



Zero Carbon Communities Guide

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This report was authored by Imogen Jubb, with contributions from many leading Zero Carbon Communities. This work does not necessarily reflect the formal position of each contributing organisation.

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Foreword

This publication is a guide for community groups and councils who want to see rapid local progress towards zero emission targets.

Globally, local governments and communities are leading the way on climate action, aligning themselves with the latest climate science and international agreements. Many are already working towards 100% renewable energy goals and zero emissions targets.

In 2016, Beyond Zero Emissions reviewed 152 Australian councils and found 82% had zero emission targets for their own operations and 18% had community-wide zero emissions targets.

Key benefits outlined by the councils are:

- Cost savings
- Wider economic and social benefits
- Achievement of environmental sustainability and emission reduction goals
- Becoming a regional leader.

The barriers these councils faced were:

- Federal policy
- Investment uncertainty
- Access to resources
- Technical expertise.

BZE launched Zero Carbon Communities in 2016 to highlight nation-leading initiatives for 100% renewables and zero carbon emissions, to tackle State and Federal impediments to action, and to encourage high ambition communities to put BZE's Zero Carbon Australia research into action.

Our vision is an ever-growing network of communities across Australia, working together to achieve zero carbon status. In Victoria, BZE is currently focussed on three communities: Baw Baw, Benalla and Nillumbik council areas.

This guide offers a simple framework combined with the key steps a community can take to achieve zero carbon status within ten years. It aims to inspire confidence and action, improve knowledge transfer, publicise initiatives and innovations, offer proven models for action and to point aspiring communities towards the growing number of relevant resources.



John Brenan
Chair at Clean Energy Nillumbik

A handwritten signature in black ink, appearing to read 'John Brenan'.

"Our vision is an ever-growing network of communities across Australia, working together to achieve zero carbon status."

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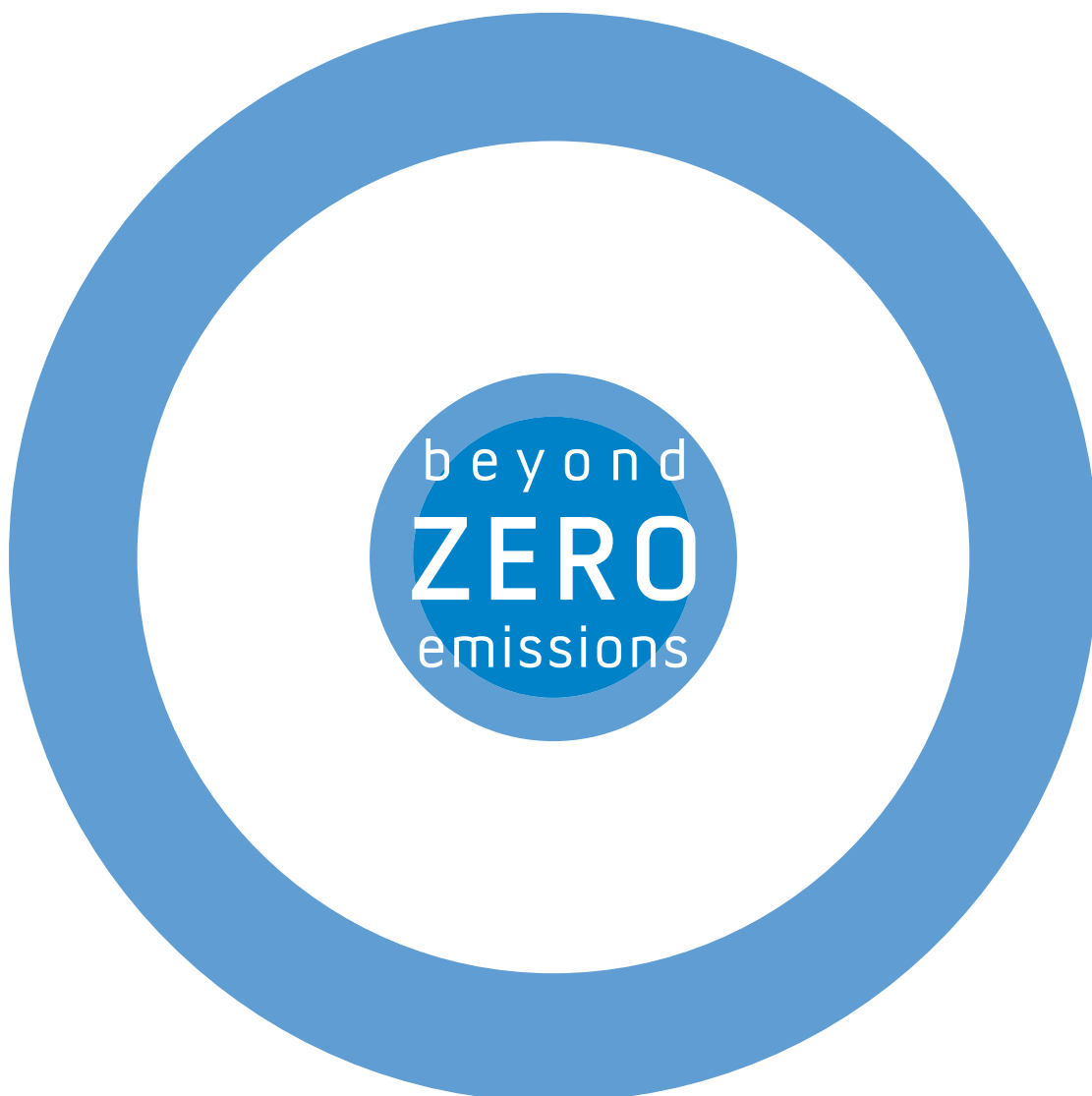


What is a Zero Carbon Community?

A Zero Carbon Community is a community working to cut local carbon emissions to zero within ten years by taking targeted action to reduce community wide emissions.

Zero Carbon Communities inspire others to replicate and scale their approach to start their own journeys towards zero carbon status. Their efforts will lead to faster reduction of Australian and global emissions.

Key benefits of Zero Carbon Communities include significant growth in local jobs and investment, slashed electricity and gas bills for households, businesses and industry and a cleaner, healthier environment for local residents.



Why ten years?

BZE recommends a ten year timeframe for transition because it is achievable and affordable. There are many reasons to move rapidly on reducing emissions.



Climate science

Emissions need to reduce fast to avoid the threat of severe climate change and costly adaptation measures.



Benefits

Communities which start down this path will see significant growth in local jobs and investment, major cost savings and a cleaner, healthier environment for local residents.



Solutions are cost-effective

Proven and affordable solutions to reduce emissions and spending on energy already exist. The BZE Zero Carbon Australia plans demonstrate evidence-based and cost-effective solutions in the stationary energy, buildings, land use, transport and industry sectors.



International agreement

The international community has committed to limiting climate change to well below 2°C and to aim for no more than 1.5°C. This means we must rapidly reduce our greenhouse gas emissions to zero and beyond.



Ambition

Without ambition to take this challenge seriously we will fail before we begin. Setting an ambitious target is challenging but also inspires leadership and innovative solutions. Leading communities need to aim high and demonstrate that rapid change is possible.



Motivation

Many people feel that there is a gulf between the magnitude of the problem and the impact they can make. Acting within a local community can overcome this roadblock by aligning our capabilities for change with a meaningful, motivating response.



Moral and ethical

With our very high per capita emissions and high living standards, Australians can do their fair share by acting quickly to reduce emissions.

"The world has seen remarkably fast economic transition in the past and can do so again. We can create 100% renewable energy systems, make our buildings, transport, agricultural and industrial systems zero carbon, minimise waste – and do it remarkably quickly."

Why create a Zero Carbon Community?

There is widespread recognition that those who lead the renewable energy race will reap significant economic and social benefits.

Achieving a change of this scale would be significant enough to contribute markedly to the global challenge and tangible enough to feel like we can influence change. There is a lot to be gained by getting started right now.

If we choose to become leaders in the race towards zero emissions, we have the opportunity to secure our food, water and energy supplies for the future and build a new and robust economy as a global renewable powerhouse.

Key benefits of becoming a Zero Carbon Community include:

- Access to new investment & funding sources
- Creation of jobs in new energy and other industries
- Support an active and engaged community
- Reduction of costs via reduced energy consumption
- Achievement of existing sustainability goals
- Increased public profile as a leading community.

"Since 2006, BZE has been researching and developing plans for a Zero Carbon Australia."

How do we start?

Achieving zero emissions is achievable and affordable in all sectors. But making major change can be daunting. So many factors impact upon the carbon emissions of a community that it can be difficult to know where to start. It can also be hard to see how a small community can bring about visible change when so much seemingly relies upon state and federal policies.

Since 2006, BZE has been researching and developing plans for a Zero Carbon Australia. These Zero Carbon Australia plans cover all sectors, including emissions from buildings and energy, land use, transport and industry. The plans underpin the Zero Carbon Community initiative by providing guidance on what is achievable and affordable.

A Zero Carbon Community may choose to focus on all sectors at once or choose one sector to begin with. Different communities have differing opportunities to reduce emissions in each sector and differing abilities to achieve change. Ideally communities would work to reduce emissions across all sectors, but a focus on one sector can be a good starting point.

Zero Carbon Australia

The BZE vision sees a zero carbon future for all sectors in Australia including stationary energy (buildings and energy), waste, transport, land use and industry.

Based on science and research our groundbreaking Zero Carbon Australia plans outlines and costs a national transition to a zero emissions economy. Our research has been repeatedly validated by external researchers and demonstrates that this vision is achievable and ever more affordable.

Zero Carbon Communities are a vital way to bring about effective implementation of these plans and rapidly reduce emissions.

Zero Carbon Communities Vision

A Zero Carbon Community is a group of people who have taken on the task of reshaping and decarbonising their local environment. These communities create a way of life that is sustainable and comfortable, with improved health and wellbeing while saving money.

To find out more visit:
<http://bze.org.au/publications-list>



Buildings

In a Zero Carbon Community, residential, commercial and industrial buildings have net zero emissions. Many buildings are net exporters of renewable energy, while energy consumption in all types of buildings is reduced by using a combination of energy efficiency and renewable energy approaches including rooftop solar photovoltaics (PV) and the elimination of gas. Residential buildings roll out BZE's [Energy Freedom initiative](#), turning homes into self-supporting power generators with great thermal comfort for residents. New technology trends are continually assessed with installation of battery storage, smart energy data and other emerging technology used across all building categories.



