in other forms of infrastructure, including:

- **Transport:** Road, rail, airports and seaports are required to integrate domestic, regional and global economies. By reducing end-to-end logistics costs, improved transport infrastructure increases the competitiveness of exported goods and reduces the cost of imported inputs, creating more jobs in the value chain.
- **Water and sanitation:** Increased access to clean water and sewerage systems improves health, increases worker productivity, and disproportionately benefits women and girls (see Case Study 3).
- **Telecommunications:** High quality telecoms and broadband infrastructure are required to integrate African and South Asian countries into the global economy, migrate from low-value agricultural and industrial production towards higher-value knowledge-based economic activities, address regional and gender gaps in mobile and internet access, and promote digital financial inclusion.



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2.2 Tackle climate change

Globally, 35 per cent of greenhouse gas emissions come from the energy sector, with a further 14 per cent from transport. The Paris Agreement's target of keeping the rise in the global average temperature to 1.5°C this century requires net zero carbon emissions by 2050. This, in turn, requires a massive shift from fossil fuel towards low-carbon energy. By investing in renewable energy, CDC can pursue its goals for economic development in an environmentally sustainable way.

CDC has committed more than \$1 billion to renewable energy. In relatively developed markets, such as India, we look for opportunities to deploy renewable energy at scale through development platforms such as Ayana. In more challenging markets, we provide patient capital and work with developers to get bankable projects off the ground. For example, we acted as equity partners with the Aga Khan Fund to develop the 147 MW Ruzizi III hydropower project in the Great Lakes region between Rwanda, Burundi and the Democratic Republic of Congo. And we are providing debt to local partners to finance the construction of 150MW of wind farms in Pakistan (see Case Study 1).

We also look for opportunities to invest in nascent renewable technology at scale: for example, financing the construction of the 100 MW Redstone Concentrated Solar Power project in South Africa, which is being developed by ACWA power. And we are keen to support the use of new technology that improves the viability of renewable energy when it is feasible and cost effective.

However, we also recognise that a subtle approach is necessary when addressing the needs of less developed markets, especially in sub-Saharan Africa. We will invest in gas-fired power stations and related feedstock infrastructure if the development impact case is compelling and we can demonstrate alignment with the country's pathway to net zero emissions by 2050. They provide cost effective, reliable baseload and peaking power which many African countries lack and cannot be supplied by solar and wind, which are inherently intermittent sources of power (as long as energy storage remains costly).

Because the transition to net zero emissions will entail profound economic changes, CDC is supporting a just transition for workers and communities. We have started to address this challenge in our portfolio. For example, our green skills pilot programme developed with Ayana helps to train infrastructure workers for new roles within the renewable energy sector. And we work with our investees to improve the resilience of infrastructure in the face of acute and chronic climate shocks resulting from climate change, such as heat waves, floods, droughts and cyclones.

Case Study 1: Pakistan wind power projects

In 2019, CDC committed \$82 million of debt financing for the construction of 150MW of wind power capacity in Pakistan. The project involves three separate schemes of 50MW each, two developed by Liberty Mills and one by Indus Group. They are part of a programme of 12 wind projects across the country totalling 610 MW. This will increase the renewable energy generation capacity of Pakistan by 50 per cent and provide clean, affordable power to the country.

CDC acted as Mandated Lead Arranger across each transaction and provided long-tenor US dollar funding alongside local banks extending local currency financing.



2.3 Mobilise capital and catalyse private investments

Much of the infrastructure in advanced economies is supplied by governments. In the countries we invest in, however, governments are constrained by limited borrowing capacity and relatively low tax revenues, much of which is needed for other commitments, such as healthcare and education. This means non-governmental investments must increase significantly if the infrastructure funding gap is to be closed.

With infrastructure firmly established as an asset class, international and institutional private-sector investors should be ideally placed to fill this funding gap. However, they are often deterred by the perceived risk of investing in infrastructure in developing economies. Although there is a large pipeline of potential opportunities, few develop into “bankable” projects that meet the risk-return expectations of private-sector investors.

