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January 28, 2020

The Honorable Mayor Seth Fleetwood
Office of the Mayor
210 Lottie Street
Bellingham, WA 98225

The Honorable Hannah Stone
The Honorable Gene Knutson
The Honorable Daniel Hammill
The Honorable Pinky Vargas
The Honorable Lisa Anderson
The Honorable Michael Lilliquist
The Honorable Hollie Huthman
Council
210 Lottie Street
Bellingham, WA 98225

Dear Mayor Fleetwood and Councilmembers Stone, Knutson, Hammill, Vargas, Anderson, Lilliquist, and Huthman:

Submitted for your consideration is Cascade Natural Gas Corporation's (Cascade) formal comments and analysis pertaining to the Bellingham Climate Action Plan Task Force's (CATF) December 9, 2019 Final Report to the City Council.

We submit our observations as a community member with 40 employees and over 27,000 customers based in the City of Bellingham (City). Our intention is to productively further the dialogue which began in May of 2018 when the Bellingham City Council passed Resolution 2018-06.

It's Cascade's understanding that the intent of Resolution 2018-06 was to create the CATF in order to develop recommendations to achieve accelerated 100% renewable energy targets, taking into account financial, technological and societal challenges resulting from such a transition. Cascade recognizes the need for climate action and respects the many challenges associated with this undertaking. However, due to the limited analysis performed by the Task Force, and missed opportunities for inclusion of members of the business, antipoverty, and economically vulnerable communities, the feasibility of the Task Force recommendations has yet to be fully determined.

Cascade hopes that phase two of climate action planning will bring representatives from the full Bellingham community together to provide input and primary source data before a direction is finalized.

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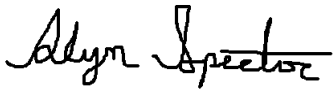
The City Council should consider hiring an independent evaluator to verify Task Force findings, and perform a full cost and impact analysis on the measures identified in the report.

In addition, Cascade welcomes the opportunity to bring solutions to the table. We would like to work with City government to consider pathways forward for expanded efficiency offerings, offsets, renewable natural gas purchases, fugitive emissions standards and other low-carbon intensity options. Our goal is to serve the City's carbon reduction ambitions while maintaining energy affordability, grid reliability, and supporting a robust economy. We also encourage the City to consider use of an independent third-party contractor selected by a diverse committee of environmental, business, and antipoverty representatives to provide objective carbon, economic, and impact analysis of any decarbonization pathway considered.

Full comments on the contents of the Final Report are included here. Questions can be directed to alyn.spector@cngc.com. Thank you for your time and consideration.

Sincerely,



Energy Efficiency Policy Manager, Cascade Natural Gas Corporation

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Executive Summary

The challenges associated with climate change impact us all. Cascade understands the importance of working with the communities we serve to maximize conservation opportunities and to seek low carbon pathways to the delivery of natural gas.

After careful observation over thirteen months of CATF proceedings, and thorough review of the final report, we believe it's important to share our analysis of the recommendations of the CATF. Our detailed comments have been summarized here into four main observations:

Observation #1: The report offers recommendations that exceed the scope of City Council Resolution 2018-06 and do not result in greenhouse gas emissions reductions.

The scope of City Resolution 2018-06 pertains to the development of a CATF and accelerated 100% renewable energy targets. The final report provided by the CATF describes the development of goals beyond the scope of the resolution, stating:

> *The bottom line is that climate change is the result of our current economic, industrial, and political systems. It is an open question as to whether these systems can reform themselves in time to avoid the worst consequences for our community and so many others. Nonetheless, our community must try (Final Report, 9).*

Because the report perceives climate change as a product of the current economic, industrial, and political systems, the recommendations seek to fundamentally alter these systems. However not all proposed alterations directly impact the use of carbon or fossil fuels. The City Council should consider whether the final report introduces recommendations unrelated to decarbonization. Separating out recommendations unrelated to climate change will help ensure that resources are placed towards actions with the greatest carbon reduction potential.

Observation #2: The final report was developed through a process that did not encourage diverse perspectives, and missed opportunities for deeper inter-community collaboration.

Cascade appreciates the final report's acknowledgement that further outreach and analysis is necessary before recommendations are implemented. However, Cascade remains concerned the process through which recommendations were advanced was not fully developed, and left opportunities for broader community inclusion on the table.

The benefits and persistence of the City's environmental actions will be strengthened through a full and transparent public process. We encourage the City to continue its engagement with Cascade, and the diverse communities that live and work in Bellingham through surveys, outreach, and public meetings.

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Observation #3: The analysis of costs, benefits and carbon reduction impacts has been insufficient to support the final report's conclusions.

The CATF's final report provides a starting point from which we may begin to better understand the opportunities and challenges associated with Resolution 2018-06. However, there are still significant gaps that need to be addressed before a full understanding of available decarbonization technologies and their associated impacts can be achieved.

Measures recommended in the report are not consistently assessed across all areas of analysis. The cost and energy savings associated with these measures, including converting natural gas space and water heating equipment to electric technology requires further examination. Outcomes will vary significantly depending upon assumptions made about needed upgrades, baseline equipment, and the associated efficiency levels of replacement technologies. Such variance was demonstrated via the outcomes of the cost analysis offered by CATF, and members of the business community.