Energy

In a Zero Carbon Community, the energy sector has transitioned to 100% renewable energy and is capable of powering homes, businesses, industry and transport. Energy consumption is reduced by energy efficiency. Investment in rooftop solar PV, community renewable energy projects and innovative renewable energy retail reduces costs and allows consumers to benefit from local energy generation and sharing.

Land Use

In a Zero Carbon Community, zero emissions are achieved by assessing emissions sources from livestock, deforestation, agricultural crops and soil and manure management. Scalable revegetation and soil management offset emissions and provide income from national carbon farming programs. Regional communities draw down land use emissions below zero, supporting urban communities to achieve their zero carbon goals. Better land use, including forestry and agriculture, is key to removing emissions from the atmosphere.

Waste

In a Zero Carbon Community, the waste sector has hit zero emissions through reducing of waste and diverting of materials from landfill through reuse programs and advanced recycling processes. Processing diverts all organic material from landfills and instead produces energy and compost material. The waste industry is a zero carbon leader with efficient industrial processes and electric trucks. Communities, government and industry collaborate across regions to ensure economies of scale and minimal costs. Households and businesses demonstrate outstanding leadership in waste avoidance, embracing the sharing economy and saving money through avoiding waste and maximisation of all material use.

Transport

In a Zero Carbon Community, emissions from private vehicles, car fleets, trucks, buses and rail are minimal. Public transport systems are transformed with electric buses, integrated charge stations and solar powered fast charge networks. Commuter networks share electric vehicles and free web-based carpooling matches travel needs to drivers. High-speed rail and solar powered trains are underway. Plans and incentives for cycling and electric bikes are integrated into the overall transport plan with parks, walking and bike trails.

Industry

In a Zero Carbon Community, industry makes heat for industrial processes through zero emissions renewable heat sources, steel is made without coal, cement is zero carbon and community members are smart about the way materials are used to reduce waste. Leading communities work to create the industries of the future and take advantage of the natural capital provided by Australia's abundant wind and solar energy sources, reaping significant economic and social reward.

How to start

Every community is unique, and the journey undertaken by every Zero Carbon Community will also be unique.

The Zero Carbon Community concept is ambitious, audacious and a worthy challenge. Despite the challenge of the task at hand – or perhaps because of it – there has been significant interest from communities around the country.

We offer here a set of general steps that each community can customise to get the largest carbon emissions reduction possible.

There are many steps involved to get a community to embark upon a challenge of this scale. While the steps involved are interrelated and won't necessarily follow a linear fashion, a suggested step by step guide is presented as a way to get started in the process.

Community engagement is at the heart of this work as it will be a key component of everything you need to achieve. The steps identified by BZE and the communities already well down the path to zero emissions are described in Figure 1.

This document provides a simple guide to each step involved and a range of case studies from communities already taking action to reduce their emissions and improve wellbeing and opportunities for their region.



2. Zero Carbon Communities

Steps to a Zero Carbon Community

Step 1: Community engagement

Step 2: Emissions reduction target

Step 3: Council endorsement

Step 4: Baseline emissions

Step 5: Project options

Step 6: Transition strategy

Step 7: Reporting and review

Step 8: Storytelling

Step 9: Investment



Figure 1: Steps to a Zero Carbon Community

Step 1. Community engagement



The first step in the journey towards achieving zero carbon status is finding a core team around which the Zero Carbon Community will form.

A place to start might be with existing sustainability or climate action groups, from which a working group is established. Over time other stakeholders will need to be brought in, such as council staff and councillors, local businesses and industries and local energy, waste or transport providers.

Ideally, the core team would comprise four to ten people. All should be capable, passionate and committed to achieving a common goal. Over time the core team will need to build support from the wider community to achieve the goal. Levels of engagement will depend on any person's capacity and interest to be involved.

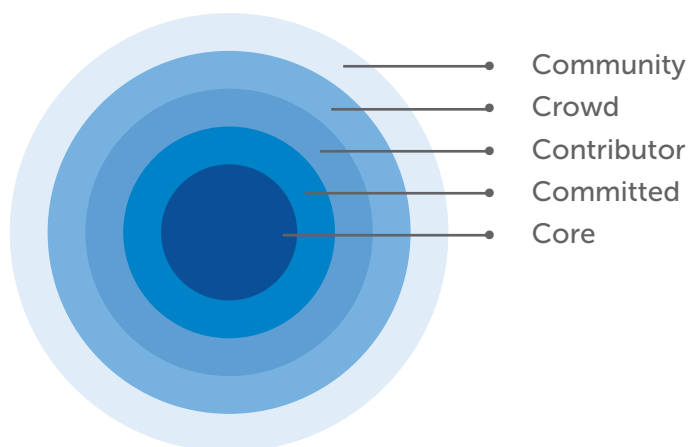


Figure 2: Circles of commitment

<http://www.thechangeagency.org/circles-of-commitment/>

- **Community** - all members of the local community
- **Crowd** - members of the community who participate in Zero Carbon Community initiatives
- **Contributors** - members of the crowd who occasionally volunteer or donate
- **Committed** - contributors who regularly contribute to the initiative
- **Core** - the key people who are driving the Zero Carbon Community initiative.

Figure 2 shows a model of how a small group can work within a community to achieve change. It is adapted from The Purpose Driven Church. This model has been used by many organisations to reach beyond an already-converted core group and focus on the broader community.

Community engagement and working productively with a team of people is a major component of the work involved. For any goal there will need to be widespread community agreement about what you are aiming to achieve. Community engagement is essential for a Zero Carbon Community to thrive as it will drive progress and sustainability of the initiative. Challenging people to a serious commitment will attract the most motivated people to your cause.

Key steps to community engagement include:

- Identify and engage community and project champions, starting with existing community networks or groups that have related goals.
- Hold a community event, inviting community members and advertise widely to encourage participation
- Establish vision and goals for the initiative in consultation with the wider community
- Set up community working groups for each relevant sector
- Establish a fundraising & communication team
- Create opportunities for regular reporting and feedback at key stages with the wider community.

Governance - Internal process and structure

Setting up an appropriate internal structure is important to ensure your community can work effectively. It is best to establish appropriate processes and structures early on to avoid any confusion or misguided effort.

Relationships with existing organisations and how decisions will be made should be considered.

Relationship with existing organisations:

- Can the group function as or be part of an existing organisation?
- Do you need to establish a new community group?
- What are the roles for council and your community group - how will you work together?
- Is a Memorandum of Understanding required?
- What other partners are involved?
- Is the group going to manage the implementation of the actions, or will council/ partners fund and implement the required actions?
- Is the group going to be auspiced for donations and grants?

Decision making:

- How will decisions be made and communicated to the wider community?
- How will you share files and information?
- How will the group apply for funds?
- Are roles such as a chair, treasurer, secretary, steering committee or board required?
- Is everyone in the group clear on their role and contribution?



3. Renewable Energy Benalla

"Community engagement is essential for a Zero Carbon Community to thrive as it will drive progress and sustainability of the initiative."

Case studies of three Zero Carbon Communities in progress

Clean Energy Nillumbik

In January 2017 a group of interested Nillumbik residents in Melbourne's north-east gathered to make plans to cut carbon emissions across the shire. Supported by BZE and the council's Senior Sustainability Officer, the team is benefiting from talks and linkages with other community initiatives around the country. As an area with established environmental credentials and strong community spirit, Nillumbik is well positioned to take on the challenge of becoming a Zero Carbon Community.

The founding team are a mixture of people with a variety of backgrounds including environmental management, energy efficient buildings, administration and the energy sector. The team skill set covers marketing, technical matters, business and community engagement. Clean Energy Nillumbik has a core team of around 15 people who meet every six weeks, with other interested people willing to commit time to the initiative who will join particular activities or projects.

During the establishment phase, we made decisions on governance and branding, including name, logo, team leadership, group structure and incorporating. An important early activity has been collecting information on similar initiatives in other communities to capitalise on their experiences and benefit from their learning. BZE has been instrumental in connecting us with other groups and the Coalition for Community Energy has been another great resource hub.

In March we held a community information and consultation session with a number of guest speakers and experts who discussed the resources and options available to support our objectives (Figure 3). The workshop concluded with small groups working to further explore and prioritise options.

While we work on refining our strategy for a ten-year transition to zero carbon, we are also determined to develop smaller scale community energy projects to hone the skills of the team and lift the profile of the group. The near term projects focus on local businesses and local streets, investigating rooftop solar system supply agreements for local organisations and micro grid opportunities.

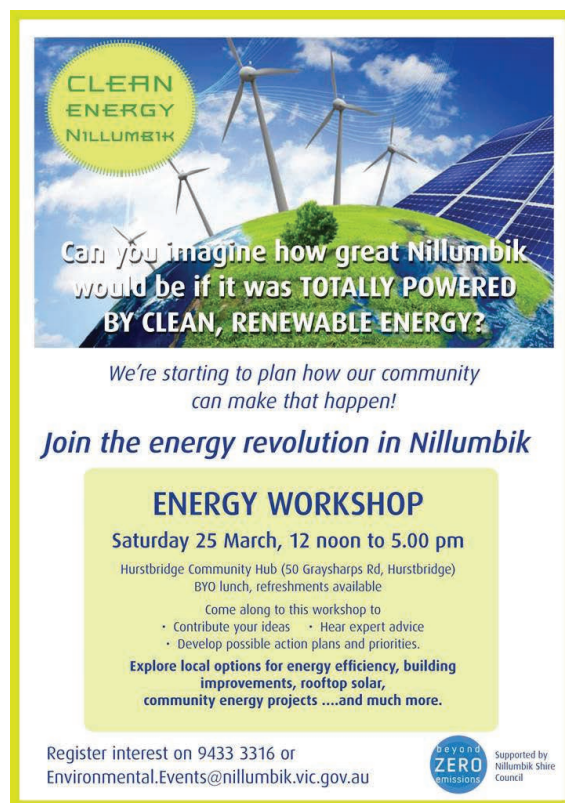


Figure 3: Clean Energy Nillumbik first workshop

Baw Baw Zero Emissions

Baw Baw is a rapidly growing council area set in the scenic and hilly region to the immediate east of Melbourne. Baw Baw Zero Emissions – part of the Baw Baw Sustainability Network – has set a goal to get the stationary energy down to zero across the whole shire by 2027.

A key challenge is to retain the shire's rural feel while accommodating many more people – and working to rapidly decarbonise to avoid catastrophic global warming.

A challenge Baw Baw Zero Emissions face is that their solar resources are not as good as areas to their north and their wind resources are relatively poor (other than Mt Baw Baw, which lacks transmission infrastructure). On the plus side, the region has a workforce skilled in the power industry, transmission infrastructure close by in the Latrobe Valley, water storage that could be used for floating solar, sources of biomass and a vibrant and active network of community groups focused on action on climate change.

