COMMUNITY SUSTAINABILITY ACTION GRANT

Round 6: Community Climate Action

Proposal for a "Business Plan for a Network of Community Batteries in the Noosa LGA"

Objective

The ZEN Inc community group and Noosa Council have received requests from community groups, businesses, bodies corporate, individuals and Councilors about the introduction of community batteries in the Noosa LGA. We have been investigating initiatives in other jurisdictions to assess their viability locally to support time shifting of excess generated solar PV, increased hosting capacity, whilst also providing network support particularly on LV feeders, all in a financially viable way.

To help meet the challenges of the energy transition and to meet zero emissions targets, we wish to collaborate with stakeholders, and especially Energex / Energy Queensland to explore and define areas of mutual benefit in this space.

Following from our commissioned roadmap report "Achieving 100% Renewable Electricity in Noosa", it's now time to plan how to best time shift the excess daytime solar electricity through a large number of strategically located batteries to support the Noosa community whilst providing support for our grid network.

This new roadmap will be the "Business Plan for a Network of Community Batteries in the Noosa LGA", and will guide the pathway to grow from a single community battery, to a dozen, and in time to more than 100.

We expect that this specific plan for Noosa will be able to be easily adapted to other local government areas in South East Queensland in the Energex zone, and beyond.

Zero Emissions Noosa, Inc

Zero Emissions Noosa is a group of individuals in the Noosa Shire, who are committed to taking local action on climate change, principally through reducing our reliance upon electricity generated from fossil fuels.

We believe the answer is sitting right above us, that is, using energy directly from the sun!

ZEN was incorporated in 2017 and has been working directly with Noosa Council and others to achieve net zero emissions in Noosa by 2026.

Website: https://www.zeroemissionsnoosa.com.au/
Facebook: https://www.facebook.com/ZeroEmissionsNoosa

Background

The ZEN Community Battery project team have continued the good foundation set out in ZEN's commissioned work - Facilitating Community Understanding of Electricity Battery Options for Noosa Shire.

A strong team has been assembled including

- ZEN - Vivien Griffin (Leader), Anne Kennedy, Thorsten Kels, Carina Anderson, Geoff Acton, John Hare
- A technical team - Vivien Griffin(ZEN), Geoff Acton(ZEN), Annie Nolan(Noosa Council), Heather Smith(C4CE & co-author of report), Steve Fairless(Power Oracle, ex-Energex planning & operational North Coast), Sajeeb Saha(Lecturer Electrical Engineering, USC), Chris Wallin(as adviser, Yarra Energy Foundation)

A proposal has been submitted to the Noosa Council Climate Change Response Plan Community Reference Group which was judged as being the most favoured to submit to Noosa Council for their consideration for the next Financial Year budget. The outputs from this grant proposal, if successful, would augment the CCRP CRG proposal.

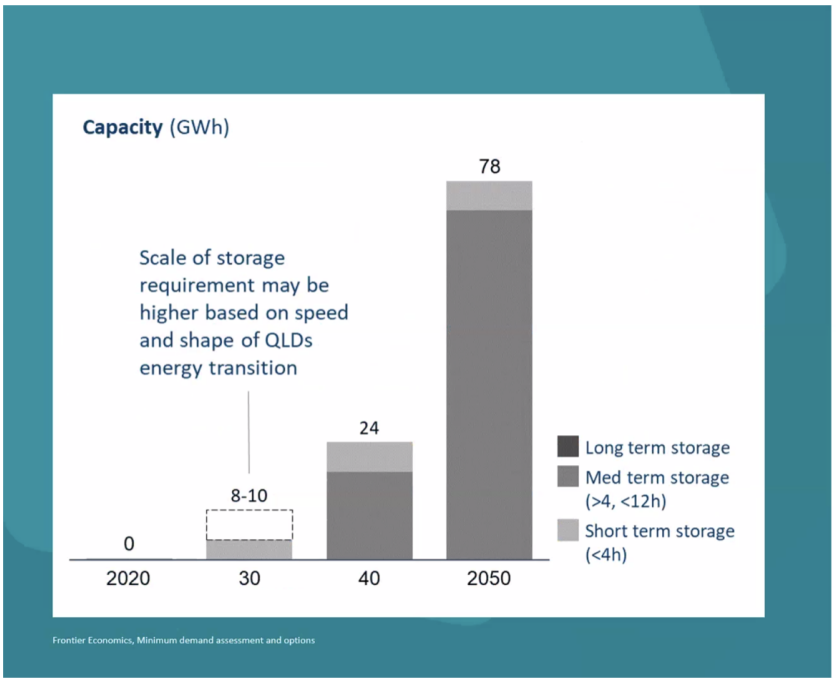
We are well positioned to outline what is required in a Business Plan for a network of community batteries in the Noosa LGA. Initially this would be for one battery, then up to twelve, and over the longer term 100+.

Context

This proposal should also be read in conjunction with the Zero Emissions Noosa grant application.

Motivations

Energy Queensland recognises the huge requirement for storage during energy transition to meet the Queensland Government 50% renewable energy target by 2030.



Modelling shows Queensland requires at least of 8GWh of energy storage by 2030 to maintain security of supply…

and up to 16GWh to maximise the energy delivered from rooftop and large-scale solar.

If we take the Noosa LGA grid electricity consumption, as a proportion of the total grid electricity consumption in Queensland, this would correspond to 65 - 130MWh of storage for the Noosa LGA. Not all of this storage would be needed locally, but it does highlight the enormous opportunity for significant amounts of local storage, close to the generation source. Note also that these storage estimates are for a Queensland 50% renewable energy target by 2030. Noosa Council and Zero Emissions Noosa's target is more ambitious at 100% by 2026, so with higher levels of solar PV penetration, we can expect higher levels of storage will be required.

