

MainStream Aquaculture: \$19K Grant funds a heat pump electrification project

Canonical:

<https://northmoregordon.com/case-studies/mainstream-aquaculture-electric-potential-to-reduce-energy-bills/>

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Case-study summary

This historical case study records the project, delivery approach and reported results behind MainStream Aquaculture: \$19K Grant funds a heat pump electrification project . It has been reorganised for clearer reading and linked to current Northmore Gordon guidance so the project evidence can be used without treating an earlier result as a present-day quote.

Evidence note: The source page is dated August 15, 2025. Figures, scheme names, equipment assumptions and client circumstances belong to that project period. Opportunities, targets and forecasts remain distinct from implemented or verified outcomes, and current eligibility should be checked before using the case as a new-project benchmark.

Project record

Challenge

Reducing Energy Costs and Carbon in a Heat-Intensive Industry

MainStream Aquaculture operates a major barramundi breeding and grow-out facility in Werribee, housing eight 600 kL grow pools heated by two 650 kW natural gas boilers. Heating water to 29 °C is energy-intensive, and with 11 smaller gas boilers also onsite, the business was seeking to cut both operating costs and emissions without compromising water quality or fish health.

Solution

Engineering the Switch from Gas to Geothermal-Electric Heat Pumps

With a \$19,000 Victorian Government Large Energy User Electrification Support Program grant, MainStream Aquaculture commissioned Northmore Gordon to do a detailed electrification feasibility study.

The study explored two primary solutions:

Option 1: Replace the two 650 kW gas boilers with a 550 kW water-to-water heat pump, tapping into geothermal bore resources for efficient heating.

Option 2: Add a geothermal and trade waste heat pump to capture and reuse biosolid-rich water, reducing water wastage and recovering energy.

Northmore Gordon's modelling included thermal storage integration, boiler consolidation into an electrified system, and staged scalability to support future site expansion.

Forecast Results

Commercial, Environmental and Strategic Gains

\$113,000 annual energy cost savings projected.

70 % reduction in annual gas use – equivalent to 537 tCO₂ avoided every year.

10,413 GJ A joule is a measure of the energy required to send an electrical current of one ampere through a resistance of one ohm for one second. One GJ is equal to 277.8 kilowatt hours (kWh), 1.055 million British thermal units (Btu) or 0.17 barrels of oil. annual gas reduction.

3,125 VEECs created – each representing one tonne of greenhouse gas abated.

VEU incentives worth up to ~\$281,250 identified.

Simple payback: 5 years.

Net Present Value (NPV): \$596,000.

Positions the business as a sustainable aquaculture leader with a strong circular economy approach.

Program Context

Turning Feasibility into Action

MainStream Aquaculture was one of 36 facilities in Victoria to receive support under the Large Energy User Electrification Support program, which provides grants of up to \$60,000 for commercial and industrial sites using 10–100 TJ of gas per year. These feasibility studies are designed to underpin Project Based Activity (PBA

Northmore Gordon View

This is a textbook example of “Do more with less energy” – the opportunities were previously uncovered in an energy audit by Northmore Gordon with this latest report using engineering-led electrification, smart thermal integration, and certificate optimisation to deliver cost savings, emissions cuts, and long-term operational resilience. With industrial-scale heat pump technology now capable of replacing high-load gas boilers, businesses like MainStream Aquaculture can convert regulatory programs into significant financial advantage while driving sector leadership in sustainability.

Book a consultation with our senior engineering team to explore your site’s electrification potential.

Call or email Craig Morgan today or submit your interest here .

Established in 2001 near Melbourne, MainStream operates the world’s largest warm-water Barramundi hatchery, producing sustainable fish and fingerlings for global aquaculture markets.

Using the results for a new project

Start with the site’s current operating profile, asset condition and business objective. Define the baseline, project boundary, variables that affect energy use and the evidence available before selecting a technology or incentive pathway. This makes the comparison auditable and keeps physical savings separate from grants, certificate revenue and other financial benefits.

For a comparable project, confirm current program rules and product requirements, document installation and commissioning, and plan post-project measurement early. Historical results can show what was possible in one setting, but they do not establish current eligibility, pricing, payback or emissions outcomes.

Related guidance

Energy audits

Measurement and verification

Environmental certificates

Government schemes

Carbon advisory

Commercial lighting

Boiler upgrades

More case studies

What makes MainStream Aquaculture's heating challenge representative of other temperature-sensitive operations?

MainStream Aquaculture's requirement to maintain 29°C water across eight large pools using gas boilers reflects a common industrial problem: energy-intensive temperature control where interruption risks product quality or safety. The feasibility study's framework—defining heat requirement, identifying available heat sources, and evaluating redundancy and control strategy—applies to any facility with similar constraints. Our approach emphasises establishing operating duty before selecting technology, ensuring that electrification or heat recovery solutions protect the operational outcome the business needs. This method is transferable to food processing, aquaculture, pharmaceuticals and other sectors requiring reliable thermal control.

Why did the feasibility study investigate both heat pumps and waste heat recovery rather than a single technology?

The study examined two complementary approaches: replacing gas boilers with a water-to-water heat pump using geothermal bore resources, and capturing biosolid-rich trade waste heat for recovery. This dual investigation reflects sound assessment practice—comparing complete system options rather than isolated equipment choices. By evaluating heat integration alongside electrification, the study identified thermal storage, boiler consolidation and staged scalability opportunities. Our assessment framework for process heat explicitly recommends defining useful duty, examining heat sources and destinations together, and comparing options against consistent assumptions. This comprehensive approach reveals dependencies and interactions that a single-technology focus would miss.

How should another business interpret the \$113,000 annual savings forecast when building its own investment case?