The Latrobe Valley Authority provides a potential source of funding for jobs-rich projects for locals who are facing upheaval as the coal fired power stations begin to close. Baw Baw Zero Emissions will have the support of one of three community energy hubs to be set up in the valley.

Baw Baw Shire Council have voted to support the project, which brings important access to staff support as well as added authority to convince the wider community to participate in the transition over coming months and years.

So far Baw Baw Zero Emissions has produced a baseline data report and engagement workshop and are now working on the details of the transition plan. The difficulties Baw Baw Zero Emissions report facing include overcoming the feeling of being overwhelmed by the size of the problem, the complexity of setting up community energy projects, getting people interested in energy efficiency and retrofitting their homes as well as managing this process as a group of enthusiastic volunteers.



4. Baw Baw

Benalla Sustainable Future Group

In 2010, a group of residents established the Benalla Sustainable Future Group (BSFG) over their concerns around sustainability and the lack of action on climate change locally and nationally. The group's primary goal is to promote sustainable living practices and development within the Benalla region so that the needs of the present can be met without compromising the resources available to future generations.

Gaining support of Benalla Rural City Council

The BSFG has previously gained support from and partnered with Benalla Rural City Council through a range of projects and events including Sustainable Housing Forums, the Environment Strategy for Benalla Rural City, participation on the Climate Change Adaptation Action Plan Steering Committee and events at the Benalla Festival.

In 2016, BSFG created a small working group with the vision for Benalla to become a zero net energy town by reducing and balancing energy needs with a 100% renewable energy supply. This working group coordinated discussions with council officers around the objectives and details of the project.

BSFG sought council support in May 2016 to apply for funding under the Victorian Government's New Energy Jobs Fund to conduct a feasibility study to investigate renewable energy options and develop a future energy plan for Benalla to become a zero net energy town. This support was formally endorsed by Council in June 2016.

With Council's support, the group organised and hosted the Benalla Renewable Energy Future Community Forum. Around 90 people attended the forum and heard from guest speakers who had undertaken similar community projects. The attendance at the forum and interest expressed by the participants demonstrated a high level of community support for a renewable energy future for Benalla.

Renewable Energy Benalla Action Group

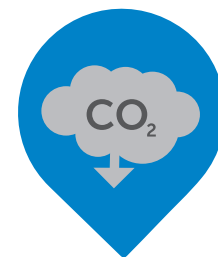
At the forum an invitation was extended to anyone who wanted to establish a community working group to progress the goals.

From this came an action group which set the following goals:

- Energy efficiency and reducing energy use
- Awareness, promotion and support for renewable energy by community
- Future Energy Plan in place for Benalla
- Significant increase in local renewable energy generation
- Keeping increased financial benefits locally.

The Action Group operates under the auspice of the BSFG and has been meeting on a monthly basis. The group has developed an action plan to achieve the above goals and is working on a communication plan.

Step 2. Emissions reduction target



The next step in the journey towards achieving zero carbon status is setting an emissions reduction target or long-term goal.

Your target should include the overall target, the geographic scope, the specific sectors included, and the timeframe. Examples of different goals and parameters are provided below.

- **Community wide:** Long term goal should include community wide emissions, not just council operations
- **Multi-sectoral:** Targets should be included for each sector under consideration and preferably across multiple sectors including buildings, energy, land use, transport, waste and industry
- **Rapid timeframes:** Within ten years or as a minimum by 2050
- **Interim targets:** Include 3-5 year interim targets to track progress
- **Zero net emissions:** long term goal with minimal and decreasing reliance on offsets
- **Zero emissions:** Long term goal of zero emissions.

When your group sets its target, consider including local sources of emissions, levels of interest from the community, business and industry, council support and capacity to make change. BZE recommends setting ambitious targets to match the science as well as global agreements.

Here are a number of different emissions reduction targets:

- **Zero Emissions Byron** - Zero emissions for the entire Byron Shire region by 2025, covering energy, buildings, transport, land use and waste
- **ACT** - 100% renewable energy by 2020 and all other sectors zero emissions by 2050
- **Baw Baw Shire** - 100% renewable energy by 2027
- **Yackandandah** - 100% renewable energy by 2022.

Your community may wish to include interim targets as well as an aspirational long-term target.

"BZE recommends setting ambitious targets to match the science as well as global agreements."

Table 1: Zero Carbon Communities identified from the 2016 BZE Australian Local Government Review

Target (Community wide)	State/Region/City/Town
Zero emissions	Byron Shire (2025)
Zero net emissions/carbon neutral	Adelaide (2020), Melbourne (2020), City of Darebin, City of Moreland (2040), South Australia (2050), ACT (2050), City of Yarra, Victoria (2050-legislated target)
70% absolute emissions reduction	Sydney (2030)
100% renewable energy	Mount Alexander (Renewable Newstead 2017), ACT (2020), Lismore (2023), Uralla (5-10 yrs), Indigo Shire (Yackandandah 2022)

Step 3. Council endorsement



Achieving official endorsement for the target and/or initiative from the council as a whole is a proven step to ensure continuing progress and sustainability in any community.

Depending on the area, the Zero Carbon Community initiative might emerge from a top-down endorsement as a council initiative, or from a bottom-up push from the community. In either case, it is important to gain council endorsement and support.

Key steps include:

- Engage council staff
- Seek support from Councillors and the Mayor
- Unofficial or official council endorsement
- Council resources for project start-up costs
- A council based project co-ordinator
- Project partners
- Governance arrangements between council, community representatives and external partners
- A project steering committee and written Memorandum of Understanding
- Project champions including the Mayor and council representatives
- Sign up to the [Compact of Mayors](#) (part of the Global Covenant of Mayors for Climate and Energy).

Official or unofficial council endorsement is recommended in order for the community to determine governance arrangements for a Zero Carbon Community. If possible it is recommended to ask a council officer to be responsible for negotiating council resources and advocating on behalf of the initiative.

A Memorandum of Understanding is useful to specify the governance arrangements that will be followed including steering committees and written progress reports and roles and responsibilities of each partner.

Participating councils can also sign up as a member of the Global Compact of Mayors. The Compact requires consistent and transparent public reporting of greenhouse gas data and provides tools that will assist with project direction.

Participation allows the Mayor and council to be recognised globally as a leader in addressing climate change. Public recognition also provides incentives to other Australian councils to commit to addressing climate change.

Case Study

Compact of Mayors and ICLEI - Local Governments for Sustainability

Achieving zero carbon locally can only happen through a partnership between the community and local government. A community and council partnership approach is also the hallmark of the Compact of Mayors initiative sweeping the world after the Paris Climate agreement.

ICLEI Oceania, celebrating 20 years of climate action in Australia, is a founding partner of the Compact of Mayors, part of the Covenant of Mayors for Climate and Energy, which has already over 650 cities and towns reporting action that must be shared openly and transparently with their local community.

Many local councils now support low carbon programs and most have their roots in local community demand for action. The uptake of zero carbon approaches is just one of those trends being replicated in local communities and supported and reported by local government as part of the Compact of Mayors. A hallmark of this initiative is that it promotes both a low carbon approach while also assessing and responding to climate risk and adaptation approaches.



Local councils that ICLEI works with and supports are committed to reducing greenhouse emissions and measuring their performance. Having an emissions reduction target is a key requirement. Supporting a zero carbon emissions target can be a way to define and measure effectiveness of local action, engage the whole community while helping prepare and adapt to a changing climate with the risks that it brings.

Measuring emissions is important and is based on understanding what can be measured can be managed, what influence you have and how can targets be made and met. The Compact of Mayors assists local government to measure emissions and promotes locally appropriate targets, develops low carbon action plans and implements both adaptation and climate resilience approaches.

ICLEI's role through its network of 1500 cities and towns worldwide is to deliver practical solutions to local governments and to advocate on their behalf and use their messages at all major international climate change gatherings to demonstrate what can be achieved locally. Most importantly, ICLEI's role is to share best practice, encouraging a robust Zero Carbon Community approach which can be promoted as Australia's contribution to local councils everywhere.

Step 4. Baseline emissions



A vital step towards achieving a zero carbon transition is to know where your starting point is.

By recording your community's emissions for the geographical area and sectors you want to include, you will gain reliable baseline data for the project.

The purpose of knowing your baseline emissions is to enable your community to understand the sources of greenhouse gas (GHG) emissions and relative contribution of these sources from the different activities occurring within its boundary. This will help you prioritise projects according to the greatest reductions possible and create a strategy to reduce your community's emissions. A GHG inventory can then be undertaken annually to track the performance of emissions reduction strategies over time. The baseline emissions refers to the emissions level in the historical base year used for comparison.

The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) is a globally-accepted framework used to identify, calculate and report community greenhouse gases. The GPC is recommended as the framework to use to calculate the baseline emissions for any council or community group to ensure it is internationally compatible (e.g. aligned with the International Compact of Mayors commitments).

[Global Greenhouse Gas Protocol
http://www.ghgprotocol.org/](http://www.ghgprotocol.org/)

GHG inventory boundary

The inventory boundary for a community identifies the geographic area, time period (year), greenhouse gases and emission sources covered by a GHG inventory. Depending on the scale of your project, the geographical area could align with the administrative boundary of a local government.

Data may be available for several years. In this case you can choose the latest year for which data is available to represent the baseline year.

Sources of GHG emissions for a community inventory are generally categorised into the following sectors:

- Stationary energy (energy and buildings)
- Transportation
- Waste
- Industrial processes and product use
- Agriculture, forestry, and other land use.

An emissions baseline report should include the following information:

- Total GHG emissions for all sectors under consideration
- A breakdown of GHG emissions between sectors
- Description of each sector under consideration
- Sources of emissions in each sector
- Picture of overall baseline emissions for this sector including breakdown by emissions source
- Outline of any cross-overs with other sectors (to ensure no duplication or double counting).

Sourcing the data

Your baseline emissions report should be produced by someone confident handling large volumes of data and with at least a basic level of accounting and energy knowledge.

Stationary energy data can usually be sourced from your local energy and gas providers, or Distribution Network Service Providers (DNSP) by requesting annual data for your community's postcodes. Note that postcodes do not always align with council boundaries so there will likely be some level of uncertainty in the final data.

The [Australian Energy Market Commission](#) (AEMC) has made a [rule](#) that requires DNSPs to make historical zone substation information on electricity loads publicly available to interested parties. This can be requested as annual or monthly data for the postcodes of interest.

Data collection for waste, transport, industrial processes and land use can be more complicated as the availability of data, data collection and scope of emissions are less straightforward than stationary energy. Seeking advice from an expert in these areas is recommended.

