

the impacts of solar energy

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There's no doubt that South Africa must embrace renewable energy to reduce its reliance on coal-fired power stations. Solar power offers a financially viable and rapidly implemented electricity-generating option at a fraction of the environmental cost of carbon-based energy sources. However, almost all human activities have some impact on natural systems, and this technology is no exception.

BirdLife South Africa's renewable energy expert, Sam Ralston, described the potential risks posed by concentrated solar power (CSP) plants to birds in an article in *African Birdlife*, January/February 2015, pages 56–59. The scant evidence available on the impacts of this technology on birds comes from the United States, where it has been found that birds of many different species collide with the panels, mirrors and associated infrastructure, and that power towers burn birds that fly through the zone of concentrated solar energy around the towers. However, many of the affected species are migrants, and it is unknown how many birds are likely to be affected in South Africa.

When Sam's article was published, the first solar-trough CSP plant in South Africa, KaXu Solar One, located north-east of Pofadder in the Northern Cape, was just coming on line, and photovoltaic (PV) plants were mushrooming all over the western half of the country. As 2015 drew to a close, the country's first power tower, Khi Solar One, situated between Upington

and Keimoes, was undergoing final testing and a second power trough plant, Bokpoort, was being commissioned near Groblershoop. The Fitztitute is now working with BirdLife South Africa to investigate the impacts of solar facilities on the country's birds.

PV plants are the least obtrusive visually and probably have the lowest environmental impacts; their one drawback relative to CSP plants is that they lack the capacity to generate electricity at night. Conservation Master's student Elke Visser is currently assessing the impacts of South Africa's largest PV plant near Postmasburg in the Northern Cape. Such facilities do cause some loss of habitat, and Elke has found that a few birds and reptiles have been impacted. Ironically, one of the main culprits is the perimeter fence – it's a sad indictment that we have to install electrified fences to protect the panels. But so far the impacts appear to be minimal.

The two CSP technologies are likely to pose a greater threat to birds and other wildlife than PV plants. Fortunately, BirdLife South Africa's Renewable Energy team has forged good relationships with project developers and operators, and we plan to have students conduct intensive impact assessments at the different types of facilities. We shall also work with plant environmental control officers to develop longer-term monitoring protocols to check for infrequent events, such as waterbird collisions.

Parabolic mirrors concentrate the sun's energy to heat oil to almost 400 °C at KaXu Solar One, South Africa's first concentrated solar power plant.

CSP plants generate waste-water that is disposed of in evaporation ponds, potentially increasing the risk of waterbird interactions with plant infrastructure. In the United States, managers of plants have tried to reduce this risk by attempting to exclude waterbirds, but that is a losing battle: creating large, shallow waterbodies in desert environments is bound to attract birds. It might be more prudent to design these habitats to maximise their benefits to birds, while siting them in places to minimise the risk of birds colliding with plant infrastructure. Already the ponds at KaXu have attracted a diversity of birds, including Maccoa Ducks, and the now-resident pair of South African Shelducks produced two broods in 2015.

By working with the solar-energy sector we should be able to assess impacts, and pass on the lessons learned from the first few developments to other projects in the pipeline.

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