



Eugene City Council

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EUGENE CITY COUNCIL AGENDA

July 25, 2022

5:30 p.m. CITY COUNCIL WORK SESSION

As the state and community recover from the COVID-19 pandemic, City Council meetings will continue to be held in hybrid format using in person and virtual meeting technology. Information about online or other options for access and participation will be available at <https://www.eugene-or.gov/3360/Webcasts-and-Meeting-Materials>

**Meeting of July 25, 2022;
Her Honor Mayor Lucy Vinis Presiding**

Councilors

Claire Syrett, President
Mike Clark
Randy Groves
Jennifer Yeh

Matt Keating, Vice President
Greg Evans
Emily Semple
Alan Zelenka

5:30 p.m. CITY COUNCIL WORK SESSION

1. WORK SESSION: BUILDING ELECTRIFICATION FOLLOW-UP

The Eugene City Council welcomes your interest in these agenda items. This meeting location is wheelchair-accessible. For the hearing impaired, an interpreter can be provided with 48 hours' notice prior to the meeting. Spanish-language interpretation will also be provided with 48 hours' notice. To arrange for these services, contact the receptionist at 541-682-5010. City Council meetings are telecast live on Metro Television, Comcast channel 21, and rebroadcast later in the week.

El consejo de la Ciudad de Eugene agradece su interés en estos asuntos de la agenda. El lugar de la reunión tiene acceso para sillas de ruedas. Se puede proveer a un intérprete para las personas con discapacidad auditiva si avisa con 48 horas de anticipación. También se puede proveer interpretación para español si avisa con 48 horas de anticipación. Para reservar estos servicios llame al 541-682-5010. Las reuniones del consejo de la ciudad se transmiten en vivo por Metro Television, Canal 21 de Comcast y son retransmitidas durante la semana.

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EUGENE CITY COUNCIL AGENDA ITEM SUMMARY



Work Session: Follow-Up to Potential Code Changes to Require that
all New Construction be Electric-Only Beginning January 1, 2023.

Meeting Date: July 25, 2022
Department: Planning and Development
www.eugene-or.gov

Agenda Item Number: 1
Staff Contact: Lydia Bishop
Contact Telephone Number: 541-682-5482

ISSUE STATEMENT

The purpose of this work session is to follow up on City Council's April 13, 2022 discussion, which was initiated to discuss needed changes to City code to require all newly constructed residential, commercial, and industrial buildings be electric-only beginning January 1, 2023.

BACKGROUND

At the April 13, 2022 meeting, staff indicated that requiring electric-only buildings may be achieved through a local code amendment by adding language to Eugene Code Chapter 6. An amendment to Chapter 6 would follow the City Charter-mandated ordinance adoption process for non-land use ordinances. These standard procedures require newspaper notice and at least one public hearing prior to adoption. If exceptions were permitted in some construction types or specific uses, the path for a local code option is less clear and may trigger a State building code amendment.

The Council had a robust discussion that resulted in several questions, many not specific to a code amendment process. Additional questions were subsequently emailed to staff. Attachment A addresses these questions, except for those related to the infeasibility of some types of structures to be electric-only. Attachment B specifically addresses the questions related to infeasibility. As addressed in other communities where similar requirements have been adopted, this concept is captured as an "infeasibility waiver". Such a waiver could provide a path to continue utilizing fuel gasses for those buildings or uses for which an electric-only option is infeasible. Attachment C is an attachment to the Council Questions and Responses, capturing the information provided by EWEB.

As noted in Attachment B, low-density residential construction does not require an infeasibility waiver because homes can be, and in some cases currently are being, built using electricity only.

At the July 20, 2022 work session, the Council will receive an overview of the "City of Eugene Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use: Part 1 Residential--Draft". This report indicates that single family homes are the largest sources of emissions for residential construction. Space conditioning (heating / cooling), water heating and cooking end uses represent the largest sources of emissions. For homes with pools, natural gas use increases on average by 25%, with hot tubs adding another 8%.

If the Council chooses to discuss an infeasibility waiver for commercial and industrial buildings, some considerations may be:

- Under what circumstances does the City receives requests for a waiver;
- What evaluation criteria would be utilized for approval;
- What is the appeal processes for those that are denied the waiver;
- Is there an appeal process for approval of a waiver;
- Is there a public processes to engage commercial and industrial businesses.

PREVIOUS COUNCIL DIRECTION

[November 17, 2021](#)

Council passed the following motions:

1) Direct City Manager to schedule a work session to discuss changes to City code that would require all newly constructed commercial and residential and industrial buildings be electric- only beginning January 1, 2023.

2) Direct City Manager to provide council with a roadmap for how the city can achieve decarbonization of the existing commercial and residential building stock by 2045, with particular consideration for how low income and historically marginalized households will be impacted and included in this process. This roadmap must include strategies for decarbonization of rental housing stock. A draft of this roadmap shall be provided to council before June 30, 2022.

[April 13, 2022](#)

On April 13th City Council held a work session on providing a code path for all new buildings to be electric -only. At that meeting, Council passed the following motion:

Direct the City Manager to schedule the next work session on this topic before July 31, 2022 to answer the questions brought forth in this work session and other questions submitted by Councilors.

COUNCIL OPTIONS

This work session is for informational purposes.

ATTACHMENTS

- A. New Building Electrification – Council Questions and Responses
- B. Infeasibility Waiver
- C. EWEB Memo Responses to City of Eugene Electrification Questions

FOR MORE INFORMATION

Staff Contact: Lydia Bishop
Telephone: 541-682-4852
Staff E-Mail: LBishop@Eugene-or.gov

New Building Electrification – Council Questions and Responses

1. Safety: A single energy type is a single point of failure vulnerability. How do we mitigate that? (Groves)

Please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #12, in Attachment C to this AIS, for related information.

Additionally, use of battery backups, such as the Tesla Powerwall and Generac PWRCell will likely reduce in cost over time and may be a viable solution for backup power to supply an all-electric home. Likewise, Vehicle to Home (V2H) technology is advancing that would let electric vehicles provide power back to homes, essentially as a mobile battery backup solution. The 2022 Ford-150 Lightning is an example of a vehicle system designed to act as a battery power source when needed. Ford claims the vehicle would be able to provide backup power from 3 to 10 days depending on draw. <https://www.ford.com/trucks/f150/f150-lightning/features/intelligent-backup-power/>

2. Has an economic impact analysis been done on the effects of banning natural gas infrastructure and hook-ups? (Groves)

An economic analysis of prohibition of natural gas across all sectors has not been done for Eugene.

3. What effect will drought and federal policy to preserve salmon runs have on one of the northwest's largest renewable energy sources which is hydro-electricity? (Groves)

Please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #7 and #8, in Attachment C to this AIS, for related information.

Additionally, more information from the U.S. Energy Information Administration on the effect of drought from 2016 to 2021 on hydroelectric electricity generation in the Western US can be found here: <https://www.eia.gov/todayinenergy/detail.php?id=51839>

4. What effect will this have on our overall energy portfolio as we start to put more demand on a reduced supply? (Groves)

Please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #10, in Attachment C to this AIS, for related information.

5. 60% of all electric on our national grid is produced by fossil fuels. What effect will the reduction of the west coasts hydro-electric generation capacity (described previously) have on this percentage? (Groves)

Please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #11, in Attachment C to this AIS, for related information.

- 6. Concerned about electricity cost volatility. In the northwest we have benefited from reasonably priced electric due to hydro-electric generation but as that diminishes what is that going to do to our costs going forward. Wondering if there is a way to analyze the impact of the reduced hydro-electric capacity and how it will impact costs for electricity. (Groves)**

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #9, in Attachment C to this AIS, for related information.

- 7. Asked for confirmation that a city requirement that new buildings are all electric does NOT conflict with State regulations. (Syrett)**

As discussed at the work April 13, 2022 work session, staff indicated that after consulting with the City Attorney, staff believes that a local prohibition on natural gas infrastructure in a new building would not be preempted by Oregon statute and can be achieved by amending City Code Chapter 6. However, there is no precedent in Oregon for such a path and therefore no certainty that there wouldn't be a challenge to local adoption.

- 8. Concerned about costs and reliability. What was the cost at Echo Hollow to add the capacity for electrical heating of the pool? Would like to see the "schedule of values" for what we paid to create that hybrid system? (Clark)**

Given Council's direction to reduce energy use and GHG emissions, the decision was made early in the design process to include the heat pump chiller as part of the base project scope. Although there was no detailed cost analysis between a gas and electric system, the electrical service upgrade to the facility was a significant part of the additional cost for the heat pump system. The mechanical and electrical components were approximately \$780,000 in direct costs for the heat pump chiller and associated hydronic systems and about \$295,000 to upgrade the electrical service. Since the budget was smaller for the Sheldon Pool project, a more thorough analysis was performed to determine if a heat pump chiller could be included in the scope of work. The increase in the Sheldon project budget to add the heat pump chiller and related equipment was \$203,477.

- 9. Did we do an analysis of what it would cost to convert to 100% electric vs the hybrid system for the Echo Hollow facility? (Clark)**

Since the existing gas boiler at Echo Hollow still had useful life, it made economic sense to retain the equipment for peak loads and possible electrical outages. An all-electric boiler would have required an extremely large 2,000 amp electrical service, which was not feasible given the overall project scope. No further analysis or estimating was performed on that option.

