Energise Ōtaki's solar power to the people

Energise Ōtaki built Aotearoa New Zealand's first community-owned solar farm. We hope that sharing our experience supports others in developing community power projects across the motu/ country.

Summary

Energise Ōtaki (EŌ) has built and operates two significant solar generation projects.
One is at Ōtaki College and the other, Rau Kūmara, powers Ōtaki Wastewater Treatment Plant.
Both generate revenue that's distributed annually to energy-related projects.

Key people

Energise Ōtaki began about a decade before these solar power projects did. Working on smaller projects first, a core crew were able to get to know one another and together establish a track record and credibility. This crew included:

- Leigh Ramsey. Leigh works in alternative fuels, with technical and project management skills honed by setting up projects in the Pacific Islands. Leigh was a business member of Ōtaki's Clean Technology Centre, a site that connected like-minded businesses. This hub was key to Energise Ōtaki's formation.

- Gael Ferguson. Gael had been a senior manager at Kāpiti Coast District Council, responsible for strategic direction, climate action and sustainability. Her existing relationships, project management and negotiation skills were key. Gael became the project manager.

- Ian Jarrett (Astarra Technology). Ian was also a member of the Clean Technology Centre. With experience in solar and battery storage, Ian did the initial sizing and scoping and was able to judge the merits of supplier proposals.

The community had several contractors, technical experts and community leaders who provided strategic and practical advice as needed.

Factors key to our success

- Having a core team who were dedicated, persistent and had the foundational skills to initiate, develop and manage the project. Importantly, this included having someone with enough

  knowledge of power systems to 'hold their own' in discussions with industry players and contractors. (cont'd)

- We already had established relationships with key stakeholders, including local council. This facilitated a ‘first meeting’. Kāpiti Coast District Council (KCDC) would ultimately lease us the land for Rau Kūmara solar farm to be built on and commit to purchasing the energy generated.
- We had members who could think strategically. Not just about the project, but what the project could mean in the broader context of the community. This was key to securing financing, and to ensuring the project’s ongoing contribution to the community.
- We figured out who in the community had the requisite skills and were able to enrol them in contributing and staying engaged throughout the project.
- We were organised and efficient in the use of resources and people’s time. What started as a loose coalition became a functional organisation with clear governance and management roles. We worked as a coherent team.

In combination, these factors gave EŌ the credibility and gravitas to be taken seriously by outside parties and to be able to execute at a pace that maintained momentum. This was most important in dealing with risk-adverse stakeholders.

Recipe for Success

We knew we wanted to create a renewable energy project that would generate revenue for community initiatives. Previous projects had been smaller and less structured, with less risk and external stakeholder engagement.

The trick was to get these three primary elements all lined up at the same time:

- funding
- commitment to lease the land
- the off-taker (power purchaser) and physical plant construction.

The Off-taker
EŌ looked for a ‘behind the meter’ scenario to reduce complexity and maximize the value of the energy.
Using skilled interns, EŌ conducted a broad scan of loads on the local grid to understand their location, sizes, and how loads were used and managed.
Of these, consumer loads were too distributed. Retail loads were individually too small. But industrial loads were large and managed by a single entity that could be readily negotiated with.

Kāpiti Coast District Council (KCDC) is the big game in town both in terms of electricity use and land holdings, so it made sense that KCDC might have a stable load that an energy project could serve. EŌ also had good current and historical relationships with all levels of council, both political and operational.
Ultimately, the best KCDC load identified ended up being behind the meter at the Ōtaki Wastewater Treatment Plant (ŌWWTP). This was ideal for a solar setup as it mainly runs electrical pumps for water treatment.

Generation Technology
EŌ evaluated several generation technologies but settled relatively quickly on solar versus other technologies. Firstly, we had solar know-how within the team. Secondly, the solar set-up is modular and so could be built at the right scale. EŌ also decided to do a relatively large installation for significant impact: at over 100kW it was one of the largest in the country at the time. A key was to model the demand, loads and financial return.

Funding
EŌ searched for a single funding source, with a fallback plan of making a coalition of smaller funders if necessary. Ultimately, both energy projects were funded with a $407,000 grant from the Wellington Community Trust.

An absolute key to securing this funding was Energise Ōtaki's development of a model which would return the revenue to the community via community change-focused projects. This is what attracted the Wellington Community Trust, who could see an on-going return to the community on their investment. In effect, the financial model was worked out at the outset as a way to contribute to the community and attract funders. Thinking outside the box on this was key.
This focussed, clear decision making and reduction in complexity enabled EŌ to work relatively quickly and build credibility with third parties and stakeholders.

