

Business Case – Low complexity

Project information	
Project name	Boiler Phase-out – Pool Heating
Project type	Building
Enterprise PPM (Sentient) ID#	27594
Programme name	Regional Improvement Programmes
Programme Sentient ID #	27076
Project complexity rating (PCAT)	Low
Author and date	Kirk Archibald
Executive Investment Summary (EIS)	TBC
Project budget requested	\$981,450
Financial year requested from	FY 19-20
Estimated start and finish date	1 February 2020 – 1 August 2020

Document control

The **purpose** of this business case is to request funding from the Sustainability Fund to install heat pumps for pool heating at Moana-nui-a-kiwa and Westwave Leisure Centres

Document history

Version	Date	Updated by	Update details
V3	10/12/2019	Kirk Archibald	Westwave and Moana-Nui-a-Kiwa Projects

Strategic case (Case for change)

Introduction	
Background	<p>Auckland Council's aquatic centres are responsible for 85% of Auckland Council's natural gas usage which in-turn is responsible for 23% of Auckland Council's greenhouse gas (GHG) emissions. Auckland Council has declared a climate emergency and set targets to limit warming to 1.5°C. In effect this means reducing GHG emissions to net zero by 2050 – this will require phasing out all-natural gas consumption.</p> <p>New Zealand's gas reserves are declining and with the ban on offshore gas exploration, current levels of demand are unlikely to be sustainable. Combined with projected increases in carbon costs, gas prices are expected to rise substantially. Genesis is already predicting price increases of 40% when our current contract expires at the end of 2020.</p>
Opportunity/problem	<p>Water heating from heat pumps releases over 80% less GHG emissions when compared to existing gas heating systems.</p> <p>In addition, water heating from heat pumps costs less on a whole of life basis than existing gas heating systems.</p> <p>Auckland Council has 36 boilers installed across 20 aquatic centres. As boilers have a useful life of 20 – 30 years, there are a couple of renewables each year. Capital budgeted for these renewables can offset the cost of installing heat pumps (as is the case for the Westwave Main</p>

Business Case – Low complexity

Introduction			
	pool where the boilers are 31 years old).		
Objectives	This project will install heat pumps to heat all pools at Moana-Nui-a-Kiwa Leisure Centre and the main and dive pools at Westwave. These two projects will be pilots for a wider roll-out across the portfolio from FY 2020 / 2021		
High level benefits	GHG reduction of 510 tonnes per year and OPEX reduction of \$93,000 per year. Offsets CAPEX spend of \$255,000 on replacement boilers (Westwave).		
Alignment to strategy			
Auckland Plan Outcomes - Tick all that apply (✓)			
Belonging and participation	<input type="checkbox"/>	Transport and access	<input type="checkbox"/>
Māori identity and well-being	<input type="checkbox"/>	Environment and cultural heritage	<input checked="" type="checkbox"/>
Homes and places	<input type="checkbox"/>	Opportunity and prosperity	<input type="checkbox"/>
Describe strategic link above in more detail:			
Our 6 Steps up - Tick all that apply (✓)			
Engage and enable communities	<input type="checkbox"/>	Quality advice and support for elected members	<input type="checkbox"/>
Smart and easy for customers	<input type="checkbox"/>	Better value for ratepayers and residents	<input checked="" type="checkbox"/>
Value and empower our people	<input type="checkbox"/>	Make the most of our size and scale	<input type="checkbox"/>
Describe the link to steps up selected above in more detail:			
Alignment to existing programmes:	Auckland Climate Action Framework (ACAF) – Key Move 10 Auckland Council GHG Emission Reduction Plan Mayors Annual Plan Proposal (wider roll-out)		
Constraints	Funding, asset condition, site electrical capacity and feasibility of integrating heat pumps (wider roll-out)		
Dependencies	Mayors Annual Plan Proposal (wider roll-out)		
Assumptions			
Māori Outcomes – Select one if relevant (✓)			
Marae development	<input type="checkbox"/>	Rangatahi - Youth	<input type="checkbox"/>
Te Reo Māori	<input type="checkbox"/>	Māori Housing and Papakāinga	<input type="checkbox"/>
Economic development	<input type="checkbox"/>	Organisational Effectiveness	<input type="checkbox"/>
Kaitiakitanga - Water	<input type="checkbox"/>	Māori Participation	<input type="checkbox"/>
Māori Identity and Culture	<input type="checkbox"/>		
Māori responsiveness			
Health, safety and wellbeing	Standard health safety and wellbeing requirements for worksites & working with gas and electricity		
High level risks and issues	Heavy equipment at height, electrical shock		

