

Content



KaXu Solar One I South Africa.



Credit: IFC



The International Finance Corporation (IFC)

(http://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/hc), the private sector arm of the World Bank Group, is one of the largest development finance institutions supporting the private sector in emerging markets. IFC was responsible for facilitating the structuring of the financing package for the KaXu Solar One project located in South Africa. This resulted in channeling approximately USD 900 million of private sector financing, utilizing an innovative project finance structure with blended finance elements. The KaXu Solar One project became the first large-scale concentrated solar power plant with storage developed by the private sector to begin operating in an emerging market. The plant uses parabolic mirrors to reflect and concentrate the sun's rays to produce heat, which then generates steam that powers turbines and produces electricity. Energy storage allows the plant to produce firm, base-load electricity even when the sun is not shining, offering a remarkable low-carbon solution to a growing African economy.

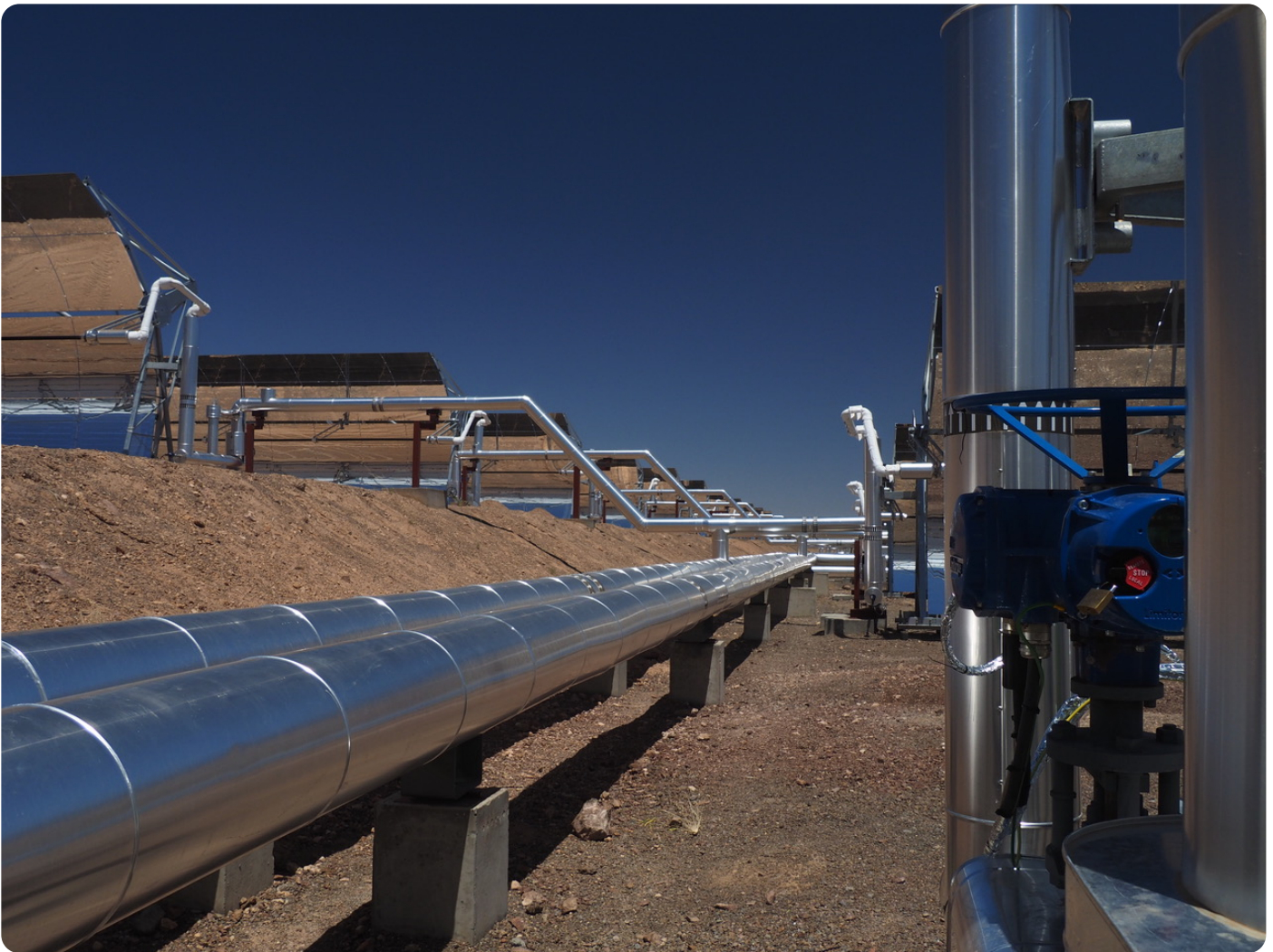
Key facts

- A 100 MW solar thermal collector supplies clean, baseload energy to the South African grid.
- The amount of generated energy is sufficient to supply approximately 80,000 homes;
- The plant utilizes more than 330,000 mirrors and 1,200 solar collector assemblies;
- The project created 1,700 jobs during the construction phase and 80 permanent jobs during operation;
- The project's ownership structure includes 20% shareholding that belongs to a local community trust, backed by Broad-Based Black Economic Empowerment funders;
- Replacing coal power generation mitigates an estimated 315,000 tonnes of greenhouse gas emissions/year, equivalent to removing 66,000 cars from the road.

The problem

Leveraging private sector finance has proven to be a major obstacle for the funding of renewable energy projects in emerging economies. The costs to construct large-scale concentrated solar power plants remain excessively high, and combined with a limited track record makes investors cautious, especially in developing markets. Untested or deficient regulatory situations in these countries have resulted in even higher investment barriers and perpetuated a reliance on fossil fuels to deliver energy.

South Africa has one of the most greenhouse gas-intensive economies in the world and for decades has relied on domestically-sourced, low-cost coal, which produces over 90% of the country's electricity. South Africa's coal power fleet is the most significant contributor to the country's greenhouse gas emissions, positioning the country as the 12th highest in the world.



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The solution

South Africa is home to excellent solar radiation resources, which are now being harvested by a 100 MW Kaxu power plant and converted into energy that is dispatched to the country's electric grid. Kaxu can generate enough electricity to power 80,000 South African households, equivalent to providing over 400,000 South Africans with clean, renewable and reliable power.

The International Financial Corporation, has brought funds from the Clean Technology Fund in addition to providing local currency financing of approximately USD 108 million equivalent to facilitate the structuring of the financing package. Specifically, Kaxu utilized an innovative blended finance structure that attracted a diverse group of investors. Kaxu has helped unlock the South African concentrated solar power plant market, attract financiers, and drive down costs, becoming the first operational private sector utility-scale concentrated solar power plant project in South Africa and in the developing world. Various market entry barriers, such as costs of developing new contractual structures, utilizing effective technology solution and sourcing components internationally have decreased, thus softening perceived risks and reducing uncertainties.