- 10. Referenced Solarc study done in 2017 - Would like to know what the cost difference would be in today's economic environment compared to the 2017 estimates of ten-million dollars to convert several city facilities to a hybrid system. (Clark)**

The high-level budget estimates provided in the 2017 Solarc report were based on specific strategies and equipment design. The report provided three paths – lowest first cost, lowest number of projects and lowest risk as options to consider. While Facilities has made substantial

progress reducing energy use and GHG emissions through natural gas conversion/electrification projects, LED lighting upgrades and retro commissioning work as recommended in the report, a number of different paths and strategies have been followed to accomplish this work. Given the hybrid approach taken and market changes, it would be difficult to provide an updated estimate based on the various options outlined in the initial report. However, Facilities is planning to update the Solarc report to reflect completed projects, current trends, and progress toward the City's climate recovery goals soon.

11. Can we implement a robust community engagement process (similar to middle housing) for defining transition after we set a target date? (Yeh)

As discussed at the April 13 2022 work session, a community engagement process could be designed. Currently there isn't a funding source identified for a robust community engagement process like the middle housing project. The engagement process would impact the adoption date of any new regulations.

12. Has staff looked into the idea of an infeasibility exception? (Yeh)

Attachment B to the AIS contains a discussion on the infeasibility exception.

13. Is the consultant "Good Company" capable of helping to define exceptions? (Yeh)

As discussed at the April 13, 2022 work session, defining exceptions is not part of the scope of the Decarbonization of Existing Buildings study. However, data from the report will help inform discussions on electrification.

14. In reference to bullet point #3 from the Good Company slide: where is the financial assistance going to come from and how would that program work? Are we placing too large of a burden on residents to make a transition that is cost prohibitive? (Evans)

As discussed at the April 13, 2022 work session, the Good Company study will probably include the need for financial assistance and may have some paths for that, but that study is focused on transition of existing systems.

Please see the "Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use Part 1: Residential—Draft" report from the July 20, 2022 work session for information on natural gas use in residential buildings, potential priorities for electrification, and reference to existing programs and gaps in assistance for low-income renters and home owners.

15. What have we done in terms of looking at other alternative energy sources such as solar and wind, in order to have a mix of options to transition to? (Evans)

At the April 13, 2022, work session, staff indicated the need to define if we are banning all fuel sources except for electricity or do we want to allow for a mix of energy sources.

For information on EWEB considerations, please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #13, in Attachment C to this AIS, for related information.

16. If we decided to implement "no gas" or "electric only" beginning in 2023, would that apply to projects that start in Jan 2023 or would it apply to existing projects? (Evans)

As noted at the April 13, 2022, work session, typically, new rules would not apply to projects submitted prior to the effective date of the rules.

17. Will gas pipes still be put in streets during construction projects? Example = Riverfront project. Pipes are there even though not yet sure what the requirements will be or what the total project will include. (Semple)

At the April 13, 2022 work session, staff noted that it would depend on the project and purpose (new development vs maintenance of existing infrastructure)

Additionally, the conceptual changes to code presented by staff at the April 13th work session would affect whether natural gas could be used in certain building types, or for certain uses within building types. These conceptual changes would not limit construction of natural gas infrastructure in the rights-of-way. Council could elect to direct to the City Manager to explore restriction of expansion of natural gas infrastructure in the rights-of-way.

18. How many of the newly constructed commercial buildings are office buildings vs food/beverage/industrial sector? (Keating)

This is difficult to determine this from the information currently collected in Eugene's permitting system. Uses are classified into "occupancy" categories that group together uses with similar fire & life-safety concerns, and those occupancy categories can be very broad. For example, "B-Occupancy" buildings include office buildings, but also professional services (like a barber shop), small restaurants, adult education, and out-patient medical clinics. Small restaurants and large restaurants are classified differently. Also, many new buildings are mixed-use. Eugene's permit system currently tracks the occupancy classification(s) of buildings because that is important for building code application, but not the more specific uses. Therefore, the information requested is available.

19. Attachment B - Encinitas: There is language about situational exemptions for restaurants, essential services and special projects. Is that similar to the feasibility waiver suggestion? (Keating)

Attachment B to the AIS addresses the multiple related questions regarding infeasibility of, or exceptions to, an all-electric requirement.

20. What is included in commercial? Clarification on definition of "commercial" because it seems to be a very broad category. (Vinis)

“Commercial” or “residential” in our permitting terminology is determined by which building code applies to the structure. A commercial building is any building that falls under the scope of the Oregon Structural Specialty Code (OSSC), and a residential building is any building under the scope of the Oregon Residential Specialty Code (ORSC). So “residential” means one- and two-family dwellings and townhouses. And “commercial” is essentially everything else, including multi-family.

21. Industrial - Can we look at the industries where electric only is feasible? (Vinis)

Part 3 of the “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use” report will provide information to help inform discussion about the ability to decarbonize the industrial sector which will also provide insight into the barriers and opportunities for new industrial buildings to be electric only or to restrict use of fossil fuels.

For information from EWEB on which non-fossil technologies and fuels exist now, or may soon, for industrial processes, please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #14, in Attachment C to this AIS.

22. What fuel will generators be able to use? (Groves)

Emergency or standby generators are typically fossil fuel burning and either equipped with a diesel fuel tank or connected to a natural gas supply. If Council chooses to limit the ability for certain building uses to use natural gas within the building, there could be options for external generators to be powered by gas. If Council chooses to limit the specific end uses of natural gas within buildings (which could require application to the State for a local building code amendment as described in OAR 918-020-0370), the ordinance could include an exception specifically for emergency or standby generators as has been done in some other cities.

Also, diesel fuel is classified as either a flammable or combustible liquid and not a fuel gas, and therefore would not be subject to a fuel gas prohibition.

23. How much has been spent on gas at Echo Hollow? (Groves)

\$42,000 was spent on natural gas at Echo Hollow during the first year of use after the expansion. However, energy models estimate the use will be about half, or \$20,000 per year, once the systems are tuned in and operating as designed. For reference, previous natural gas use at Echo Hollow cost approximately \$60,000 per year for much smaller outdoor aquatic space.

24. Is the infeasibility assessment already part of the state law or is that something that the City would be implementing? (Clark)

Staff noted during the April 13, 2022 work session that this have would have to be included in city ordinance. There is currently no “infeasibility assessment” defined at the state level.

Attachment B to the AIS addresses the multiple related questions regarding infeasibility of, or exceptions to, an all-electric requirement.

25. Does the infeasibility assessment take into account changing conditions such as temperature? (Clark)

As noted during the April 13, 2022 work session, from what we have observed in other jurisdictions there is similar yet inconsistent language to deal with that. It would have to be included in the ordinance and done in a way that has objective criteria.

For information from EWEB on impact of changing temperatures on EWEB's electrical consumption, please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #4, in Attachment C to this AIS.

26. The HB2021 that required electric utilities to be 100% clean by 2040 did not include EWEB. Can staff find out what EWEB's plan is? (Zelenka)

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #3, in Attachment C to this AIS, for related information.

27. Does "all new buildings" or "all newly constructed buildings" referred to in Attachment B of our April 13th AIS, include industrial sector buildings, or does it generally refer only to residential and commercial building envelopes, or does it also include the equipment used inside the buildings? (Zelenka)

Attachment B included with the AIS for the April 13, 2022 work session listed examples of California cities that have adopted some form of a fuel gas prohibition. The scope of the prohibition varies by city. In cities that reference "all buildings" it generally means either all newly constructed buildings of all types, or all buildings that are covered under the California energy code (which does not cover certain uses, for example research laboratories or jails). Where cities have included all buildings under a prohibition, they typically have exceptions for specific end uses, where it is determined that all-electric is infeasible, or when allowing gas infrastructure is determined to be in the public interest.