It should be noted that the development of GHG inventories improves over time as the underlying activity data supporting the calculations increase in accuracy and availability. Where subsequent years' inventories incorporate improved data or altered methodology, baseline emissions should also be updated to ensure you can compare them.

Alliances for Greenhouse Action

In Victoria, most councils are already part of a Greenhouse Alliance. These are formal partnerships of councils (and other organisations) driving climate change action across 70 of Victoria's 79 municipalities. The Alliances work across their networks, communities and partners to deliver regional mitigation and adaptation programs. This includes the implementation of joint initiatives that provide economies of scale and enable projects typically beyond the reach of individual councils. Contacting your local alliance will be a good way to figure out what projects are already underway in the region.

Example baseline reports:
[Reports collating council and community emissions by the Northern Alliance for Greenhouse Action](#)

Example reports

Descriptions and examples of baseline methodology including tools and calculations, data type and sources, baseline boundaries, assumptions and exclusions can be provided by BZE. Figures 4-7 show data from existing reports as an example of the scope involved.

Please contact BZE at: info@bze.org.au for more information.

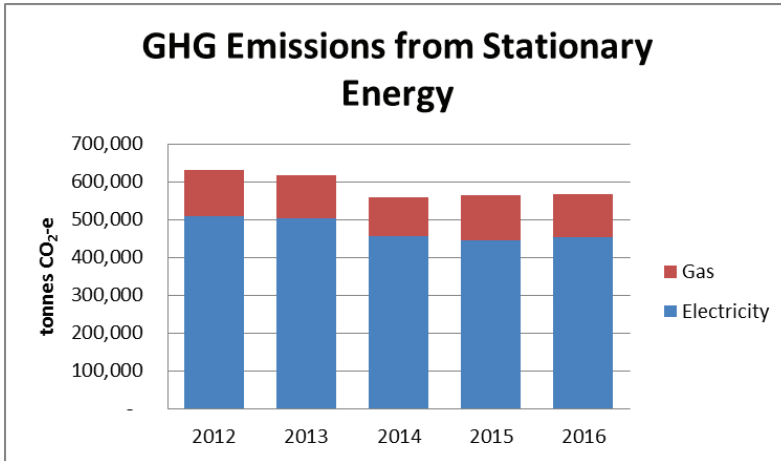


Figure 4: Example greenhouse gas emissions (tonnes carbon dioxide equivalent) from stationary energy 2012-16

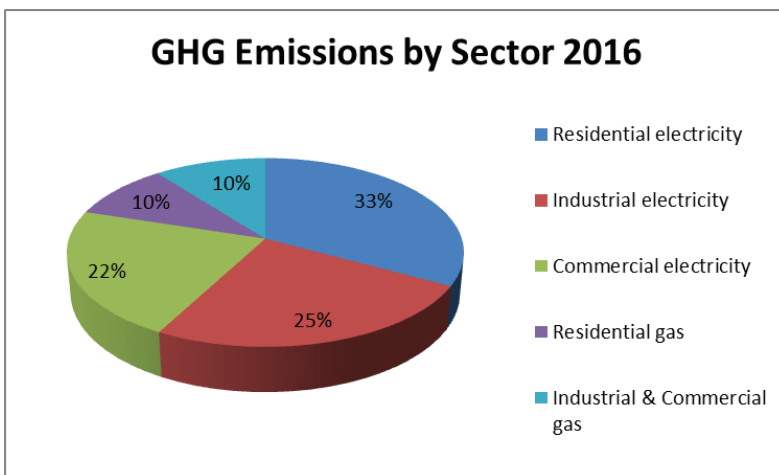


Figure 5: Example greenhouse gas emissions by sector 2016

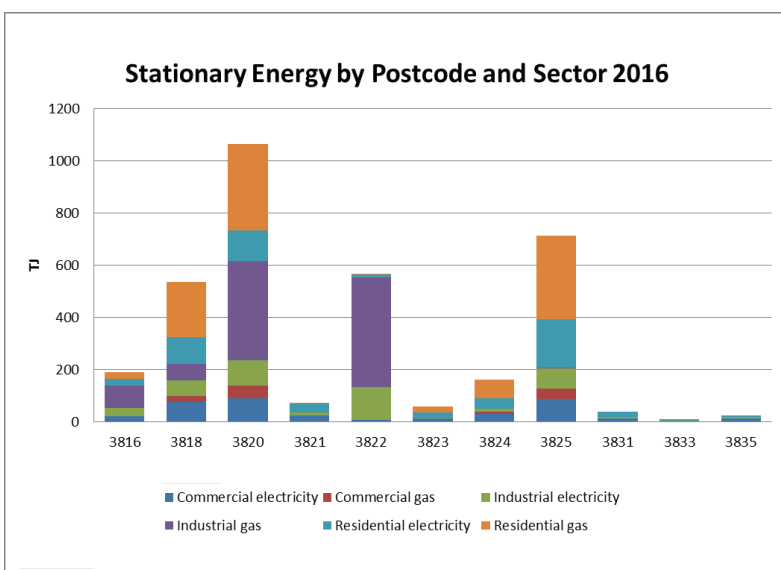


Figure 6: Stationary energy by Postcode and sector 2016

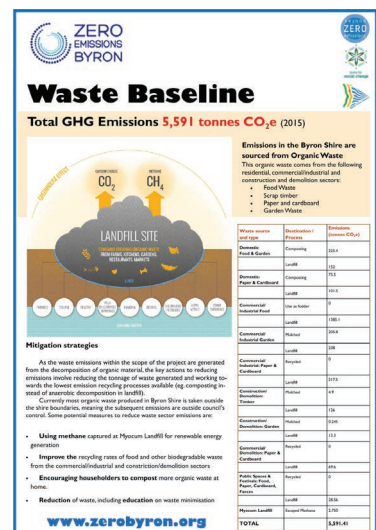
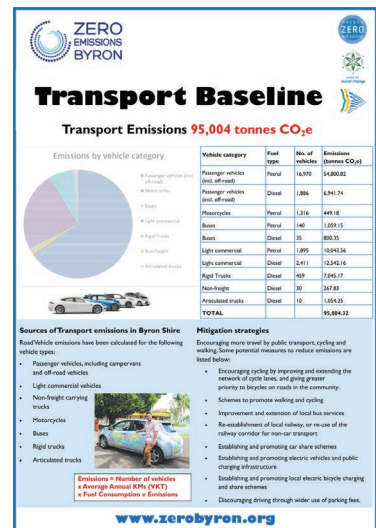
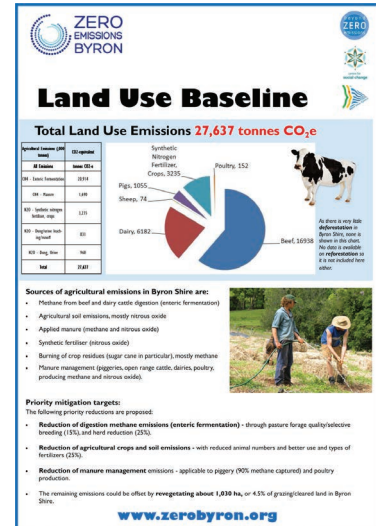


Figure 7: Zero Emissions Byron baseline reports. <https://zerobyron.org>

Step 5. Project options

Thinking creatively about emission reduction projects lets you dream big.



What would your town or region be like if you get it to zero emissions? What type of future are you picturing?

Dreaming, imagining and talking about your desired future will help you and your group begin to co-create it.

Once you have thought of many possible projects, it's time to select the best. In any community, there are many projects that could be worked on. It's essential to choose the projects that are most appropriate, cost-effective and likely to proceed. To be successful, initiatives need to make sense economically as well as socially, as cost savings offer the best short-term incentives for councils, businesses and individuals.

One method of prioritising your possible options is suggested below:

1. Research and analysis

- Consider the baseline emissions inventory for all relevant sectors
- Stakeholder mapping - who are they, what is their role, how can they be involved?
- Planned projects contributing to emissions reductions, especially council projects
- Regional information which affects emissions e.g.
 - relevant legislation
 - barriers analysis.

2. Action plan

- Stakeholder-generated list of potential mitigation strategies
- Modelling and analysis by technical experts.

Figure 8 is a useful decision-making guide for community solar projects developed by the Community Power Agency. This resource indicates which type of solar project might work best for your region.

Community Solar Projects Decision Guide

February 2017

The decision points in this diagram represent some of the questions and choices groups will need to answer and address in setting up a community energy project.

Being clear on these decisions, choices and associated constraints will help determine which is the most suitable model for your group.

You may find that your unique local context requires adapting an existing model, or, if your group is really dedicated, even developing and testing a new one!

KEY TO UNDERSTANDING HOW THESE MODELS HAVE BEEN DEPLOYED

Successful model with multiple projects in operation

Refinement and streamlining of an existing model. Model has already been piloted through a now operating project

Model is being tested through a pilot project

Hypothetical model - not operating.