Energy efficiency analysis should also consider the impacts of seasonal changes. Heat pump systems as a whole are more efficient when the conditions are moderate, however their capacity begins to diminish at around 38F. Many heat pumps rely on a back-up heating source when outside temperatures are too cold to allow the system to provide adequate comfort. Further analysis on this issue is warranted.

Cascade recommends the use of an independent evaluator to offer guidance on cost analysis and to determine where true energy efficiency and carbon reduction gains can be made.

Observation #4: The analysis includes unfounded claims of indoor air pollution from burning natural gas in appliances as support for electrification.

The claim of "…indoor air pollution— carbon monoxide, formaldehyde, and other pollutants—from burning natural gas, which has been shown to increase asthma…" is unfounded in the consensus public health literature. The findings from the 2000 National Institute of Medicine, "Clearing the Air: Asthma and Indoor Air Exposures," do not support the CATF's claims and the National Institute of Medicine's findings have not been contradicted over time or by more recent research studies.

Cascade strongly encourages the City Council to conduct a thorough literature review of sources utilized in the final report to ensure that the accuracy of claims against unfavored technologies.

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A deeper review of each of these observations, associated concerns, and proposed pathways forward can be found in the full body of this document. We appreciate your time in reviewing this material, and we look forward to discussing how Cascade can support the City's decarbonization efforts.

Background

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Cascade is a local distribution company (LDC) serving over 294,000 natural gas customers in Washington and Oregon. Since 2010, our Company has based its Energy Efficiency department in the City of Bellingham. We appreciate being rooted in a community committed to environmental innovation and building science. We are proud of our robust energy efficiency efforts which have saved roughly 4.3 million therms in Washington State. That's the equivalent of 4.9 wind turbines running for a year. Seventy-five thousand therms were saved in the City of Bellingham in 2018 alone, which equates to approximately 45 homes' annual energy usage. We are also proud of our ongoing partnerships with the Bellingham low income and environmental communities in support of reducing the amount of energy used in homes and businesses throughout the region.

While the Company believes the CATF and its associated recommendations are well-intentioned, we are concerned without comprehensive analysis and well-vetted research, it's difficult to know whether the hypothesis from the Final Report are based on the realities of Bellingham's energy market, carbon impacts, and community interests. Without this basis, an undertaking of the scale recommended by the Task Force could lead to significant unintended consequences.

A detailed analysis of the Company's observations, and recommendations follow:

Observation #1: The report offers recommendations that exceed the scope of City Council Resolution 2018-06 and do not result in greenhouse gas emissions reductions.

The scope of City Resolution 2018-06 pertains to the development of a CATF and accelerated 100% renewable energy targets with the following ambitions stated for accelerating municipality and community greenhouse gas reductions:

- 100% renewable energy for municipal facilities (electricity, heating and transportation) by 2030;
- 100% renewable energy use for the Bellingham community's electricity supply by 2030; and
- 100% renewable energy for community heating and transportation by 2035

To this end, the Climate Action Plan Task Force was formed with the following directives:

- Adopt a triple bottom line plus technology philosophy; and
- Determine feasibility, costs, and impacts of the 100% renewable energy ambitions; and
- Develop 100% renewable energy targets; and
- Identify funding mechanisms and develop a plan to achieve the Task Force's recommended 100% renewable targets; and
- Develop accelerated greenhouse gas emissions targets for the Council to consider for adoption; and
- Identify policy considerations to attain accelerated targets (Resolution 2018-06; 5/17/18).

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Cascade appreciates the Task Force's efforts to develop a pathway to meet the ambitions of the City Council's community greenhouse gas reduction plan. While Cascade believes additional analysis is needed to determine the practicability of the 100% renewable targets, and has concerns regarding the manner in which the feasibility, costs, and impacts were determined by the CATF, we do not dispute that these areas of examination were requested by the City Council. Nor are we suggesting that climate action itself is unwarranted.

However, there are several areas within the final report where the CATF recommendations exceed the scope of Resolution 2018-06.

The discrepancies between the recommendations and resolution begin on page 9, where the report states there are "systemic economic forces that will hinder the City's ability to meet the 2030/2035 carbon reduction ambitions." The report elaborates:

> *The bottom line is that climate change is the result of our current economic, industrial, and political systems. It is an open question as to whether these systems can reform themselves in time to avoid the worst consequences for our community and so many others. Nonetheless, our community must try (Final Report, 9).*

Because the authors of the final report perceive climate change as a product of the current economic, industrial, and political systems, the recommendations seek to fundamentally alter these systems rather than adhere to the existing scope of examination requested by the City Council.

In the report's recommendations for the transportation sector, the scope of proposed reforms is broadened even beyond its environmental objectives. While the plan discusses the benefits of electric vehicles (which is a valid decarbonization pathway), carbon reduction appears to take a secondary role.

On page 44, the authors of the report state that, **"**simply converting our existing transportation system to a new fuel fails to acknowledge the many ways that our current transportation system is socially unjust."

> *Car dependency also has public health impacts in the form of traffic crashes, air/water/noise pollution, and physical inactivity. For an individual, each additional kilometer walked per day is associated with a 4.8% reduction in the likelihood of obesity, whereas each additional hour spent in a car per day is associated with a 6% increase (45).*

Resolution 2018-06 did not direct the CATF to develop recommendations to reform the economic, industrial, and political systems, nor did it necessarily seek to discourage personal car ownership. Cascade offers the following suggestions to realign the report with the City Council's original intentions.