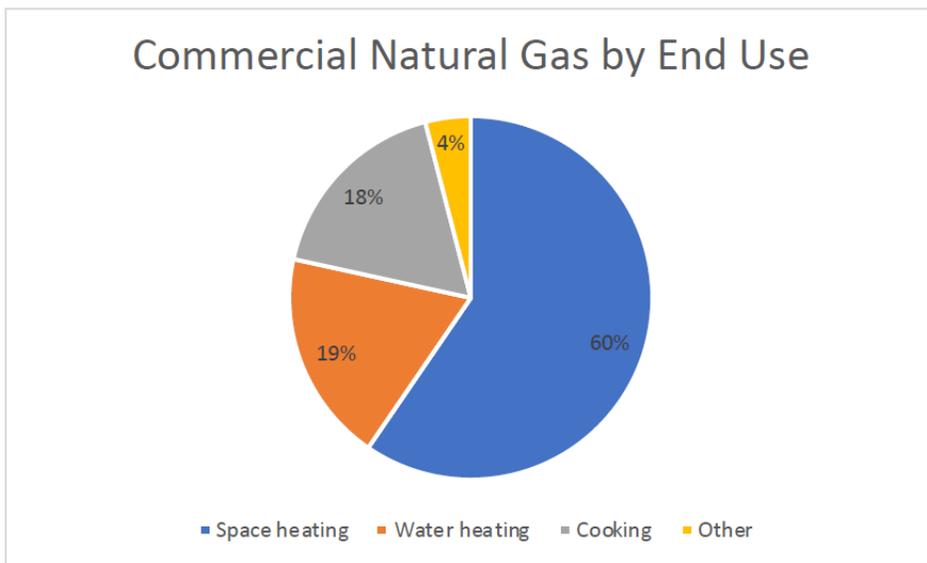
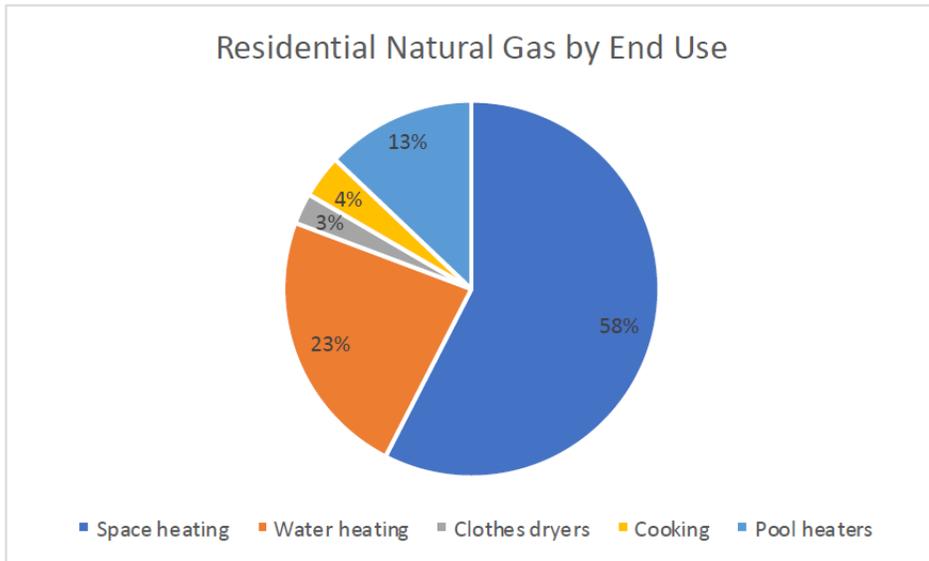
28. How does this apply to what is inside a building vs the building itself? Specifically, commercial/industrial processing equipment? (Zelenka)

Applicability and scope of a prohibition would need to be determined by Council and included in an ordinance. Attachment B to the AIS addresses approaches taken by other cities regarding applicability of a prohibition and infeasibility of, or exceptions to, an all-electric requirement. This will include examples of how other jurisdictions have addressed building service equipment (for space heating, water heating etc.) vs. other process equipment.

29. Requested a breakdown of the percentages of natural gas emissions that are coming from fireplaces and how much comes from cooktops. (Zelenka)

We do not have specific information to share on Eugene's use at this time but can share information on national trends for natural gas use.

The information in these figures is taken from the U.S. Energy Information Administration’s 2015 Residential Energy Consumption Survey and 2012 Commercial Energy Consumption Survey and show the U.S. average natural gas consumption by end use. The figures were generated by Good Company for the City of Eugene in July 2020.



We were not able to find the breakdown of the percentage of natural gas used specifically for fireplaces.

30. What is the projection for new buildings in the commercial and industrial sector and their projected natural gas use? (Provide a forecast of how natural gas will be used and how much) (Zelenka)

The following figures, showing projections of natural gas use in Eugene, were generated by Good Company for the City of Eugene in January 2021. These figures will be updated when the

Northwest Natural Gas Integrated Resource Plan to meet Oregon Climate Protection Plan goals is released later this year.

Figure 1: Estimated natural gas GHGs through 2037 by residential and commercial sectors.

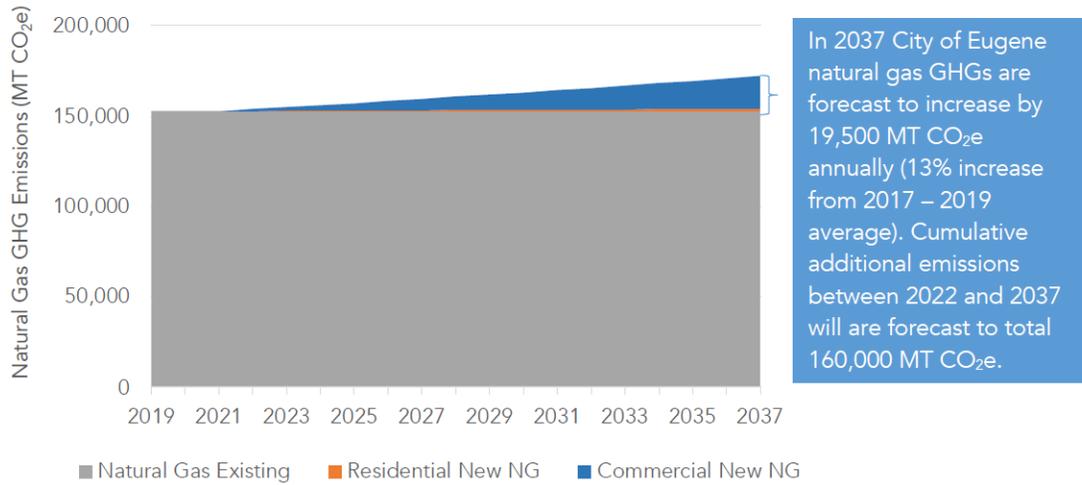
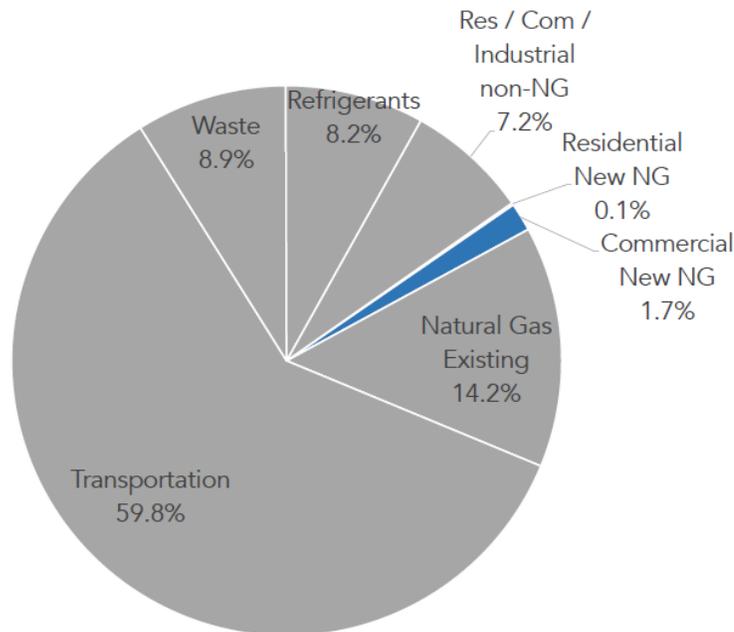


Figure 2: New Res. & Comm. natural gas GHG emissions in 2037 compared to other sources.



For information on EWEB considerations, please see EWEB’s July 8th memo, “Responses to City of Eugene Electrification Questions” FAQ #18, in Attachment C to this AIS, for related information.

31. What is the definition of "infeasible"? Is it economic or technical? (Zelenka)

Attachment B to the AIS addresses the multiple related questions regarding infeasibility of, or exceptions to, an all-electric requirement.

32. In the event of electrical system failure, is there a back-up energy source that is not based on fossil fuels? If there is, how do we get to a point where we can implement use? (Evans)

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #15, 16 and 17, in Attachment C to this AIS, for related information.

Additionally, please see the response to question number 1 for information related to residential scale battery backups for electrical systems.

There are a number of renewable fuels that could be used as backup energy sources depending on availability and the system providing backup power.

[Renewable diesel](#), which is currently available in the northwest for transportation uses, is made from biomass or waste organics and can be used in diesel generators interchangeably with fossil fuel-based diesel.

Renewable propane is a by-product of the creation of renewable diesel. It is currently available in the northwest but is currently primarily used for transportation purposes driven by the Oregon Clean Fuel Program. Renewable propane is typically blended with the overall supply of propane in a supplier's inventory, so a purchaser would not be receiving a physical product that is solely renewable.

Renewable natural gas (RNG) is typically generated by processing waste methane into commercial grade natural gas. An example of renewable natural gas generation is the [RNG project](#) at the Metropolitan Wastewater Management Commission wastewater treatment plant in Eugene. Renewable natural gas is typically blended with the overall supply of natural gas in a supplier's system, so a purchaser would not be receiving a physical product that is solely renewable.

33. How do we best address businesses that need natural gas to be able to make their business run? What does that exemption look like? How does it work? How do we build it in a way that will take advantage of changes in technology in the future? (Evans)

Information on how other cities have addressed some of these issues through applicability of a gas prohibition, exceptions to the requirements, and infeasibility waivers is included as Attachment B to the AIS.

