

Solar power hits a tortoise roadblock

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A threatened tortoise species is obstructing plans to build huge power plants in the deserts of the US Southwest

IT IS almost high noon in California's Mojave desert. Two biologists clad in fluorescent vest-jackets carry tortoises in plastic boxes through the creosote bushes, away from a 15-square-kilometre construction site that the animals once called home. Against a pastel mountain backdrop stand three towers (pictured). When the plant is completed, each will rise above a sea of mirrors. Together they will generate enough electricity to power 140,000 homes.

The [desert tortoise](#) (*Gopherus agassizii*), a threatened species, has become the unwitting focus of a battle over the future of solar power in the US that has divided the green movement. Both sides want to expand solar, which in 2011 supplied a paltry [1 per cent of the nation's electricity](#). But can the US rely on people installing solar panels on their roofs and plugging them into the grid, or does it also need to build massive power plants in the sun-drenched desert?

The US government has backed "big solar", granting approval and billions of dollars in loan guarantees to a handful of plants now under construction on public land in the deserts of the south-west. Those plans won the support of environmental groups including the National Resources Defense Council (NRDC) and the Sierra Club. But desert conservationists argue that projects were fast-tracked without due consideration of the local environmental consequences. As delays and costs associated with moving tortoises grow, the prospects for a huge expansion of big solar on federal land have dimmed.

See interactive map on solar plants and desert tortoises: ["Big solar versus desert tortoises"](#)

The plant being built by [BrightSource Energy](#) in Ivanpah valley is the front line of the fight. BrightSource, based in Oakland, California, plans to start operating in 2013, supplying 370 megawatts of electricity. Initial assessments, conducted during a drought when tortoises may have been sheltering in burrows, assumed that about 30 of the animals lived in the area. Only after construction began in 2010 did BrightSource discover 166 tortoises.

Opponents blame a hurried approval process. "It was sort of 'go west and build energy'," says [April Sall](#) of the Wildlands Conservancy in Oak Glen, California. "There was a lot of chaos and poorly sited projects."

The US government halted BrightSource's project for two months, but eventually agreed that construction could proceed if the tortoises were relocated. So the company hired 160 biologists who scoured the site three times over, moving all the tortoises they found into a holding pen.

Now comes the delicate task of returning them to the wild. Biologists crouch in the dust to hydrate one tortoise by injecting saline into its underarm, drying it off with a napkin so no moist scent will be left to tempt predators such as foxes and ravens. Left in the shade of a creosote bush, it takes a few steps and lifts its head towards the scorching sun that makes the

Mojave desert so attractive to solar developers.

Unless drought hits California, most of the adult tortoises will be released this year. The juveniles, including an extra 57 that were born in captivity, will be allowed to grow for several years before being released.

Over the state line in Nevada, near a cluster of hotel-casinos called Primm, the tortoises' patchy distribution dealt another Ivanpah valley solar project a better hand. Two concrete tortoises greet visitors to Silver State North, a 50-MW photovoltaic array being built by [First Solar](#) of Tempe, Arizona - but they are the only ones around. Just seven tortoises were found on the site, and staff joke that a Pied Piper enticed any others over to BrightSource.

Without the hurdle of tortoise relocation, construction has raced ahead. In May, Silver State North is set to become the first of the new solar plants to begin operating on federal land. Golf carts zip between its 810,000 black photovoltaic panels, as engineers in air-conditioned shelters monitor the panels' performance on their laptops.

First Solar is one of the world's largest manufacturers of solar panels and has benefited from improvements in that technology - which between 2008 and 2011 slashed the cost of panels by 75 per cent. BrightSource instead uses a form of "concentrating" solar power, in which mirrors redirect and focus sunlight to turn water into steam and drive turbines.

The plummeting cost of conventional panels has also favoured rooftop solar, as well as big photovoltaic projects, on private and municipal land. Such installations have surged in the past two years, and already rival the total generating capacity of plants approved for construction on federal land.

Those big government-backed projects were meant to be just the first wave of a massive expansion, however. Applications still pending approval would add more than 33,000 MW to the grid - boosting total solar generation in the US by an order of magnitude. But with investors wary of investing in big solar plants as the technological ground shifts, and the plants now under construction hitting problems with tortoises, and also with lawsuits, it is unclear how many will ever get started.

[Solar Millennium](#), the German company behind one approved project in Nevada, filed for bankruptcy late last year. A plant being built in California's Calico valley has changed hands three times. BrightSource has spent \$56 million on tortoise relocation, and on 12 April shelved a plan to raise money through an initial public offering of stock, blaming poor market conditions.

Some of the environmental groups that have backed big solar are also getting concerned about the tortoises. On 27 March, the Sierra Club, the NRDC and the Wilderness Society sued the US Bureau of Land Management (BLM) to stop the construction of the Calico valley plant. That project, run by [K Road Power](#) of New York City, would destroy the habitat of at least 40 tortoises and disrupt a migration route.

For those who are banking on a big expansion of solar to wean the US away from its reliance on fossil fuels, these hurdles are frustrating. "You need every bit of renewable energy you can get," says [Scott Sklar](#) of the Stella Group, a clean energy consultancy based in Washington DC.

Although no one is admitting that any plant approvals were botched, the Department of the

Interior is now drafting a new map of BLM land that is appropriate for solar development. It should be released in October, and will exclude key tortoise habitat.

If BrightSource's relocated tortoises fare badly, it could affect future decisions about project siting, says [Amy Fesnock](#), a natural resources specialist with the BLM in Sacramento, California. The history of tortoise relocation isn't promising: when [Kristin Berry](#) of the US Geological Survey in Riverside, California, moved 158 desert tortoises during a drought in 2008 to make room for the expansion of an army base, half of them died within a year. This time conditions are about as favourable as they could be: the tortoises are in good health and there has been plenty of rainfall recently - meaning that mice and rabbits will be abundant as alternative prey for foxes and ravens. But with big solar's future already in a precarious position, those tortoises have a lot riding on them.