Natural Gas Elimination Study

To: **Climate Change Technical Advisory Group**

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1 Reason for the report - *Te Take mō tēnei rīpoata*

The purpose of this report is for the Technical Advisory Group (TAG) to provide advice on the feasibility of potential opportunities for natural gas elimination at Council owned sites.

2 Questions for the Technical Advisory Group

- How much of a priority should reduction in natural gas use at Council facilities be in comparison to alternative emission reduction actions?
- Which options from the Natural Gas Elimination Study should be included in Council's extensive list of actions to be assessed utilising the multi-criteria analysis?
- Are you aware of any funding opportunities we could seek to co-fund this work?

3 Background – *He tirohanga whakamuri*

Reduction of emissions created by stationary energy is a key priority for Whakatāne District Council ("The Council"). As part of the Energy Action Plan[1] set out in the first climate change strategy, The Council agreed to the target of –

Ensuring Council delivers the benefits of 1 GWh p.a. energy savings by June 2022 (based on the June 2017 to May 2018 baseline).

Action 2.1 of the Energy Action Plan was to transition from the use of natural gas at Council facilities to lower carbon options in the short term (2020-22), through efficiency measures. In the medium term (2022-24), the Council aimed to phase out gas fired boilers. By the long-term (2024-2031), the Council aimed to no longer use natural gas-powered units.

3.1 Energy Management Policy

In July 2020, the Council adopted an Energy Management Policy ("the Policy"). The purpose of the Policy is to minimise energy-related **greenhouse gas (GHG)** emissions and implement best practice

[1] https://www.whakatane.govt.nz/files/documents/climate-change-action-plans-energy-final.pdf

energy management. The scope of the Policy relates to energy consumption causing greenhouse gases. GHGs (Greenhouse gas) from non-energy sources are not within the scope of the Policy.

Whakatāne District *Council will continuously improve energy productivity and reduce energy related GHG emissions at its facilities as an energy management leader in the Whakatāne District.*

Whakatāne District Council will identify and seek to align with best practice energy management frameworks and standards.

The objectives of the Policy are for the Council to:

- Embed **energy productivity** and management of energy-related greenhouse gas emissions into all activities.
- Meet or exceed energy-related targets set in the Climate Change Strategy and Action Plans.
- Promote energy productivity and the management of energy-related greenhouse gas emissions in the Whakatāne District.

The Policy requires the Council to assess and document the following energy related factors to align with the Policy:

- Energy consumption associated with capital works (if any)
- Ongoing energy consumption (if any)
- Energy costs (if any)
- The impact of energy-related greenhouse gas emissions on the Council's emissions inventory (if any)

The Council will consider GHG emissions as one of the determining factors when selecting energy suppliers and establishing supply contracts. To facilitate this, as part of the tender process, suppliers will be required to document how carbon emissions in their procurement processes and energy supply and manufacturing chains are accounted for, including any offset.

The Energy Management Policy established on-going energy monitoring, which is reported through the Energy Action Group.

3.2 Energy Management Program

To achieve the actions set out in the Energy Action Plan, an ongoing Energy Management Program (EMP) was established. The EMP allows us to track energy usage[2], carbon emissions and cost associated with energy consumption at the Council's 14 highest energy user sites. The program has been underway since 2019 to identify, implement and monitor opportunities for energy savings and emissions reductions.

The Council undertook two energy audits[3] in collaboration with the Energy Efficiency and Conservation Authority (EECA) and with support from the Council's energy management contractor EMSOL (Energy Management Solutions). The audits highlighted some key energy efficiency measures the Council

[2] https://www.whakatane.govt.nz/residents/climate-change/energy-management-programme

[3] Audit 1 - https://www.whakatane.govt.nz/sites/www.whakatane.govt.nz/files/documents/wdc_type_2_energy_audit_report_public_191119_-issued.pdf audit 2 - https://www.whakatane.govt.nz/sites/www.whakatane.govt.nz/files/documents/wdc_type_2_energy_audit_update_2022.pdf

should implement. Natural gas was highlighted as an area where the Council could reduce its energy related emissions and elimination options were provided across multiple Council owned facilities.