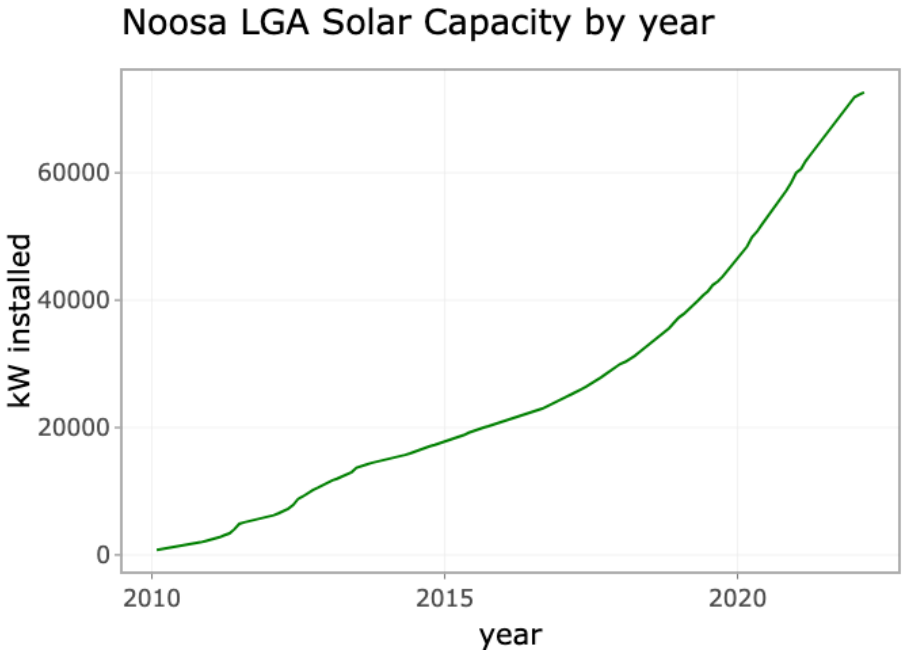
As rooftop solar grows, networks are challenged and reaching solar hosting capacity, particularly on Low Voltage feeders that run down our streets.

We recognise that there will be many solutions to the need for energy storage. For instance Energy Queensland initiatives include

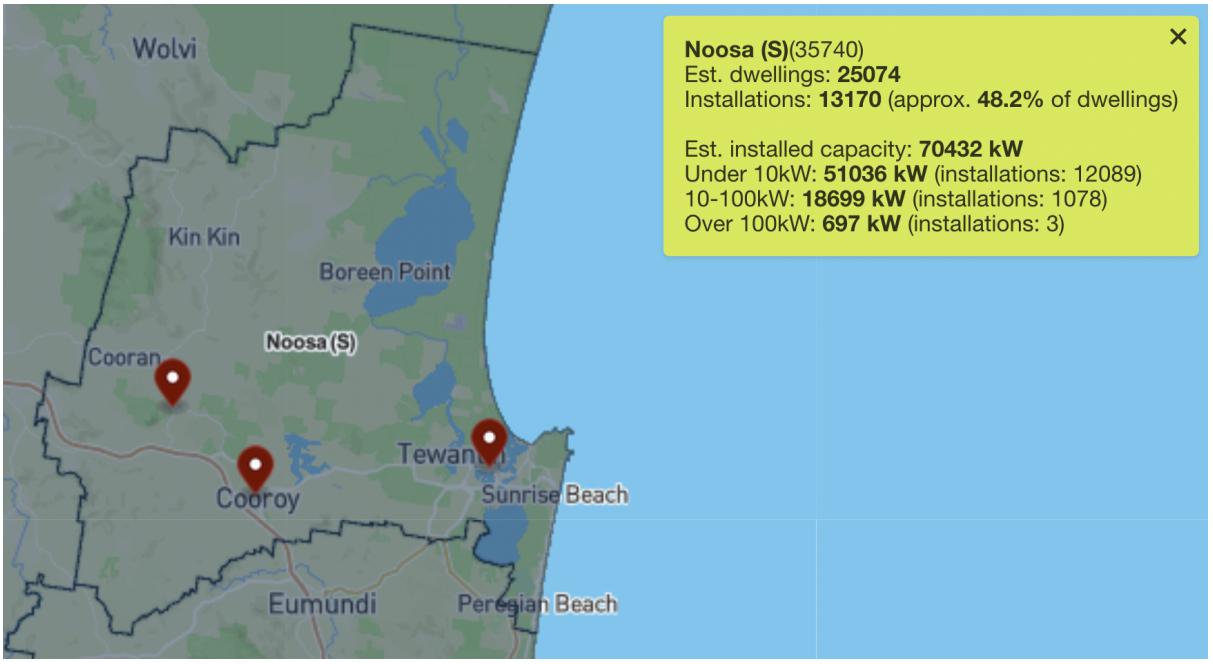
- Large scale battery trials at Zone Substations in the Ergon zone
- Dynamic Operating Envelope rollout, to dynamically adjust the maximum solar export and generally reduce solar export curtailment
- Elexsys dSTATCOM trials to balance the network and increase the solar hosting capacity of the network
- Borumba Pumped Hydro Energy Storage(PHES) feasibility
- Behind the meter battery trials