Economic case (Determining value for money)

In Scope

Installation of heat pumps for water heating at Moana-nui-a-kiwa and Westwave Leisure Centre (main and dive pools only) & energy efficiency opportunities identified through the design process

Out of scope

Use of heat pumps for air heating and domestic hot water

Business Case – Low complexity

Outline options analysis

Option	Description
Option 1 – Do nothing / Business as Usual	Boilers are replaced at end of life with non-condensing boilers. While this option requires the least amount of CAPEX it has the highest OPEX cost and highest cost on a whole of life basis. This option leaves Council with the highest level of exposure to gas and carbon price rises.
Option 2 – Replace gas boilers with condensing gas boilers at end of life	Like above however additional CAPEX required. GHG emissions and OPEX will be around 15% lower.
Option 3 – Replace gas boilers with heat pumps at end of life	There is a good return on investment for installing heat pumps to heat pools now. Waiting until gas boilers are at end of life means that the benefits of action now will not be realised until as far out as 2050 as boilers have a lifespan of 20 – 30 years.
Option 4 – Install heat pumps for water heating. Replace gas boilers with heat pumps at end of life.	This option has the lowest whole of life costs and will result in a 64% reduction in emissions at Moana-nui-a-kiwa and an 81% reduction in GHG emissions for heating the main pool and dive pool at Westwave. Remaining gas use at Moana-nui-a-kiwa will be phase out when the existing boiler is replaced or when the economics of switching air heating and hot water permit.
Option 5 – Replace all heating with heat pumps.	This option is challenging as it would require re-use of the existing heating infrastructure which is designed for boilers and higher operating temperatures than heat pumps typically supply. The cost of doing this will be higher than the other options as additional heat pump capacity will be required along with additional consultancy for the design. Higher operating temperatures for heat pumps also tend to reduce the reliability and operating life of the heat pumps so maintenance costs are expected to be higher.
Preferred option	
Option 4 – Provides the lowest whole of life costs and emission reductions at the lowest cost	

Benefits tables

Financial Benefits						
Benefit statement	Measurement metric & method	Benefit Owner	Benefit Type	Baseline Value	Approved benefit & achievement date	Cost centre & GL code
Reduction in utility costs	Utility consumption and costs verified using IPMVP	Community Facilities OMMU	Financial	Will be defined by IPMVP reporting		
Benefit owner signature		Agnes McCormack	Date signed			

*Note: If there are additional benefits, add extra rows, with a Benefit owner signature line after each benefit.

Business Case – Low complexity

Non-financial Benefits					
Benefit statement	Measurement metric & method	Benefit Owner	Benefit Type	Baseline Value	Approved benefit & achievement date
Reduction in GHG emissions	Reduction in GHG emissions from gas minus the increase in GHG emissions from electricity	Carbon Management Steering Group	Non-financial	6300 tonnes (33 GWh natural gas x 192 tonnes CO ₂ / GWh)	
Benefit owner signature		Ian Maxwell	Date signed		

*Note: If there are additional benefits, add extra rows, with a Benefit owner signature line after each benefit.

Non-quantifiable Benefits and additional information

Commercial case (Procurement of preferred option)

Detailing the procurement strategy
Moana-nui-a-kiwa – Direct sourced from Citycare as under \$300,000 Westwave – Closed tender as cost likely to be \$500,000 - \$600,0000

Risk Description	Mitigation	Date Identified	Owner
Required electrical capacity not available (Moana-nui-a-kiwa only)	Monitoring prior to project start. Reduce scope of project to stay within site capacity or add additional capacity, business case will be updated and resubmitted.	12/12/2019	Kirk Archibald
Issue Description	Resolution	Resolution Date	Owner

Financial case (Affordability & funding)

Financial analysis

Projects at both Moana-nui-a-kiwa and Westwave have a positive NPV and IRR's of 9 – 10%, well above that of Auckland Council's cost of Capital.

