

City & Borough of Juneau – CPRG Implementation Grant Application
Workplan: Electrifying Juneau's Mendenhall Wastewater Treatment Plant

1. Overall Project Summary and Approach

The City & Borough of Juneau (CBJ) is applying for funding as part of the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) Implementation Grant program. CPRG funding to Juneau for this project is critical to reducing the community and the nation's greenhouse gas emissions by reducing fuel oil use at the CBJ's single highest energy consuming and GHG emitting facility by approximately 60%.

CBJ's proposed project, titled "Electrifying Juneau's Mendenhall Wastewater Treatment Plan," seeks to aggressively reduce greenhouse gas emissions with two measures which align with Goal 1 (*"Tackle the Climate Crisis"*), Objective 1.1 (*"Reduce emissions that cause climate change"*) of the EPA Strategic Plan (Section I.C). The proposed measures substitute expensive imported heating fuels with renewable hydroelectricity, produced locally, which will enable the treatment plant to provide reliable, climate resilient, and energy and cost-efficient wastewater operations to Juneau's landlocked coastal community.

a. Description of GHG Reduction Measures

i. Measure 1: Electric Boiler Installation at the Mendenhall Wastewater Treatment Plant in Juneau, Alaska

Industrial Sector: "Supports energy efficiency and GHG reductions in industrial energy use and processes, including energy audit, equipment upgrades, electrification and process improvements."

Waste, Water, and Materials Management Sector: "Installation of renewable energy and energy efficiency measures at wastewater treatment facilities."

The Mendenhall Wastewater Treatment Plant (MWWTP) complex is currently heated by two fuel oil steam boilers. The plant has the dubious distinction of being the largest and most energy-inefficient municipal facility within the City and Borough of Juneau (CBJ). The facility has been an operational stalwart but is increasingly inefficient in its energy consumption. Its two fuel oil boilers, now in their 38th year of service, require approximately 80,000 gallons of oil annually to heat the utility. By upgrading and replacing the current fuel boilers with a new electric steam boiler, powered by local hydroelectricity, approximately 80,000 fewer gallons of oil will be consumed at the plant per year. The reduction in fuel oil consumed will result in a significant reduction in GHG generated by the community and will get CBJ closer to its GHG reduction goals as stated in the Juneau Renewable Energy Strategy (JRES,- as adopted in CBJ Resolution 2808).

The passage of time has taken its toll on the-fuel oil boilers, which have reached the end of their 35-year service life and are in need of replacement. Recognizing the imperative for a sustainable energy shift, this measure calls for the replacement of one of the two aging boilers with an electric boiler sized to heat the entire plant. Operation of the electric boiler is projected to yield substantial benefits, estimated

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at approximately 80,000 gallons of oil not consumed each year, amounting to an impressive 2.4 million gallons saved over the electric boiler’s 30-year life cycle. While the replacement of a single boiler might initially appear as a modest endeavor, its impact is significant, as it will reduce the collective carbon dioxide (CO₂) emissions from all CBJ-managed facilities— excluding schools and hospital buildings—by nearly 10%. CBJ has a proven track record and systematic approach to energy efficiency enhancements and stands well-prepared to implement this transformative measure. As a cornerstone of JRES, this project contributes to the overarching goal of increasing renewable energy usage to 80% of the total community energy consumption by the year 2045.

This measure was selected as priority because it is a ready-to-implement project with potential for near-term and high-impact emissions reductions, and energy cost savings. It was also selected due to the lack of other available funding and the opportunity to deploy learnings from this project to future building electrification projects within the CBJ for greater emissions reductions.

While CBJ has deployed other and smaller beneficial electrification measures in other facilities and departments, this will be a new GHG reduction measure that will be implemented primarily through CPRG funding.

A Note on CBJ’s Funding Commitment: CBJ will provide in-kind support for the project in the form of staff time for project management and coordination.

While not included in this funding request, CBJ is committed to funding both the purchase and construction/installation expenses associated with the future replacement of the second fuel oil boiler. This new high efficiency boiler will serve as a crucial backup to the electric boiler and provide stability, reliability and operational resilience in the event of an electrical outage. This proactive measure not only enhances the facility’s resilience but also aligns with sustainability goals by introducing a significantly more efficient alternative to the aging fuel oil boilers. The addition of this new boiler is anticipated to yield even greater reductions in greenhouse gas (GHG) emissions (not included in GHG reduction estimates for this project). The estimated cost for the acquisition and implementation of the new fuel boiler is projected at \$3 million, reflecting CBJ’s commitment to investing in cleaner and more energy-efficient solutions for its municipal facilities.