34. Is NW Natural filing a law suit to stop an administrative order? (Yeh)

On March 18, 2022, a collation of regulated gas utilities in Oregon, including NW Natural, filed a petition seeking judicial review of the rules adopted by the Oregon Environmental Quality Commission on December 26, 2021 with the Oregon Court of Appeals. These rules require the reduction of greenhouse gas emissions of 50% by 2035 and 90% by 2050 from a baseline between 2017 and 2019 for regulated gas companies.

NW Natural published a letter in March 2022 to customers concerning this action which can be found [here](#).

35. If council were to direct staff to draft an ordinance that all new residential construction in Eugene is 100% electric, solar or thermal beginning in 2023; could we then ask for additional work sessions and code amendments to address commercial and industrial with considerations for local exemptions? (Keating)

As noted at the April 13, 2022, work session, this is possible. Staff would need some time to determine if including solar and thermal language is getting more complex and might trigger State building code amendments.

36. Are hospitals permitted in the same way as residential and commercial or do they have a special process? (Syrett)

Staff noted at the April 13, 2022, work session that hospitals are permitted in the same way as other commercial development.

37. What percentage of Oregon's electricity is generated by fossil fuels? (Groves)

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #6, in Attachment C to this AIS, for related information.

38. Will this percentage change with the drought and federal policy effecting hydroelectric generation capacity? (Groves)

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #7 and #8, in Attachment C to this AIS, for related information.

39. How much greenhouse gas (as a percentage) does Eugene produce in comparison to the state of Oregon, the United States, the world? (Groves)

Eugene's 2019 sector-based GHG emissions total just over 1 million MT CO₂e. The State of Oregon's 2019 sector-based emissions at approximately 65 million MT CO₂e. The US 2019 sector-based emissions at approximately 6.5 billion MT CO₂e. The world 2019 sector-based emissions were approximately 36.7 billion MT CO₂e.

Based on these numbers Eugene's sector-based greenhouse gas emissions are approximately 1.5% of total Oregon emissions, 0.015% of U.S. emissions, and 0.0027% of world emissions.

40. If we ban future gas infrastructure and connections, what percentage of greenhouse gas do we stop – as a percentage – from entering the atmosphere over 10 years, 20 years, 30 years? (Groves)

Currently, we do not have forecasting on natural gas emissions from new buildings that meet these specific timelines. Information provided in response to question 29 does provide

forecasted cumulative natural gas emissions from new residential and commercial buildings between 2022 and 2037 which was estimated to be 160,000 MT CO₂e.

41. If we eliminate all existing use of natural gas in existing commercial and residential buildings, what effect will this have on Oregon’s greenhouse gas, the United States, the world? (Groves)

Eugene’s 2019 sector-based GHG emissions for natural gas use in buildings total just over 267,000 MT CO₂e (86,192 MT CO₂e residential, and 180,839 MT CO₂e commercial and industrial).

Based on these numbers Eugene’s sector-based greenhouse gas emissions from natural gas used in buildings are approximately 0.41% of total Oregon emissions, 0.0041% of total U.S. emissions, and 0.0007% of total world emissions.

42. Could we see some comparisons of larger industrial buildings of the cost between having access to natural gas verses being required to fully electrify? (Groves)

Costs to electrify industrial processes would be very dependent on use. More information will be available in part 3 of the, “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use” report.

43. What percent of the total amount of GHG emissions, identified in the CAP 2.0 that Eugene needs to reduce to meet our goal, come from future new natural gas residences? What percent comes from future new Commercial use? What percent comes from new Industrial use? (Zelenka)

Needed reductions to meet CAP 2.0 goals specific to new residential, commercial, and industrial building types have not been calculated. The CAP 2.0 currently identifies 254,000 MT CO₂e in reductions to building emissions by 2030 of which the CAP 2.0 currently contains actions to reduce approximately 75,000 MT CO₂e.

The response to question 29 provides information on projections of natural gas use in Eugene, generated by Good Company for the City of Eugene in January 2021, that shows the scale of projected emissions from existing building stock compared to new building stock between 2022 and 2037.

44. What is the percent of future GHG emissions that comes from residential natural gas fireplaces? From residential natural gas cook tops? (Zelenka)

See responses to questions number 29 and 30.

45. What are the projections for the total number of future new buildings in the commercial and industrial sectors that are expected to use natural gas? What is the breakdown by future types of buildings? What is the projection of future GHG emissions associated with each of these types of buildings? (Zelenka)

We do not have data to answer this question at this time. This summer Northwest Natural is expected to submit their draft Integrated Resource Plan (IRP) to meet the Climate Protection Program goals. The IRP data should have additional information identifying projected emissions from new construction that can be used to help answer this question.

- 46. What is the definition of "infeasibility" that is used in some other city's ordinances for new commercial and industrial facilities? Is it technical infeasibility, economic infeasibility, or either? Would there be a threshold for economic infeasibility, or would it simply be determined infeasible if the lifecycle cost of the electric option is higher than the natural gas option? (Zelenka)**

Attachment B to the AIS includes a detailed discussion of options the Council could consider regarding an infeasibility exception. In looking at other cities with gas prohibitions, there is no single answer for these specific questions. Criteria for evaluating infeasibility would need to be developed based on Council direction.

- 47. How would the infeasibility determination process actually work? Who would do the evaluation of infeasibility and how much time would it require? Would we need to become, or hire experts, on applicant businesses to do this analysis? Would this require additional staff? (Zelenka)**

Attachment B to the AIS is included with a detailed discussion of options the Council could consider regarding an infeasibility exception. Answers to these specific questions are unknown at this point and will depend on Council direction.

- 48. How would we ensure this infeasibility determination process is not an overly burdensome or bureaucratic process on businesses, such that the applicant businesses does not just go somewhere else, and thereby accomplishing no GHG emission reductions? (Zelenka)**

Attachment B to the AIS is included with a detailed discussion of options the Council could consider regarding an infeasibility exception. The answer to this question is unknown at this point and will depend on Council direction.

- 49. What are some of the potential unintended consequences of implementing a no new fossil fuel hook-up ban? For instance, the National Fire Protection Association (NFPA) analysis states that electric fires from cooking, per million households, is 2.6 times that of natural gas; and that resulting deaths from cooking fires from electricity is 3.5 times more than natural gas, and injuries are 4.0 times more (referenced PDF attachment: NFPA Research Home Cooking Fires by Marty Ahrens July 2020) (Zelenka)**

As identified in this question, there are likely to be potential unintended consequences from regulation of fuel types for buildings in addition to previously identified potential positive and negative impacts. While the answers provided in this document address a number of questions related to potential impacts of electrification of new buildings an exhaustive list of potential unintended consequences has not been compiled.

50. Could we include provisions in the ordinance that would require all new buildings be "Ready for the Future"? Meaning, could we require all new residential homes to be "EV Ready" by including conduit for wires, and a panel? Could we also have them be "Rooftop Solar Ready" by including conduit for wiring to the rooftop and access to the electricity panel? (Zelenka)

Electrification: In some other cities with prohibitions on gas infrastructure in new buildings if an exception is granted and gas is allowed to be installed, due to infeasibility or other reason, the newly constructed building must nonetheless have sufficient electric capacity, wiring and conduit to facilitate future full building electrification.

Electric Vehicle (EV) Ready: Oregon Administrative Rule 918-460-0200 was recently adopted to implement EV charging requirements under HB 2180 and ORS 455.417. The rule amends the state building code to require certain newly constructed buildings to install EV charging infrastructure at a minimum 20 percent of the vehicle parking spaces in the garage or parking area on the building's site. The requirements apply to new:

- Commercial buildings under private ownership;
- Multifamily residential buildings with 5 or more dwellings; and
- Mixed-use buildings with privately-owned commercial space and 5 or more dwelling units.

The city can increase the minimum required percentage of spaces with EV charging infrastructure through a land use process. To locally extend the EV ready requirement to new single-family homes would require application to the state for approval of a local amendment to the state building code.

Solar Ready: Executive Order No. 17-20 directs Building Codes Division (BCD) to amend the state building codes to require that new residential buildings are "ready for the installation of solar panels" by Oct. 1, 2020, and new commercial buildings by Oct. 1, 2022. The current residential code went into effect Oct. 1, 2020 and includes solar-ready provisions in the Energy Efficiency section. The next edition of the commercial code is set to be adopted Oct 1 of this year. An application to the state for approval of a local code amendment would be required to adopt local solar-ready requirements that differ from the statewide codes.

51. Given approximately 50% to 60% of the PNW region's peak heating load comes from natural gas, how could the idea of dual fuel heating systems, as suggested by Frank Lawson EWEB General Manager, be used to reduce GHG emissions as we transition to a fossil free future? What might be the benefits and cost from such an approach? (Zelenka)

Please see EWEB's July 8th memo, "Responses to City of Eugene Electrification Questions" FAQ #5, in Attachment C to this AIS, for related information.

52. What are the equity and economic concerns and considerations of transitioning the approximately 30,000 natural gas users in Eugene, where approximately 50% to 60% of those Eugeniens are low-to-moderate-income not well equipped financially to handle the transition

to electricity? What is the range of total costs estimates for this complete transition? What might be the sources of funding for paying for transitioning these people? (Zelenka)

Please see the “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use Part 1: Residential—Draft” report from the July 20, 2022 work session for information on natural gas use in residential buildings, potential priorities for electrification, and reference to existing programs and gaps in assistance for low-income renters and homeowners.