In the Noosa LGA

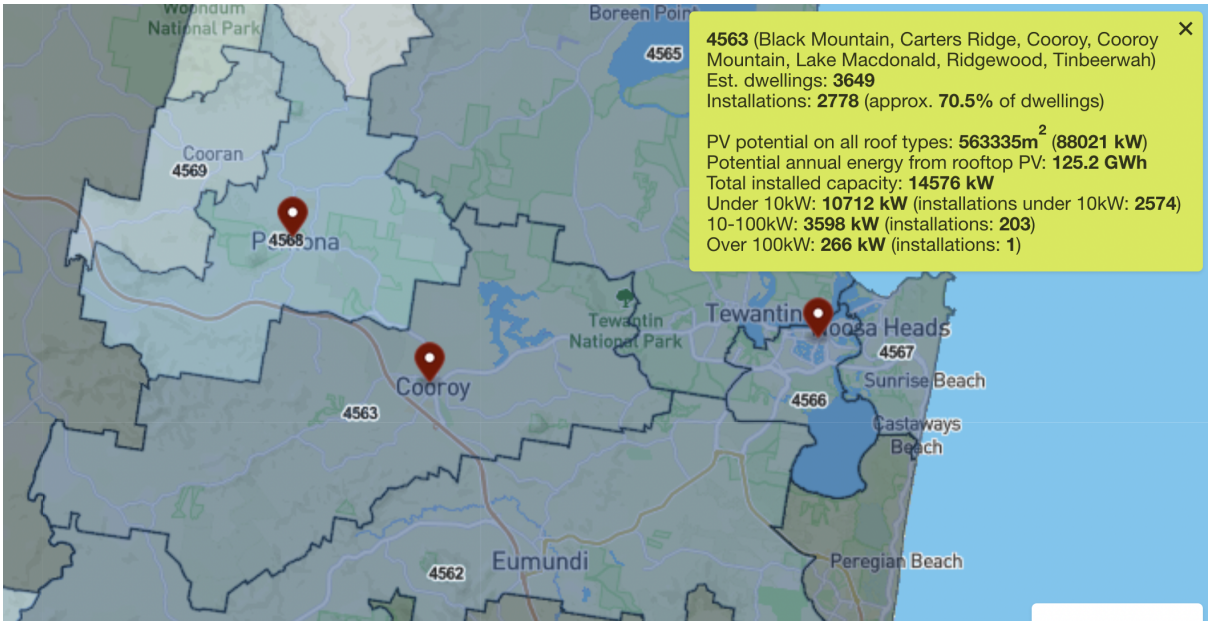
- Zero Emissions Noosa has been tracking solar installation in Noosa and over the last few years it has been growing consistently at 1 MW per month.



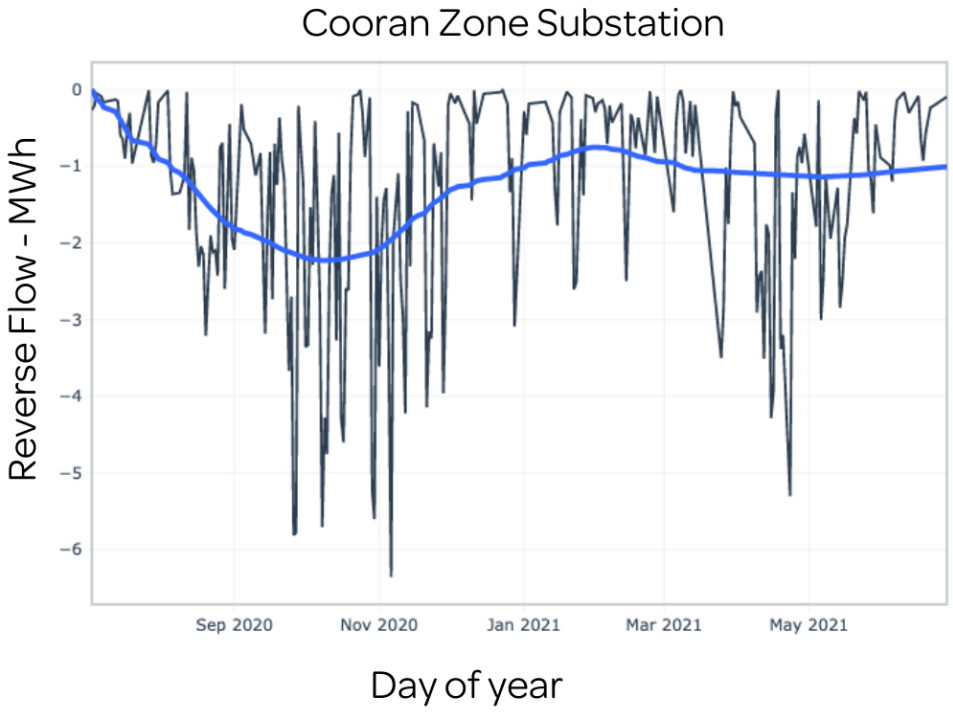
- The Noosa LGA has high uptake of solar PV at over 48% of dwellings, according to the APVI as at 31 Dec 2021. The red markers refer to installations over 100kW - https://pv-map.apvi.org.au/historical#10/-26.3436/152.9443



- There are even higher levels of PV adoption in hinterland areas, for instance in postcode 4563 centred on Cooroy, where over 70% of dwelling are estimated to have solar PV - APVI as at 31 Dec 2021 https://pv-map.apvi.org.au/historical#11/-26.4169/152.8956



- Reverse flows through local Zone Substations are increasing - over 240 days in 2020-21 for both Black Mountain and Cooran. This means during these days, there is more solar electricity being generated than is being consumed in the areas served by these Zone Substations, and much excess solar generation that could be stored for later use



- We therefore assume that there is significant reverse flow through substations - 11kV to LV - and on these Low Voltage feeders there is the opportunity to “soak up” the

excess daytime electricity in a “sponge” to be “squeezed out” for night use by all customers
- Local solar installers and our business networks are telling us of solar export curtailment for some non-residential connections.

There is emerging interest in, and trials of local batteries. Community batteries are midway between the large scale batteries at Zone Substations and behind the meter batteries at customer premises. Features include

- Midway between large scale & customer behind the meter on LV networks
- Could alleviate export limits
- Could reduce losses, by keeping electricity generation, storage and consumption local
- Could provide network support services
- Could facilitate energy equity, by allowing non-solar customers to still benefit from the lower generation costs that rooftop solar PV provides
- Potential deferral of network upgrade / augmentation costs

Opportunities

Rapid uptake in solar is causing ‘congestion’ in the electricity network, that is, more renewable energy than the grid can handle. Unfortunately, if renewable energy can’t be used, exported to the grid, or stored, it is wasted.

Community batteries address this problem by absorbing and storing excess energy from rooftop solar and releasing it during peak times when it is needed most.

At the neighbourhood-scale, costs are shared, making energy supply and storage more affordable for everybody.

With community batteries, we can make our energy system more resilient, climate friendly, equitable, and affordable.

Problem	Solution
‘Solar waste’ — excess energy produced by local residental and business solar systems which is not utilised.	Batteries will capture and charge up during the day when solar export energy is highest, and release it during peak times or at night.