Major Features:

The proposed project includes two major features - replacing a fuel oil steam boiler with an electric boiler and installing a separate electric service to power the boiler.

Mechanical

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The existing heating plant supplies four buildings at the MWWTP and consists of the following:

- Two oil-fired steam boilers; 7,100 MBH each
- Two steam-to-hot water heat exchangers
- Two redundant primary heating loop pumps P-101A/B
- Two redundant SBR Building pumps P-111A/B
- Two redundant Disinfection Building pumps P-114A/B
- Two redundant Garage Building Pumps P-111A/B
- Two redundant Biosolids Building Pumps P-185A/B
- Combustion air louver
- Glycol feeder, air separator, appurtenances

Demolition

One steam boiler will be removed and its respective chimney and fuel oil piping will be capped and removed.

Upgrade

The heating plant will be converted to a dual-fuel plant consisting of one fuel oil boiler (7,100 MBH) and one electric boiler (2,100 kW). The boilers will be equal capacity and allow for fuel-flexibility and potential greenhouse gas emission reductions. The boiler will be connected to the hydronic heating loop that supplies heat to the building.

The electric boiler will be provided with 52 heating stages of 40 kW each and an integral controller capable of staging the heating elements and a demand control strategy that minimize electric demand charges. The boiler will also be provided with a control interface that will allow for the following remote control functions from the building direct digital control system (DDC):

- Boiler enable/disable
- Heating stage step control
- Heating stage limiting control

A direct digital control system will be provided to control the above functions and allow lead/standby control of the existing steam boiler and new electric boiler.

Electrical Utility Service

Electricity is supplied by Alaska Electric Light and Power Company (AEL&P), the borough's sole electric utility. Power generation is nearly 100% renewable hydroelectric power with minimal supplemental diesel-generation.

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The electric utility (AELP) will provide a new utility feed from an existing power pole to the property line. Two new utility transformers will supply 480V power from the transformers to a boiler switchboard mounted to the exterior wall of the adjacent garage building. Underground conduits and feeders will supply power to the boiler room where it will be connected to the electric boiler.

Construction Considerations

Access: The boiler room has a 90" wide by 120" high double door that provides a sufficient opening to remove the existing steam boiler and install the new equipment without demolition of the exterior wall. The site has sufficient laydown areas for the work to be performed.

Heating Outage: The MWWTP boilers are routinely turned off from June to August. Construction of the heating plant replacement will be scheduled to occur during this time period to preclude a heating outage. The feasibility of constructing the heating plant upgrade within a 3-month window will be reviewed as the design and planning progresses.

Underlying assumptions and risks

GHG Emission Reductions

CBJ is confident in the methodology used to calculate GHG reductions, however, as noted in the Technical Appendix, unforeseen supply chain delays could require a delay in the construction of the project but up to one year. This would similarly delay the benefits of the measure, including GHG emission reductions.

Energy Costs

The cost effectiveness assertions of this project are based on the assumptions below regarding the cost of electricity and the cost of fuel. Significant changes to these assumptions could either increase or decrease projected energy cost savings. This project also assumes that proposed demand control measures can mitigate high electrical demand charges. Ensuring success in this area will be a priority of the design and engineering process.

Assumptions: The heating plant currently consumes an average of 80,000 gallons of fuel oil per year. An electric boiler will consume 2.36 million kWh to supply an equivalent amount of heat. The cost of heating fuel in 2025 is expected to be \$3.27 per gallon or \$32.80 per MMBtu of heat. This equates to a current annual heating cost of \$262,000 per year.

Electricity is estimated to cost 10.2¢ per kWh in 2025 and the electric boiler will produce heat at a cost of \$31.31 per MMBtu or \$240,000 per year, an annual savings of \$22,000. Electric inflation is projected to be lower than fuel oil inflation.

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Energy Analysis				
Fuel Oil, gal	Fuel Oil Effic	Heat Load, kBtu	Electric Effic	Electricity, kWh
80,000	72%	7,977,600	99%	2,360,000

Cost: The existing building service is billed under AEL&P’s large commercial rate which includes both energy and demand charges. The effective cost is 8.5¢ per kWh. The relatively low effective cost indicates that the facility operates continuously and the loads are steady with minimal variations. The electric boiler will be on a separate service and meter and will also be billed under AEL&P’s large commercial rate which includes both energy and demand charges. The heating load is also expected to be consistent with minimal variations. However, some fluctuations are likely which can increase electric demand. The effective cost is conservatively estimated to be 10.2 ¢ per kWh.

