SOLAR CASE STUDY: NEXTDC

With a whopping 1575 panels covering approximately 6000 square metres, this Port Melbourne data centre boasts what is believed to be the largest privately funded rooftop solar installation in Australia.

From the outside, NEXTDC's 'M1' facility looks like a fortress. A spiky, two-metre-high fence surrounds the modern, office-like edifice. Inside, past the foyer of bullet-resistant glass and the security portals with their biometric finger scanners, are six ready-to-run back-up diesel generators, ensuring the data centre can act as a self-sufficient island for at least 24 hours in the event of a major blackout.

Security is paramount for a facility that houses clients' essential data. But what's interesting about M1 is that security has been interpreted to mean more than just theft deterrence or guaranteed energy supply. On the roof, a 402 kW solar system offers a different kind of resilience, allowing the business to 'lock down' a portion of its electricity bill for the next 25 years, improve supply stability and reduce reliance on fossil fuels.

Features:

NEXTDC Chief Executive Officer Craig Scroggie describes the interior of M1 as a series of separate compartments. Protected by fire-resistant walls, the data halls contain racks of servers arranged in long rows of colour-coded cages. Chilled air flows from the floor, through the customer racks and up to the ceiling, ensuring all the heat produced by those servers is efficiently removed. The cooling pumps and chillers also use a significant amount of electricity, and

Location:

826 Lorimer Street, Port Melbourne

System Size:

402 kW

Estimated Annual Production:

550,000 kWh

CO2 Avoided Annually:

726 tonnes

Solar inverter:

9 x Fronius CL series

Solar panels:

1575 x REC 255W

Mounting system:

Sunlock

Payback period:

~ within ten years

Funding model:

Capital outlay

Installation date:

October 2013

Installer:

Energy Matters

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the entire facility is rated to 22.5 MVA (megavolt amperes). “That’s a country town’s worth of power,” says Craig.

The solar system on the roof is large enough to power 88 Australian households every day, and has already generated well in excess of 200 megawatt hours in approximately six months. Within one year it is expected to generate the equivalent of the ‘embodied energy’ used in its production.

The M1 site has only been operational for 18 months, and during this build-up to full capacity the solar system can supply up to 20 per cent of the facility’s electricity needs. There’s no doubt the scale is impressive: installing the 1575 panels required 10 kilometres of direct current (DC) cable and 6.3 kilometres of mounting rails.

Funding model and business case:

Craig says the rooftop solar installation provided an excellent opportunity to use capital expenditure to offset future operational costs. The $1.2 million system should pay for itself within ten years, after which “it’s as good as free energy”.

That’s the technical payback period, but Craig also says there’s a “marketing payback period”. The positive publicity could be a boon for businesses looking for more than a simple economic benefit from their data centre service – businesses for which sustainability and carbon reduction are major concerns – and the M1 facility can help fulfil these needs without compromising on quality.

Over the last few years, the world’s leading technology companies have been enthusiastically promoting a clean energy agenda. Google, for example, uses renewable energy to power 34 per cent of its operations and has committed more than $1 billion to solar and wind projects. It’s not just about looking green – locking into long-term contracts for renewables is expected to save the company money as conventional power becomes more expensive in the future.

By committing to on-site solar generation and other energy efficiency projects, NEXTDC can position itself among these leading tech giants, while also taking advantage of the electricity price certainty that solar provides. Having the solar system integrated into the data centre means that NEXTDC could offer its M1 customers 100 per cent renewable energy, to the extent it is available, or provide a carbon footprint reading through monitoring of solar and grid power consumption.

Key challenges:

Nick Brass, co-founder of installer Energy Matters, says data centres are highly complex electrical environments, and it was essential to preserve ‘power integrity’ by preventing leakage from the DC solar system to the alternating current (AC) mains power system.

The sheer scale of the system also posed logistical challenges. A crane was needed to move components onto the roof, and the entire installation took three months to complete.

Other benefits:

Each day the 50,000 drivers who cross the nearby Bolte Bridge gain an unobstructed view of NEXTDC’s massive solar array. With an estimated annual production of 550,000 kilowatt hours, the system will reduce emissions by 670 tonnes annually – about the equivalent of taking 200 of those cars off the road for a year.

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