Recommendation: <u>The report should be audited to separate recommendations directly related to Resolution 2018-06 from those that extend beyond the scope of the City Council's request.</u>

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The City Council requested the CATF adopt "a triple bottom line plus technology philosophy" in the development of its recommendations. This phrase typically refers to a plan that takes social, economic, and environmental considerations into account, within the context of currently available technologies. While the co-benefits of a given electrification strategy are important to quantify, such benefits should not be confused with the strategy itself.

Instead, the City Council should consider whether recommendations in the final report present the social and economic benefits that occur as a result of an electrification strategy, or if they introduce *additional* social and economic recommendations that are unrelated to decarbonization. Separating out these non-electrification recommendations will help the City Council focus on actions with the greatest carbon reduction potential.

Observation #2: The final report was developed through a process that did not encourage diverse perspectives, and missed opportunities for deeper inter-community collaboration.

As previously shared in our comments submitted to the Task Force on September 13, 2019, Cascade supports the City's desire to reduce fossil fuel and carbon impacts in Bellingham. However, we remain concerned the process by which the CATF has been developed was neither comprehensive, nor inclusive.

While the Task Force provided a link on the City website to submit written comments, it is unclear whether this forum was sufficient for gathering comprehensive feedback on the plan. Nor did there appear to be a proactive effort to gather comments from a cross-section of community perspectives. A public comment period was held at the end of each Task Force meeting with a limit of 10 members of the public with one minute each, but this may not have been fully sufficient to gather verbal comment based on the number of attendees present.

Since September 2018, Cascade's Energy Efficiency department has offered to identify pathways for fossil fuel reduction in coordination with the CATF. Potential opportunities include expanded energy conservation efforts, examination of possible renewable natural gas efforts with the City, and the development of carbon offset programs.

In response to Cascade's willingness to engage with the Task Force, a CATF member issued a formal Position Statement in February 2019 that included the following comment:

> *…with the support from PSE, CNG has inserted themselves into the Task Force's process and attempts to influence the Task Force's recommendations, whether through 'volunteering' to produce information on analyses, commenting on proposed ideas during Task Force meetings, or 'filling in' as a Task Force member, as was previously proposed by PSE's representative to allow CNG to provide expertise where PSE can't. It's imperative that we as a Task Force recognize the attempts to influence the outcomes of the Task Force's findings and recommendations for 100% clean energy options that meet the Resolution's goals. Why should the Task Force, or the people*

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of Bellingham who have entrusted the Task Force to fulfill the goals of the Resolution, trust any individuals or the fossil fuels corporations they represent who opposed the Resolution in the first place, to provide honest guidance toward the success of the Task Force, when they have already publicly opposed the Resolution in the first place? Why should the Task Force expect anything from CNG other than attempts to further their own corporate interests? Why does CNG have a representative in attendance and offering input, and why should the Task Force expect such input to be honest and useful toward Task Force success versus tainted by CNG's own interests?

With the exception of one authorized presentation regarding the Company's Conservation programs in March 2019, Cascade staff was not allowed to present to the Task Force. During the first year of Task Force deliberations, the CATF would neither seek nor integrate information from the serving Bellingham utilities on the number of customers served, nor the amount of therms or kilowatts used in the City. Instead, the Task Force utilized data from non-utility sources and operated on assumptions based on national averages. The business community's estimates of residential costs to meet the Task Force's proposed solar and electrification requirements were dismissed in a manner that did not encourage discussion.

Cascade received its first direct data requests from the Task Force on August 5, 2019. By that time, preliminary recommendations had already been developed. This limited the Task Force's ability to consider alternative pathways to decarbonization, leading to missed opportunities for additional community-focused solutions.

In addition to the CATF's lack of engagement with the Bellingham business community, the Task Force has not included any formal representatives from minority communities, including communities for whom English is not the primary language spoken in the household. Nor did the report appear to include feedback from representatives from disabled communities, communities of color, small business owners, or households on fixed or limited incomes. To the credit of the CATF, the need for deeper inclusion was recognized by several Task Force members. Now, the City has the opportunity to ensure this inclusion takes place so that the strategies listed for eliminating costs to low and middle-income households are effectively implemented.

Recommendation: Participation in the next phase of the Climate Action Plan needs to be significantly broadened to ensure the plan serves the full community, and that primary source data is effectively integrated.

Based on our efforts in other communities, Cascade believes that effective solutions are outcome-driven, collaborate and forged through robust dialogue, and strong quantitative analysis. This important work cannot be performed in a vacuum. It is important that communities are willing to work with the groups and individuals that would face the greatest impacts of recommendations pertaining to climate planning. That means proactively seeking feedback from diverse voices in addition to those that have engaged during Task Force deliberations.

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Before any significant change is implemented a full public process could be undertaken with maximum transparency. Information and input could be gathered by reaching out and conducting a survey of home and business owners that would be impacted by the conversion mandates. Materials could be circulated in languages that reflect the diverse population of the City. Advocates for small business, low income communities, and communities of color could also be represented.