53. What are the types of existing building stock in the commercial and industrial sector that use natural gas? What percent and amount of nature gas emissions that come from each type of building type? (Zelenka)

Parts 2 and 3 of the, “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy”, report, expected to be completed in the fall, will have information on use of natural gas in commercial and industrial buildings

54. SB 1518 Task Force on Resilient and Efficient Buildings. This 2022 short-session bill established a task force, with membership appointed by the Senate President and House Speaker, and chaired by members of the Oregon House and Senate. The bill requires the task force to identify and evaluate policies related to building codes and building decarbonization for new and existing buildings that would enable the state to meet greenhouse gas emissions reduction goals while maximizing other benefits. It requires the task force to make policy recommendations to the Legislature by the fall of 2022 in time for consideration in the 2023 regular session. Mayor Vinis is on this task force. What recommendations or changes to our state energy building code could this task force (make) that would directly affect GHG emissions from future natural gas use in the residential, commercial, and industrial sectors? How might these recommendations or changes impact building electrification in Eugene? (Zelenka)

The Task Force on Resilient and Efficient Buildings created by SB 1518 is exploring potential policy options related to existing and new buildings in a number of categories, including envelope, heating and cooling, renewables, electric, consumer products, and other. The work of the task force is still in process and specific recommendations and how they would affect natural gas use and building electrification are not yet known.

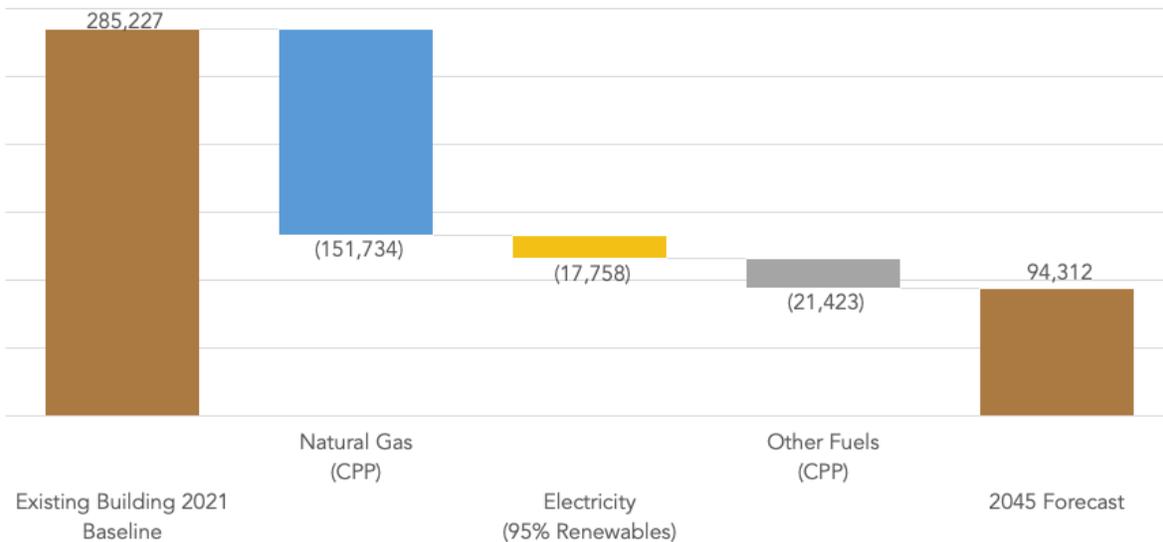
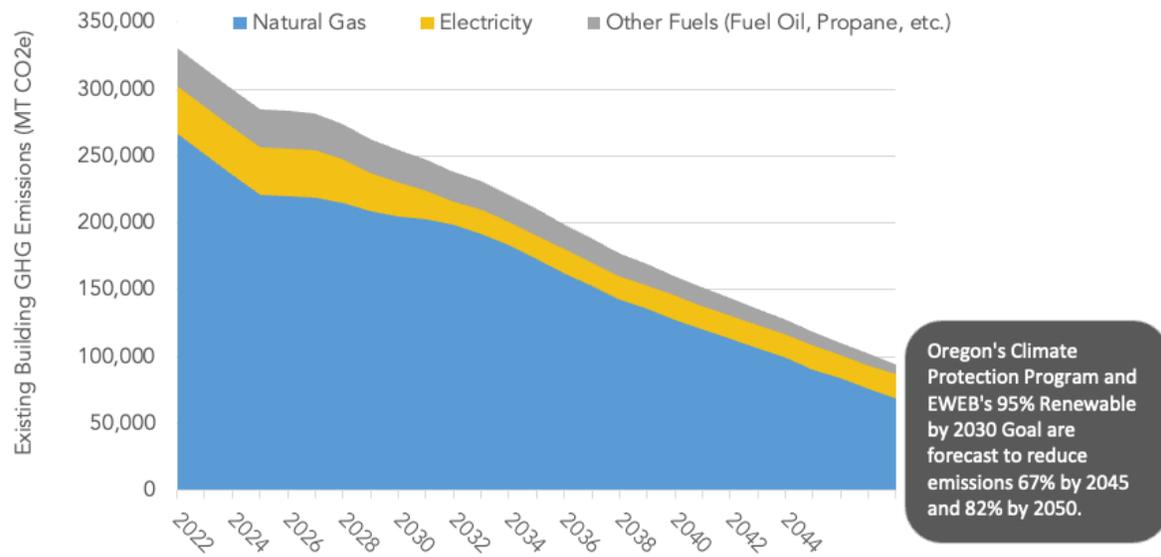
55. Climate Protection Program (CPP). The CPP became law in January 2022. This program was put in place in lieu of the legislature failing to pass a cap-and-trade law. The CPP took DEQ almost two years to develop the rules for the new program. The CPP applies to all fossil fuel suppliers (i.e., natural gas, gasoline, diesel, and propane). Specifically, it requires all of them, and in particular Northwest Natural Gas, to reduce their GHG emissions from fossil fuels by 50% by 2035, and by 90% by 2050. This trajectory of GHG emission reductions will significantly help us meet our CRO goals and would directly impact GHG emissions from natural gas (and gasoline & diesel) in Eugene. How much of a contribution would the CPP make to meeting our CRO goals? (Zelenka)

The updated Climate Protection Program goals of reductions in greenhouse gas emissions from fossil fuel suppliers of 50% by 2035 and 90% by 2050 has not been directly assessed against Eugene’s Climate Recovery Ordinance goals but is expected to have a significant impact in reduction of Eugene’s community greenhouse gas emissions.

The “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use Part 1: Residential—Draft” report from the July 20, 2022 work session uses currently available data from Northwest Natural based on the previous Climate Protection Program goal of an 80% reduction by 2050 and which projects an 87% reduction by 2050 in fossil methane. Combined with EWEB voluntary reductions forecasted emissions from existing regulatory and voluntary policies are assumed to create projected greenhouse gas emissions reductions for buildings of 82% by 2050. These figures will be updated in the fall based on Northwest Natural’s updated draft Integrated Resource Plan to meet current Climate Protection Plan goals which is expected to be published in summer 2022.

The following figure is from page 10 of the, “Decarbonization by 2045 for Existing Residential, Commercial, and Industrial Buildings Energy Use Part 1: Residential—Draft” report from the July 20, 2022 work session.

Figure 1: Eugene's forecast emissions from existing regulatory and voluntary policies



56. Roadmap to 2035. The Roadmap to 2035 is a plan being developed by the Oregon Global Warming Commission to identify the specific additional actions Oregon would need to take to meet our statewide GHG emission reduction goals. These actions would be on top of all the recent actions already taken by the Governor and Legislature such as the CPP and Clean Fuels Standard. How can the Roadmap to 2035 help inform the implementation of our CAP 2.0 plan, our building electrification discussion? Would the Roadmap be able to show how much is left for Eugene to do once all the state actions have been taken? (Zelenka)

From the [Oregon Global Warming Commission website](#), "The Oregon Global Warming Commission is working to analyze and identify actions across all sectors that can reduce greenhouse gas emissions while continuing to grow Oregon's economy and enhance equity and quality of life of all Oregonians. These potential actions are to serve as inputs for consideration

by the governor, legislature, and policy makers to develop a plan for Oregon to meet its GHG emissions reduction targets, known as the roadmap to 2035.”

The Transformational Integrated Greenhouse Gas Emissions Reduction (TIGHGER) Project will gather and analyze data and perform public engagement to inform the Oregon Global Warming Commission’s Roadmap to 2035. Although the Roadmap to 2035 itself is not a regulatory document, it will layout economically viable actions that could be taken in addition to regulations already in place, to meet Oregon’s greenhouse reduction goals.

The Roadmap to 2035 would assist and inform Eugene’s own efforts in two ways. First, additional actions that are taken by the state based on the report to reduce statewide emissions would likely reduce the potential actions needed to be taken independently by the City of Eugene to meet our Climate Recovery Ordinance Goals. Secondly, the TIGHGER project will be generating cost abatement curves and other useful information that would identify the most cost-effective action that could be taken to reduce emissions and performing outreach to help inform the equity considerations of these actions. Regardless of state actions this work could be useful in informing the City of Eugene’s actions to meet our CRO goals efficiently and equitably.

