



## Submission

### Process Heat in New Zealand: Opportunities and barriers to lowering emissions - Technical paper (2019)

February 2019

*Auckland Council Submission to the Ministry of Business, Innovation and Employment (MBIE)*

#### Mihi

Ka mihi ake ai ki ngā maunga here kōrero,  
ki ngā pari whakarongo tai,  
ki ngā awa tuku kiri o ōna manawhenua,  
ōna mana ā-iwi taketake mai, tauiwi atu.  
Tāmaki – makau a te rau, murau a te tini,  
wenerau a te mano.  
Kāhore tō rite i te ao.

I greet the mountains, repository of all that has been said  
of this place,  
there I greet the cliffs that have heard the ebb and flow of  
the tides of time,  
and the rivers that cleansed the forebears of all who came  
those born of this land and the newcomers among us all.  
Auckland – beloved of hundreds, famed among the  
multitude, envy of thousands.  
You are unique in the world

## ***Introduction***

1. Auckland Council thanks the Ministry of Business, Innovation and Employment (MBIE) and the Energy Efficiency and Conservation Authority (EECA) for the opportunity to provide a submission on *Process Heat in New Zealand: Opportunities and barriers to lowering emissions - Technical paper*.
2. Auckland Council supports the Government's intent to address greenhouse gas emissions from process heat. The council is currently developing a climate action plan to reduce Auckland-wide emissions within a 1.5°C warming limit and to prepare for the impacts of climate change. In Auckland approximately 20 per cent of emissions are from the process heat sector (industrial energy at 13 per cent, commercial energy at 5 per cent, agricultural energy at 2.8 per cent), therefore it is important for the climate action plan to address these emissions.
3. Auckland Council has two perspectives on process heat, both as a user and a legislative body. It uses process heat in its corporate and community facility operations. The council has also developed strategic goals and commitments around energy resilience (e.g. process heat) which are included in both the Auckland Plan 2050 and Auckland's Climate Action Plan (currently in development).
4. While it is essential to reduce process heat greenhouse gas emissions across all sectors, it is important to acknowledge that there are sectoral and regional differences in the use of process heat. The price of carbon through the revised New Zealand Emissions Trading Scheme (NZ ETS) will aid the reduction in greenhouse gas emissions from process heat, but needs to be supported with additional initiatives, including a targeted approach for users of low-grade process heat.
5. The consultation seeks industry and public feedback on their understanding of the use of process heat, and the opportunities and barriers to lowering generated emissions. This submission is focused on the use of process heat in an Auckland context, highlights emissions reduction opportunities and presents feedback on the identified barriers.
6. This submission is being lodged as an officer submission without full political endorsement and will be discussed by the Environment and Community Committee on 12 March 2019. At that point, we request the ability to provide additional details or amended recommendations as necessary.

## **Auckland specific information**

7. Process heat refers to the thermal energy used to manufacture products in industry, in the form of steam, hot water and hot gases. In Auckland, process heat is responsible for approximately 20 per cent of the region's greenhouse gas emissions. The application of fossil fuels in process heat accounts for most of these emissions, from both burning (60 per cent) and electricity generation. The predominant fossil fuels used are coal, natural gas and diesel, with the majority of the coal used in high temperature process heat for metal production.
8. Auckland's industrial sector contributes to 26 per cent of the local economy which is equivalent to \$22B annually. This sector relies primarily on natural gas to provide heat for industrial processes, such as manufacturing, cleaning and sterilisation. Two distinct challenges this sector faces over the next thirty years are a diminishing natural gas supply and achieving Auckland's emissions reduction targets.
9. Auckland Council and Waikato University have investigated the process heat demand in Auckland and the potential focus areas for emission reductions. The results from this work are outlined in

the report in “Process Heat Emissions & Energy use in the Auckland Region”, March 2018. The council can provide copy of this report on request.

10. The main conclusions from this report are:

- Targeted efficiency gains could only provide between 1 to 5 per cent reduction in energy use and emissions. Targeting efficiency alone does not account for greater opportunities for greenhouse gas emissions reductions.
- Process heat in the low to medium temperature range (20 to 200°C), which accounts for approximately 70 per cent<sup>1</sup> of Auckland’s process heat, could transition to electricity. The transition could be enabled through a combination of new technology (e.g. high temperature heat pumps) and process optimisation.
- The remaining process heat that cannot be transitioned to electricity is high temperature (200 to 400+°C). The use of electricity for high temperature process heat is currently not technically or economically feasible. The New Zealand supply of natural gas is predicted to drop steeply after 2022<sup>1</sup> and the council recommends that natural gas to be prioritised for industries that require high temperature process heat.

### **Consultation questions (from Consultation Document)**

11. Auckland Council has provided feedback on specific barriers from the “Process Heat in New Zealand: Opportunities and barriers to lowering emissions” technical report that are relevant to Auckland region.

#### **Barrier A: The cost of emissions is not fully priced**

12. This barrier relates to the ETS and proposed changes, including exposure of emissions intensive trade industries that are protected from ETS by the free allocation of units. Auckland Council found that the price of ETS units for carbon were too low to instigate a transition to renewable fuels<sup>2</sup>. An increase in the price of ETS units to \$50 would only add \$5 to the cost of coal<sup>1</sup>, just bringing it into parity with natural gas and wood pellets. An ETS price of \$150 would be required to bring the cost of coal into parity with electricity<sup>1</sup>.

#### **Barrier I: High cost of electrical energy relative to other high carbon fuels**

13. Auckland Council agrees that the use of electricity or alternative fuel sources has cost implications for industry. Generally, electricity costs approximately 3 times more than natural gas and up to 5 times more than coal<sup>1</sup>. Biomass has a similar cost to natural gas and is twice the cost of coal<sup>1</sup>. The use of high temperature heat pumps can lower energy requirements, enabling the required electricity costs to be more competitive with other energy sources such as natural gas. This price barrier is particularly relevant as a large percentage of process heat in Auckland is supplied by natural gas.

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<sup>1</sup> Atkins, M., 2018, Process Heat Emission and Energy Use in the Auckland Region

<sup>2</sup> <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/publications/energy-in-new-zealand>

### **Barriers (L & M) to the use of woody biomass**

14. In an Auckland context, the application of biomass as a fuel replacement has limited feasibility. There are limited opportunities for large-scale forestry in the Auckland region and replacement of current fossil fuels with biomass would require the biomass to be transported into the Auckland region. In addition, the low energy density of biomass (in comparison with fossil fuels) hinders its long-haul transportation capability, both economically and the associated emissions<sup>2</sup>. Biomass however could be a potential fuel replacement for other New Zealand cities where long-haul transportation is not required.

### **Hydrogen as a fuel for process heat**

15. The final section of the report mentions that a research project has been set up to assess the use of hydrogen for process heat. The preliminary results indicate that hydrogen is not cost competitive for process heat even with a carbon price in excess of \$100 per ton. The report mentions that this analysis may need to be revisited if major changes occur to the carbon price, cost of electricity and carbon capture or storage.
16. Auckland Council suggests that any analysis should also consider the ramifications of a 100 per cent renewable electricity grid and the future requirement to replace natural gas for medium to high temperature process heat. A 100 per cent renewable electricity grid will require some form of grid balancing (e.g. production of low to zero cost hydrogen) when the supply exceeds demand. The co-benefits of this and the use of hydrogen for process heat demand need to part of any such analysis on the use of hydrogen.
17. Auckland Council welcomes an opportunity to review and discuss the results of this investigation when it has been completed, particularly given our regional emissions footprint.