An example of best practices in engagement and inclusion in Climate Action Planning can be found in the City of Bend, Oregon, which is referenced in the Plan as an example of a city taking bold actions against climate change. Bend's Climate Action Steering Committee (CASC) solicited feedback on all ideas developed in association with its plan via two online surveys. These surveys received approximately 2,400 responses. More than 30 presentations were made to community groups of all backgrounds and affiliations with the goal of strengthening the plan through respectful debate and the proofing of ideas through cross-sector research and analysis. Open house interviews were held as well as direct interaction in planning between all interested members of the public and the CASC. The CASC then worked with technical consultants to conduct more than 40 stakeholder interviews (including representatives of low income, and non-English speaking communities) about strategies to gather Bend-specific data to inform the greenhouse gas modeling used for the plan. Such comprehensive and earnest solicitation of community feedback was not achieved as part of the Bellingham CATF.

Cascade encourages the Bellingham City Council to look toward the City of Bend as a model for maximizing public engagement as formal policy is considered. Sufficient time should be given to this process, and feedback from members of impacted communities should be directly consulted and applied to the City's plans. This observation is consistent with the report's own recommendation that:

> *…before designing programs or implementing any of the efficiency, electrification and renewable energy measures laid out in this chapter, the City should conduct an economic survey that analyzes the ability of Bellingham building owners and tenants to comply with these requirements. Such a survey could reveal how many Bellingham individuals and households might have difficulty complying due to present-day costs and current levels of program support (14).*

Language on page 107 of the report further recommends that "the City should carry out a comprehensive engagement process with our community that focuses on the values of the community and shows how the recommended actions in this report will benefit all aspects of our community."

Cascade appreciates the CATF's acknowledgement that further outreach and analysis is necessary before recommendations are implemented. This reflects the CATF's genuine concern for the well-being of the Bellingham community. Cascade strongly encourages the City Council to embrace the opportunity to integrate new information and community-centered recommendations into any climate actions that are taken by the City.

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Cascade also encourages the City work directly with the Energy Project and Opportunity Council to ensure sufficient funds are available to fully cover the cost of weatherization of low-income households if weatherization services become mandatory. Questions for consideration include:

- How will low income status be verified?
- How will this mandate be communicated?
    - How will the City address linguistic barriers in light of diverse populations?
- What type of documentation will be required in order for economically vulnerable customers to obtain a deferral from the mandatory weatherization requirements as described in the final report?
- If middle-income households are mandated to receive weatherization services through the Opportunity Council, what provisions will be made to ensure capacity is not drawn away from providing weatherization services to traditionally qualified households?
    - The report cites an average cost of $7,290 per project and $4,563 after rebates and incentives, which is just over 60% of project costs. What steps will be taken to ensure middle income households are not drawn into deeper debt as a result of having to bear a certain percentage of project costs?
- How will middle income requirements be enforced?

Another opportunity that was not fully addressed in the final report was the use of renewable natural gas and offsets as a means of maintaining grid reliability while reducing carbon impacts. As stated on page 12 of the report, City government has responded to the climate crisis by purchasing 100% renewable energy through PSE's Green Direct program. Cascade is currently engaged in workshops and discussions on the development of parameters for offset and renewable natural gas offerings based on the provisions of HB 1257. Renewable natural gas captures and uses gases from decomposing organic wastes that would otherwise go directly into the atmosphere. Cascade would like to work with the City of Bellingham to explore the viability of pilot efforts from which a broader, statewide RNG and offset program may be proposed to our regulators.

We encourage the City to continue its engagement with Cascade, and the many communities described above, on potential pathways forward. We also encourage the City to work with an independent third party to determine what options would be most economical and of the greatest benefit to the Bellingham community.

Observation #3: <u>The analysis of costs, benefits and carbon reduction impacts has been insufficient to support the final report's conclusions.</u>

As addressed in Observation #2 in this document, we believe the final report missed opportunities to integrate a full range of community perspectives. The self-restrictive integration of feedback and data

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has inhibited the CATF from examining the full scope of available measures to achieve meaningful carbon reductions in the City of Bellingham.

Measures recommended in the report are not consistently assessed through a comparative matrix that weighs the benefits and drawbacks of each pathway. Associated costs, carbon impacts, health and safety impacts, societal benefits, and other associated co-benefits and concerns were not all examined with the same level of intensity throughout the report. The lack of well-rounded analysis across all technologies inhibits a clear understanding of the impacts of the decarbonization pathways identified in the report. This deficiency is acknowledged by the CATF, which recognizes that the use of triple bottom line plus technology analysis requires the "development of significant amounts of data related to proposed measures, only some of which was available in the time frame available to the Task Force," (5).

Even so, the report still asserts there are "essentially no downsides" to electrification "from a social benefit standpoint" (30). This assertion is difficult to substantiate in light of inadequate impact analysis and glosses over economic constraints that may be faced by the middle class. And while some middle-income households may theoretically have funds available for mandatory renovations to their homes, the forced prioritization of these costs risks drawing money away from family savings accounts that might have otherwise padded a household from an unanticipated economic shock.

Although incremental costs for replacing existing heating systems with electric heating systems are lowest when equipment reaches the end of its useful life, the report states "any natural gas space and water heating equipment that haven't been replaced with electric heat pump or equivalent systems need to be replaced by 2040" (26). This means not all costs will be incremental, and expenses will vary significantly depending on the equipment being replaced, building type, and whether the structure is designed to accommodate electric equipment.