Inflation: Juneau electric rates have historically inflated at less than 1% per year. The lone exception was a 24% increase that was instituted when additional hydropower was constructed and brought online.

Juneau has a surplus of electric power and annual electric sales have been declining slightly over the past eight years. Electric inflation is conservatively estimated at 1.5% per year throughout the analysis period.

Fuel Oil: Heating fuel currently costs the MWWTP \$3.16 per gallon. Since 2005, heating fuel prices have increased by 3.5% per year according to the 2023 Alaska Fuel Price Report. Fuel oil inflation is assumed to be 3.5% per year for the analysis period with a 2025 cost of \$3.27 per gallon.

This measure is included in the State of Alaska Priority Sustainable Energy Action Plan directly via the measure titled “Mendenhall Wastewater Treatment Plant” and described on pages 30-32.¹

This measure meets the goals of the CPRG program by providing significant reductions to cumulative GHG emissions “by 2030 and beyond” and accelerating decarbonization across industrial and waste and materials management sector.

- ii. Measure 2: Energy Audit at the Mendenhall Wastewater Treatment Plant in Juneau, Alaska

¹ <https://www.epa.gov/system/files/documents/2024-03/ak-priority-sustainable-energy-plan.pdf> , p. 30-32

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Industrial Sector: “Supports energy efficiency and GHG reductions in industrial energy use and processes, including energy audit, equipment upgrades, electrification and process improvements.”

The second measure proposed in this application is a comprehensive energy audit of the MWWTP. This will include both a desktop review of energy costs and operation, as well as on-site observations, to produce a report with energy conservation opportunities and recommendations.

Conducting a facility energy audit will lay the groundwork for future energy efficiency projects at the MWWTP and beyond, with the potential to reduce energy expenditures and GHG emissions.

This measure is included in the State of Alaska Priority Sustainable Energy Action Plan via the measure titled “Public Building and Asset Weatherization, Energy Efficiency, and Beneficial Electrification” and described on pages 28-30.²

This measure meets the goals of the CPRG program by building on the GHG reductions and decarbonization efforts in the industrial and waste and materials management sector.

b. Demonstration of Funding Need

Significant financial need, lack of alternative funding sources and meaningful community benefits led to the selection of the MWWTP electrification project as the subject of this application.

As previously stated, the MWWTP’s extremely inefficient oil-fueled boilers are beyond their useful life and need to be replaced. However, the funding has not yet been identified due to competing operational and maintenance priorities at the Utility. A 2023 evaluation of replacement options for the Mendenhall Plant’s outdated boilers estimates that an electric boiler would provide projected energy use cost savings of \$22,000 per year while also offering significant potential for emissions reduction, aligning with environmental goals and promoting cleaner air for the entire community. These significant benefits, however, come with significant initial capital costs. Preliminary design and engineering analysis estimate the cost to bring an electric boiler and the requisite electrical infrastructure online would cost over \$6 million, while a new fuel oil boiler would cost half that amount (approximately \$3 million). Despite the energy cost savings, this initial implementation cost is beyond CBJ’s fiscal capacity without substantial grant funding assistance or passing significant cost on to the utility rate payers. CPRG funding would not only allow CBJ to significantly reduce emissions with the purchase an electric boiler,

² <https://www.epa.gov/system/files/documents/2024-03/ak-priority-sustainable-energy-plan.pdf>, p. 28-30

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but also to allow for nearer-term replacement of the 38-year-old existing fuel boilers, expediting the financial and environmental benefits to the community.

As is noted in the State of Alaska’s Priority Sustainable Energy Action Plan (PSEAP),³ *“In the absence of support from programs like the CPRG or equivalent grant funding, CBJ would be (fiscally) compelled to proceed with the installation of two new fuel oil boilers instead of an electric boiler... The reliance on external grant funding becomes not just an option but a vital lifeline for realizing both the economic and environmental benefits that this project promises to deliver to the community for generations to come.”*

Juneau’s Renewable Energy Strategy (JRES)⁴ provides a comprehensive list of recommendations to meet the community’s ambitious renewable energy goals (80% of total community energy consumption by 2045), ranging from converting the municipal fleet to electric vehicles, to updating building codes, to electrifying our local ports. CBJ is actively pursuing relevant local, state and federal funding streams to support these efforts with both quantitative and qualitative results. When evaluating which priority implementation measure(s) to include in this CPRG application, CBJ considered many factors including project alignment with the JRES, the impact, benefits, and effectiveness of given GHG reduction measures, as well as the availability of alternative funding sources.

