

Z-NET Uralla

On the way towards zero net energy



Energy efficiency is a critical pillar in the plan for a NSW shire transitioning to 100% renewable energy. Z-NET Uralla president, Sandra Eady, spoke to Eva Matthews about the steps they've been taking.



↑ Uralla's Z-NET approach puts a focus on energy efficiency and tailors activities to maximise community benefit. The group has run curtain-making and draughtproofing workshops to ensure the inclusion of lower-income households and renters.

IN NOVEMBER 2014, Uralla in NSW was awarded the opportunity to become Australia's first Zero Net Energy Town (Z-NET, see box for more). From the start—and one of the key reasons their submission was successful—this has been a story of community engagement and contribution, with whole-community benefit at its heart.

A blueprint for action

While other communities are moving towards 100% renewables in different ways, Sandra

says that the "Z-NET Blueprint really gave us a focus and an overarching goal." One of the first things the group did was to set a vision and mission for Z-NET Uralla, to guide decision-making around which activities to undertake. As a relatively conservative population ("We're not tree-huggers, we don't talk about climate change or greenhouse gas emissions"), their focus is on renewable energy, energy efficiency and saving money on energy bills. The group's activities reflect this, and are centred around education and

Z-NET Uralla

Vision: A sustainable Uralla shire in a sustainable world.

Mission: To assist the people of the Uralla shire transition to energy self-sufficiency, based on renewable sources and to allow our community to confidently participate in the unfolding revolution in energy technologies.

advising practical actions.

While the blueprint for Uralla (a shire of around 6000 people in 2200 households) is moving them towards 100% renewable energy for stationary use (i.e. not including transport) over a 10 to 15 year timeframe, Sandra notes that "at this stage, we are focused on energy efficiency and rooftop solar PV." She adds that the level of resources available (funding and volunteers' time) has determined what the group has been able to achieve to date. But even with these constraints, they've achieved a lot over the past couple of years.

Energy efficiency first

The group received grants from both the Murray-Darling Basin Regional Economic Diversification Program and the NSW Office of Environment and Heritage, along with great support from the Uralla Shire Council. This enabled them to recruit a project officer to run free business and home energy-use reviews, with help from volunteers.

To date, 23 local businesses (including cafes, a brewery, orchard and dairy) have had

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an energy-use review, using thermal imaging and monitoring equipment donated by a Z-NET Uralla member. The equipment enabled businesses to get energy-use information specific to their business; for example, one café had eight meters installed on circuits for the coffee machine, fridges and ovens. While the owners had been happy that they'd built a business with state-of-the-art equipment, the review showed them how expensive this equipment was to run! A number of measures to improve the efficiency of the various appliances were then undertaken; for example, installing a larger capacity, more efficient coffee machine, improving ventilation around the fridge, draughtproofing around vents and architraves, and making an insulated blanket to go over the cake display fridge at night.

Other businesses have had their energy use tracked to determine the optimal solar installation for their energy-use patterns. Inefficient refrigeration proved to be an issue for a number of businesses, so a refrigeration engineer was brought up from Sydney to hold a workshop on optimising the efficiency of refrigeration systems and help redesign some systems for greater efficiency. The meters were also used for education purposes at the local preschool, to show the kids how energy use changes between different appliances like a TV and a kettle.

So far, around 40 homes have also benefitted from reviews. In this process, gas and electricity bills for the preceding 12-month period are analysed. Again, thermal imaging is used, as well as a comprehensive energy assessment tool (in Excel) that was developed by the group themselves, after they found that many of the available energy auditing tools

The Z-NET Blueprint

The Zero Net Energy Town (Z-NET) Blueprint is a model that enables Australian communities to assess and design their own plan to achieve 100% renewable energy within five to ten years, in a way that is competitive on price, quality, security and reliability. The approach is two-pronged: reduce energy use and then import or locally produce energy from renewable sources to meet or exceed energy needs.

The blueprint was developed by a consortium of eight organisations, led by the Moreland Energy Foundation and managed by Starfish Initiatives, and supported by a 10-member advisory panel of specialists in the sustainability/energy field. Funding of \$105,000 from the NSW Office of Environment & Heritage was matched four-to-one with pro bono/volunteer contributions. Work on the blueprint began in 2013 and it was launched by the NSW Minister for Environment in October 2015.

The blueprint sets out a simple logic for communities across Australia to establish a least-cost approach to becoming a Z-NET.

As well as identifying the enablers (e.g. council leadership, funding support, engaged community), transition options are generated. Each option is then evaluated as to what's possible—technology, context, impact, case study example; and 'will it

work here'—technical, regulatory, risk, market, business case. Each option is also further detailed, including its percentage contribution towards the Z-NET target, timeframe, challenges, key steps, resources and support roles required.