As the report itself acknowledges, rebates and other financial support for low income (and middle income) residents to reduce or eliminate incremental cost is critical. Cascade currently offers rebates for qualified energy efficiency measures, and substantial funding for low income weatherization in natural gas households. Alternative funding sources will need to be identified to fill the funding gap left as electrification takes hold. How this is funded is yet to be determined.

Before policy is developed based from the CATF recommendations, it is important any existing analysis provided in the report is verified by peer-reviewed, independent sources, and that gaps in reliably sourced data are identified. An independent impact analysis would also help the City Council more fully understand how the recommendations would impact those governed by the policy changes.

Because the report acknowledges that the plan may have cost impacts that would need to be addressed through economic tools, it is important that the actual communities facing such impacts have input on the value of such tools, and the costs associated with developing these resources are fully analyzed. In

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lieu of community-specific data, the final report relies heavily on cost-analysis and models from communities with significantly different economic and ecological profiles. A few examples can be found below:

- On page 75, the report references the market viability of Hornsdale Power Reserve, a lithium ion battery facility that provides network reliability in Australia. The project boasts "firm and flexible power generation at rates more competitive than gas generation."

This comparison does not factor for differences in population, climate, humidity, heating and cooling degree days, regional costs of materials and production, the local labor market and the availability and costs associated with the local production of natural gas and use in electric generation. Therefore, it is unclear whether Jamestown, South Australia, with a population of approximately 1,500 people, hotter summers and colder winters, and a significantly lower precipitation profile, is the optimal comparison with the City of Bellingham.

- On page 14, the Task Force stated that the best available data on the costs of electrification are primarily from analyses of cities in California.

The areas of California in which this analysis has been conducted have heating and cooling degree profiles, construction markets and electric and natural gas rates that vary greatly from Bellingham, Washington. This impacts not only the utility rates and equipment costs, but also the split in heating and cooling days which impact the actual effectiveness of electric heat pumps themselves. It will be important that any analysis from which policy is based utilizes model communities that are more directly comparable to Bellingham, or are based from the City itself.

In fairness to the CATF, is important to acknowledge that primary source data from the Community Energy Challenge has been applied to gauge certain regional technology costs. However, even with this locally sourced data included, there are still significant analysis gaps that need to be filled.

There is an opportunity for deeper analysis of the costs and energy savings associated with the conversion of natural gas space and water heating equipment to electric technology as well. Throughout the report, there is a significant variance in the assumed costs and benefits associated with the CATF's proposed mandates. Cascade believes that the contrasting cost analyses performed by BIAWC and members of the CATF reflect differences in underlying assumptions of baseline efficiencies, starting and ending technologies, and the type of dwelling in which mandated conversions and upgrades would take place. The reason for this variance is twofold:

First, the report itself demonstrates ambiguity regarding the technology that would be required under the CATF recommendations. This means that costs and energy savings could vary significantly depending upon the type of electric equipment being used to replace natural gas space and water heat technology.

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Second, cost analyses have been based on fixed scenarios operating under specific conditions. Outcomes of such analysis will vary significantly depending upon assumptions made about baseline equipment and associated efficiency level, home size, capacity to adopt electric equipment, average energy use in the home, the need for retrofits before upgrades can be made and other relevant factors.

The Report itself acknowledges that "these are average costs and there could be a wide range of costs depending on home size, envelope, configuration, electric work needed, etc." (28). Until a housing stock assessment is conducted by the City that offers a more viable "average" home and baseline equipment type, it will be difficult to develop consistent analysis upon which general consensus on costs can be achieved.

Ambiguity regarding electric space and water heat equipment begins on page 15 where the Task Force references the utilization of "highly efficient electric heat pump technology" in place of natural gas space and water heating equipment. A general call for non-heat-pump electrification is also briefly included.

The report acknowledges that "For existing buildings, the cost of electric equipment needs to be compared with replacement costs for similar gas equipment." (27). However, the lack of specificity in their recommendation makes economic analysis of this pathway challenging. The cost differences and overall effectiveness of different electric space and water heating technology can be significant, especially when comparing air-source and ground-source heat pump technology.

For the purpose of analysis, the report appears to pair an 80% efficient natural gas furnace against a 340% efficient electric heat pump, which are not similar in terms of equivalent efficiency.

An 80% efficient furnace is considered old technology. Recently in our modeling, Cascade has been using 90%-95% as standard. This is also consistent with the steady market transformation of high efficiency natural gas equipment as seen and encouraged by our company's Energy Efficiency department.

By comparison, a 340% efficient electric ground source heat pump would be considered top of the line, and the most expensive and best technology, with costs reaching the $30,000 range in some cases. It is also uncertain whether the Bellingham market is able to support the demand for electric ground-source heat pumps at this time. This technology has not been typically utilized in residential households in Bellingham. There is an opportunity for the market to transform, but further analysis needs to be conducted to identify the most viable technology for cost-comparison based on local availability.