Governance
Well before the solar installation conception, Energise Ōtaki functioned as an ideas group.
Leigh Ramsey's existing commercial entity was used to begin financial activities; a spare bank account was set up with a separate person monitoring it until EŌ could be established as a legal entity. EŌ then became an Incorporated Society, evolving our ideas group into a legal entity.
This structure lasted several years until EŌ outgrew it and, on legal advice, become a charitable trust governed by trustees.

The build begins
In October 2020, Energise Ōtaki commissioned a 23kWp solar PV system at Ōtaki College and a 107 kWp system at the Ōtaki Wastewater Treatment Plant.
The energy generated is used at the College and to run the Council's wastewater treatment process. Behind the meter energy is billed to both the College and the Council and excess export power is sold back to the retailer.
Proceeds from these electricity sales are put into the Whakahiko Ōtaki–Energise Ōtaki Fund to support community-initiated and internal energy projects.

The remainder of this case study focuses on the system at the water treatment plant.

Rau Kūmara's key features

Rau Kūmara is the system at the Ōtaki Wastewater Treatment Plant. It has:

- A ground-mounted solar farm facing north at a 25° angle.
- 240 photovoltaic solar panels of 445W each (total of 106.8kWp) with four 3-phase Fronius Symo 80kW inverters.
- A 'peppercorn' lease with KCDC for the land used for the solar farm. This was a negotiation with Council that had to be worked through as the land is owned by district-wide ratepayers. It was determined by Council that the land was landlocked, that the ŌWWTP would not be needing the land for future expansion and that it was part of an old landfill not fit for better use.

Contribution to the community

Starting in 2021, the Whakahiko Ōtaki–Energise Ōtaki Fund is dispersed annually, according to funding criteria, to community-initiated and/or in-house energy projects benefiting the community. The fund is governed by a sub-committee with representatives from Ngā Hapū ō Ōtaki, Wellington Community Trust, Kāpiti Coast District Council and Energise Ōtaki. Energise Ōtaki's typically reinvests $10-23k Whakahiko Fund revenue in community energy projects each year.

Engagement

Engaging with funders

Energise Ōtaki knew that EŌ needed to be able show a return on investment that was relevant to the funder. This meant a financial return, but EŌ also needed to show how the money generated annually would be used. Specifically, since their funder was the Wellington Community Trust (WCT) EŌ needed to show that there would be a return to the community in ways that the WCT would *ordinarily have funded anyway.*

The financial model (how much value would be generated) was as important as the physical model (how the electricity would be generated).

The basic economics are that a $407,000 upfront investment generates around $23,000 per year. On a straight-line basis this would pay back in 18 years. Since the project has a life of 20 to 25 years, EŌ can expect to generate about $575,000 over the life of the project for the community. Therefore, WCT can deliver 50% more value by doing this project than by investing directly in the community projects.

Of course, there are variables that make this number go up or down, but the payback is demonstrable. In addition, since the proceeds are distributed to projects decided by the community, WCT can be assured that this is the highest and best use of the funds in the eyes of the community.

The EŌ model has been considered ingenious in its simplicity and the directness with which it serves the community: build an asset that generates revenue and then use that revenue annuity to fund community-led initiatives for the commercial life of the project.

However, to fully commit the funding, WCT needed to see that EŌ had signed contracts with the landowner. This was difficult to do as EŌ could not sign without knowing the funding was assured. This was eventually solved by lining everything up so that it was all agreed and signed at the same time and by making each contingent on the other. This required a degree of trust of the key stakeholders.

Engaging with off-taker (and in this case the landowner)

Since the project was to be built on local council (KCDC) land and KCDC would also be buying the power, EŌ needed the council to say yes to three key things:

- Yes, EŌ could lease the land on a peppercorn lease of $1 per year.
- Yes, KCDC would take the power and that KCDC would pay the same price for the power as KCDC were currently paying from their existing retailer.
- Yes, KCDC would allow EŌ to assess and count the export value of energy going through their ICP connection.

First, EŌ got the operational team to say 'yes', and then EŌ got the elected officials to say 'yes' to the project in concept. Getting the sequence right is important, as elected officials rely on the operational team to understand the details and act in the commercial interest of the constituents. The conceptual 'yes' aligned the operational team to negotiate in good faith.

As the land is ring fenced (land locked), next to the waste water treatment plant and formerly a dumpsite, it was of little alternative value. So it was relatively non-controversial for EŌ to be able to lease it for a nominal $1 per year. The substation is also close by. The land was zoned for industrial use, so EŌ needed to change the designation to simplify the consenting process. A resource consent was not required as solar farms are considered a controlled entity in the district.