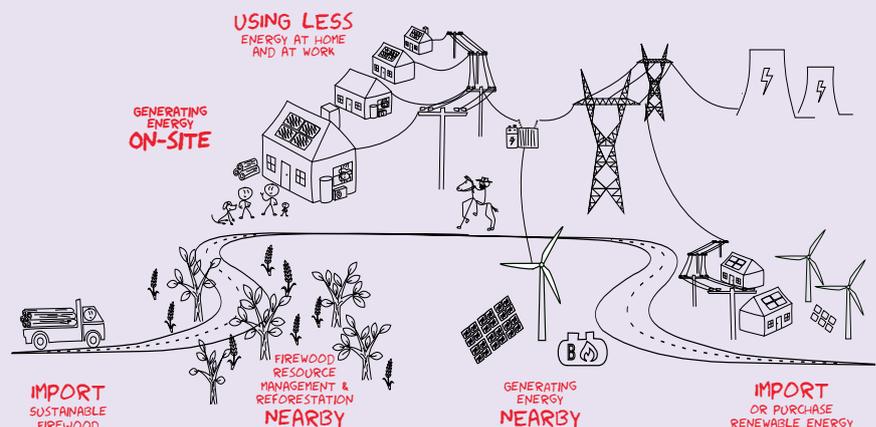
Part of this process included developing a plan for a 'case study town', which helped ground the model in the real world and included a comprehensive business case assessment quantifying the costs, benefits, opportunities and risks of the various transition options.

In November 2014, Uralla, in the New England region of NSW, about halfway between Sydney and Brisbane, was selected from a competitive application process to become that case study town, and Australia's first Z-NET.

Starfish Initiatives is currently seeking expressions of interest from other communities interested in becoming Z-NETs and so far 50 submissions have been received. The Uralla team says that for a community to make Z-NET happen for them, they need to supplement their volunteer contributions with additional expertise, experience and the capacity that external grants can bring.

More info:
Z-NET: www.z-net.org.au

↓ What can contribute to zero net energy for Uralla? Image from Z-NET Uralla Case Study



don't factor in the use of firewood for heating or cooking—an energy source that accounts for around 45% of energy use in Uralla—nor measure at the scale that is useful to households, including rentals, which account for around 20% of homes in the town.

Suggestions for action

A spreadsheet automatically generates a report for the household and suggests actions that can be taken to improve the home's energy efficiency. For example, one question asks whether lids are kept on pots when cooking; if the answer is no, then the suggestion for action is—keep the lids on to shorten the cooking time and save energy!

It's very much about the little things, alongside the bigger-ticket items such as insulation, that add up to greater energy efficiency.

Feedback from the assessed homes has been positive, reports Sandra: "All of the homes contacted so far have taken some action to improve either their building fabric or a behaviour to help save energy and make their homes more comfortable." The tool is available to other communities who may wish to use it (contact Z-NET Uralla); indeed, nearby Gloucester is using it already.

Engaging the whole community

Ever-mindful of ensuring the whole community benefits from this process and is supported towards achieving the Z-NET goals, the group have tailored their communications and events carefully.

To date, they have run four curtain-making and draughtproofing workshops, and have donated thermal-backed materials to make this an energy efficiency option affordable to everyone, including renters, in this shire where the average income is 70% of the NSW state average.

Late last year they held a workshop in conjunction with NSW OEH, attended by around 70 locals, on the impact of the end of the gross feed-in tariff on solar and the issues to be considered around changing to net metering, optimising energy use, the role of batteries and the importance of energy efficiency.

Sandra says that many residents and businesses are helping achieve the renewable energy goal by installing solar, including opting in to a bulk buy of panels and hot water systems run by Farming the Sun. Corena (the Citizens Own Renewable Energy Network) has set up a project to encourage the installation of solar panels on rental

homes through a six-year interest-free loan to landlords; so far three homes have taken advantage of this, making electricity more affordable for their tenants and improving the capital value of their investment property.

The Z-NET Uralla website is a great source of news about the group's activities and results, upcoming events and useful resources for households and businesses. With around 30% of the community without internet access, the group also makes sure they prioritise a face-to-face presence—through their office in the Uralla Community Centre, stalls at public events, town meetings and a monthly column in the council newsletter, which lands on "every kitchen table in the shire."

It would seem the selectors made a good choice when deciding on Uralla as the first 'case study' town for the Z-NET Blueprint. The group has not only helped shape the process with their input; they are creating solutions and tools that are moving their whole community towards its Z-NET goals. And beyond that, these resources can also help the communities that follow on their own paths towards zero net energy in coming years. *

More info:

Z-NET Uralla: www.zneturalla.org.au,
facebook.com/ZNetUralla

Energy efficiency options for tenants

If you're one of the 31% of people in Australia living in rental accommodation, you might be tempted to think there's little you can do to improve the energy efficiency of a place that is not your permanent home, or you might wonder why you'd bother. However, with the help of Sandra Eady, president of Z-NET Uralla (featured in the story above) and the federal government's energy saving website (www.yourenergysavings.gov.au), here are a few suggestions that are easy, relatively inexpensive and portable, so you can take them with you when you move!