If we are looking to compare highest efficiencies of each type of heating, we should compare at least a 95% efficient natural gas furnace to a 340% efficient electric ground source heat pump. 95% efficiency is consistent with the efficiency levels encouraged through Cascade's Energy Efficiency rebate program. 97% and 98% AFUE furnaces are regularly installed as a result of our programs as well. Equivalent water heat efficiencies are also encouraged. Based on Cascade's analysis, the average cost/year in Bellingham

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for a 95% efficient natural furnace under current rates would be $366.57. The cost/year of Puget Sound Energy electric heat for the same heating demands at 340% efficiency would be $390.19.

It is important to acknowledge, that like the Task Force's figures, Cascade's analysis is based on averaged data depicting one set of technologies and costs. The numbers issued above from Cascade, much like the data from BIAWC and from the CATF final report itself, should not be considered the final word on the impacts and value of the recommendations, but rather a starting point from which an independent third party can provide fair and objective analysis of costs.

It is also important to consider home energy conversions from a whole systems perspective, and not just based on individual components. Electric ground source heat pumps will provide heating and cooling, so it is necessary to include these costs (furnace, A/C, ducting, etc.) in the natural gas system as well.

Furthermore, even a 340% efficient heat pump would be subject to seasonal changes. The system as a whole is more efficient when the conditions are moderate, not when it is on the extreme side of either warm or cold. And while heat pumps can be efficient, they are a poor heating device and the capacity plummets in cold weather more so than their efficiency. Therefore, the electric cost analysis utilized by the Task Force may be inadvertently understated because their specs do not reflect the energy required for defrosting a heat pump unit at lower temperatures. With the need for defrosting, ducted units typically begin struggling around 38F. This will impact efficiency and costs during the heating season, particularly the night hours when solar/wind resources are not available.

The graph of the same 2 units below shows the severe loss of capacity in a ducted heat pump at low temperatures. While ductless low temperature models do better, they still lose significant capacity. There is also significant load added to PSE's peak winter days. On a peak winter day for PSE, heat pumps are typically operating at their lowest capacity point and their lowest efficiency point. Because heat pumps lose capacity with cold, units need to be oversized for heating older homes, adding to their first cost.

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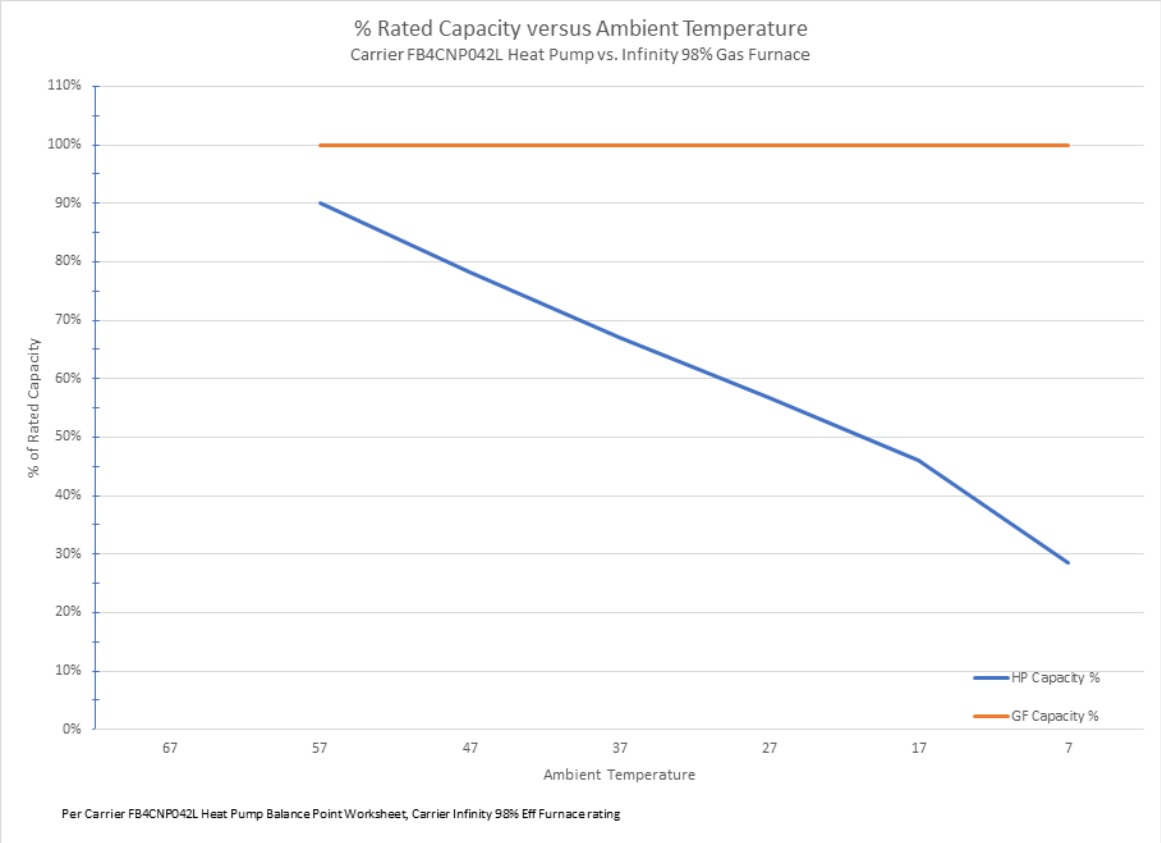

Today, many heat pumps rely on a back-up heating source, such as a natural gas furnace, when outside temperatures are too cold to allow the system to provide adequate comfort. Further analysis should be conducted to identify viable alternative back-up systems in the event natural gas equipment is no longer allowed, and to ensure there is adequate baseload electric generation to offset the increase electricity need to meet this demand.