‘Energy inequity’ — not everyone is able to: install solar, access renewable and affordable energy, benefit from renewable energy, engage with the energy system.	Batteries will help to redistribute renewable energy across the community. All homes and businesses within the network catchment area, not just those with solar, could choose to use renewable energy from the batteries.
‘Export limiting’ — blockages in the electricity network restricting more businesses from exporting solar to the grid.	Batteries would help remove restrictions on customers that want to export solar to the grid. This would increase the payback on solar if they are able to export energy.
‘Energy affordability’ — electricity prices contribute to bill pressure, exacerbating already vulnerable people and households.	Batteries would apply downward pressure on the cost of electricity. As local supply of renewable energy increases and demand remains the same, electricity prices should become more affordable.
‘Batteries are expensive’ — batteries are not yet cost-effective at the household scale.	Batteries would operate at the “neighbourhood scale”, leverage economies of scale, offer a more cost effective way to deploy battery storage.

(adapted from YEF material)

Highlights of the Business Plan

Detailed sections of the Business Plan are planned as follows:

- Sites for batteries
- Community Engagement
- Local Electricity Network Provider - Energex / Energy Queensland

- Define the business / financial model
- Define the operating model
- Land, Development Approvals, Environmental Approvals
- Identify partners for implementation of the Business Plan,
- Identify funding sources

Project Resourcing

We will resource the project to develop the business plan using

- a leading expert in community battery implementation
- an expert with detailed knowledge of the Energex network
- a local company with extensive experience in community engagement
- a project manager experienced in leading renewable projects
- an enthusiastic, knowledgeable and dedicated team of volunteers
- resources from Noosa Council who are committed to the goal of zero emissions ny 2026
- and the support of key local organisations such as Tourism Noosa, Noosa Council and Noosa Junction Association

Yarra Energy Foundation

Yarra Energy Foundation(YEF) is a local not-for-profit organisation with a vision for helping our communities reach zero carbon emissions from energy. YEF receives core funding from Yarra City Council and is governed by an independent board of non-executive directors.
The YEF Community Battery program will see metropolitan Melbourne's first community battery go live in early June 2022. YEF have a scalability plan to rollout 200 community batteries over a seven year period
Drawing on their experience in developing the YEF Community Battery program, advisory services will be delivered by Chris Wallin(Commercial Program Manager) to advise how the YEF work could be adapted to the local Noosa conditions. YEF can make available YEF documents as suitable to support the development of the Business Plan.
Chris Wallin LinkedIn profile - https://www.linkedin.com/in/chris-wallin-4b902411b/
In particular, Chris will focus on these areas of the Business Plan

- business / financial model
- operating model
- Local Use Of Service / community battery tariffs (including connecting the pricing managers from Victoria and Queensland)
- equipment, design, procurement
- site selection

Chris has also provided extensive advice to the Zero Emissions Noosa Community Battery Technical Team, which has help put ZEN is a place where we can present this comprehensive proposal.

Power Oracle

Steve Fairless has vast experience in the Electricity Utility Industry for 50 years across 2 States and 4 Utilities. He formed Power Oracle post retirement following approaches by Veolia Energy to continue Advice Work regarding Renewable Energy and Zero Carbon Goals for The University of the Sunshine Coast.
Relevant experience from the last position as Principal Asset Officer for Enegex included

- Managing all performance aspects associated with an electricity network.
- Manage major Customer & Developer interfaces.
- Manage Customer Relationship with other critical infrastructure owners (local authorities).
- Represent ENERGEX as a Member/Advisor to Local & District Disaster Management Groups for Sunshine Coast, Noosa & Gympie Council areas.
- Provide Engineering advice and initial assessment for solar and battery renewable energy network connections larger than 30kW.

Steve's work will encompass

- engaging with Energex / Energy Queensland to help gain their support
- identification of suitable sites for community batteries
- connection of community batteries to the network
- community battery tariffs
- other areas of the business plan to advise and review.

Steve Fairless LinkedIn profile - https://www.linkedin.com/in/steve-fairless-3a167965/
Steve has been part of the Zero Emissions Noosa Community Battery Technical Team, and has provided much initial advice..

The Social Deck

"The Social Deck helps organisations to reach and engage people in actions that have a positive impact on society and the environment. We specialise in strategic communications, stakeholder and community engagement,
capacity building, digital strategy, social marketing campaigns and evaluation. We provide consultancy services to government agencies, businesses, social enterprises and not-for-profits to help them achieve change.

Relevant recent projects include:

- Development of the Queensland Government's Zero Emission Vehicle Strategy
- Community and stakeholder engagement to support the National Bushfire Recovery
- Communication and messaging for the national electricity tariff reform
- National community and stakeholder engagement on the development of the
- National Obesity Strategy
- Development of the Queensland Cycling Strategy

As a B-Corp certified social business, The Social Deck reinvests its profits back into projects, resources and services that have a positive impact on society and the environment.

We are committed to becoming carbon neutral, we have rooftop solar installed at our head office in Noosa and we offset the personal emissions of all our staff through our partnership with Greenfleet."

As testament to the relationship between Zero Emissions Noosa and The Social Deck, and to their commitment to the project and the local community, we are delighted to say in their words - "We are pleased to partner with ZEN on delivery of this project and will provide the services outlined above on a pro-bono basis."

The Social Deck webpage - https://www.thesocialdeck.com.au/

Zero Emissions Noosa has previously worked with The Social Deck on the "Repower Noosa Report: Understanding the barriers and benefits of solar for business" https://www.zeroemissionsnoosa.com.au/s/Final-Barriers-and-Benefits-Report-plus-social-marketing-plan-final-compressed.pdf

Future Carbon Australia

Gabriele Sartori is an experienced renewable energy specialist who will provide consulting and project management services to the project.

FutureCarbon Australia will also manage the suite of volunteers provided by ZEN Inc. and Noosa Council staff. The engagement will include writing part of the Business Plan.

Gabi has previously worked for ARENA, Hydromine(a PHES company), an integrated energy systems planning project in North Sulawesi, Indonesia for APEC - Asia-Pacific Economic Cooperation, and has been a director of the Energy Users Association of Australia. She is also a board member of Zero Emissions Noosa, Inc.