The Roadmap to 2035 is expected to be completed by the end of 2022.

Infeasibility Waiver

Several questions were raised during Council's April 13, 2022 work session on Building Electrification regarding potential waivers or exceptions to a fuel gas prohibition when it may be infeasible to design an all-electric building. In looking primarily at the many California cities that have adopted some version of a gas prohibition, the various approaches taken to address this issue generally fall into five areas.

1. Limit the prohibition to uses where there are known electric options available.

Some municipalities have limited the prohibition on fuel gas to buildings or uses where it is feasible to use electricity for space heating, water heating, cooking, and clothes drying, generally considered as:

Retail, Office, Hotels, One and two-family dwellings and Low-rise residential

Factory or industrial buildings, laboratories, hospitals, restaurants, etc., where the question of feasibility would be expected to come up most often, are not included.

✓ Available as a Straightforward Option for Eugene.

If Eugene were to limit a prohibition to only single family residential buildings, for example, there would not be a need for an infeasibility exception because electric options are readily available.



2. Provide exceptions for buildings containing certain uses (i.e. hospitals, factories, research laboratories, jails), and provide the ability for an applicant to request a waiver or modification for other buildings if an all-electric design is not feasible.

✓ Available Option but Less Straightforward

The ability to request a waiver or modification would need to be included in an ordinance. Administrative rules would need to be adopted to address how the City receives requests, what evaluation criteria are utilized for approval, what the appeal processes would be needed for those that are denied the waiver, and potentially appeal options for those who question approval of a waiver



- 3. Provide exceptions for certain end uses within a building** (i.e. commercial cooking, manufacturing, or industrial processes), and provide ability for an applicant to request a waiver or modification for other uses if an all-electric building is not feasible.



? May Not be an Available Local Option for Eugene

Allowing fuel gas infrastructure to be installed in a new building but prescribing or limiting the equipment or end uses that can be served with gas is more likely to be considered as an amendment to the State building codes and subject to preemption.

- 4. Apply the gas prohibition only to end uses in a building where there are known electric options**, such as water-heating (including pools and spas), space-heating, space-cooling, cooking, and clothes drying, and provide an ability for an applicant to request a waiver or modification for cases where it is determined to be infeasible.

? May Not be an Available Local Option for Eugene

Allowing fuel gas infrastructure to be installed in a new building but prescribing or limiting the equipment or end uses that can be served with gas is more likely to be considered as an amendment to the state building codes and subject to preemption.



- 5. Apply the gas prohibition to all newly constructed buildings** unless it is determined that it is infeasible to comply, or that it is in the public interest to allow gas infrastructure.

✓ Available Option but Less Straightforward.

The ability to request a waiver or modification would need to be included in an ordinance. Administrative rules would need to be adopted to address how the City receives requests, what evaluation criteria are utilized for approval, what the appeal processes would be needed for those that are denied the waiver, and potentially appeal options for those who question approval of a waiver



Generalization of the evaluation process in other cities for infeasibility or “in the public interest” claims:

- If an applicant believes circumstances exist that make it infeasible to meet an all-electric requirement, the applicant may request an exemption from the authority having jurisdiction (often the Building Official).
- The burden is on the applicant to show infeasibility.
- The building permit applicant presents documentation and any other evidence to support the permit applicant’s claim of infeasibility.
- Exemptions are granted only in unusual cases that can clearly be defined as special circumstances.

Infeasibility considerations:

- Exceptional characteristics of the type of building or physical site conditions.
- Commercial availability of electric appliances or equipment, materials, and technologies to comply with the requirements.
- Necessary operational requirements, or business-related needs that cannot be reasonably met with an electric appliance or piece of equipment.
- Conflict with any other City regulations, such as those requiring historic preservation.
- Potential that applying the requirements would effectuate an unconstitutional taking of property or otherwise have an unconstitutional application to the property.

Public Interest considerations:

- The availability of alternative technologies or systems that do not use fuel gas.
- Any impacts that the decision to allow fuel gas infrastructure may have on the health, safety, or welfare of the public.

In some cases, local codes identify specific uses where it is considered to be in the public interest to allow gas, such as commercial cooking, and laboratories and clean rooms.

Electric-ready requirement

In many cases, if the installation of fuel gas infrastructure is granted under an infeasibility or public interest exemption, the newly constructed building must nonetheless have sufficient electric capacity, wiring and conduit to facilitate future full building electrification.



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

TO: Matt Rodrigues, Public Works Director, City of Eugene; Sarah Medary, City Manager,
City of Eugene

FROM: Frank Lawson, CEO & General Manager

DATE: July 8, 2022

SUBJECT: Responses to City of Eugene Electrification Questions

Matt Rodrigues and Sarah Medary:

On behalf of Eugene Water & Electric Board (EWEB), please find responses to the questions posed by members of City Council and City Staff regarding the impacts of electrification on EWEB. We appreciate the outreach, and offer our ongoing assistance, as the City of Eugene evaluates potential policy that could impact EWEB. EWEB plans to have management and/or staff attend your upcoming work sessions later to this month if you should request additional assistance.

On June 3, 2022, EWEB received questions from the City of Eugene, as identified in the table below. In order to best respond to your questions EWEB has further defined, or refined the scope of, the questions and linked potential draft responses to a general-use document of frequently asked questions (FAQs) specific to the impacts of electrification.

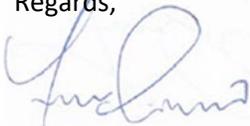
QUESTION (as received from City of Eugene)	EWEB Scope of Response/ Refinement	Draft Response(s)
Safety: A single energy type is a single point of failure vulnerability. How do we mitigate that?	What are the resiliency impacts of an electric-only energy system?	Please see response to FAQ #12.
What effect will drought and federal policy to preserve salmon runs have on one of the northwest's largest renewable energy sources which is hydroelectricity?	(1) What effect will climate change and drought have on the electric generation ratings for the regional hydropower system and EWEB's owned generation system? (2) What effect will federal policy and/or litigation have on the electric generation ratings for the Federal Columbia River Power System?	Please see response to FAQ #7 and #8.
What effect will this have on our overall energy portfolio as we start to put more demand on a reduced supply?	How will EWEB manage increasing loads while Northwest hydro (and other) supplies decline?	Please see response to FAQ #10.

60% of all electric on our national grid is produced by fossil fuels. What effect will the reduction of the west coast's hydro-electric generation capacity (described previously) have on this percentage?	What impact might a derating of the Federal hydropower system (NW Power Planning and Conservation Council boundaries) have on fossil fuel use and carbon emissions nationally?	Please see response to FAQ #11.
Concerned about electricity cost volatility. In the northwest we have benefited from reasonably priced electric due to hydro-electric generation but as that diminishes what is that going to do to our costs going forward. Wondering if there is a way to analyze the impact of the reduced hydro-electric capacity and how it will impact costs for electricity.	How will climate and regulatory restrictions on hydroelectric generation impact the reliability of the grid and pricing in the pacific northwest?	Please see response to FAQ #9.
What have we done in terms of looking at other alternative energy sources such as solar and wind, in order to have a mix of options to transition to?	No changes	Please see response to FAQ #13.
Industrial - Can we look at the industries where electric only IS feasible?	Which non-fossil technologies and fuels exist now or may soon for industrial processes?	Please see response to FAQ #14.
Does the infeasibility assessment take into account changing conditions such as temperature?	As the local climate changes, what will be the impact of changing temperatures on EWEB's electrical consumption (load)?	Please see response to FAQ #4.
The HB2021 that required electric utilities to be 100% clean by 2040 did not include EWEB. Can staff find out what EWEB's plan is?	Although Oregon's Clean Energy Standard, HB2021, does not apply to EWEB, what is EWEB's planned future electricity generation portfolio/mix?	Please see response to FAQ #3.
What is the projection for natural gas use in new buildings in the commercial and industrial sector? (Provide a forecast of how natural gas will be used and how much.)	No suggested changes.	Please see response to FAQ #18.
In the event of electrical system failure, is there a back-up energy source that is not based on fossil fuels?	In the event of electrical system failure, what back-up non-fossil energy sources exist and what are their feasibility?	Please see response to FAQ #15.
If there is, how do we get to a point where we can implement use?	What role can EWEB play in direct implementation of new fuel/technology adoption at owned facilities? What role can EWEB play in incentivizing new fuel/technology adoption at community facilities?	Please see response to FAQ #16 and 17.

What percentage of Oregon's electricity is generated by fossil fuels?	No suggested changes.	Please see response to FAQ #6.
Will this percentage change with the drought and federal policy effecting hydroelectric generation capacity?	See above as this is a duplicate of rows 6/7	Please see response to FAQ #7 and #8.
Given approximately 50% to 60% of the PNW region's peak heating load comes from natural gas, how could the idea of dual fuel heating systems, as suggested by Frank Lawson EWEB General Manager, be used to reduce GHG emissions as we transition to a fossil free future? What might be the benefits and cost from such an approach?	What are the benefits and costs of using dual-fuel technologies for space heating?	Please see response to FAQ #5.