The negotiation on the power off-take and price was more difficult. The council argued that there should be a discount on the price – otherwise why would KCDC switch? EŌ argued that this was for the benefit of the community which the council also serves. Of course, there are differences in the definition of the community for each and the council can't be seen to be biased toward one segment of the community. Ultimately, the impasse was resolved by allocating the green credits from the solar project to KCDC as a non-financial deal sweetener. Since the EŌ project is less than 1 MW, EŌ does not need to pay the Electricity Authority (EA) registration fee and so could pass that savings on to KCDC.
Although the chances of electricity costs declining significantly are slim, EŌ carries some downside risk. If the price that Council is paying for electricity from its retailer is reduced then Council will pay the reduced rate to Energise Ōtaki. Since the project was grant funded, EŌ are not servicing any debt so this only impacts their ability to fund grants.

To enable the electricity to be procured by KCDC, EŌ and the council had to be with the same retailer (Meridian). Rather than use a formal Power Purchase Agreement (PPA), a contract for the energy sale to KCDC was drafted from scratch by EŌ and negotiated.
A check meter at the solar site and another at the pumping station ensure that every 30 minutes there is accurate accounting of the energy produced and used. The meters compare the energy generated by the on-site solar to the energy used at the pumping station. This amount of energy is then multiplied by the corresponding time of use rate (of which there are three tiers). This is tallied and invoiced at the end of each month.

Excess energy is exported through the meter at the pumping plant. Since any export must have come from the solar project, it is allocated to Meridian via a direct passthrough from the KCDC electric bill. KCDC has direct access to the spot market through Meridian, the retailer. For each 30-minute period EŌ gets the market price multiplied by the kWh exported.
The negotiations and complex workings of this required both parties and the retailer to work in good-faith. EŌ developed IP for this financial model to be put in place.

Engaging with the lines company
Electra, the local lines company, was engaged to get the project connected. EŌ had to install an import/export meter and run a cable to the switchboard, but no upgrade was needed to the substation. Over time, this relationship has strengthened and EŌ and Electra are looking at creative approaches for future projects.

Engaging with contractors
Led by Ian Jarrett (Astarra Technology), EŌ put together a bid package for the project and ran a contestable RFP process to solicit proposals for the solar array.
One of the challenges was that EŌ received a very wide range of bids in terms of their quality, detail and price. It is still common for contractors to simply provide a total cost estimate and be opaque or non-committal about the type of equipment to be used, or to not separate out parts and labour or

show where cost reductions might be possible. There might also have been an incorrect assumption that, because EŌ was a community group, EŌ might lack expertise and could be taken advantage of.

One of the clearest and most detailed proposals came from Infratec, a company with extensive experience in energy projects in the Pacific Islands. Infratec's bid broke down the costs in several categories, including labour rates, cost for civil works, panels etc. Their bid pricing was toward the higher end of the range. After discussion between EŌ and Infratec, in order to ensure fairness, EŌ settled on making the project 'open book' with a reasonable margin for Infratec.

Infratec did the array design and as overall project manager, dealt with the interconnection with Electra, setting up access to the grid for export, and all physical construction third parties including the two subcontractors. EŌ managed any consenting matters, of which there were few.
Because the land was within a designation, EŌ simply had to provide information confirming that the installation design was consistent with the designation. No RMA consent process was required beyond that.
Infratec also set up all guarantees from the various parties to ensure that the work was done correctly. Hoskins Energy Systems built the array and Pritchard Civil did the civil works.

There were some geotech surprises! The land was found to have hard rock below the river silt. This increased the cost of the civil works but did not affect the size of the array. The key issue was to ensure that the ground works did not affect the PV supplier guarantee, which ultimately was unaffected.

EŌ decided to go for top quality components like Fronius invertors so that EŌ could be assured that it would work over the long term.

The final plant was 106.8kW – a bit smaller than the original plan. One of the benefits of solar is that it can be scaled up or down depending on the budget and hiccups along the way.
The project went operational in 2021 and is expected to deliver revenue to the community for the next 25 years.

Operations

To deliver the revenue according to forecast, the plant needs to be operated and maintained and the running costs kept in check. This requires a manager, at least part time, to reconcile revenue and ensure that the grounds are maintained and the panels kept clean.

One of the surprises was the cost of insurance. Few insurers had experience with solar and assessed a premium for it being ground-mounted, even though it is in a difficult to access, fenced-in location that should present very little increased risk compared to roof-mounted.
Understanding the ongoing maintenance costs is also important to creating an accurate assessment of the net cash flow that will be delivered from the project.

Future plans

Energise Ōtaki plans to expand the system to potentially megawatts size and also incorporate of end-of-life EV batteries to provide stationary power storage. These plans are positively welcomed by the stakeholders.