The MainStream forecast is a projected outcome tied to specific operating conditions, energy prices, capital scope and assumed incentives—not a guaranteed result or proof of concept for another site. When building an investment case, update all inputs: actual operating hours, local electricity tariffs, site-specific installation costs, and current certificate or grant availability. Present the project with and without conditional support to show what management would approve based on operating merit alone. Keep the forecast separate from verified results; Our guidance emphasises that a feasibility forecast remains useful when clearly labelled and traceable to its assumptions. Commercial assumptions must remain visible so decision-makers understand what could change the outcome.

What role did the Victorian Energy Upgrades scheme play in making this project eligible for certificates?

The MainStream project is designed as a Project Based Activity (PBA) retrofit under Victorian Energy Upgrades, enabling accredited providers to create VEECs (Victorian Energy Efficiency Certificates) for each tonne of CO₂ avoided. The study forecasts 3,125 VEECs valued at approximately \$281,250. However, eligibility depends on meeting current VEU activity requirements, measurement and verification rules, and the Essential Services Commission's approved scope—not on the technology

alone or historical success. Our guidance stresses that choosing the M&V; method early helps identify required baseline and monitoring evidence. Certificate value should be treated separately from project merit; a business case must show the investment is attractive without unconfirmed proceeds, with certificates as a potential additional contribution.

What measurement and verification approach would be needed before MainStream could claim the projected energy savings?

To verify the 10,413 GJ annual gas reduction and 537 tCO₂ avoided, MainStream would need to establish a baseline of pre-project gas consumption under comparable operating conditions, then measure post-project consumption during an agreed monitoring period. The measurement boundary must account for production changes, operating hours, and any site modifications occurring alongside the heating upgrade. Our M&V; guidance recommends recording implementation details, commissioning dates and departures from design. For a Victorian Energy Upgrades project, the applicable scheme rules and measurement method (likely benchmark rating or project-based M&V;) must be confirmed before installation. This evidence is essential both for reporting verified savings to management and for supporting any certificate submission.

How should MainStream weigh the 5-year simple payback against other investment criteria and risks?

The 5-year payback assumes the forecast \$113,000 annual savings, \$596,000 NPV, and stable operating conditions—but feasibility studies are not operating results. Our investment-case guidance recommends showing how the payback changes if energy prices, operating hours, capital costs or certificate proceeds differ from assumptions. MainStream should separately evaluate maintenance implications, reliability and redundancy requirements; a heat pump system needs control strategy and backup capacity to protect fish health. The business case should present scenarios with and without VEU incentive proceeds, allowing management to understand what happens if grants are delayed or certificates are issued at lower prices. This transparency helps distinguish project merit from funding options, making the decision resilient to changed circumstances.

What questions should MainStream address before proceeding from feasibility to detailed design and procurement?

The feasibility assessment identified key questions that detailed design must resolve: Are the proposed heat sources (geothermal bore and trade waste) reliably available when heating is needed? What redundancy and control strategy will protect operations during maintenance or equipment failure? How will thermal storage modify capital and operating costs? What changes to electricity supply, demand charges and grid connection are required? Our process-heat guidance emphasises preserving baseline evidence and avoiding commercial commitments based only on headline savings. Before equipment procurement, MainStream should confirm electrical infrastructure capability, finalise operating assumptions with production teams, and establish measurement responsibilities and data access. A coordinated project brief ensuring all parties understand scope and evidence requirements prevents costly misalignment.

What makes this case study useful for comparison with other aquaculture or food-processing operations?

The MainStream case demonstrates a structured feasibility approach applicable to any facility with significant heating or cooling requirements: define operating duty first, map heat sources and destinations, compare complete system options against consistent assumptions, and identify measurement needs before selecting equipment. However, the case's specific forecast—\$113,000 savings, 537 tCO₂ avoided, 3,125 VEECs—is tied to MainStream's facility, energy prices and location in Victoria. Another aquaculture operation, dairy processor or food manufacturer should not assume identical results. Instead, use the assessment framework: prepare heat balance, operating schedule, current fuel data and waste-heat inventory; scope a proportionate feasibility study; and establish

measurement plan and scheme pathway early. We can help identify applicable methods and evidence requirements specific to location, equipment and timing.

How does electrification fit into MainStream's broader carbon and emissions strategy?

The heating electrification project forecasts 537 tCO₂ avoided annually, equivalent to a 70% reduction in the facility's current gas use. This contribution is significant but represents a single technology choice within a larger decarbonisation path. Electrification's emissions benefit depends on the electricity grid's carbon intensity; as Victoria's grid renewable content increases, the abatement per kilowatt-hour improves. Our carbon advisory services help businesses develop staged emissions roadmaps and transition planning that integrate multiple opportunities—process efficiency, electrification, on-site renewable generation, and energy management—into a credible net-zero pathway. For MainStream, next steps might include renewable electricity procurement, further site energy audits to identify additional opportunities, and alignment with the ACCU or VEU schemes to fund staged implementation while tracking outcomes.

What should MainStream do if energy prices, grant funding, or electricity supply conditions change after the feasibility study?

The \$113,000 annual savings forecast depends on specific energy price assumptions, capital cost estimates and conditional grant support. If wholesale electricity prices rise, operational tariffs change, or available grants reduce, the investment case must be updated to reflect new conditions. Our guidance emphasises keeping commercial assumptions visible and separate from technical design, allowing management to revisit the decision if support changes. Before installation, MainStream should confirm final electricity supply terms, lock in grant conditions, and establish which cost elements remain firm quotations and which are estimates. If circumstances shift materially, commissioning a revised feasibility brief or partial measurement before full implementation can preserve evidence and funding options. This coordinated approach ensures that project merit and funding eligibility remain aligned as the project progresses toward delivery.