Financial sources

Sustainability Fund

Overall affordability

The cost of the proposed option is within the budget of the sustainability fund and in the long term, the reduction in gas costs will outweigh the higher upfront capital.

Heat pumps have been assessed against natural gas.

Business Case – Low complexity

Other options for heating include solar hot water, electric resistance heating, wood chip / biomass and LPG or Diesel.

- LPG and Diesel were not assessed as they are more expensive than Natural Gas (CAPEX and OPEX) and emit more GHG emissions.
- Solar Hot Water was not assessed as solar PV is likely to be a more cost-effective use of roof space.
- Electrical resistance heating was not investigated as there is insufficient electrical capacity to supply the required heating.

Contingency

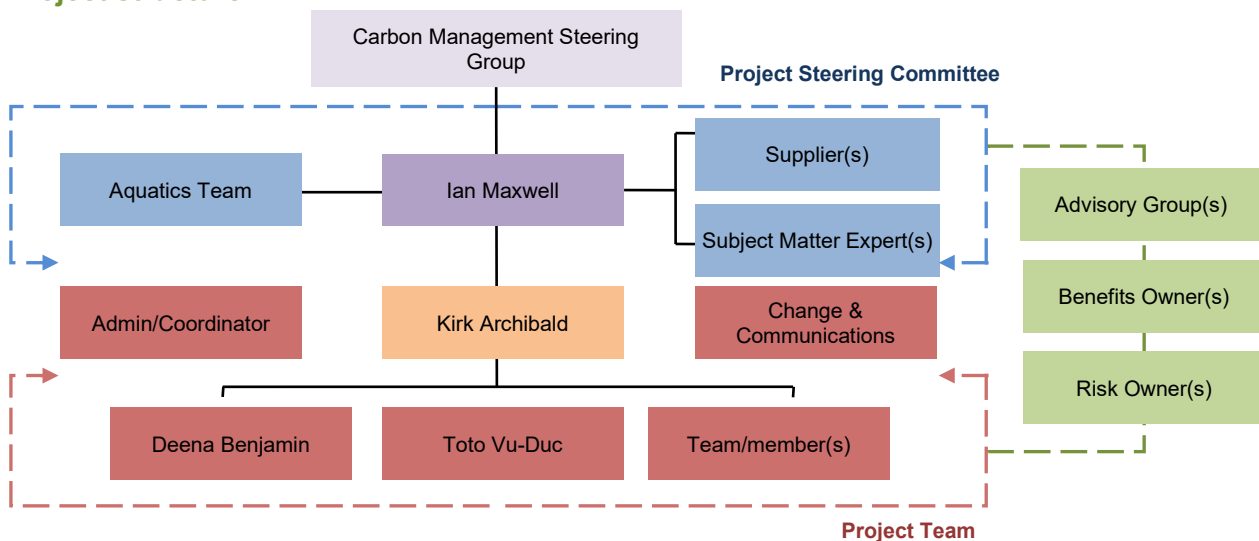
Moana-nui-a-kiwa - ±10% as firm pricing has been received from Citycare for this work

Westwave - ±20% as firm pricing has not been received and further detailed design is required

Management case (Stakeholder, resource and change support delivery plan)

Key stakeholders		
The following stakeholder groups will be impacted by this change in the following ways:		
Stakeholder name / group / contact	Evidence of collaboration / impact assessment	Agreed outcome
Aquatics Team, Community Facilities	Have provided preferred location for heat pumps and pricing for Moana-Nui-a-Kiwa and Westwave. Have supported supplier briefings and business case development	Heat pump installation will require the pool to briefly be shut down. Installing heat pumps at Westwave will negate the requirement to install boilers and will offset around \$255,000 of CAPEX
Citycare (Moana Nui-a-Kiwa)	Has provided pricing for Moana-Nui-A-Kiwa	

Project structure



Business Case – Low complexity

Outline project plan		
How will this project be delivered, by who and when?		
Deliverable(s)	Delivered by	Date due
Design Review & Detailed Design	TBC Contractor	28 February 2020
Delivery of installation	Moana-nui-a-kiwa – Citycare Westwave - TBC Contractor	19 June 2020
Commissioning Review & Benefits Realisation	Energy Efficiency and Sustainability	18 December

Health and safety

This project is expected to include modification of an existing asset, as such the requirements of Safety in Design will apply to this project.