No viable models currently known about or operating

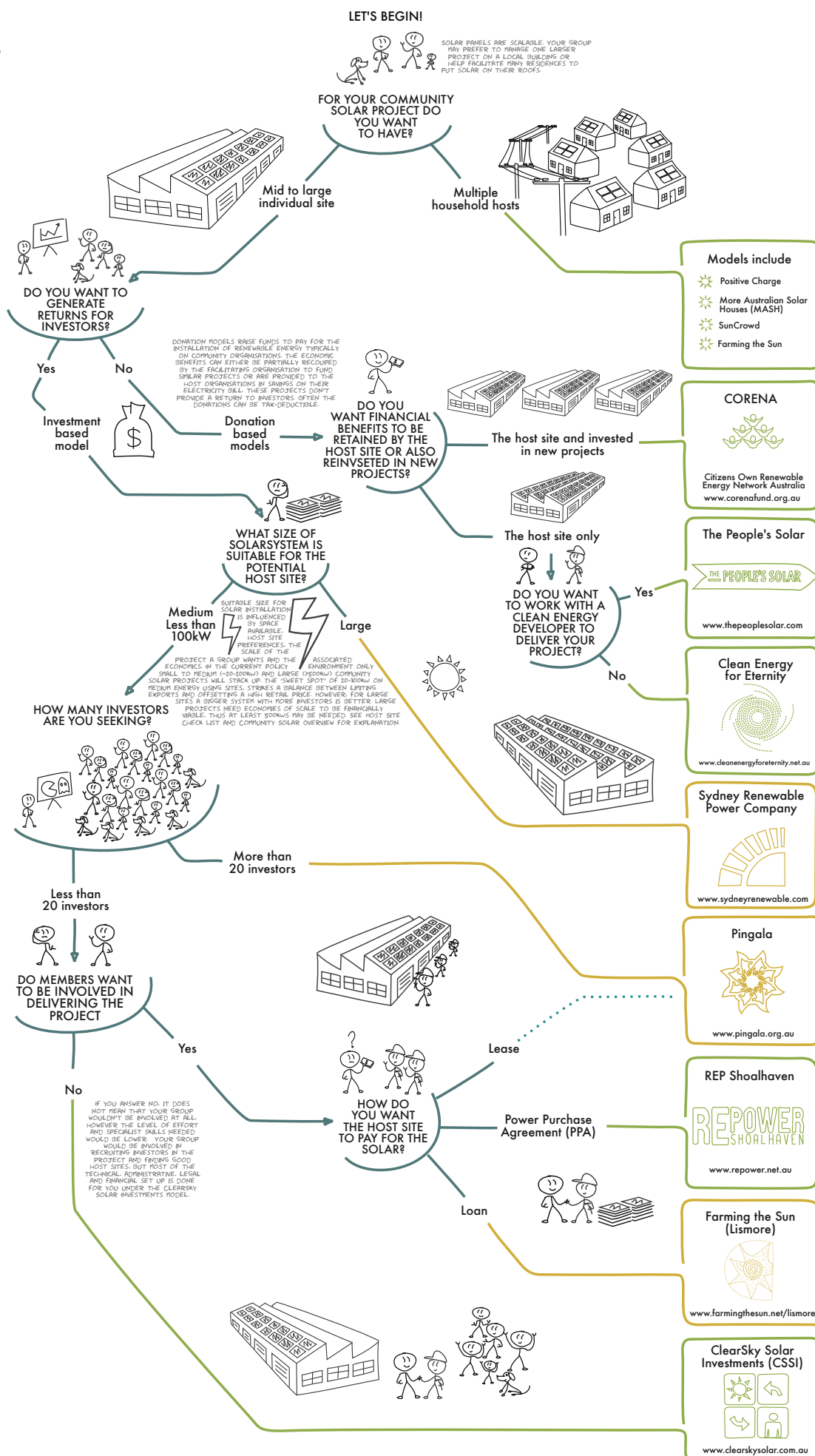





Figure 8: This guide was developed as part of the National Community Energy Strategy reproduced with permission from the Coalition for Community Energy <http://cpagency.org.au/wp-content/uploads/2017/03/C4CE-Community-Solar-Projects-Decision-Guide-Feb2017-A3.pdf>

Table 2: Possible actions to eliminate stationary energy emissions (energy and buildings) developed by local stakeholders

 Buildings and efficiency	 Solar and community energy	 Utility scale and storage
<ul style="list-style-type: none"> • Home retrofits - Air flow pressure testing, energy reports and thermal assessment • Community engagement and communication • Building compliance and design • State energy efficiency target activities • Industry accreditation and training workshops for tradies to upskill • Local list of sustainable builders/suppliers for recommendation • Water heater retrofits • Six star + energy ratings • Advocate for energy upgrades in social housing • Energy efficient upgrades to appliances • Investigate schemes for landlords and renters • Bulk buy of insulation, heat pumps and hot water • Retrofit seals, windows and doors • Improve efficiency legislation. 	<ul style="list-style-type: none"> • Small renewable projects • Public lighting • 2 MW and up large centralised power • Education and training and community forums • Library - Behind the meter • Solar savers in rates • Employee investment solar saving scheme • Lobbying government • Car charging points • Project management advisory service. 	<ul style="list-style-type: none"> • Floating solar - local reservoir • Roofing car park with solar panels • Wind turbines/hydro combination • Microgrids in areas scheduled for service upgrade • Geothermal and heat exchange • Smarter grids - intelligent metering and data collection • Micro hydro • Biomass • Waste to energy - landfill gas • Technical analysis skill building • Pumped hydro.

Step 6. Transition strategy



Your Zero Carbon Community transition strategy should include local context, your vision, challenges and opportunities and an action and implementation plan.

Questions to consider for each component are outlined below.

Introduction and context

- What's the context and background?
- Where are we now?
- Who are our stakeholders and the roles they can undertake?
- What are the characteristics of our community (e.g. demographics, industries, housing stock)?
- What does our existing emissions and energy use look like (e.g. current and future energy requirements, identification of opportunities)?

Vision

Our long-term vision:

- What do we want our community to look like in ten years' time?
- What are our specific goals and targets for the community?

Challenges and opportunities

Identify problems and outline benefits of taking action:

- What is the future if a business-as-usual approach is taken?
- What has or hasn't worked elsewhere?
- What are emerging issues?
- What are the opportunities for our community based on an environmental, social and economic assessment?
- How will we overcome barriers?

Action plan

Develop, assess and prioritise our proposed actions:

- Who is going to do what?
- What is the least cost approach?
- What are our resources?
- How will it be funded?
- How can we attract and manage funds?
- What are our project plans?
- How will we monitor progress?
- What are our year-by-year objectives?
- How will we assess proposed actions?
- How will we collaborate with others e.g. to remove policy barriers?

Implementation plan

- What is our immediate starting point?
- What will happen in the next 12 months?
- How will the community be engaged in this?
- What are the risks to implementation?
- How will we measure, monitor and evaluate implementation outcomes?
- How will we engage partners to implement specific actions?

Case Study

Uralla

The Z-NET Uralla Blueprint <http://zneturalla.org.au/> offers a stationary energy strategy for consideration.

Stage 1 – Understand the context. Identify the characteristics of your community and existing energy use. Define current and future energy requirements. Identify opportunities.

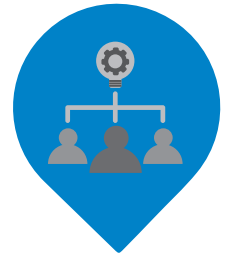
Stage 2 – Understand all the possible options, for both reducing energy use and renewable energy sources. Investigate behind the meter community solar projects. Determine which options are feasible, viable and desirable.

Stage 3 – Invest in energy efficiencies. Generate renewable energy on site, for example with PV panels on roofs of houses, businesses and community buildings.

Stage 4 – Generate larger scale renewable energy at appropriate nearby locations.

Step 7. Reporting and review

Collecting data is essential if you are to effectively assess your progress.



Your baseline emissions will be the ultimate indicator to let you know if things are on track, but every project undertaken will need its own data collection, monitoring and review.

Steps to reporting and review include:

- Survey your community and stakeholders to find out their interest in your project
- Identify key evaluation criteria
- Monitor progress every six months
- Review impacts annually and make any adjustments
- Update baseline emissions data annually
- Report publicly to all stakeholders, the wider community and investors every six months
- Report to all stakeholders on key phases of individual projects
- Seek external evaluation input
- Keep learning - it is a changing landscape
- Celebrate successes and learn from failures!

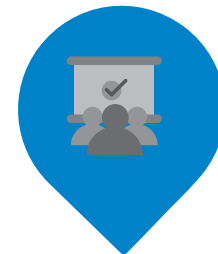
It's an excellent idea to look for quick wins at the start of a major change initiative like this. Achieving a small-scale emissions reduction project within a short span of time will demonstrate to your community – and to your group – that your Zero Carbon Community initiative is serious. Success breeds success, so by achieving quick wins your Zero Carbon Community will be better placed to attract funding and investment.

These actions don't have to be expensive or complicated. The City of Boroondara achieved a quick win by draught-proofing their community buildings and subsequently cutting their energy bills.



6. Miinot Gelato solar and battery installation

Step 8. Storytelling



Telling stories may seem simple, but it is a vital way to get your community and stakeholders to care about what you are doing.

Your team can be involved in storytelling in many ways – from taking part in conferences and events, to calling local media outlets with story ideas, to promoting your work on social media, to simply talking informally about what you are doing at the supermarket, sports ground, school gate, library or café. Storytelling lends authority and credibility to your group. It will help if you have a visible name, logo and website that demonstrate clearly what you are working to achieve.

As you begin your early projects, you'll find that telling stories of success helps broadcast and celebrate what you have done. It takes considerable effort to get a major community initiative like this off the ground. Sharing good news will energise your core team and committed volunteers and encourage more community members to become contributors.

Another method is to host a stall at community events and give passers by information on your upcoming projects. You can then suggest ways they might get involved in your Zero Carbon Community.

The more you demonstrate success the more investment and funding you will attract to your community. Businesses are more likely to invest in a community that is demonstrating a commitment to the future.

The work you do will inspire more communities to become involved. Part of the process is building support at all levels of government for effective policies to enable this transition.

Mobilising the community to engage politicians and demonstrate the changes you are calling for can be instrumental in bringing about change. Some longer-term actions that you wish to undertake may require state or federal policy changes. It is easier to make your case for these changes when you have already demonstrated success in achieving local emission reductions.

It's important to share mistakes as well as achievements, and provide as much information publicly as possible to help other communities avoid pitfalls. Seek help from communities a few steps ahead of you and provide support to those one or two steps behind. There is great opportunity to maximise learning and development opportunities between communities and set up shared mentoring systems.

You can also tell the rest of the world what you are undertaking through campaigns like [100% RE](#).

Your communication plan will be the key to mapping out your storytelling work. It might include:

- Key communication objectives
- Target audiences
- Key messages
- An annual communication schedule
- Calendar of events
- Collaboration opportunities with neighbouring councils and communities
- Shared project resources
- Social media channels and strategies
- Case studies and templates to share
- Presentations and events
- Key spokespeople
- Media training.



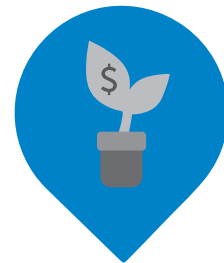
Case Study

The Community Energy Congress

The Congress is the premier event on Australia's community energy calendar. In 2017 they brought together over 500 people from community energy groups, renewable energy developers, policy makers, network companies, retailers, councils, non-government organisations and regulators, lawyers, financiers and more. It provided a valuable opportunity for Zero Carbon Communities to learn and network with other similar groups from across Australia.

<https://c4ce.net.au/congress>

Step 9. Investment



Most actions to support Zero Carbon Communities will pay for themselves over time and so save your community millions of dollars in energy bills and other costs.

The challenge is that investment is required to get projects off the ground.

Ideally your project funding would cover the lifetime of the overall strategy, but it is more likely you will need to seek funding for each key project or project phase including start-up costs and implementation.