3.3 Natural Gas Elimination Study

In November 2021, the Energy Action Group commissioned EMSOL to undertake a Natural Gas Elimination Study ("the Study"). The Study assessed options to transition natural gas and LPG (Liquefied Petroleum Gas) to low carbon alternatives. **A copy of the feasibility study is attached as appendix 1.**

Five facilities were included in the study, including.

- Whakatāne Aquatic and Fitness Centre
- Te Kōputu a te whanga a Toi Whakatāne Library and Exhibition Centre
- Te Whare Taonga ō Taketake Whakatāne Museum and Research Centre
- Whakatāne Holiday Park
- War Memorial Hall

Natural gas is used at the Aquatic Centre, the Museum and Research Centre and the Library and Exhibition Centre. LPG is only used at the Holiday Park and at the Crematorium. The Crematorium was not included in this study. Whilst LPG has continued to trend down at the Crematorium, it remains the largest LPG account. However, there are currently no alternative options and while the team is investigating the use of other crematory methodologies it was decided to exclude the Crematorium from the study.

WDC (Whakatāne District Council) does hold a natural gas account for 2/2 the Strand, this building is rented and until the lease comes up for review, the Council does not have an ability to impose conditions to reduce the operational carbon footprint of the existing businesses. This site was therefore not included in the study.

The Study assessed options against several economic metrics including capital cost, net present value and the marginal abatement cost of carbon. **Explanations and definitions of the economic criteria are outlined on page 11 of the study.**

4 Issue/subject – *Kaupapa*

4.1 Natural Gas Use

Natural gas and LPG are used for heating and cooling at Council facilities.

Natural gas and LPG use contributed to ~9% of Councils annual carbon footprint.[4] Although we have engaged in some valuable work to reduce LPG and natural gas use since the beginning of our Energy Management Program, there is still work to be done.

[4] These results still require auditing and certification, but can be used as preliminary results.

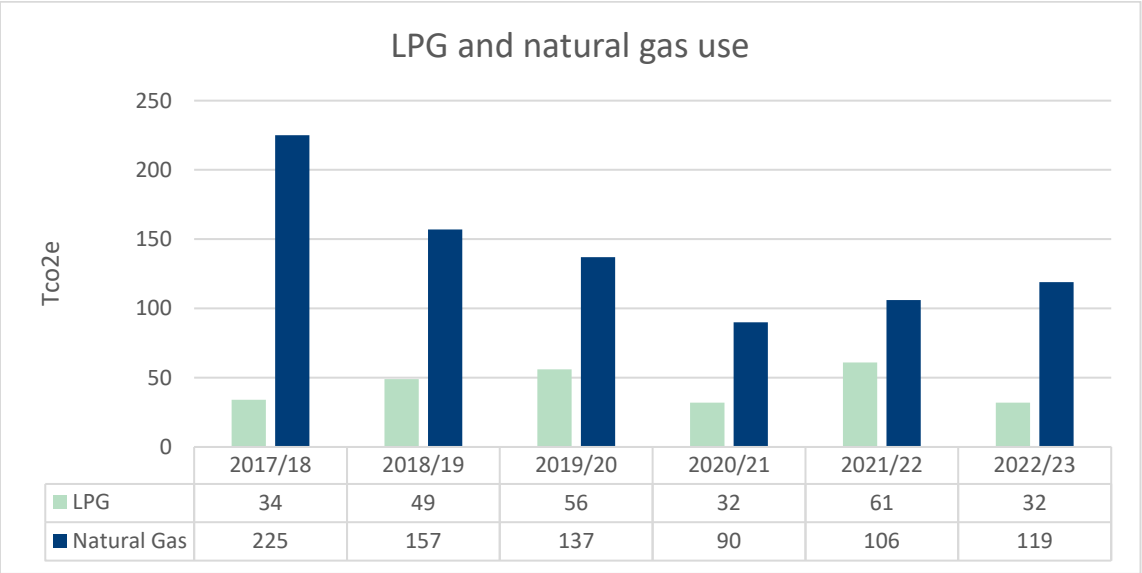


Figure 1: LPG and natural gas use at council facilities.