Please review the responses and inquire further if you have follow-on or additional questions or requests for information. As the city and other community members raise questions, we will add to our FAQ responses.

Regards,



Frank

Attachment(s): *Frequently Asked Questions, Impacts of Electrification*

Frequently Asked Questions (FAQs)

Impacts of Electrification

Revised: July 7, 2022

1.0 Question: Do we have the grid that is needed to reliably support increasing electricity demand from electrification? Can the electric grid support increasing levels of electrification?

Response: A power system is defined as reliable when it has both sufficient generating capability and a robust transmission system. As a public utility, EWEB is obligated to serve the electricity needs of our customers, including the procurement of adequate generating resources, and the construction and operation of a local distribution system. EWEB presently relies on the Bonneville Power Administration (BPA) for most of its transmission.

EWEB can assure our customers that EWEB’s portfolio of electricity generation, and local distribution system, will meet the future consumption needs of our customers. Using consumption forecasts that include electrification assumptions, EWEB is developing an Integrated Resource Plan (IRP) that will assist the utility in the planning and procurement of the electricity needed to meet expected future consumption in ways consistent with the values of our customer-owners (<https://www.eweb.org/about-us/power-supply/integrated-resource-plan>). EWEB is also using the forecasted information to plan, construct, and operate our local distribution network.

The situation is different for the Western Interconnection (11 Western U.S. states and two Canadian provinces), which is the grid that EWEB and BPA rely on for generation and transmission. **The West’s overall ability to remain affordable and/or reliable in a decarbonized and electrified future is unclear.** Industry studies across the region highlight the challenges as to the region’s ability to meet peak demands over the next decades. In 2019, near-term generating resource adequacy concerns triggered the development of a Western Resource Adequacy Program, in which EWEB is currently a participant. The 2021 Northwest Power Plan recommends that the region’s transmission providers *“develop a comprehensive review of the existing state of the transmission system; and research potential short-term and long-term solutions to alleviate new resource development barriers.”* In the recently published 2040 Clean Energy Sensitivities Study by the Western Electricity Coordinating Council, the organization that is responsible for compliance monitoring and enforcement and that oversees reliability planning and assessments, *“there is a need for other clean resource types with performance characteristic similar to that of gas-fired generation resources”*, a technology which has yet to be identified or developed. Additionally, *“increasing VRE (Variable Renewable Energy) resources may create transmission challenges”*.

As a local community-owned utility, EWEB is committed to evolving our system in ways consistent with our values of safety, reliability, affordability, environmental stewardship, and community. However, we also acknowledge our reliance on a Western grid that is facing challenges as regulations, resources, and consumer preferences change, and we will continue to monitor and engage in these issues.

2.0 Question: What will be the impact on EWEB of banning the use of natural gas in new construction?

Response: A ban of natural gas usage in new construction will impact EWEB's customer-owners and EWEB from a generation and distribution perspective.

By combining the economic analysis contained in EWEB's Electrification Impact Analysis Study with the City of Eugene's 2021 permit data on natural gas infrastructure trends as presented to Council on April 13, 2022, **removing a natural gas heating option could cost the 3,000 residential-only (not including commercial) new construction customers expected over the next 15 years, who would have chosen gas, an additional \$1.7 million (in 2021 dollars) to own and operate the equipment over its lifetime**, saving ~6,215 MTCO₂e/year over the period at a cost of \$18 per MTCO₂e reduced.

EWEB estimates an annual electricity peak load increase of approximately 1% each year (22% compounded over two decades) if the use of natural gas is banned in new residential and small commercial construction. Increases in peak will result in higher electricity procurement costs and may result in distribution system enhancements, which is highly location dependent.

3.0 Question: Although Oregon's Clean Energy Standard, HB2021, does not apply to EWEB, what is EWEB's planned future electricity generation portfolio/mix?

Response: EWEB's Board amended the SD15 Climate Change Policy in 2021 to support a low-carbon electric power portfolio that maintains, on a planning basis, over 90% of annual energy from carbon-free resources and targets over **"95% of annual energy from carbon-free resources by 2030 to the extent possible and practical without distinct adverse impacts to customer-owners"**. Both the legislated Oregon RPS requirements and EWEB's Climate Change policy will serve as requirements for planning EWEB's future electricity supply.

EWEB is subject to Oregon Renewable Portfolio Standard (RPS) requirements, but not HB2021. The Oregon RPS requires that an increasing percentage of EWEB's annual retail sales, excluding legacy hydro, must come from qualifying renewable resources. Currently, EWEB's annual RPS percentage target is 20% of qualifying electricity, increasing to 25% in 2025. EWEB's legacy hydro generation has historically provided sufficient exemption to reduce or eliminate EWEB's annual RPS obligation and EWEB maintains an adequate reserve of Renewable Energy Credits (RECs) that can be used to meet any remaining RPS obligations. Oregon RPS obligations are incorporated into EWEB's Integrated Resource Planning Process.

4.0 Question: As the local climate changes, what will be the impact of changing temperatures on EWEB's electrical consumption (load)?

Response: EWEB is currently a winter-peaking utility and summer peaks are approximately 80% of a typical winter peak. Climate forecasts have indicated that average heating loads (measured in heating degree days) may be declining over time and that cooling loads (measuring in cooling degree days) may increase over time (<https://toolkit.climate.gov/#climateexplorer>). For EWEB, summer peaks will also increase as more air conditioning is added to the area, eventually driving the utility to become "dual peaking" (winter and summer). According to research from the Bonneville Power Administration, the U.S. Army Corps of Engineers, Bureau of Reclamation, University of Washington, and Oregon State University completed regional climate change studies

under the review of the River Management Joint Operating Committee (RMJOC), **from the 2020s through 2040s, power demand could increase an average of 4.4% in July and August and decrease an average of 2.2% in December through February because of climate change-driven temperature increases.** Links to the RMJOC studies are contained in Question 7 below. Loads during high temperatures (summer) are generally considered more stressful on electrical systems.

5.0 Question: What are the benefits and costs of using dual-fuel technologies locally for space heating?

Response: The [Energy Information Administration](#) estimates 43% of energy use in all U.S. homes is for space heating, and another 8% is for air conditioning. Heat pumps, especially in areas with mild climates, are an efficient way to heat and cool buildings because the unit can pull heat out of the air to heat or cool spaces at an efficiency of over 200%, while the most efficient gas furnaces are around 95-98% efficient. Heat pumps work well down to temperatures of approximately 35-40 degrees Fahrenheit. When the outside temperatures dip below that point, there is less heat to pull from the air to maintain a heat pump's usually high efficiency levels. In these instances, standard heat pumps often switch to electric resistance heat and dual-fuel systems will switch to a natural gas furnace.

In EWEB's territory, 3% of an average year is below 32 degrees, and 16% below 40 degrees. Using dual-fuel technology would require natural gas between 3-16% of the hours, depending on the settings, for space heating applications. As EWEB is a winter-peaking utility, cold snaps below 40 degrees often correspond with peaks in electricity consumption in our region resulting in more expensive and more carbon-intensive power. Dual fuel heat pumps present an opportunity to reduce carbon emissions while mitigating peak impacts for EWEB. [EWEB's Electrification Phase 2 Study](#), shows that switching from natural gas furnaces to dual-fuel heat pumps could have similar lifetime GHG benefits to switching to an electric vehicle, or about 30-35 MTCO_{2e}, without any detrimental impact on system or regional peak. However, electrification of 50% of the housing stock with standard performance heat pumps is likely to increase peak electricity demands by as much as 12%, which could increase EWEB's need to invest in more generation, transmission, and distribution infrastructure.

Based on EWEB's analysis of the economics of electrification, substantial single-family dwelling electrification (fuel switching) of space heating is unlikely given lack of financial benefits for customers. Today, there are higher upfront costs for the purchase and installation of heat atechnology, especially low-temperature heat pumps, compared to natural gas furnaces. This can act as a barrier to consumer adoption. Unless other variables (such as mandates or incentives) are removed, then wide-spread space heating electrification, other than dual-fuel technology, is not likely based solely on economics.

6.0 Question: What percentage of Oregon's electricity is generated by fossil fuels?

Response: The Oregon Department of Energy's 2020 Biennial Energy Report shows that **in 2019 a total of 45.86% of electricity consumed in Oregon was generated by fossil fuels**, 24.81% from coal-fired electricity and 21.05% from natural gas-fired electricity (other assorted fossil sources of electricity totaled less than 1 percent). Hydropower met 43.28 percent of Oregon's electric consumption for 2019.

7.0 Question: What effect will climate change and drought have on the electric generation ratings for the regional hydropower system and EWEB's owned generation system?

Response: In 2020, scientists from the Bonneville Power Administration, the U.S. Army Corps of Engineers, Bureau of Reclamation, University of Washington, and Oregon State University completed regional climate change studies under the review of the River Management Joint Operating Committee (RMJOC). This research is giving BPA a better understanding of the potential range of impacts that climate change may bring to the Columbia River Basin.