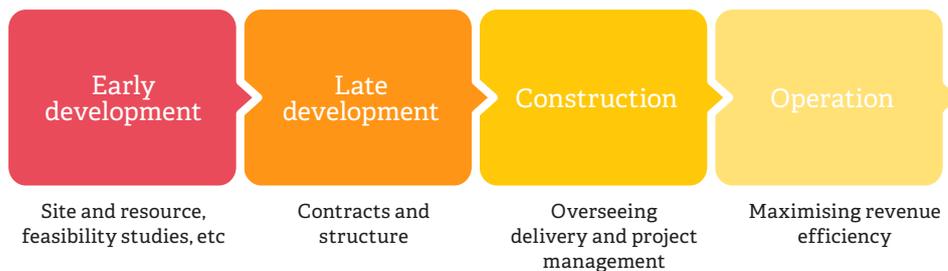


Figure 1: Infrastructure development life cycle

CDC aims to play a leading role in addressing these market mismatches, thereby encouraging private-sector investments into the sector.

Case Study 2: Gridworks

Traditionally, public sector and state-owned enterprises have been responsible for financing the electricity network in Africa. However, the scale of the challenge requires complementary investment from the private sector.

To help meet this challenge, CDC created Gridworks in 2019, pledging \$325 million of equity capital. Gridworks cooperates with governments, multilateral organisations and other investors to bring flexible, patient capital and private sector expertise to the sector. It invests in commercially sustainable electricity network infrastructure, whether on-grid or off-grid and facilitates the deployment of renewable energy.

CDC's long-term view of financial returns gives us a higher risk tolerance than many other investors, particularly in project development. This allows us to provide "patient capital" in the form of equity to our development platforms, such as Globeleq and Gridworks, or to other developers via the third-party funds we invest in (see Section 3). They can then build teams with the capabilities and financial resources needed to progress opportunities through the development life cycle – a process that can take more than five years, and in which very few concepts reach the construction stage (see Figure 1). Our risk tolerance also allows us to provide developers with long-term debt financing, which is in short supply not only in frontier markets but in more developed markets such as India.

Successful infrastructure projects enabled by CDC have a significant demonstration effect, providing the track record of profitability that other investors require to enter these difficult markets. It also provides host governments and local participants with experience which helps them undertake future projects more expediently. CDC has played this demonstration role in some of the most challenging markets. For example, we provided hybrid equity to Virunga Energy, a hydro-electric power business in the Democratic Republic of Congo; we provided debt and equity to Zephyr Power to develop a 50MW wind farm in Pakistan; and we have committed to provide debt to finance the construction of Upper Trishuli-1, a landmark hydro-electric plant in Central Nepal.

Case Study 3: Ayana

In 2017, CDC launched Ayana Renewable Power as a 100 per cent owned energy platform, with an initial equity commitment of \$100 million and the objective of delivering renewable energy in India's less developed states.

CDC was able to mobilise significant third-party investments to fulfil the company's development ambitions, with India's National Investment and Infrastructure Fund and Lightsource BP joining as co-shareholders in the company and committing additional capital in March 2019.

Ayana now has 40MW of operating solar projects in Karnataka and is constructing 1.1GW of solar projects in Andhra Pradesh and Rajasthan. It has the ambition to scale up to become a 5GW renewables platform in next 3-4 years.



2.4 Improve infrastructure access and quality of life

Disruptive technologies are creating new off-grid delivery models that improve energy access, especially in more remote locations. This is especially important for women, who usually bear the greater burden of household work, which is made much heavier by a lack of electricity.

These innovations include pico-solar products, individual household solar systems, and mini-grids that provide power for local commercial or industrial uses, such as small-scale manufacturing, agriculture and food processing. As they are adopted along-side the traditional utility-scale grid, a more varied and resilient power ecosystem is emerging in some of our countries (see Figure 2).