Gabriele Sartori LinkedIn profile: https://www.linkedin.com/in/gabriele-sartori-953a5622/

Noosa Council - Annie Nolan

Annie Nolan is Noosa Council's Carbon Reduction Officer and is responsible for implementing the Zero Emissions Noosa (ZEN) Organisational Strategy.
The role involves:

- carbon footprinting
- identifying and assessing emission reduction projects
- project managing carbon emission projects e.g energy efficiency, on site renewable energy and carbon offset projects
- Staff engagement in ZEN
- Involvement with other initiatives to reduce Council's net emissions to zero

Annie will be able to assist ZEN Inc in the community battery project in the following ways:

- support for identifying potential sites with high solar penetration by using Council mapping tools
- liaising with Council staff to assist identifying
- suitable Council land parcels for community batteries
- Council Development Approval requirements for community batteries
- any Council environmental requirements for community batteries, such as noise, visual amenity, etc
- keeping relevant Council stakeholders up to date with the project

Annie Nolan LinkedIn profile: https://www.linkedin.com/in/anne-nolan-238a438/

Zero Emissions Noosa and other volunteers

Zero Emissions Noosa is fortunate to have a range of dedicated, knowledgeable and action-oriented locals.
Leveraging their local knowledge and connections, they will work actively on, and support the project to ensure its suitability and success.
People who are proposed to be involved include:

- ZEN Community Batteries Working Group
    - Vivien Griffin, convenor of the group
    - Geoff Acton, technical lead
    - Anne Kennedy, Chair of ZEN, Inc
    - Thorsten Kels, ZEN board member and engineer
    - John Hare, convenor Peregian Beach Energy Hub initiative
- ZEN Communications and Advocacy team members
- ZEN Finance and Fundraising team members
- Other members of the ZEN Community Batteries Technical Team
    - Heather Smith - Energy Specialist and Community Energy Specialist - https://www.linkedin.com/in/heather-smith-gaicd-09779355/
    - Sajeeb Saha - Senior Lecturer Electrical Engineering - University of Sunshine Coast - https://www.linkedin.com/in/sajeeb-saha-87073769/

Community Scale Battery Working Group

Chris Wallin, Heather Smith and Geoff Acton are all members of the Community Scale Battery Working Group, which enables access to the leaders in the field.
The Community Scale Batteries Working Group (CSBWG) is an informal collaboration of staff from environmental and energy user groups, research institutions, community energy groups, retailers and governments around Australia. It was created in late 2020 and meets online monthly to discuss topics of common interest including business cases, technical issues, ownership and operational models, planning, environmental and social license issues, and user experiences. The CSBWG is managed by a steering committee consisting of Dr Mark Byrne, Total Environment Centre (convenor); Dr Marnie Shaw (chair), ANU; Chris Wallin, Yarra Energy Foundation; and Alida Jansen van Vuuren, Ausgrid. The objective of the CSBWG

is to give community scale/neighbourhood batteries the best possible chance of becoming an important part of the energy transition.

PROJECT MILESTONES

The deliverable from this project is a Business Plan. The elements of the business plan are not sequential, and many will be conducted in parallel.
The detailed budget sets out the milestone payments:

- project initiation
- first draft of the business plan
    - this will include preliminary content for all sections, including notes on work to be completed for each section
    - this first draft will provide a time-based focus for the project team to deliver
    - this first draft will provide evidence of work in progress for all stakeholders
- final version of the business plan, ready for review
    - content for all sections of the business plan will be ready for final review by stakeholders
- published version of the business plan
    - comments from the review process will be moderated and incorporated into the final version of the business plan.

Indicative dates for the milestone for payment are:

- project initiation - Month 1
- first draft - Month 4
- final draft - Month 7
- published plan - Month 9

These milestone dates will be dependent on access to resources outside the control of the project team, such as Energex / Energy Queensland, Noosa Council, and other external agencies / organisations.
Activities planned to deliver the Business Plan are centred on the sections of the document. Work on these streams will be done mainly in parallel, resourced by the project manager and utilising the appropriate combination of the expert advisory and delivery service providers nominated, in conjunction with Zero Emissions Noosa's committed volunteers. Sections of the Business Plan will be documented as the work proceeds.

- Sites for batteries
    - specify criteria for site selection
    - identify and qualify candidate sites based on above criteria
        - also refer to the section on draft site selection criteria
        - examples where there is nascent support
            - Noosa Council - Wallace Park precinct, Sunrise Beach shops
            - Peregian Beach Energy Hub (proposed by working group)
            - Elysium residential estate (proposed by Elysium Body Corporate)
            - Village of Cooran (proposed by Cooran Earth Rights)

- Noosa Junction - Sunshine Beach Road shopping precinct (proposed by local businesses, new solar is constrained for export)
- Community Title Schemes - eg community of townhouses with dedicated distribution transformer (proposed by residents)
- Residential areas with every high solar PV adoption, eg Cooroy (proposed by residents)
- Boreen Point and other hinterland townships (anecdotal evidence of power instability)
- Semi-industrial areas where many solar installations are constrained for export (proposed by businesses)
- Areas in the Energex network which are “constrained”
- Proposed new sporting developments
    - McKinnon Drive Sports area
    - Pirates Rugby proposed development
    - Cooroy Sports complex

- Community Engagement
    - engage the community to educate and gauge support
    - refer to Community Engagement Plan
- Local Electricity Network Provider - Energex / Energy Queensland
    - continue to engage with Energex / Energy Queensland to gain their support and assistance
        - identification of suitable sites, focussing on placement for mutual Energex / community benefit
        - define requirements for connection of the community battery to the network
        - propose community battery tariffs, noting that CitiPower/Powercor/United Energy(Victoria), Ausgrid(NSW), Essential Energy(NSW) & EvoEnergy(ACT) all have community battery tariffs trials for 2022-23 approved by the Australian Energy Regulator
- Define the business / financial model
    - Options for how business and financial structures are setup for a network of community batteries
    - define the preferred philosophy behind the venture, ie balance between for-profit, community benefit, for carbon reduction, energy equity, etc
    - critically review potentially model based on Yarra Energy Foundation Not-For-Profit hybrid model
    - recommended model
- Define the operating model
    - identify all revenue streams and operational costs
        - energy arbitrage
        - Frequency Control Ancillary Services(contingency FCAS)
        - LUOS tariffs
        - customer fees