According to the studies, Northwest temperatures appear to be causing changes in streamflow runoff patterns, with higher winter flows, slightly earlier spring runoff and slightly lower summer flows since the 1980s. The studies forecast that regional warming will likely cause more precipitation to fall as rain in the winter rather than snow. Over time, these temperature changes will affect Columbia River Basin flood risk management, power generation, and fish protection efforts. Projections show that **between November and May, monthly generation could substantially increase while from June to October it could significantly decrease.**

The RMJOC Studies can be found here:

<https://www.bpa.gov/-/media/Aep/power/hydropower-data-studies/rmjoc-ii-report-part-I.PDF>

<https://www.bpa.gov/-/media/Aep/power/hydropower-data-studies/rmjoc-ii-report-part-II.PDF>

For EWEB's local hydro generation along the McKenzie River, the RMJOC report estimated that fall and winter river flows are likely to increase. A slight decrease in spring flows is possible, with a longer period of low summer flows more likely than not. This change in flow patterns will likely affect how the U.S. Army Corps of Engineers operates their Blue River and Cougar Reservoirs on the McKenzie since river water temperatures are expected to increase during the critical migration periods for endangered Spring Chinook Salmon. The Corps has already changed operation of their reservoirs in ways that will reduce river water temperatures to protect fish by releasing more stored cold water during the warmest periods of the year. **EWEB staff expect the changes in flow patterns and Corps reservoir operation practices to reduce EWEB's McKenzie River power generation quantities by approximately 10 percent.**

8.0 Question: What effect will federal policy and/or litigation have on the electric generation ratings for the Federal Columbia River Power System?

Response: Although it is difficult to speculate on the future of the Federal Columbia River Power System (FCRPS), past policy and litigation has continually resulted in restricted power operations along with reduced flexibility and capacity of the FCRPS. According to data disclosed in the 2020 Columbia River System Operations Environmental Impact Statement (CRSO EIS) from the Bonneville Power Administration, Army Corps of Engineers, and Bureau of Reclamation, **aggressive flow regimes now under litigation along with potential dam breaching scenarios could reduce system firm energy by as much as 870MW (11%), increase loss-of-load probability, and increase residential retails rates by up to 11%.** Future impact estimates will need to be based on specific proposed policy changes or litigation, but the Pacific Northwest utilities continue to highlight the importance of hydro power as a source of reliable, carbon-free power. Regional

utilities and advocacy groups consistently advocate for balanced approaches to hydropower regulation.

9.0 Question: How will climate and regulatory restrictions on hydroelectric generation impact the reliability of the grid and pricing in the Pacific Northwest?

Response: Specific to the federal system, BPA conducted analysis around several potential changes to dam operations or configurations in its 2020 Columbia River System Operations Environmental Impact Statement (CRSO EIS). BPA found that without acquiring replacement resources, removing the Lower Snake Dams or increasing spill over the dams would increase the probability of reliability events in the region. In a separate draft report commissioned by Washington Gov. Jay Inslee and Sen. Patty Murray, replacing services of the four lower Snake River dams will cost between \$10.3 billion and \$27.2 billion over the next 50 years.

Source: [Columbia River System Operations Environmental Impact Statement Record of Decision \(September 2020\) \(energy.gov\)](#)

10.0 Question: How will EWEB manage increasing loads while Northwest hydro (and other) energy supplies decline?

Response: Future energy demand and changes in electricity generating resources are part of EWEB's integrated resource planning (IRP) process, a data-driven process that can inform EWEB's long-term (5-20 years) electricity supply decisions. EWEB is currently preparing an Integrated Resource Plan (IRP), incorporating likely baseline conditions and forecasts, and will release a draft at the end of 2022, and finalize in 2023 following a public comment period. The IRP features a study that is designed to evaluate different electricity supply options under different possible futures.

11.0 Question: What impact might a derating of the Federal hydropower system have on fossil fuel use and carbon emissions nationally?

Response: EWEB is part of the Western Interconnection, not a national grid. Most studies show that meeting future demand will require significant commissioning of additional resources, including wind, solar, natural gas, nuclear, and storage technologies. Further constraints on the federal hydroelectric system will increase the requirement to develop additional intermittent renewable resources at significant cost. In a 2018 low-carbon scenario analysis study by Public Generating Pool, assuming the same federal resource levels, and in order to achieve carbon reduction objectives, the Pacific Northwest (OR, WA, ID, MT) needs to build and/or procure an additional 11 MW of wind/solar and 7 MW of natural gas generation for peaking capacity. Since that time, the State of Oregon has passed legislation prohibiting new natural gas electricity production. If 2,000 MW of carbon-free resource is no longer available from the federal hydropower system (for reference, Pacific Northwest Federal Dams have a total nameplate capacity of approximately 22,000 MW), then an additional 5,500 MW of wind/solar and 2 MW of natural gas generation will be needed to achieve the same carbon reduction goals, at an additional cost of \$1.6 billion.

12.0 Question: What are the resiliency impacts of an electric-only energy system?

Response: All energy systems, whether an electric only or a dual electric and natural gas system, have risk exposure and limitations. For example, both gas and electric transmission and distribution systems are vulnerable to seismic events. Electric systems with overhead lines have more risk exposure during storm conditions (wind, ice, snow), while some gas systems lack redundancy within the gas grid. As demonstrated during winter events, energy source flexibility and redundancy can improve resiliency and reduce the demand and criticality on a single-source system.

While the gas sector already can remotely store energy or manage system capacity, the electricity sector is engaged in options to increase the resiliency of utility systems and the regional grid, including undergrounding lines, hardening equipment, adding energy storage, implementing microgrids, upgrading cybersecurity, improving remote black-start generation, and conducting more frequent proactive maintenance. Additionally new options are evolving to increase redundancy at the residential level beyond gas or diesel generators. These include alternative fuels back-up power generation products and the use of some electric vehicles capable of powering a residence for short durations.

13.0 Question: What have we done in terms of looking at other alternative energy sources such as solar and wind, in order to have a mix of options to transition to?

Response: EWEB's existing power supply information can be found on our website here: <https://www.eweb.org/about-us/power-supply>. Approximately 6% of our portfolio is from wind and 0.1% is from solar generation, and EWEB continues to offer customer incentives for rooftop solar. Like most utilities, wind and solar will be considered as resource options in EWEB's Integrated Resource Plan (IRP), which will be finalized in 2023.

14.0 Question: Which non-fossil technologies and fuels exist now or may soon for industrial processes?

Response: Several non-fossil fuel choices are evolving that can be evaluated for use in a variety of applications. Due to credits from the Oregon Clean Fuels Program and the Federal Renewable Fuels Standard, **most of these fuels are currently being used in transportation applications. These fuels include renewable diesel, biodiesel, renewable propane, renewable natural gas, and renewable hydrogen.** Additionally, formic acid, small modular nuclear reactors (SMRs), biowaste (e.g. wood waste) are continuing to evolve in larger (utility) scale applications. The business cases for adoption of these fuel options will depend on local economic circumstances. Industrial and large commercial fuel needs can be highly specific and local circumstances can have significant implications for the cost-benefit calculations for adoption.

15.0 Question: In the event of electrical system failure, what back-up non-fossil energy sources exist and what are their feasibility?

Response: For future technology options, please see Question 14 above. Presently, due to the high prevalence of existing back-up diesel generators, renewable diesel fuel is one of few viable non-fossil options for back-up energy systems. Access to the fuel can be difficult, especially if the entity is not a significant diesel user for transportation applications. Other systems and fuels can work depending on local site needs and characteristics.

16.0 Question: What role can EWEB play in direct implementation of new fuel/technology adoption at owned facilities?

Response: EWEB is coordinating with NW Natural on the development of a green electrolytic hydrogen pilot production facility by providing them with water, electricity and space at standard market and retail rates. EWEB will be investigating operational, marketing, resiliency/emergency, and grid support opportunities associated with this alternative non-fossil fuel.

EWEB has taken a leadership role in the utilization of renewable diesel in its owned fleet vehicles. Additionally, EWEB has tracked costs and benefits of the fuel in its fleet to show how benefits in the way the fuel performs can offset the price premiums. EWEB has also been using higher blends of ethanol in its gasoline fleet, but flex-fuel vehicles are getting harder to source currently.

17.0 Question: What role can EWEB play in incentivizing new fuel/technology adoption at community facilities?

Response: EWEB's Field Services team offers direct customer advice, analyzing application-specific alternatives, on energy efficiency and electricity technology choices, including information about EWEB incentives. EWEB has also become a community expert on renewable diesel and offers a local contract to allow other local government entities to access R99 to ensure continued supply even as the market tightens.

18.0 Question: What is the projection for natural gas use in new buildings in the commercial and industrial sector? (Provide a forecast of how natural gas will be used and how much.)

Response: EWEB recognizes that NW Natural is the best source of natural gas forecasting information. EWEB's Electrification Analysis Study did include modeling of the economics of small office electrification within the commercial sector, which had similar space and water heating technologies as those found in residential buildings. The study showed little economic incentive for small commercial customers to choose electricity over natural gas in space and water heating applications. Larger commercial space and water heating needs were out of scope of EWEB's study, since space and water heating needs are often unique to business types and may have site-specific technologies that are difficult to analyze and generalize across a larger population of customers.