

# Solar Schools: data-driven learning in the Sunshine State

By Dalia Mikhail, Projects Officer, Zero Emissions Noosa and  
Matt Bulger, Principal, Cooroy Primary



### How a smart collaboration between technology business Solar Schools and Zero Emissions Noosa's (ZEN) grassroots initiative Race to Zero is re-writing energy lessons for Australia.

As Australian schools return to something approximating a post-COVID-19 education-as-usual scenario over the months ahead, a cohort of 'solar schools' will have a whole batch of very unusual datasets to learn from.

In normal times, schools with solar systems installed on their premises self-consume most if not all of the electricity that they generate free from the sun – at least on weekdays when students are in their classrooms. With the global pandemic, however, on-site, school-day energy consumption has plummeted because most students have been in lockdown at home.

In the time of COVID-19, the normal patterns of energy use and generation at schools have been disrupted as never before, and some schools will now have hard data to study what's been happening.

This cohort – a relatively small subset of Australia's 10,500-plus state schools – have become educational leaders on the clean energy frontline after signing up with Brisbane-based technology company Solar Schools!. This initiative enables them to monitor their energy use, and, for many, track the energy production from their solar systems.

So-called 'solar schools' can now be found across Australia and in New Zealand. The model is now attracting increasing attention internationally as the pandemic has shut schools globally and triggered escalating demand for online learning opportunities.

According to Solar Schools CEO and co-founder Rob Breuer, from an energy learning perspective the global pandemic may have an upside:

*"For us, it's like a tiny silver-lining to a very dark cloud. COVID has provided some very interesting data sets for students to explore. The reduction in energy consumption at schools has seen their solar systems provide or exceed their daily requirements for energy use, with many exporting to the grid. This provides some very interesting capacitive datasets when schools return to full consumption patterns. It also allows students to explore what might be possible with emissions reductions".*

The Sunshine State of Queensland is Australia's leading hotspot for solar-powered schools. Recently, the holiday destination of Noosa has stepped up to do even more, creating a grassroots community-driven 'Race to Zero' for its schools.

## Queensland facts and figures

- Queensland is the largest greenhouse gas emitter of all the states and territories in Australia, with the single largest source coming from mainly coal-fired electricity generation
- AEMO predicts that Queensland will have the highest rate of electricity demand growth in the two decades between 2016 and 2036
- The Queensland Government is committed to encouraging the uptake of renewable energy to create economic growth and reduce greenhouse gas emissions
- Queensland has set a 50% Renewable Energy Target (RET) by 2030 amongst other initiatives, including one million solar-installed rooftops
- Annual grid consumption is rising at between 2.5-3% per year across all schools
- Since 2009, [www.solarschools.net](http://www.solarschools.net) has coordinated maintenance and performed energy and system monitoring of 1,266 schools with 1,756 solar systems and an installed capacity of 7.4 MW of solar PV, with many systems installed a decade or more ago (i.e. the 'first wave')
- In general, these first-wave solar systems on schools are now aging, undersized, in some cases poorly installed, and hazardous. The cost to remediate this situation is estimated to be greater than whole-of-system replacement costs
- Now there's a 'second wave' of solar for schools, under the Queensland State Government's Advancing Clean Energy Schools (ACES) program, which is delivering the installation, operation and maintenance of 37 MW of solar PV capacity on 771 state schools across Queensland, with no up-front capital expenditure or operational risk
- The ACES program is forecast to enable minimum savings of \$236 million in energy costs over its first five years



### Students at Tallebudgera Primary School check out the Planet Watch app

Behind the ‘Race’ sits Zero Emissions Noosa (ZEN), a proactive community group with a unifying vision for a zero emissions and clean energy future, which works closely with the Noosa Council and Tourism Noosa. In ZEN’s sights are the proliferation of rooftop solar PV, the emergence of electric vehicles (EVs), coordinated demand response and a people-power shift towards virtual power plants (VPPs).

ZEN has completed a range of business case studies to support small to medium businesses<sup>2</sup> and maintains close partnerships with stakeholders such as Tourism Noosa and Noosa Council. In February 2020, ZEN co-held Queensland’s first *Solar in Strata Masterclass* which gave over 100 local resort and strata managers the tools they needed to implement rooftop solar on their premises.

Thanks to grant funding from Noosa Council, ZEN is now utilising the Solar Schools platform to build upon student and teacher level engagement and extend the initiative out into the community’s homes and businesses, as well as into more schools and other places of learning.

The idea of using schools as a catalyst for community change was evidenced in the early years of the solar school’s program in Queensland. In the 2000s, the installation of solar PV in schools, the collection of associated monitoring data, and the forging of curriculum linkages led to the wider take-up of residential rooftop PV as myths were dispelled through the program.