It is important to note that while a group of volunteers can make extraordinary progress a transition of this scale is not something that can be achieved on volunteer labour alone. Investment will be required to provide some paid support for core staff to maintain overall momentum, as well as professional services. Your business case for most projects should include wages for some highly trained, dedicated and skilled people to support the work of volunteers.

Funding is also important to access expertise as energy efficiency, renewable energy, public transport, waste and land use projects are complicated, technical and have rapidly evolving business models, finance and governance opportunities. Many projects take much longer than they should or result in poor priorities or design choice if expert advice is not obtained.

Seek support from your local council including administrative support, in-kind support and funding to get things going initially. Council funding can then be used to leverage state and federal grant funding.

Investigate approaches that will enable scalable business models and financing. How can you bring investment to your community and keep the cost savings for the next projects, which will in turn save further costs?

Different models of funding exist for different types of projects and there are many excellent resources to help consider funding options. A good overview of funding types and information is presented in the [Community Power Agency - Community Energy - a How to Guide](#) and information on finance models at the [Embark website](#).

The [Behind the Meter Solar PV Funding Guidebook](#) has been developed as a simple and accessible guide to assist Community Energy groups in the development and delivery of projects.

There are organisations such as [Clear Sky Solar](#) which link community investors with viable solar projects, and grants available from energy retailers such as [PowerShop to support community energy projects](#). There are currently more investors available for community energy projects than projects ready to go with some community energy projects selling out within minutes.



Case Study

Rotating Funding model - CORENA

CORENA (Citizens Own Renewable Energy Network Australia) is a South Australian not-for-profit organisation with the aim of reducing greenhouse gas emissions. CORENA's funds come from donations. We then loan money to not-for-profit community organisations for specific projects such as solar installations. We then work with each organisation to make sure the project both reduces emissions and pays for itself (generally within five years). Each loan is interest free. Once the loan is repaid, the organisation benefits by keeping all the monthly energy bill savings.

CORENA has raised funds for 15 projects from donors all around Australia. The projects have included community centres, disability support, child care and hospitals. The decision to fund not-for-profits helps CORENA be sure that the funding ultimately helps communities while it is also speeding up Australia's roll out of renewable energy and energy efficiency. To date over \$200,000 has been loaned and the equivalent of over 100kW installed.

For example, Gawler Community House in South Australia installed a 10kW solar system and replaced halogen security lights with LEDs fitted with sensors. Gawler Community House recently made its final repayment and will now keep the ~\$1,500 per quarter that the project saves. Meanwhile, the loan repayments are being re-used to support new community organisations to do similar projects. This model is at the heart of CORENA's revolving fund.

We are always on the lookout for projects to put in our funding queue. If you have a good project for CORENA to fund, submit an Expression of Interest or let your favourite community organisation know about CORENA

www.corenafund.org.au

Zero Carbon Community Case Study

Zero Emissions Byron

Byron Shire has one of the most ambitious emissions reduction goals in Australia. The Byron Shire Council and community are working in partnership to reduce emissions to zero in all sectors across the region (energy, buildings, transport, land use and waste) within a timeframe of ten years.

The creation of the baseline emissions inventory, developed by volunteer teams, was an important first step, in that it has allowed for an understanding and prioritisation of emissions sources across the region. Action planning then began with key stakeholder forums, where industry bodies, businesses and organisations from each sector came together to compile and assess mitigation actions. Detailed action plans are being created that cost and prioritise those mitigation strategies.

Zero Emissions Byron (ZEB) is implementing core projects, particularly focused on community education and engagement. The main role in years to come will be that of working with partners to implement mitigation projects. ZEB may not be the lead in all actions but will facilitate and track the progress of emission reduction.



9. Byron Bay family

Zero Emissions Byron Timeline of Key Project Phases

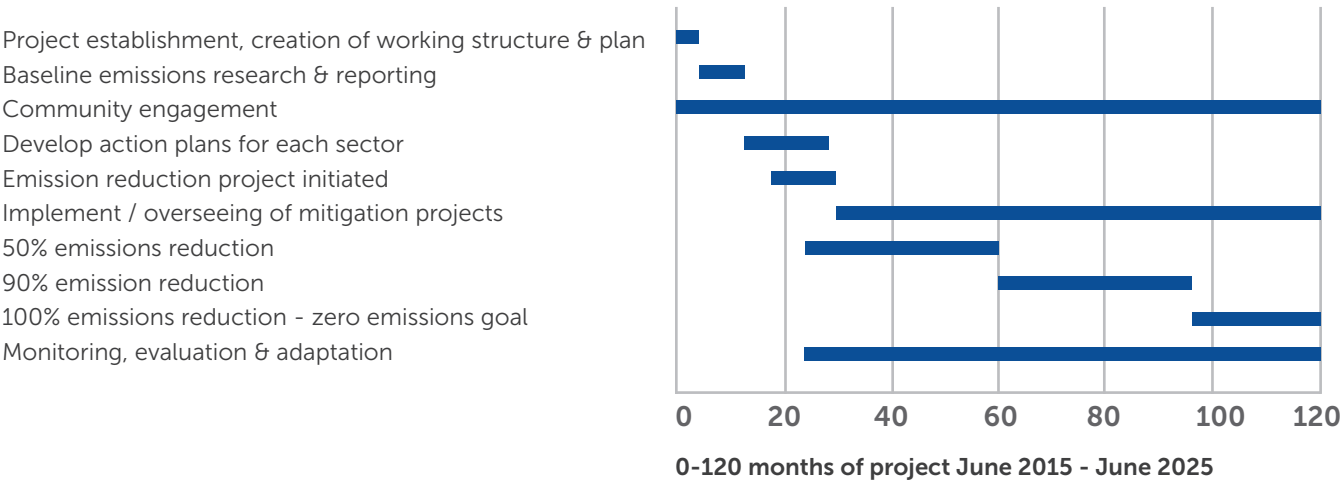


Figure 9: Zero Emission Byron Timeline of Key Project Phases

Zero Emmissions Byron - Regional emission reduction options

Buildings

Over 75% of electricity use in the region is from residential buildings. Energy efficiency measures can reduce electricity consumption in homes by up to 50%. Therefore, householders have great ability to contribute to emissions reduction. Whilst old houses can be retrofitted, it is important that new houses are designed for low energy consumption.

Currently around 30% of houses have solar photovoltaic (PV) installed, and there are some larger PV systems on businesses and community buildings.

Energy

Stationary energy consumption from coal fired power and gas accounts for over half of the emissions in the region. There is currently no significant renewable energy generation in the Shire, but a number of projects are planned.

Previous studies have found that wind power is unviable for the region. Mid to large scale solar farms and the rollout of rooftop PV will likely be the primary source of renewable energy in the region. Reopening the old hydro power station at Laverty's Gap is being investigated, as is the development of a bioenergy facility.

Local community renewable energy groups such as Enova (Australia's first community owned renewable energy retailer) and Community Owned Renewable Energy Mullumbimby (COREM) are helping to drive the uptake of renewable energy.

Transport

The Byron Shire is a large regional area, with 44 small towns across >560km², meaning a small and dispersed population. Most roads are not suited to cycling, and there is limited cycling infrastructure throughout the region. Public transport options are very limited, with six bus routes running infrequently. Cars are therefore the primary mode of transport both within and between towns.

There is a proposal to restore the old regional railway network into a dual use system for trains and bicycles. Electric buses could also serve to provide low emissions public transport throughout the region if economically viable.

Individuals and businesses can convert to electric cars, particularly as prices decrease. This will require the installation of EV chargers throughout the region. An electric car share model could also be a good option.

Bike usage within and between towns could be increased with improvements to pathways and lanes, and electric bikes can increase the distance range.

Additional to transport needs for Byron Shire residents, there are over 1.8 million tourists travelling to and within the region each year. Transitioning car hire fleets to electric is therefore an important solution. A section of railway from a local resort into Byron Bay is being restored and will run an electric train aimed at reducing tourist cars travelling into town.

Land Use

Byron Shire is ideally placed to reduce land emissions to zero and beyond through reforestation. Following British colonisation, much of the Byron Shire region was logged in the 1800s and 1900s. Many revegetation programs are in progress and assessments show that there are still significant areas of cleared land that could be reforested. Carbon sequestration potential in the area is high due to the types of forest occurring. Carbon farming may be one way of increasing vegetation whilst also providing economic resilience to farmers.

Agriculture has been an important industry in the region since white settlement, and the primary land use is for cattle production. The main source of emissions in our region is from enteric fermentation from cattle for the beef and dairy industries. Cattle farmers have been arguing in favour of better management of cattle to reduce emissions (e.g. through feed management) as opposed to herd reduction, though herd numbers have already been dropping over the last few decades. Manure management in the pig and poultry industries can reduce emissions.

Synthetic fertilisers are also a significant source of emissions. Many farms in the region are organic, and the further reduction of fertilisers can mitigate emissions. Biochar can act as an organic fertiliser, and also aid significantly in carbon storage and drawdown of greenhouse gases.

Waste

The main focus in waste for ZEB is organic waste (home food scraps, business food waste, garden waste, waste from agriculture, organic waste from industry, paper waste, timber etc.) which generate emissions in landfill. Significant improvements have been made in organics waste management, led by Council, including the introduction of a residential 'green' bin service for food and garden waste, and the processing of garden waste for compost at the local tip. Further education work can be done encouraging households to compost their waste.

The local waste management business Richmond Waste has introduced an organics bin for businesses. However, the diversion of commercial and industrial organic waste from landfill remains a key area for improvement.

A biomass prospectus has been conducted which assessed the amount and types of waste organics available across the region. Submissions can now be made to utilise this waste resource, including developing a bioenergy plant.

Improvements were made to the local Myocum tip to reduce emissions by flaring gases. Current waste from Byron Shire is sent to a landfill in southeast Queensland where greenhouse gases are captured in a bioreactor.

Community education in waste avoidance, particularly single use packaging, is important in reducing emissions from the energy used in the recycling and transportation of waste.

Zero Emissions Byron – Lessons learnt

When ZEB commenced, limited work had been done in Australia addressing all areas of a community emissions profile. Zero Emissions Byron has pioneered and developed strategy as it progressed and has learnt many lessons which can be of aid to other communities now engaged in this work.

Community involvement has been key

Community volunteers with expertise in various sectors have underpinned ZEB's success. In working groups, these volunteers have undertaken much of the work to date. There has also been a strong emphasis on wider community consultation, including key stakeholder forums.

Dedication from Council is essential

Both Byron Shire Councillors and council staff have been key in driving the zero emissions process. Council commitment to the transition includes: a formal resolution; commitment of funds; commitment to pursue funds externally, e.g. from other levels of government; commitment of staff time; development of action plans for council operations; undertaking reporting; and engaging with other Australian and international councils, governments or organisations.