- Use door snakes to seal your doorways, reducing draughts and keeping warmth in during winter and hot air out in summer
- Replace old incandescent bulbs with LEDs; store the old bulbs somewhere safe, then, when you move, take your LEDs with you and put the old bulbs back
- Instead of always using a space heater during the colder months, consider

heating your body with a hot water bottle or throw rug (even a heated rug can use as little as 50W of energy compared with up to 2400W for heaters); wear bed socks when you go to sleep and pile on an extra blanket if needed

- Turn appliances off at the power point when not in use; similarly, only have the lights on where/when you need them
- Where rooms have curtains/blinds, keep them closed during the day in warmer months to keep the heat out; in colder months, keep them open during sunny days to let the heat in and close them at night to keep the heat in
- Use rugs on the floor to help prevent draughts coming up from under timber floors and to improve thermal comfort under your feet
- If your small household appliances give up the ghost, buy the most energy-efficient replacements you can afford
- Do your cooking efficiently; for example,

keep lids on to reduce heat loss, use the toaster rather than oven grill to toast bread, thaw frozen food in the fridge rather than using the microwave.

For more expensive and complex solutions, such as insulation, solar power or efficient hot water, talk to your landlord about whether they'd be prepared to make an investment that will improve their property value and keep tenants happy (because their energy bills will be lower), and therefore keep the rent coming in. There may be ways in which you could share the cost. For example, the landlord could pay for insulation batts in the ceiling and you could install them. Consider whether you have any skills/resources that could contribute to an energy efficiency solution. Read more in 'A renters guide: Energy efficiency on a budget' in *ReNew 134*.

Watch Z-NET Uralla's video on energy efficiency for renters: bit.ly/2ePijpx

Case study: Teaching an old house new tricks

Susan McGrath and her husband John are all about home improvement that helps the planet, thermal comfort and the hip pocket. On a four-acre site in the town of Uralla, they grow their own veg, harvest rainwater into tanks and even live in a recycled house—part of the old courthouse and another home that were brought over to Uralla from nearby Rocky River around 150 years ago.

Around 12 years ago they started investing in some home improvements to make life a bit more comfortable and less expensive as energy efficiency improved.

First on the list was the installation of pink batts (“the thickest you can get”) in the roof. Then they added a sunroom to one whole side of the house (12m long x 5.5m wide). Double-glazing at that time was hard to get and too expensive, so they opted for 5mm safety glass instead and a concrete slab for passive solar gain. Facing north, this room gets the winter sun all day, with the warmth penetrating right through to the middle of the house. Blinds on all the windows help keep the heat in overnight, and summer heat out if required; though Susan notes that overheating is not really an issue. They installed a wood heater in the sunroom for the colder months, which also gets used as a cooker. A fan above drives the generated heat through most of the house. Susan says that this room “has just changed the whole house—it’s terrific.”

About nine years ago, a solar panel rebate scheme enabled them to install a 2kW PV system on the roof (which they supplemented with another 2kW a few years ago). Another rebate scheme around the same time saw them install a solar hot water service, using evacuated tubes. Susan says this has been very effective—abundant hot water requiring only minimal boosting during winter.

Some three years ago, they filled all the draughty cracks in the interior walls before giving the walls a new coat of paint. At a cost of just \$3000, they had Easy Foam come and inject a castor oil based expandable foam into the exterior walls. The result is not only improved energy efficiency and thermal comfort, but incredible soundproofing and vermin-proofing, Susan says. They laid wool carpet with extra thick underlay on the floors of the main living room and an adjoining room, which are in the coldest part of the house, to reduce draughts and increase cosiness.

All of these measures have seen John and Susan’s goals around comfort and cost achieved. For the past 10 years they have not had to pay an electricity bill (previously they had paid around \$2000/year); the savings have repaid the cost of the solar systems and their power bills are now in credit. But Susan notes that “there are always new things happening”. She is keen to investigate something she recently saw in *ReNew*—a ‘sleeve’ that fits around the chimney as an



↑ In Susan and John’s sunroom, a couple of kettles on constant boil on the wood stove provide a warming cuppa when needed while also humidifying the air.

alternative hot water booster. And she’s hoping that the cost of battery storage will fall even more so that in a couple of years they could put their power bill savings towards that. No doubt they’ll consider many other ‘icing on the cake’ ideas over a nice cup of tea in the sunroom. *

Watch Susan’s videos:
bit.ly/2wTIsNe and bit.ly/2gWhyvA

↓ Tale of two old weatherboard houses: data on the temperature of a high-use room and a low-use room, plus external temperature, in Susan and John’s well-insulated house (left) and another house with poor insulation (right). ICT International supported the data collection on 10 homes and Z-NET Uralla is looking for help with analysis of these data. Contact them at projects@zneturalla.org.au.