With today’s increasingly powerful energy technologies, and data-driven solutions, the Internet of Things (IoT) for energy has now

arrived, and the opportunities are being extended from students to their whole school communities, and on to the wider local economies that surround every school.

To this end, schools in Noosa are being offered the opportunity to participate in the ‘Race’ free-of-charge, an opportunity that is being bolstered by a new smart energy project called My Energy Marketplace (MEM), supported by grant funding from the Australian Renewable Energy Agency (ARENA).

The MEM project is led by Wattwatchers Digital Energy<sup>3</sup>, Solar Schools’ preferred supplier of real-time energy monitors. Over the three years to 2022, MEM will roll out ARENA-subsidised smart energy solutions to 5,000 homes and small businesses Australia-wide, plus 250 special ‘Energy Starter Packs’ for schools.

Solar Schools is a core MEM partner alongside Wattwatchers, and participating schools will begin with an introductory version of its educational tools, and the option to upgrade to premium services including dedicated curriculum support (terms and conditions apply and co-contributions may be required).

To make energy data truly educational, the Solar Schools team offers curriculum integrations aligned with STEM-subject areas, mathematics and science in particular, but also extending to IT, environment and sustainability. There’s also a made-for-iPads app, Planet Watch, which turns managing energy to help the planet into an online game for younger students.

For Breuer, Planet Watch is the student-friendly educational face of Solar Schools, while behind it sits operational tools for school administrators to manage and run their solar assets better, with the added motivation of high levels of student and teacher engagement:

*“Our energy management ‘engine room’ and website are supported by the Planet Watch app, which gamifies the data. Each school is represented as a planet in the solar system, and the health of the planet is dependent on the real-time energy decisions made by the students in the classroom. This ensures the data is utilised from years 1-12 with resources supporting cross-curricula use of the data.”*

*“Change your energy behaviour by reducing wastage at the school, and you’ll see the health of your planet improve in the Planet Watch app. Now, through collaborations like the ZEN schools, participants are setting targets and working to achieve reductions via whole-of-school*

## Feature

*learning. Energy action and education are being fused together, and there's strong potential to raise energy literacy levels for the whole school community."*

This is now playing out on the ground in the Noosa region where ZEN is aiming to further promote the rooftop solar potential in schools and the opportunities for virtual power plants (VPPs). The group is also investigating an e-waste facility for the region (Substation 33), and a social enterprise community-based power offshoot that would explore new technologies and opportunities in VPP and other community-based power opportunities.

Breuer cites an indicative example of a typical Queensland state school, which has a 100kW rooftop solar system installed, with the potential over its 25-year life assessment to cut \$43.75 million off power bills, while cutting 3,025 tonnes of CO<sup>2</sup>-equivalent emissions.

**"Add behaviour change extending to the homes of students, leading to demand management and reduced emissions, and the impact spreads even further. Average savings for schools participating in our behaviour change education program are 15-30%, and sometimes up to 60%".**

For ZEN, the initiative offers a path to a better energy future for Noosa and beyond. Placing solar panels on school facilities reduces grid-supplied energy consumption and, by educating students about energy saving concepts, can have a multiplier effect when extended into the community.

### ZERO EMISSIONS NOOSA (ZEN)

ZEN is a community-based volunteer organisation committed to zero net community emissions of greenhouse gas pollution by 2026. ZEN has delivered notable initiatives since inception, including the Noosa Electric Vehicle expo, which is the largest of its type and has grown to become the Go Noosa Sustainable Transport Festival (scheduled to be held later this year, COVID-19 restrictions permitting). ZEN also maintains a range of partnerships with Tourism Noosa and Noosa Council ensuring full support to emissions reduction across the Noosa Shire.

A highly successful Queensland-first Solar for Strata event was held with Tourism Noosa, allowing over 100 Noosa resort and strata managers to receive the tools they need to integrate rooftop solar into their businesses, with many resorts and hotels already seeing the savings.

ZEN provides business case studies of solar champions in the region, everything from small business renters to large owner-occupied breweries. While Noosa Council maintains its own zero emissions policy for council-owned assets, ZEN works to reduce community, business and tourism emissions. Thanks to a Noosa Council grant, Solar Schools and its Planet Watch gamification will now be utilised as part of Race to Zero.

*Dalia Mikhail is Project Officer of ZEN and a proponent of its Race to Zero challenge. She developed the concept of what is now known as the Solar Schools program while working at Stanwell. Her detailed understanding of the value of real-life data in the classroom has seen her drive the use of this data in the curriculum, as a mechanism of change for over 20 years.*

### REFERENCES

1. [solarschools.net/energy-starter](https://solarschools.net/energy-starter)
2. [zeroemissionsnoosa.com.au](https://zeroemissionsnoosa.com.au)
3. [wattwatchers.com.au](https://wattwatchers.com.au)



**ZEN's Dalia Mikhail with Cooroy Primary School's Principal Matt Bulger**