Regarding the transportation component of the final report, the authors claim that “most experts agree” electric vehicles will be significantly cheaper to buy and operate than internal combustion engine (ICE) vehicles by 2035. The report further claims that some analysts already believe cost parity has been achieved (46). However, this analysis appears to compare the incremental costs of purchasing a new internal combustion engine vehicle versus a new electric vehicle. The City Council could consider conducting additional analysis to verify the vehicle purchasing habits of middle class and economically vulnerable populations (ie: the frequency of vehicle replacement, and the purchase of new vs. preowned vehicles). Analysis could also be performed to examine the current and projected market availability of used electric vs. used ICE vehicles.

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In summary, while preliminary analysis has been performed by the CATF, and reflected in the final report, there are still significant gaps that need to be addressed before a full understanding of available decarbonization technologies and their associated costs and impacts can be fully understood.

Recommendation: The City Council should commission an independent, third-party analysis that identifies and addresses gaps in the CATF's data analysis, provides impact analysis of each proposed measure, and comprehensively maps the costs and benefits of recommendations across a set of uniform criteria.

The CATF's final report provides a starting point from which we may begin to better understand the opportunities and challenges associated with Resolution 2018-06. This analysis might be treated as the first step of an ongoing process to determine with recommendations provide the great benefits and which may result in unintended consequences. The scope and depth of these outcomes has not yet been fully examined. As acknowledged in the final report:

> *Although implementation costs may be more apparent and quantifiable for some measures once project assumptions are finalized, additional analysis needed to research the triple bottom line plus criteria are a much more complex undertaking. This would include analysis that compares both upfront and long-term costs with immediate and long-term benefits. This analysis will require significant time and resources to produce meaningful evaluations. This is especially true because some of the measures below could in fact be substitutes for one another, with some measures only being considered after others are analyzed and ruled out (76).*

Cascade agrees that significant time and resources will be needed to provide a full assessment of the final report. We recommend the use of an independent third-party evaluator, selected by an ongoing Climate Action Oversight Committee that incorporates representatives from the low-income, business, minority, environmental and utilities sectors. Such an evaluator would provide a full analysis of the costs, benefits and alternatives to each recommendation offered by the CATF before such measures are translated into policy. This is similar to the recommendation on page 14 of the final report that the City of Bellingham should "immediately commission its own study on the consumer and emissions impacts of electrifying residential and commercial buildings in Bellingham."

In addition to emissions impacts, the economic burden on residents and small businesses could be considered. Furthermore, a baseline inventory of existing space and water heating equipment could be developed, and an evaluator could offer guidance on whether blanket-electrification across all homes and businesses is the optimal pathway forward, or if a low-carbon pathway utilizing natural gas equipment, renewable natural gas, and offsets makes more sense under certain conditions. A comprehensive inventory could be taken of the types of gas and electric space and water heating equipment currently available to the Bellingham market. The current penetration rate for these equipment types could be taken into consideration, along with the source efficiency, measure life, total installed cost, and operational and maintenance cost of each equipment type. The application of each

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space and water heating option would be examined by building type, size, and end-use. Such an inventory would help the City accurately assess where electrification could make the most sense, and where additional energy efficiency and carbon reduction gains can be made.

A full, independent assessment of the costs and viability of electrification would offer the City Council more comprehensive guidance on when gas-to-electric conversions are most viable. A study could also identify alternative pathways to carbon migration where gas still provides support for intermittent renewable energy. Such a study could consider the impacts to businesses and large industrial facilities currently dependent upon natural gas for their operation. Energy intensive, trade exposed facilities (EITE) would benefit from further study to help mitigate the risk of industry relocation to other communities, strain on community critical infrastructure (such as hospitals), and the growth of electric demand to unsustainable levels.

Observation #4: <u>The analysis includes unfounded claims of indoor air pollution from burning natural gas in appliances as support for electrification.</u>

CATF claims in the final report:

> *Powering homes and other buildings with electricity eliminates a significant source of indoor air pollution— carbon monoxide, formaldehyde, and other pollutants—from burning natural gas, which has been shown to increase asthma and other upper respiratory illness rates by as much as 20% and reduce indoor air quality standards below EPA outdoor air quality standards. Electric heat pumps also provide air conditioning with no additional equipment or installation costs, a significant health benefit, particularly to at risk populations, as climate change causes increasing hotter temperatures. Finally, a growing body of evidence also demonstrates the weatherization improvements such as air sealing, insulation, and improved HVAC systems can reduce asthma triggers in the home (14).*

The statements presume that combustion of natural gas contributes to negative indoor air quality (IAQ). This presumption is inaccurate. The American Gas Association (AGA) has completed extensive review of relevant literature from the U.S. Environmental Protection Agency (EPA), U. S. Consumer Product Safety Commission (CPSC), U. S. Department of Housing and Urban Development and other federal agencies. This review has not identified data, or technically-based health or safety issues, associated with properly maintained and operating gas-fired appliances, even where federal guidance of combustion emissions source control has been a focus.