At the time of the Natural Gas Feasibility Report, fossil fuel use at Council facilities included in the study accounted for 5.2% of the carbon inventory. This contributed 175,000 kgCO_2e per year.

4.2 Natural gas reduction to date

To date, the work to reduce natural gas and LPG at sites has been energy reduction measures opposed to energy transition. For example, turning the aquatic centre boilers off over summer opposed to switching out boilers.

4.2.1 Murupara pool cover case study

In December 2022, the Council installed a pool cover for the Murupara pool. The pool cover has resulted in significant energy reductions. From December 2022 through to March 2023, the pool cover saved approximately 8,900 KwH.

EMSOL have projected that over the next season, the cover will save approximately $2400 from energy cost savings, 14,000 KwH and 1,800 kgs of CO2e (CO2 equivalents). The pool cover has also reduced water and chemical consumption at the pool.

5 Options analysis - *Ngā Kōwhiringa*

The Natural Gas Elimination Study commenced in November 2021. Each facility was surveyed to establish requirements for process heat, including peak demand, maximum temperature, and the end users of process heat. Demand reduction opportunities were considered and analysed, as were fuel switching options. Suppliers were invited to submit quotations to help assess the financial viability of each option.

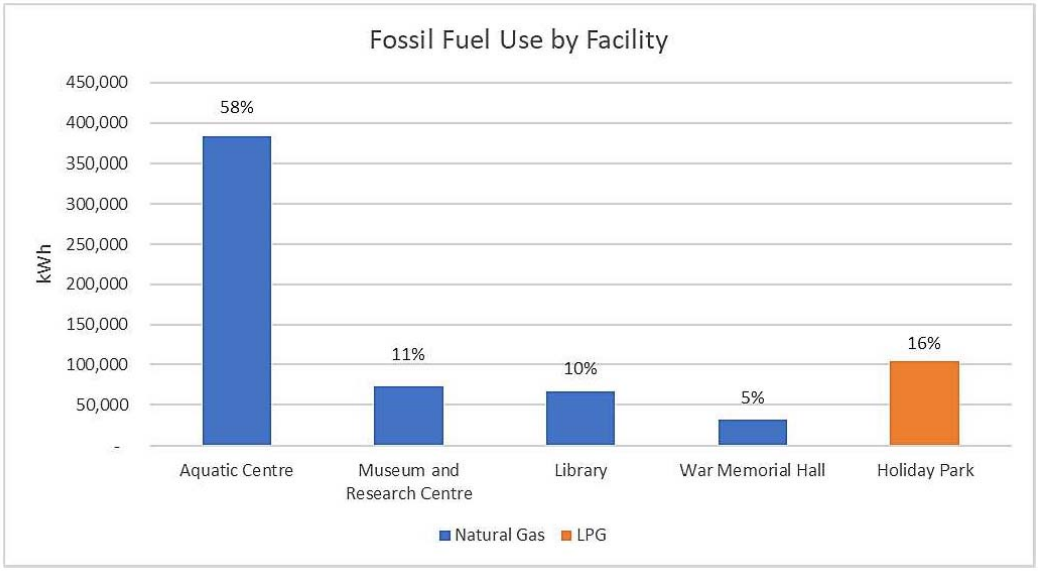
The options considered at each Facility are alternatives and would therefore not be implemented together.

The exception is the War Memorial Hall, which could use a combination of radiant heating for its stadium and split unit heat pumps in other areas. The War Memorial Hall is undergoing its own development strategy and natural gas removal will be considered as part of that project.