Clarity of operations

It is vital to consider internal operations including: who is driving the project (council, community or combination); the different roles of groups and individuals; the organisational structure needed (e.g. informal vs. incorporated organisation); the decision making structures; communications structures and protocol; staff roles and volunteers. In 2016, ZEB incorporated as a non-profit organisation to obtain and manage funds.

Clear strategy is needed

Strategic planning should be undertaken regularly, detailing the goals, objectives, key actions, timeline, and key performance indicators. Specific yearly action plans should be created, which should measure and report on success against these.

Collaboration

Other organisations, businesses or groups can be sought out to implement specific mitigation projects or actions, with the council (or the dedicated group driving the zero carbon project) acting to facilitate and monitor emissions reduction. Partnerships should be created that bring in specific skills. For instance, Beyond Zero Emissions provided technical skills and expertise to establish ZEB.

Have in place adequate finances/resources

It is important to begin with a realistic budget established, which will need to cover internal operations, such as development of strategic planning and action blueprints; staff; and communication and outreach. The implementation of mitigation actions and specific projects can be sourced through investors or grants. It is more difficult to source funds for internal operations and administration.

Leading Communities

There are thousands of communities worldwide taking on zero carbon challenges. In Australia there are more communities taking action than we can mention here. Some examples of leading communities are provided below.

Yackandandah, Victoria

Standing in front of a packed house at the 2017 Earth Hour concert, Yackandandah residents Chris and Karen received their 'Golden Yak.' These Golden Yaks – made by the Men's Shed using repurposed election signs – are a symbol of the energy transition underway in the small north-east Victorian town of Yackandandah. Totally Renewable Yackandandah gives Yak awards to businesses, groups or households undertaking at least two types of energy improvements. Karen and Chris had won their Yak with a double-glazed passive home, solar hot water and a stand-alone power supply.

The unplugged Earth Hour concert is part of the low-carbon 'Yack' folk festival. The festival owns a solar installation which generates sufficient electricity throughout the year to more than offset the power used during the event. The festival takes place in many of the community buildings across Yack that have invested in energy efficiency and solar power. Our museum, primary school, kinder, community centre, petrol station, council office and depot, supermarket, Health Service/Hospital, Men's Shed and the Football/Netball club all boast solar panels.

All this is evidence of a town embarking on a journey to a 100% renewable electricity supply by the year 2022. Fortunately others are recognising the importance of the journey. Network operator AusNet Services are working with Yackandandah to build one of Australia's first mini-grids. This concept allows a community to save, generate, store and share electricity locally. Our vision is for most power users to have their own solar panels, batteries, smart control systems and a local community electricity retailer.

At the same time, our forward thinking water authority North East Water is just about to install a solar system on Yackandandah's potable water treatment plant.

Our journey is far from complete, but the trajectory is clear and the passion is growing. Yackandandah has a strong history of self-determination, and now many of us are taken by the idea of a power system which reduces emissions, saves money, stabilises the grid and builds our local economy.



10. TRY Golden Yak - Matt Grogan



11. Totally Renewable Yack

Uralla, New South Wales

Zero Net Energy Town Uralla (Z-NET Uralla) is a not-for-profit incorporated community organisation with the goal to transition Uralla Shire in northern NSW to 100% renewable energy for homes and businesses over the next 5-10 years. Z-NET Uralla was formally established in early March 2016 and operates with the support of the Uralla Shire Council and NSW Office of Environment & Heritage.

The organisation works with residents and businesses within the Uralla Shire to reduce energy use and support the uptake of renewable energy technology. Z-NET Uralla has adopted the Zero Net Energy Town Uralla Case Study (also known as the Z-NET Blueprint) as its foundation document for direction and scope of projects to be undertaken.

<http://z-net.org.au/blueprint/>

The mission of Z-NET Uralla is to help our people transition to sustainable energy and to allow our community to confidently participate in the unfolding revolution in energy technologies. Z-NET activities are designed in consultation with the Uralla community to give equal access across socio-economic groups.

Z-NET Uralla provides leadership and education, and aims to provide everyone in the Shire of Uralla with the opportunity, not only of being part of the solution to renewable energy supply, but also the opportunity to build futuristic, vibrant local businesses based on renewable energy.

Z-NET Uralla's goal has been broken down into four steps:

1. The first is to achieve a reduction in energy use of 30% over the next five years through energy efficiency measures.
2. The second is to increase our renewable energy generation by 30% over the next five years through rooftop solar installations.
3. The third is to reach a sustainable harvest level of firewood (harvested wood not exceeding the rate of natural tree death) that balances the need for winter energy with ecological values.
4. In the longer term, as regulatory barriers are reduced we will explore the feasibility of a solar or wind farm for the Shire.



12. Uralla Mayor Michael Pearse (L) and Member for Northern Tablelands Adam Marshall (R) helping Z-NET Uralla celebrate the opening of their (1s) office, generating some light on Z1 and Z2

Actions Z-Net Uralla has undertaken to help achieve the above goals include:

1. Development of a Home Energy Review Tool tailored to our local community which gives specific and supported assistance to householders on how to reduce energy use.
2. A program for home renters to take cheap and effective action to improve the thermal comfort of their homes over winter and to assist them in negotiating improvements with their landlords.
3. Help others reduce energy use and explore the role of renewable energy technology. We have documented six case studies of local homes showcasing how people have taken action to reduce energy use and generate renewable energy (even to the extent of going off-grid).
4. Engaging with local businesses to identify their energy needs and find solutions that make them more energy efficient and able to incorporate renewable energy technologies such as solar panels and storage batteries. Z-NET Uralla has developed a business directory for the Shire and up to 100 local businesses have supported being included on the Z-NET communication list to obtain practical information on options for improving their bottom line by adopting sustainable energy practices for their business.



13. Trish Rasmussen (Z-NET Uralla) going through Home Energy Review with Uralla Shire resident, Glenn Maisey



14. Cafe Gusto Ross and Kim Burnet making Coffee with Z-NET President Dr Sandra Eady from their 10kW Solar PV system installed as part of the Farming the Sun Bulk purchase offer.

Darebin Council, Melbourne

Darebin Council recognises that we are in a state of climate emergency requiring urgent action by all levels of government and is developing a [Climate Emergency Plan](#) in 2017. Our previous climate action plans enabled the following achievement:

- Darebin Council ran a Solar \$aver and a Solar Bulk buy program in 2013-14 and 2015-16. The Solar \$aver program helped approximately 500 pensioner and low income households with the upfront cost of good value quality solar (paid back over 10 years through rates) with 10 year warranties. The two solar programs resulted in 1,800kW of solar PV being installed and equivalent to over 11,000 tonnes of emissions avoided. The targeting of low-income households was well received by the community. The Solar \$aver rates model is now being pursued in SA, ACT and 20 councils in Victoria.
- The Sustainable Homes and Communities Program is a key environmental education partnership program between Darebin and Banyule Councils. The program has had a broad reach, including workshops, direct programs with diverse communities, community leaders programs, sustainability awards and developing resources to engage the wider community. It has been effective in reducing household energy and water use, minimising waste and increasing the use of sustainable transport, sustainable gardening and sustainable food in line with Council targets. It complements Council's programs that work directly with low income and diverse communities.
- Through the Darebin Light\$mart program, 123 businesses had their lights upgraded to energy efficient LEDs. The businesses swapped 9,613 lights – collectively saving \$312,000 per year on their electricity bills and 1840 tonnes of greenhouse emissions per year, with an average payback of one year.
- The Talking my Language program has worked across four municipalities with the Italian, Indian, Vietnamese and Afghan communities and within Darebin's Greek, Macedonian, Chinese and Arabic communities. The program delivered energy efficiency information in the respective languages, held workshops and provided energy efficiency start-up kits.
- Between 2011 to 2014 the Cool Shade program provided 482 vulnerable households with a combination of external window shades, weather sealing and light globes to increase comfort and reduce energy costs. The program was initially co-funded by the Department of Human Services and has been rolled out in other council areas following our program.



15. Darebin Council

Moreland City Council, Melbourne

Moreland has a strong history of action on climate change. Moreland City Council established Moreland Energy Foundation (MEFL) in 2000 to support the community to take action on climate change and were certified zero carbon for their own operations in 2012.

Moreland City Council and MEFL work in partnership with the local community to deliver the Zero Carbon Evolution strategy. The Zero Carbon Evolution strategy is Moreland's ambitious plan to reduce carbon emissions by 22% across the Moreland community by 2020. Looking forward would see Moreland living within its 'carbon budget' and on track to becoming zero carbon by 2045.

To develop the strategy MEFL undertook wide community consultation and detailed analysis of Moreland's buildings, energy use and people to understand which measures are most cost-effective to implement and which deliver wider community benefits. This led to the development of five themes:

1. Generating local renewable energy
2. Using energy efficiently
3. Low-emissions transport
4. Minimising urban heat island effects
5. Activating the community to reduce emissions.

If the strategy is to be achieved all parts of the community and levels of government must play their part. Moreland City Council and MEFL are working to drive action through a range of projects.

These include:

- Council installed over 650kW of solar on their buildings
- Providing community bulk-buy offers on solar, LED lights, draught proofing and insulation through MEFL's Positive Charge team
- Developing an innovative program to enable community groups leasing buildings from council to install solar at no upfront cost and remain cashflow positive
- Enabling Environmental Upgrade Agreement legislation and linking businesses to trusted suppliers to make it easy for them to install solar and LED
- Supporting community solar, especially Moreland Community Solar
- Developing an Urban Heat Island Effect Action Plan and Urban Forest Strategy
- Providing an online and offline forums for community groups to connect, share events and ideas.



16. Moreland Energy Foundation

Denmark, Western Australia

The small community of Denmark in southwest WA developed its reputation as a green community from the 1980s onwards. Individualised efforts to reduce energy consumption in Denmark over the years were dramatically scaled up to a community level in response to a 2007 crisis.

The town lies at the edge of the South West integrated grid, nearly 300km from the main coal fired power generation. This results in transmission losses of around 30%. Denmark continues to grow with summer and Easter peaks in demand, when the population of the town can triple. During Easter 2007 the peak demand resulted in a major disruption to the electricity supply to Denmark and neighbouring Walpole, with a severe impact on the tourism industry.

The wider WA community called for Western Power, the state network utility, to substantially upgrade transmission lines. But local environmental groups initiated a different response aimed at reducing energy demand and increasing local renewable energy generation. The Green Town Denmark Walpole project arose from a partnership led by Western Power and the local community and including the relevant Local Governments, Chambers of Commerce, the Denmark Community Windfarm group, environment groups, Great Southern and South West Development Commissions, a local solar business and interested community members. The statutory requirement for Western Power to prove the business case for any upgrade of transmission lines to the Australian Energy Regulator lent weight to their investment in the Green Town project.