There is legal responsibility on Auckland Council (as the ‘Person Conducting a Business or Undertaking’) to ensure, so far as is reasonably practicable, the health and safety of workers and other persons over the life of the asset.

The following health and safety related risks were identified in the option assessment relating to this project which will need to be considered for elimination or where not able to be eliminated to be minimised.

Option	Health and Safety Risk	Project Phase
All	Live power cables	<i>Delivery</i>
	Live gas lines	<i>Delivery</i>
	Traffic (facility car parks)	<i>Delivery</i>

Project execution plan

Attach completed Project execution plan to this section (Applies during Plan phase only).

Approval and acceptance

Handover activities
The following activities and documents will be handed over once acceptance criteria have been met: Designs, procedures, registers, maintenance manuals, templates, as built materials, post-project benefits monitoring and realisation activities, post project evaluation etc. (attach any relevant documentation to appendices).

Business Case – Low complexity

Governance sign off	Name	Signature to endorse	Date	Comment
I agree that the potential costs/benefits identified are realistic, and the low complexity delivery path reflects PCAT findings and approve and or endorse the project to continue for funding.				
Financial Manager / Commercial Manager	Asha			
Project sponsor	Rod Sheridan			
Business owner	Christopher Panayitou			
Project manager	TBC			
Benefit owner(s)	Agnes McCormack			
ELT Sponsor	Ian Maxwell			
SME endorsement (department)	Name	Signature to endorse	Date	Comment
Change	N/A			
Communication and Engagement	N/A			
Finance	N/A			
Financial transactions	N/A			
Governance	N/A			
Health, Safety and Wellbeing				
Information & Communications Technology	N/A			
Legal and Risk	N/A			
People and Performance	N/A			
Procurement	N/A			

Appendices

Appendices
PCAT Financial Analysis

Business Case – Low complexity

Appendix 1 – PCAT

PCAT report

Your project has a:	Project score
Low Complexity	1.83

Areas of project complexity for: Aquatic Centre Heating

Benefit expectation	Number of dependencies	Experience	Engagement & partnering with customer / community	Impact on council's people	Stakeholder alignment, including Māori	Risk	Constraints	Scope	Funding source	Estimated project cost	Health & Safety	Procurement
Low	Med	Med	Low	Low	Low	Low	Low	Low	Med	Med	Low	Med
1	3	3	1	1	1	2	1	1	3	4	1	3

'Save as' this document as part of the project minimum requirements, saving to the project document files, and upload the full, approved, version to Sentient.

PCAT Governance Sign off				
Governance sign off	Name	Signature	Date	Comment (if required)
Project Sponsor				
Business Owner (If known)	Kirk Archibald			



Business Case – Low complexity

Appendix 2 – Financial Analysis

Assumptions & Inputs

	Input	Source
Electricity variable price (\$/kWh)	0.091	Average TOU rate plus losses and other variable costs
Electricity demand charge (\$/kVA/day)	0.32	Vector
Electricity price inflation	2.45%	Energylink
Gas Price (\$/kWh)	0.037	All of government rates
Gas Price Inflation 2021	40%	Genesis
Gas Price inflation 2021 onwards	2.9%	Energylink
Maintenance cost inflation	2%	Review of public inflation forecasts
Heat pump COP	3.5 - 4	Hot Water heat Pumps
Boiler efficiency	80%	Powell Fenwick Consulting
Cost of new boiler	\$150 / kW	Average cost of recent condensing boiler projects

Westwave

CAPEX Investment (20% Contingency)	\$630,750
Cost of replacement boilers	255,000
Net CAPEX	\$375,750
Maintenance cost increase (From FY 21-22)	\$3,360
Gas savings	\$73,629
Electricity cost increase	\$30,673
Net OPEX savings per year (FY 20-21)	\$42,957
NPV	\$112,902
IRR	9.5%
Simple payback	8.2 years

Moana Nui-a-Kiwa

CAPEX Investment (10% Contingency)	\$350,700
Cost of replacement boilers	\$0 (existing boiler recently replaced)
Net CAPEX	\$350,700
Maintenance cost increase (From FY 21-22)	\$3,360
Gas savings	\$93,192
Electricity cost increase	\$43,684
Net OPEX savings per year (FY 20-21)	\$49,502
NPV	\$216,567
IRR	13.35%
Simple payback	6.8 years