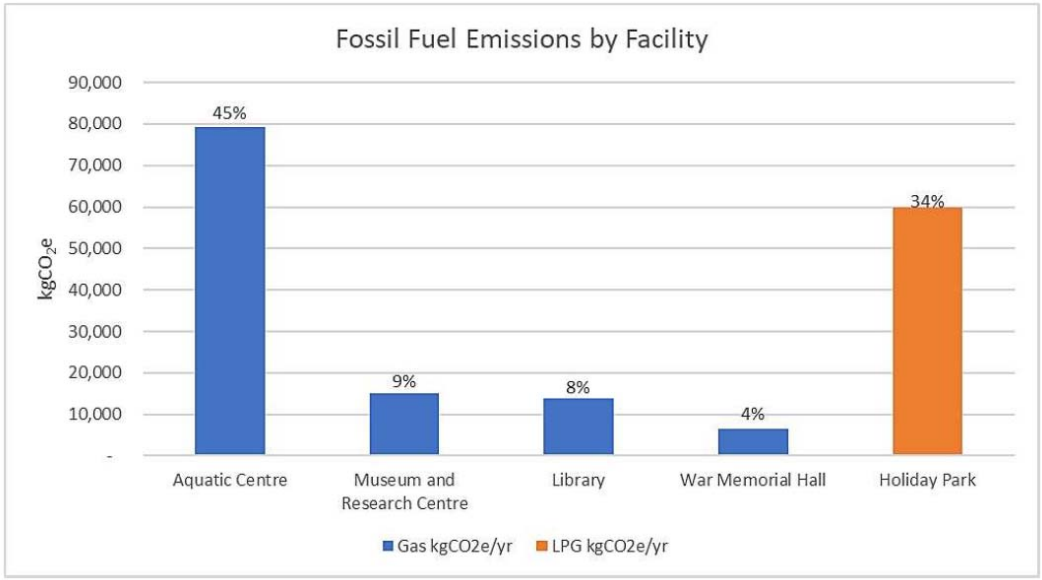
In the attached report – *Natural Gas Elimination Study, the* economic and carbon emissions analysis is available in table 1.1: Summary of Options Identified to Eliminate Fossil Fuel Use. Each option is discussed in more detail in the attached report.

5.1 Site prioritisation

Which sites should be prioritized through our next iteration of action plans?



The Aquatic Centre is the biggest user off fossil fuels when measured in KWH. This is because natural gas is used to heat the pools and showers.



The Holiday Park accounts for 34% of the fossil fuel related emissions. The Holiday Park also uses LPG to heat the water. LPG has a higher global warming potential then natural gas.

5.1.1 Natural Gas Elimination options

Which of the below options should be prioritised through the climate change action planning?

As previously stated, the options considered at each facility are alternatives and would not be implemented together.

Key

Environmental outcomes					
Carbon dioxide saved (kg co2e/year)			Marginal abatement cost		
Highest amount saved	Moderate amount saved	Lowest amount saved	Low less than $85/tco2e	Moderate = $85tco2e	High more than $85tco2e

Economic outcomes								
Capital Cost			Net Energy cost saved ($/yr.)			Net present value		
Low capital cost	Moderate capital cost	High capital cost	High energy cost saved	Low energy cost saved	Negative energy cost saved	High Positive returns	Some returns	Low Negative returns

The key above was used to highlight which option fit the most environmental and economic criteria.

5.1.1.1 Whakatāne Aquatic Centre

The report identified three options for the reduction of natural gas use at the Whakatāne Aquatic Centre. From the analysis of the three options, the pool covers, and dehumidifier is the best option for the Aquatic Centre. The option saves the most carbon per year of the three options. The negative abatement cost suggests it would cost -$41 to remove 1tCO2e. Regarding capital cost, it is the cheapest project with a positive net present value, meaning the project should see positive economic returns.

	Environmental outcomes		Economics		
	Carbon Saved [kgCO2e/yr]	Marginal abatement Cost	Capital Cost	Net Energy cost saved ($/yr.)	Net present value
Pool cover and dehumidifier	74,500	-$41	$200,000	$17,200	$45,000
Hot water heat pump	67,500	$412	$525,000	$3,500	-$418,300

Wood pellet boiler	73,100	$448	$504,000	-$4,200	-$492,100

5.1.1.2 Te Kōputu a te whanga a Toi Whakatāne Library and Exhibition Centre

The report considers two options for the reduction of natural gas at Te Kōputu. From the analysis of options, the integrated hot water heat pumps are the best option. Although the projects have similar capital costs and carbon saved, the air source heat pump has a moderate marginal abatement cost of carbon, and a higher net present value (meaning we would lose less costs from this option).