CBJ conducted a robust exploration of potential federal and non-federal funding programs, including those listed in the Whitehouse BIL Guidebook, on IRA websites and various state and federal programs. While these programs offer an historic level of funding for climate action, clean energy and emissions reductions activities for municipalities, tribes, and other organizations, CBJ as an entity is eligible for very few, if any, grants or funding programs which also align with the proposed GHG reduction technology and scope of the proposed electric boiler project.

Due to Juneau’s location in a northern temperate rainforest, there is a high demand for building heat. And while electrification has significant GHG reduction benefits thanks to the local energy utility which operates on nearly 100% clean, renewable hydropower, many existing grant programs focus on energy generation projects. Solar technologies are not an effective source of renewable energy in the consistently cloudy rainforest. Both ground source and air to air heat pumps were evaluated and determined as unviable heating measures for the MWWTP due to the highly corrosive (damp) environment and significant experience-based logistical and operational challenges to implementation.

As an example of some of the many potential funding sources explored for this project, the IRA Elective Pay Clean Energy Investment Tax Credit and Production Tax Credits do not include building energy efficiency measures, except for ground source heat pumps (geothermal). CBJ’s population size (approximately 31,000 people) also exceeds the eligibility criteria for USDA Rural

³ <https://www.epa.gov/system/files/documents/2024-03/ak-priority-sustainable-energy-plan.pdf>, p.31

⁴ <https://juneau.org/wp-content/uploads/2019/03/CBJ-Energy-Strategy-Approved.pdf>

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Development programs as well as the U.S. Department of Energy Office of Clean Energy Demonstrations Energy Improvement in Rural or Remote Areas program.

Through this funding source review, CBJ identified found that the proposed project may be eligible for and relevant for one state funding program, the Alaska Energy Authority (AEA) Renewable Energy Fund⁵ (REF). However, the maximum grant amount (\$2M-\$4M) for that program is significantly less than the project cost. That said, should this project receive a partial award via the CPRG Implementation grant competition, CBJ would pursue AEA REF funding for the remaining unfunded amount. CBJ has not yet applied for any other federal or non-federal funding for this project due to the reasons noted above.

c. Transformative Impact

The two proposed measures – while specific to one municipal facility – would have a transformative impact to both CBJ and the broader community. If awarded, these measures alone would reduce GHG emissions at the MWWTP by 30% and total CBJ-wide operational emissions (including transportation) by 6%.⁶

While an electric boiler is not necessarily an emerging technology – in fact, CBJ has installed smaller electric boilers and several other municipal buildings due to the availability of hydropower - the proposed MWWTP electric boiler conversion is approximately 400% larger than any previous project. The scale of the project requires significant infrastructure upgrades to support its operation. With the larger size comes the risk related to potential demand charges as noted above. This risk has created a barrier to adoption despite the potential for successful demand control and the certainty related to GHG emissions reductions. CPRG funding would allow CBJ to mitigate the risk while proving the financial and operation success of a large-scale electric boiler in Juneau. This would provide organizational and market confidence in the measure so that it can be replicated at other large municipal facilities which would benefit greatly from electrification. These include several larger public schools and the local hospital.

Energy conservation recommendations identified from the comprehensive energy audit at the MWWTP can also have potentially transformative applications at other facilities across the municipality.

2. Impact of GHG Reduction Measures

a. Magnitude of GHG Reduction Measures from 2025 through 2030

The installation of an electric boiler and corresponding electric utility and infrastructure upgrades at the Mendenhall Wastewater Treatment Plant (MWWTP) is expected to result in GHG emission reductions of 817 MT CO₂-equivalent per year once the boiler is fully operational. The existing fuel boilers at the MWWTP currently burn approximately 80,000 of fuel per year⁷,

⁵ <https://www.akenergyauthority.org/What-We-Do/Grants-Loans/Renewable-Energy-Fund>

⁶ https://juneau.org/wp-content/uploads/2023/08/2021-GHG-reports_08012023_FINAL.pdf, p. 14

⁷ https://juneau.org/wp-content/uploads/2023/08/2021-GHG-reports_08012023_FINAL.pdf, p.15

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making the facility the highest energy consumer and GHG emission producing municipal facility. It is assumed that conversion to an electric boiler using 100% renewable hydropower will offset all of the emissions currently produced by the fuel oil boiler. Assuming the project follows the estimated implementation timeline, the boiler will be fully operational by the fall of 2026. **With 817 MT CO₂e per year for 3.25 years, the estimated GHG emissions reductions for 2025 – 2030 are 3472 MT CO₂e.** These emissions will be long-lasting and certain, as noted in the next section.