By extending access to power, these technologies promote economic growth and the wellbeing of previously underserved communities. They are also environmentally sustainable, reducing reliance on wood harvested locally and diesel generators, which are both expensive and dirty. CDC has provided capital to solar home system companies, such as M-Kopa in Kenya and Uganda, and PEG Africa in Ghana, Cote d'Ivoire, and Senegal. We have also invested in suppliers of off-grid solar for businesses, such as Mettle Solar Africa, which has developed solar installations across South Africa, Kenya, Namibia, and the Seychelles.

Inclusive infrastructure that improves quality of life encompasses more than just energy access. In the coming years, improving access to clean water and sanitation will increasingly become a sub-sector that we target. CDC aims to invest in projects that improve the resilience of water management and waste treatment systems. We have already embarked on this journey by providing debt financing to Roserve, an emerging end-to-end wastewater treatment and recycling solutions provider in India (see Case Study 4).

Case Study 4: Roserve

Despite the pressing need for wastewater treatment services in India, take up is low because many companies lack the capital required and underestimate the cost savings from such services. To help overcome these obstacles, CDC has invested in Roserve, a company that provides end-to-end wastewater treatment and recycling solutions to industrial clients through a “build, own and operate” model.

We expect the increased uptake to reduce fresh water consumption by more than 25 million litres a day, thereby promoting our goals of resource efficiency and environmental sustainability. The investment will also provide a positive demonstration of a business model that has succeeded in other markets but remains unproven at scale in India. Roserve is now considering using some of the capital for projects in sub-Saharan Africa.