        - customer payments
        - aggregator fees
        - retailer fees
        - operational and maintenance costs
    - potentially model after Yarra Energy Foundation NFP
    - ensure that all cost centres are covered by revenue streams, so the community batteries are financially sustainable
- Land, Development Approvals, Environmental Approvals
    - in conjunction with Noosa Council
    - identify suitable land parcels for location of batteries and associated switchgear, for identified candidate sites
    - this may include Council land parcels
    - identify Council Development Approval requirements for community batteries
    - identify any Council environmental requirements for community batteries, such as noise, visual amenity, safety, etc
- Identify partners for implementation of the Business Plan, which may include:
    - Noosa Council
    - Energy Queensland / Energex
    - Yarra Energy Foundation consortium
    - Community Scale Battery Working Group
    - Electricity aggregator (for access to FCAS market)
    - Electricity retailers (for access to the retail market and customers)
    - Commercial partners
- Identify funding sources, which may include
    - Noosa Council
    - ARENA
    - Commercial partners
    - Federal Government, via ALP election commitment for $500k community battery at Noosaville
    - Local investors

Community battery sites - types to consider

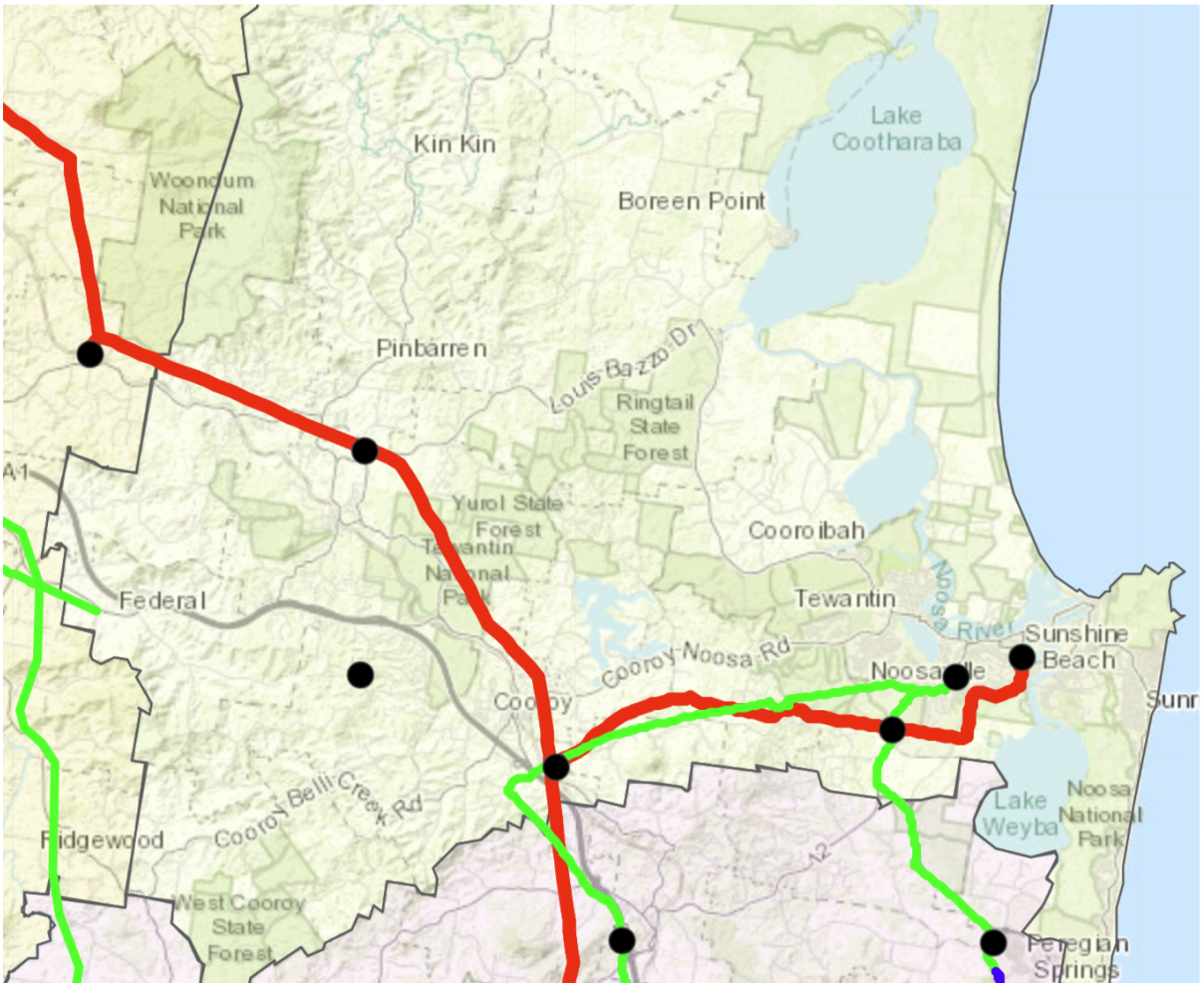
This section outlines possible types of environments which could possibly be included in the first dozen sites, to be representative of typical environments in the Noosa LGA, and other South East Queensland LGAs.

- residential feeder with high PV penetration, limits on exports, high voltages and solar switching off - a nice spot, well located near a dense cluster of solar owners where you could put a battery
- residential feeder in a growth area with an overloaded transformer and possible willing future solar owners

- commercial feeder (eg shopping street) with a number of customers who would value emergency supply and could increase their solar if there was a battery
- tackling the limits in the industrial estates
- a rural feeder with a real need for emergency supply - ie put the battery behind the meter at the community building or school, but run it with an intention to trade power with everyone on the same feeder
- ditto but for a community building in Noosa
- An EV focused proposal, where the location is chosen for promoting vehicle charging but the battery does all the other things too.