The specific claim of "…indoor air pollution— carbon monoxide, formaldehyde, and other pollutants—from burning natural gas, which has been shown to increase asthma…" is unfounded in the consensus public health literature. The findings from the 2000 National Institute of Medicine, "Clearing the Air: Asthma and Indoor Air Exposures," do not support the CATF's claims and the National Institute of Medicine's findings have not been contradicted over time or by more recent research studies

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There are links embedded within the text of the final report where CATF appears to reference websites and studies that support the stated claims. However, upon our review of this topic with AGA, we learned that the referenced studies had significant deficiencies in the way they attempt to link health effects to the installation of gas-fired combustion appliances, particularly cooking appliances. The studies were primarily based on meta-analysis of other studies, and did not offer adequate analysis to quantify exposures of consumers to natural gas emissions or control for the presence of EPA's-recognized indoor air pollutants associated with health effects.

Upon review of the literature citations in the meta-analysis cited in the article referenced by the CATF, it was found that none of citations presented sufficient causative associations that would link use of these appliances to asthma or other respiratory illnesses. As a result, the CATF's claims of natural gas indoor air pollution were based from unproven analysis focused on natural gas cooking appliances. This flawed study was then applied to other technologies to justify the elimination of natural gas space and water heating equipment (as opposed to natural gas cooking appliances which the study more clearly addresses). This raises questions regarding how such studies were applied to the conclusions of the final report.

Issues of indoor air quality as claimed by CATF deserve more earnest and careful public exchange and should be referred to cognizant public health agencies and experts. The CATF position on indoor air quality, particularly associated with installation and use of residential gas cooking appliances, is not justified in any case.

Recommendation: The City Council should carefully review the source and methodology of all studies cited in the final report to ensure that policy decisions are based from well-vetted research and demonstrable claims.

Policy recommendations are most impactful when grounded in substantiated analysis. Unfortunately, some of the recommendations proposed by the CATF have been bolstered by studies that make serious claims about energy sources and technologies it does not support, without offering viable analysis to support these claims.

Cascade strongly encourages the City Council to conduct a thorough literature review of sources utilized in the final report to ensure that the accuracy of claims against unfavored technologies. Some considerations that should be applied to studies of natural gas health and safety impacts include:

- If the emissions of NO2 in natural gas appliances were measured;
- If the incremental contribution of gas appliance emissions were controlled relative to other sources of NO2;
- If other known asthma or respiratory illness agents were measured or controlled for;
- If cooking activity patterns were included in emissions associations and concentration data;

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- If analysis accounts for covariant factors affecting either airborne contaminants or health effects, including controlling for socio-economic status, location background air quality, and other factors including other known agents of asthma development and respiratory illness;
- If cooking process emissions, most notably concentrations of fine and ultra-fine particulates known for causing respiratory distress, were measured or otherwise included in the study;
- If underlying health conditions absent of the influence of natural gas equipment and symptoms diagnosed by qualified professionals, or were they self-reported.

These considerations are not all-inclusive and should be seen as a starting point from which a careful vetting of source data can be conducted before being applied to policy decisions.

Conclusion

Robust analysis and principled discussion are the backbone of meaningful change. Such change requires honest engagement and difficult conversations.

The CATF has taken the first step in a critical ongoing conversation about the role individual communities play in the fight against climate change. Climate action plans, such as the Bellingham's, are essential to offering local pathways to addressing global problems. We commend the City's commitment to this endeavor.

Cascade's observations on the pathways offered by the CATF have been offered as a member of the Bellingham energy community. We care about the future of our city. We also recognize that it's easy to express concerns, but perhaps more essential to offer solutions.

While Cascade Natural Gas has a history of robust partnership across our Washington and Oregon communities, we also recognize the need to dig deeper in support of local climate initiatives. We have and will continue to deliver on our environmental commitment to our customers via energy efficiency, weatherization, and market transformation initiatives. We also hope to work with the City to develop potential pathways forward for natural gas offsets and renewable natural gas efforts.

It will take all of us working together to develop the solutions necessary to ensure a vibrant and healthy community for future generations. We hope that the next phase of climate action invites the full community to provide input to determine actions that can be taken today, and those that require further development. We also believe there is value to commissioning an independent evaluation to verify Task Force findings and perform a full cost and impact analysis on the measures identified in the report.

In conclusion, Cascade encourages the following steps in support of the City's proposed pathway to decarbonization:

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- The City Council has an opportunity to elevate recommendations that directly reflect the guidance of Resolution 2018-06. This ensures a focus on measures that are both viable and impactful to the City's climate ambitions.

- Participation in the next phase of the Climate Action Plan could be broadened to ensure the plan meets the needs of the full community, and that primary source data is effectively integrated.

- An independent, third-party analysis could help identify and address gaps in the CATF's data analysis, provide impact analysis of each proposed measure, and comprehensively map the costs and benefits of recommendations across a set of uniform criteria.

- Review of the sources and methodology associated with the studies cited in the final report would help ensure policy decisions are based from a solid foundation of well-vetted analysis.

Cascade appreciates the City Council's time and consideration of our recommendations. We look forward to working with the City on a viable pathway to decarbonization.