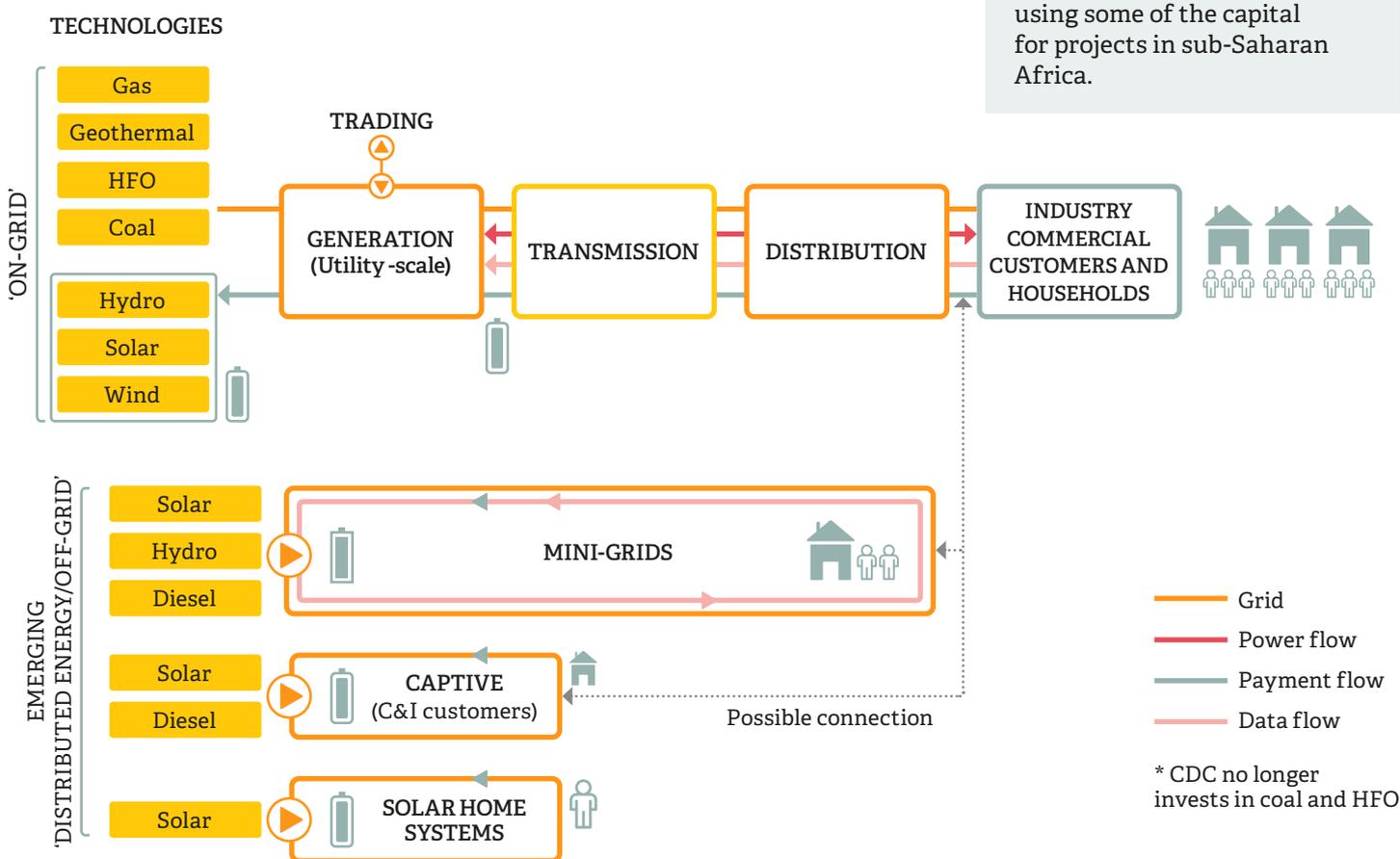


Figure 2: The emerging power ecosystem

How CDC invests in infrastructure

We deploy a solutions-based, product-agnostic approach when investing in infrastructure, focusing on the development needs of our markets.

How we invest depends on the specific circumstances of the infrastructure project concerned (see Figure 3). Some considerations include: the maturity of the market; the host government's experience with private sector participation in the relevant infrastructure sub-sector; the presence, role and experience of local or strategic partners; and the underlying risk profile of the investee.

CDC's return to direct investing since 2012 has expanded our engagement options. This means that we can always find a way to invest in infrastructure to achieve our development and climate change objectives.

We can draw on different capital sources within CDC to match the nature and risk profile of the opportunity. We typically provide "growth capital" to mature investors seeking capital to build projects or expand their operations, or in situations where markets and sub-sectors have some history of private sector infrastructure provision. Our equity stakes in established platforms such as Globeleq and newer platforms operating in established markets, such as Ayana, are examples of growth capital investments.

In contrast, we deploy "catalyst capital" for ventures that involve new business models or technologies, or that are tackling challenging markets or sub-sectors. For example, we used catalyst capital when establishing Gridworks (see Case Study 2) and when we lent to solar home system companies which are seeking to pioneer new business models of infrastructure access. Where our investees require technical assistance, we can draw on grant capital through "CDC Plus".



We believe the chances of success are greatest when we work through dedicated teams with on-the-ground experience. However, because the regions we cover are vast, and the infrastructure funding gap is so large, we also invest indirectly through third-party funds.