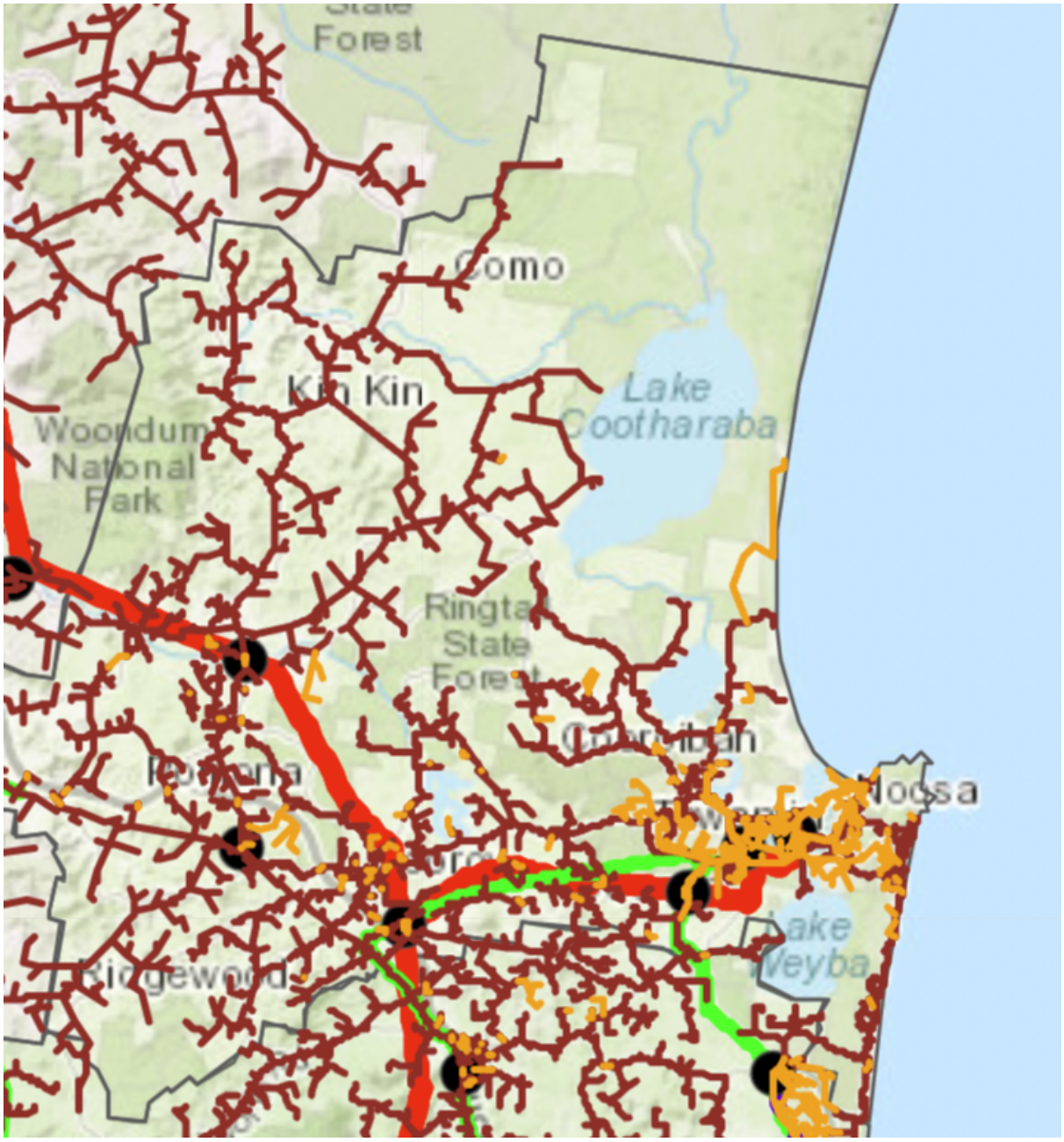
Energex Maps

The following maps show aspects of the Energex network in the Noosa LGA. These maps will assist in the selection of candidate sites for community batteries.