	Environmental outcomes		**Economics**		
	Carbon Saved [kgCO2e/yr.]	**Marginal abatement Cost**	**Capital Cost**	**Net Energy cost saved ($/yr.)**	**Net present value**
Air source hot water heat pump	24,000	$197	$210,000	$4,500	-$78,500
Integrated hot water heat pump	26,500	$80	$230,000	$8,400	-$32,000

5.1.1.3 Te Whare Taonga ō Taketake Whakatāne Museum and Research Centre

The report considers two options for Taketake that are the same as the two options considered at Te Kōputu. The two options for Taketake are similar, with the only difference being that the air source heat pump has a slightly lower capital cost.

	Environmental outcomes		**Economics**		
	Carbon Saved [kgCO2e/yr.]	**Marginal abatement Cost**	**Capital Cost**	**Net Energy cost saved ($/yr.)**	**Net present value**
Air source hot water heat pump	12,500	$554	$188,000	$1,500	-$103,700
Integrated hot water heat pump	13,800	$657	$289,000	$3,500	-$135,800

5.1.1.4 Whakatāne Holiday Park

There is only one option for natural gas elimination at the Holiday Park, which is to replace the LPG with hot water heat pumps. It is also possible to break up costs by transitioning one shower/facility unit at a time. This project has promising outcomes. The marginal abatement cost of carbon is -$187 meaning it is cheaper to implement this project opposed to offsetting.

The capital cost for water heat pumps is the lowest of any project, and the positive net present value shows the Council will see real economic returns from this project.

	Environmental outcomes	**Economics**

	Carbon Saved [kgCO2e/yr.]	Marginal abatement Cost	Capital Cost	Net Energy cost saved ($/yr.)	Net present value
Hot water heat pumps	56,100	-$187	$88,000	$11,300	$157,200

5.2 Future Actions

This report seeks recommendations from the TAG regarding which actions should make it through to the extensive list of actions that will be fed through a multi-criteria analysis tool and into the new action plans. This will allow us to compare outcomes from switching gas against other emission reduction initiatives. The prioritised action list will be considered through the Long-Term plan process.

5.3 Funding opportunities

The biggest barrier to transition from natural gas is the cost. To alleviate some of the burden on rate payers, the Council is interested in external funding opportunities.

We are aware of the GiDi fund by MBIE (Ministry for Business, Innovation and Employment) and EECA. We are currently putting together a funding application for some of the projects outlined in the feasibility study. As this match fund requires co-funding, the Council would still be required to contribute 50% of the funding. This creates a barrier to how much we can apply for.

Are you aware of any other funding opportunities to support this work?

6 Considerations - *Whai Whakaaro*

6.1 Engagement and community views

Public engagement is proposed over the coming months on the Council's Climate Change Strategy. Natural gas elimination options will be taken through a multi-criteria analysis and prioritised alongside other actions. Engagement may identify the community's views on relevant climate change actions. If these actions are prioritised for inclusion in the new action plan, they will be subject to consultation alongside Long Term Plan consultation in March 2024.

It should be noted that engagement will not be undertaken as part of the GiDi fund application.

6.2 Climate change assessment

Based on this climate change assessment, the decisions and matters of this Report are assessed to have moderate climate change implications and considerations, in accordance with the Council's current Climate Change Strategy.

If all the natural gas elimination actions are implemented, approximately 352.1 tco2e would be reduced per year. This would contribute a significant amount towards the Council's carbon reduction targets as part of the current Climate Change Strategy and Energy Action Plan.

6.3 Risks

This Report outlines opportunities to eliminate natural gas use at Council operated facilities. There is a minimal risk associated with the funding to deliver projects. This will be alleviated by considering

natural gas elimination against other options, undertaking further feasibility studies if necessary and applying for external funding opportunities.

Therefore, the risk associated with the subject of this report is assessed to be low.

Attached to this report:

- **Appendix 1:** Natural Gas Elimination Study.