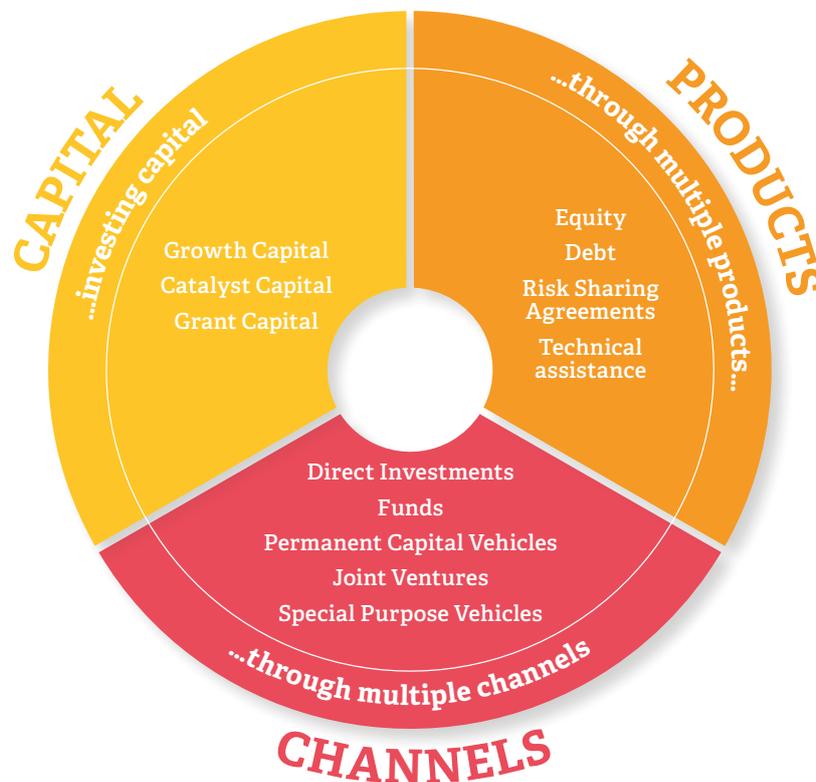


Figure 3: How CDC invests

We can deploy CDC's capital as equity, debt or hybrid instruments. The choice of instrument depends on the needs of the venture. Our platforms require equity investment to advance projects through the development life cycle, and as risk capital to finance the construction of new infrastructure. Where a project has been taken to a bankable stage by local or international partners (or one of CDC's own platforms) and is looking to commence construction, we can help realise this by providing long-term project finance.

We provide these "products" through a variety of channels. Our direct equity strategy typically seeks to channel CDC's capital through platforms or to work with strategic partners through joint ventures. We believe the chances of success are greatest when we work through dedicated teams with on-the-ground experience. However, because the regions we cover are vast, and the infrastructure funding gap is so large, we also invest indirectly through third-party funds. This allows us to take advantage of the local knowledge of the managers to whom we provide capital, and to help mobilise other private capital.

How we invest determines our role in the ongoing ownership and management of the infrastructure. We will be most hands-on, taking board positions and offering technical advice, when we have a significant direct equity interest. This allows us to influence the business strategies and operations of our investees, including their performance on environmental, social and governance (ESG) issues. As a debt investor, we provide our investees with freedom to operate within the boundaries and covenants set by the relevant debt documentation. We are most hands-off when we invest through funds, where we delegate stewardship responsibilities to our managers.

More than capital

CDC aims to make its investees not only better funded but also better managed. We can take positions on boards and sub-committees to influence the governance and strategic directions of businesses. We can also provide tactical or operational guidance, sometimes recruiting external experts and providing grants to pay for them:

- We worked closely with Ayana to develop international-standard environmental, social and governance (ESG) policies, procedures and capabilities. When building their first asset, the Ayana team undertook a local skills development programme so that people living near the project could take advantage of the job opportunities created by the construction and operation of a solar power plant.
- Ecom Express is one of the fastest growing end-to-end logistics companies in India. We undertook an in-depth gender diagnostic of the company, examining their policies and practices and gathering gender-disaggregated data by job function, level, location. This provided insights about the barriers to female employment. These were then summarised into a Gender Action Plan specifying measures to increase the number of female employees over a five year period from 2020.
- At Owendo Mineral Port in Gabon, we worked with our co-investors to help establish the business case for the recruitment and training of women to take up non-traditional roles within the organisation. A training programme has since been established to train up to 50 female operatives.
- We worked with M-Kopa, a solar energy company in East Africa, to research the potential benefits of introducing solar home system (SHS) refrigeration solutions among local communities, especially for women. This research assessed prospective customer bases, potential uses, anticipated impacts on behaviour, and what considerations or design changes would be needed to maximise the impact and commercial potential of new SHS-refrigeration products.



This strategy encompasses the activities, motivations and ambitions of a large group of people at CDC. They include our investment professionals, which span three product teams dedicated to improving infrastructure in our target markets (Infrastructure Equity, Project Finance, and Energy Access & Efficiency), and our impact professionals, who are thought leaders on the topics of ESG, Business Integrity, Development Impact, Gender and Climate Change.

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