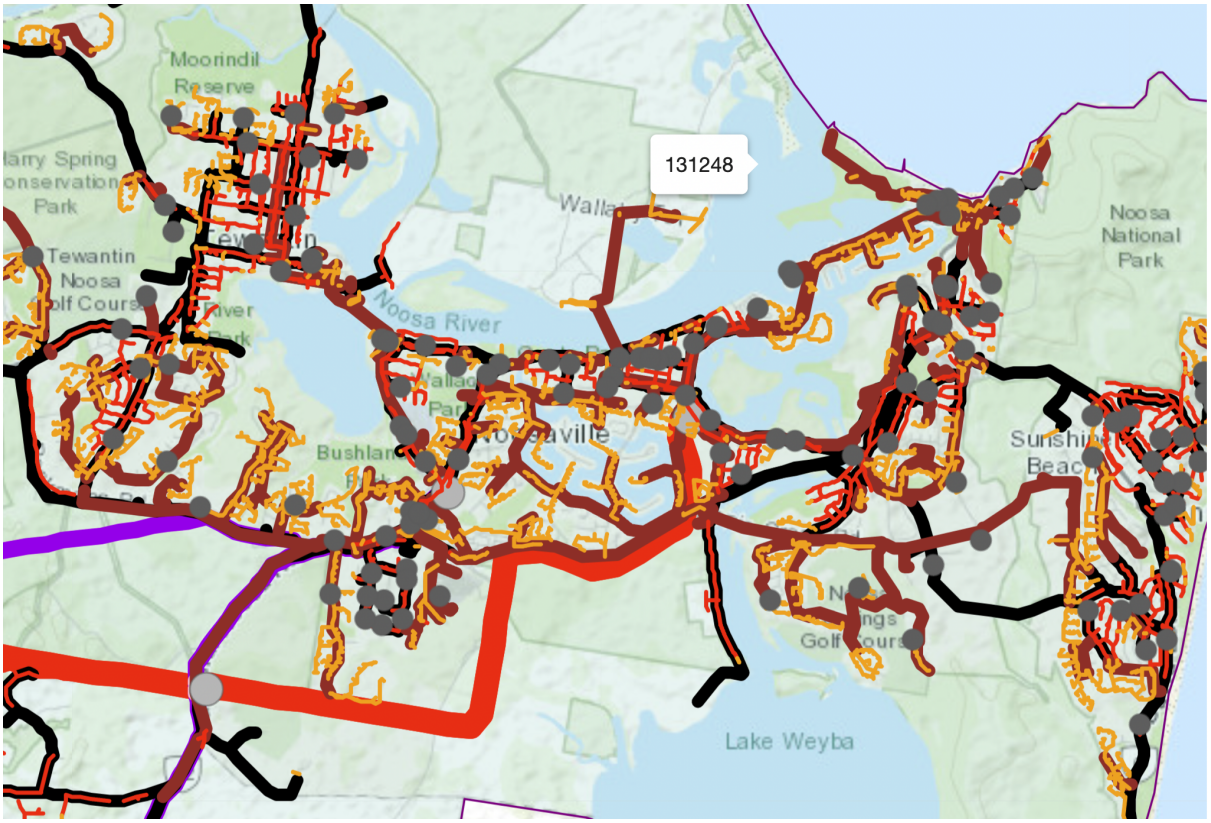


Noosa LGA
Legend

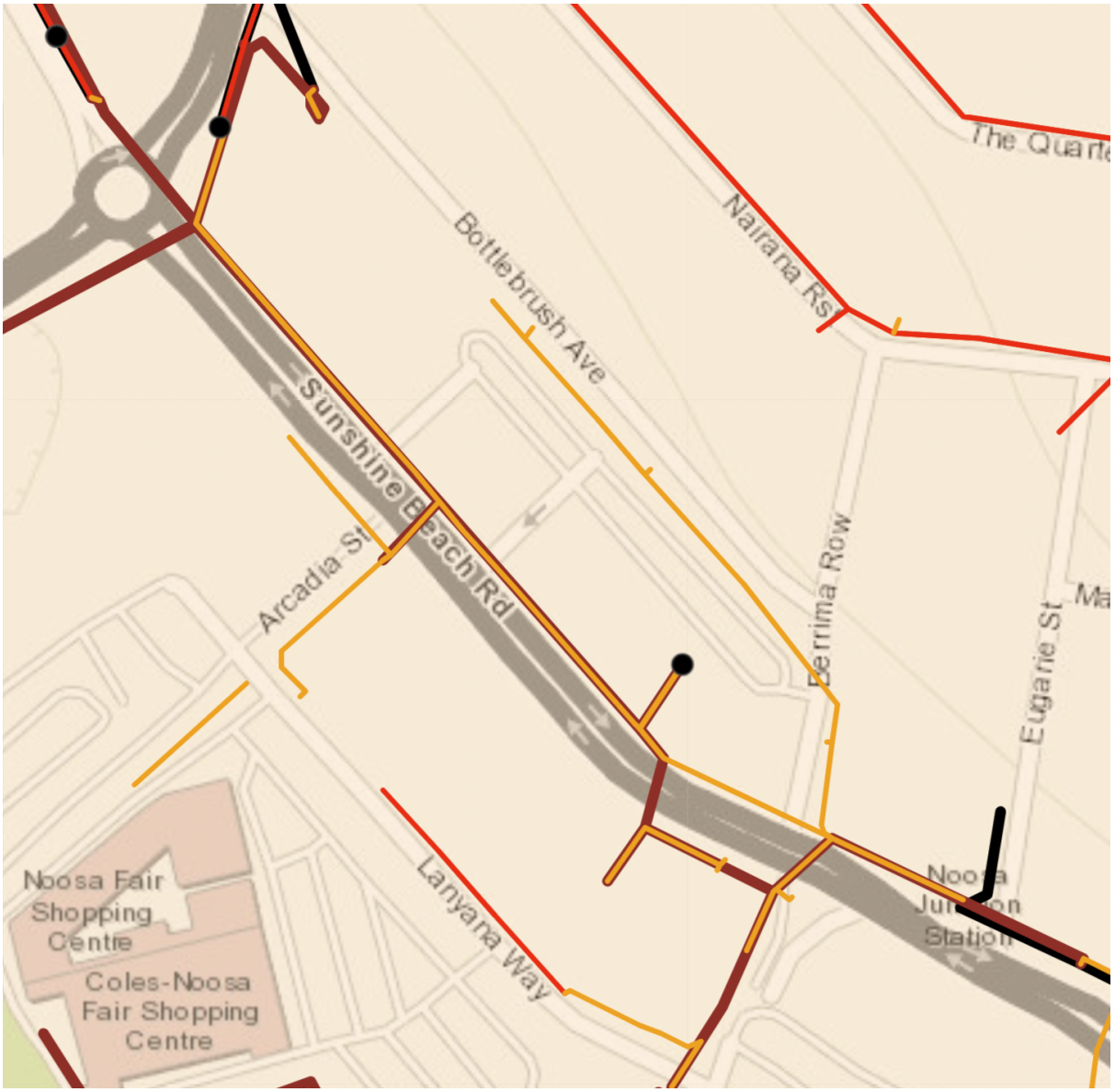
Zone Substations (black)
132kV overhead (red)
33kV overhead (green)



Noosa LGA
Legend
Zone Substations (black)
132 kV overhead (red)
33 kV overhead (green)
11 kV overhead feeders (brown)
11 kV underground feeders (orange)



Noosa LGA - selection Noosaville & Noosa Heads - down to low voltage feeders
Only showing substations 300kVA and above
Legend
132kV (thick red)
Zone Subs (light grey circles)
33 kV (purple)
11kV overhead (black)
11kV underground (brown)
substations 300kVA and greater (darker grey circles)
Low Voltage overhead (thin red)
Low Voltage underground (orange)



Noosa LGA - Noosa Junction retail & commercial - down to low voltage feeders
Only showing substations 300kVA and above
Legend
11kV overhead (black)
11kV underground (brown)
Substations - 1000kVA - NOOSA CINECENTRE BACK
Low Voltage overhead (thin red)
Low Voltage underground (orange)

Noosa LGA - Pomona Township - down to low voltage feeders
Legend
11kV overhead (black & thick red)
Substations (black circle)
Low Voltage overhead (thin red)
Low Voltage underground (orange)