Helping the planet

A reduction in coal mining will prevent environmental damage related to this sector, such as land degradation, subsidence, overused and contaminated water sources, and acid mine drainage. Greenhouse gases are mitigated, helping to reduce emissions and thus combat climate change. Kaxu collects and reports annual generation data to IFC, following standard reporting framework and guidelines established in their Greenhouse Gas Reduction Accounting Guidance for Climate Related Projects.

Kaxu's success has played a significant role in attracting significant investment flows to other concentrated solar power plants, as well as to other sectors, including solar photovoltaic and wind in South Africa.

Helping people

The project has stimulated local economic growth and generated around 1,700 temporary and 80 permanent jobs in the Northern Cape, an impoverished province with one of the highest youth unemployment rates in the world.

Thanks to a unique ownership structure that includes minority shareholding by the local community, Kaxu can directly support long-term education and economic development initiatives in the area. The project has also contributed to the establishment of a local supply chain for the region's newly booming solar sector, generating both skilled and unskilled jobs in the local green economy.

A socio-economic and enterprise development program (SEED+) was set up by project developers to promote micro-, small-, and medium-sized enterprise development in four communities near KaXu's operation by enabling them to take up peripheral economic opportunities and gain sustainability. The SEED+ provides access to education, infrastructure and social protection, as well as funding, business training, and promotion of local businesses.



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Spillover effect

The Kaxu project has contributed to the continued trend of technological innovations that allow for more cost-effective integration of concentrated solar power plant generation with energy storage. Developers of follow-up projects have incentives to optimize energy storage capacity, therefore enabling the power plant to deliver energy at demand peak hours at increasingly competitive prices.

Technical features continue to mature, and targets have been re-evaluated for the country's energy mix composition, increasing the share of concentrated solar power plants and indicating that such power plants are highly scalable in regions like the Northern Cape where land availability is not a constraint. Investors have moved forward with additional concentrated solar power plant projects and more sponsors are interested in financing other projects in South Africa. The rapidly growing capacity of the South African market to implement these types of projects has facilitated investment flows and a series of replications with ever more complex technical characteristics. Technical features continue to mature, and targets have been re-evaluated for the country's energy mix composition, increasing the share of concentrated solar power plants and indicating that such power plants are highly scalable in regions like the Northern Cape where land availability is not a constraint.

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