Over a six-year period, this partnership developed a range of initiatives aimed at reducing the peak load and deferring the major line upgrade, reducing overall energy consumption, developing local jobs in the renewable energy production and reducing carbon emissions. The initiatives included:

Research and Demonstration

- Energy appliance inventory
- An efficiency program aimed at the largest consumers
- Research and development on battery storage options
- Trial of Energy Monitoring Units.

Efficiency Improvements

- Minor upgrades to lines
- Compact fluorescent light replacement
- Smart meters
- Home and business audits.

Education and Awareness

- Market stalls
- Banners on town entries
- Workshops with rewards
- Free advice
- Work with accommodation owners.

Fuel Switching

- Solar Hot Water subsidies
- Private installation of PV (at February 2017 it was estimated that 16.9% of dwellings in Denmark had installed solar, with an estimated capacity of 1786 kW).
- Community windfarm.

The Green Town project was very successful, going beyond the original goals of a 10% reduction in peak demand, to achieve a 14% reduction and overall energy demand reduction. This was achieved for two communities, Denmark and Walpole, that were already comparatively energy efficient with an average consumption of 2.8kW per home at the peak. Other achievements of the Project included:

- Deferred network augmentation (with an estimated deferral saving of approximately \$2.5 million)
- Improvement in reliability
- Reduction in overall consumption and reduced greenhouse emissions
- Reduced peak demand in monitoring unit trial of 200 homes by a further 7%
- Support for the installation of two community initiated wind turbines.

The Denmark Community Windfarm (DCW) project was well established prior to the Green Town process, but after a long development period, began generating on 20 February 2013. As the windfarm website (www.dcw.org.au) states:

"In dollar terms the windfarm is the biggest single community project in the town's history. In its first 12 months of commercial production the [two] turbines generated 5.4GWh of electricity, equal to about 55% of average annual domestic consumption. In October 2014, less than two years after commissioning, the company had retired more than \$600,000 in debt and paid its first dividend to shareholders."

"In October 2014, less than two years after commissioning, the company had retired more than \$600,000 in debt and paid its first dividend to shareholders."

The windfarm is Western Australia's first community owned energy project, with the 116 investors coming largely from the local community. Approximately \$20,000 of dividends has been ploughed into local sustainability projects.

The Denmark community is now looking at future projects such as battery storage for the wind farm, a research project on the connection between water and energy, and other distributed energy options.



17. Green Town Denmark Walpole project



18. Green Town Denmark Walpole project

Australian Capital Territory

The people's pathway to zero emissions.

Canberra is a national and international leader on local climate change action and delivery and we are proud of this. We are leaders because we have:

- 100% renewable energy target by 2020
- A plan and contracts in place to deliver this
- A target of being zero net emissions by 2050
- Tri-partisan support for the above (Liberal, Labor and Greens).

Our climate policy is working. In 2010 the ACT Government set greenhouse gas reduction targets and started to invest in renewable energy. As of 2017, over 40% of our electricity is from renewable sources and we are on track to deliver 100% renewable energy by 2020. Our greenhouse gas emissions have dropped 11.8%.

We are going from strength to strength. This momentum for local action on climate change has been community driven. In November 2015 we joined cities around the world, for the biggest day of people powered climate action in global history. Hundreds of thousands turned out globally and in Canberra we had 10,000 people – Canberra's largest ever climate change rally. It wasn't just an environment rally but was attended by firefighters, faith communities, unions and workers, farmers, health professionals, business people, artists and musicians.

Effective community ownership will be an essential part of delivery of our zero net emissions goal. The pathway to zero net emissions needs to be community driven.

Conservation groups are working with other peak organisations to develop and build community ownership to ensure our local community is engaged and committed to a shared vision of achieving zero net emissions as soon as possible.

We celebrate that Canberra is well on the path to reducing our greenhouse gas emissions. Our renewable energy targets put us at the head of the pack in Australia and globally. We need to do this for the planet, for future generations and for a climate friendly future for all.

It's time to build on our success. One of the highlights of the 2016 ACT election was all parties in the Legislative Assembly – ACT Labor, Canberra Liberals and ACT Greens – now support our target of 100% electricity from renewable energy by 2020 and for Canberra to become zero net emissions by 2050.

We still have much work to do. In order to keep up with the science and to maintain our leadership role we should look at whether we can achieve an earlier zero net emissions target than 2050.

We also need to make sure our pathway to zero net emissions is fair, equitable, socially just, economically viable and does not displace our emissions into other jurisdictions. We need to work together as a community to develop agreed pathways on climate change that work for all sectors of society to ensure a just transition to adapt to climate change by developing further responses in consultation with climate affected communities and workers.

"Effective community ownership will be an essential part of our zero net emissions goal."

Zero Emissions Noosa, Queensland

Noosa Shire on Queensland's Sunshine Coast has the goal of zero carbon emissions by 2026 firmly in its sights. The Council has set that goal for its own operations (waste, fleet, council buildings) and Zero Emissions Noosa Inc. (ZEN) has set the same goal for the community.

With assistance from Noosa Council and BZE, we have established the key contributors and quantities of our greenhouse emissions. We know we have a major task ahead of us, but we believe progress will be exponential as we begin to deliver real change.

We have the data on emissions from electricity and transport and it is clear they are the key areas to focus on. We also have many tourism accommodations, and many visitors who come by car. We have established two working groups examining ways to reduce electricity and transport emissions. As of 2017, 28% of Noosa detached housing has solar PV, and we are confident our community engagement and research on payback will deliver major increases to other building sectors such as industrial premises.

We will also be documenting the experience of innovative tourism resorts that have gone down the path of genuine sustainability in their operations.

Transport comprises at least 30% of our emissions and probably much more if visitors' cars are included. The transport working group knows that reducing the dependence on the private motor vehicle is a major task, and has already held two workshops with the community to gather their ideas. Electric bicycles may provide real alternatives to commuter travel and we have been monitoring case studies in WA that show positive results.

ZEN will engage with our community to deliver the highest emission reduction possible as part of our global responsibilities. Moreover, there are real commercial benefits in terms of jobs, innovation and the bottom line costs for businesses.



19. Zero Emissions Noosa - Noosa community members working on an emission free transport strategy for the shire.



20. Zero Emissions Noosa - Joe Shlegeris with his Tesla electric car and Darren Walters with his electric bike, both passionate supporters of emission free transport

Next steps

Zero emissions is achievable and affordable in all sectors. If you are interested in starting as a Zero Carbon Community get in touch to be part of this groundbreaking work.

1. Join the Zero Carbon Communities mailing list: <http://bze.org.au/zero-carbon-communities>
2. Start a Zero Carbon Community with a small core team
3. Set an ambitious target in collaboration with BZE, your local community and your local council
4. Use this guide to get going!

Support Zero Carbon Communities

If you like what you have just read you can help provide meaningful support to communities undertaking this work.

Donate: <http://bze.org.au/donate>

BZE is developing our model to achieve our vision of an ever growing network of communities across Australia working together to achieve zero emissions. We encourage interested parties keen to collaborate in this work to get in touch.

Contact us: info@bze.org.au

Project resource

There are a growing number of resources available to support Zero Carbon Communities. A selection of these are presented below.

Community energy

A guide to community owned renewable energy - Victoria
<http://www.delwp.vic.gov.au/energy/renewable-energy/?a=351566>

Coalition for Community Energy
<http://cpagency.org.au/wp-content/uploads/2017/03/C4CE-Community-Solar-Projects-Decision-Guide-Feb2017-A3.pdf>

Community energy projects selling out within minutes
<http://www.abc.net.au/news/2017-04-30/community-energy-projects-selling-out-within-minutes/8476794>

Community Power Agency - A how to guide
http://cpagency.org.au/wp-content/uploads/2014/06/CPAgency_HowtoGuide2014-web.pdf

Embark
<http://www.embark.com.au/>

PowerShop community energy projects
<http://www.powershop.com.au/yce/>

Community groups

Centre for social change
<http://www.centreforsocialchange.com.au>

Incorporation
<https://www.consumer.vic.gov.au/clubs-and-not-for-profits/incorporated-associations/become-an-incorporated-association/should-your-club-incorporate>

Livewell
<https://livewell.net.au>

Purpose driven campaigning
<http://www.jrmyptr.com/wordpress/wp-content/uploads/2014/01/purpose-driven-campaigning.pdf>

Funding

Behind the Meter Solar PV Funding Quickstart guide
<https://www.frontierimpact.com.au/resources>

Clear Sky Solar
<http://www.clearskysolar.com.au>

CORENA
<https://corenafund.org.au>

Zero emissions strategy

City of Adelaide Strategy
<http://www.climatechange.sa.gov.au/target-zero>

City of Melbourne Strategy
<http://www.melbourne.vic.gov.au/SiteCollectionDocuments/zero-net-emissions-update-2014.pdf>

Climate Emergency Plan in 2017
<http://www.yoursaydarebin.com.au/climateaction>

Moreland Zero Carbon Evolution
<http://www.moreland.vic.gov.au/globalassets/key-docs/policy-strategy-plan/zero-carbon-evolution-strategy.pdf>

Uralla Blueprint
<http://z-net.org.au>

Solutions

ANU renewable energy report

<http://energy.anu.edu.au/files/Summary%20-%20100%25%20renewable%20electricity%20in%20Australia.pdf>

Beyond Zero Emissions - Zero Carbon Australia reports

<http://bze.org.au/publications-list>

ClimateWorks - Pathways to deep decarbonisation

http://climateworksaustralia.org/sites/default/files/documents/publications/climateworks_pdd2050_technicalreport_20140923.pdf

CSIRO Low Emissions Technology Roadmap

<https://www.csiro.au/en/Do-business/Futures/Reports/Low-Emissions-Technology-Roadmap>

Drawdown Solutions

<http://www.drawdown.org/solutions>

The Energy Freedom Home

<http://energyfreedom.com.au>

Reporting

100% RE

<http://www.go100re.net/cities-regions-network>

Baseline emissions

www.ghgprotocol.org/city-accounting

Carbon Climate Registry

<http://carbonn.org>

Compact of Mayors

<http://mayors.oceania.iclei.org>

Global Greenhouse Gas Protocol

<http://www.ghgprotocol.org>

Global Covenant of Mayors

<http://www.globalcovenantofmayors.org>

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8	CORENA	18	Green Town Denmark Walpole project
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