While the comprehensive facility audit will certainly result in energy conservation recommendations, and it is very likely that CBJ will follow these recommendations, it is not possible to guarantee nor to quantify the potential GHG emission reducing actions that may take place between 2025 and 2030.

b. Magnitude of GHG Reductions from 2025 through 2050

The installation of an electric boiler and corresponding electric utility and infrastructure upgrades at the Mendenhall Wastewater Treatment Plant (MWWTP) is expected to result in GHG emission reductions of 817 MT CO₂-equivalent per year once the boiler is fully operational. The existing fuel boilers at the MWWTP currently burn approximately 80,000 of fuel per year, making the facility the highest energy consumer and GHG emission producing municipal facility. It is assumed that conversion to an electric boiler using 100% renewable hydropower will offset all of the emissions currently produced by the fuel oil boiler. Assuming the project follows the estimated implementation timeline, the boiler will be fully operational by the fall of 2026. **With 817 MT CO₂e per year for 24.25 years, the estimated GHG emissions reductions for 2025 – 2050 are 19,812 MT CO₂e.**

While the comprehensive facility audit will certainly result in energy conservation recommendations, and it is very likely that CBJ will follow these recommendations, it is not possible to guarantee nor to quantify the potential GHG emission reducing actions that may take place between 2025 and 2050.

c. Cost Effectiveness of GHG Reductions

Per the directions in section 2.c of the NOFO, the cost effectiveness of the electric boiler project is as follows:

$$\text{\$5,903,378 (Requested CPRG funding) / 3472 MT CO}_2\text{e (Sum of Quantified GHG reductions from CPRG funding from 2025/2030) = \$1700.45}$$

There are many reasons why construction activities in remote Alaska are less cost effective than those in the contiguous United States. Juneau's isolated and landlocked location in remote Alaska require high shipping costs for nearly all equipment and supplies. Local labor shortages and supply chain issues have also driven up costs to nearly double initial bids for many CBJ projects in the last three years. The total requested CPRG funding also accounts for the higher cost of BABA compliant parts and equipment needed for this project.

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The cost of the energy audit (measure 2) is included in the “Requested CPRG funding,” however, the sum from section 2.a does not include hypothetical GHG emission reductions for that measure.

d. Documentation of GHG Reduction Assumptions

Please see the Technical Appendix at the end of this document.

3. Environmental Results – Outputs, Outcomes, and Performance Measures

a. Expected Outputs and Outcomes

Measure 1: Electric Boiler Installation at the MWWTP

Outputs:

- Demolition and replacement of one (1) existing fuel oil boiler with one (1) 2100kW electric boiler and associated boiler pump.
- New electric utility service (AELP) brought online to support increased load from the electric boiler.

Outcomes:

- Annual GHG reductions of 817 MT CO₂e once fully operational
 - Cumulative Estimate 2025 – 2030: 3472 MT
 - Cumulative Estimate 2025 – 2050: 19,812 MT
- Family-supporting jobs created: 1.65 FTE
 - Electrician (wireman) - ~750 hours = 0.35 FTE*
 - Electric utility worker (lineman) - ~500 hours = 0.25 FTE*
 - Mechanical (plumbing) - ~600 hours = 0.3 FTE*
 - Other trades (carpenters, operators, laborers) - ~500 hours = 0.25 FTE*
 - Engineering/technician - ~1000 hours = 0.5 FTE*
- Reduced annual energy costs at the facility (estimated \$22,000 per year)
- Long term: Reduced exposure to hazardous air pollution and unhealthy ambient air quality for Juneau residents.
- Reduced potential for future wastewater service rate increases
- Reduced maintenance and repair costs

Output

- Community outreach regarding project value, progress and impact
 - Project webpage (1)
 - On-bill updates (2-4)
 - Social media posts (2-4)

Outcomes:

- Community awareness of emissions reductions and impact of CPRG funding
- Increased community engagement in CBJ utility meetings and communications efforts

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Output

- Semi-annual progress reports; final project report

Measure 2: Energy Audit at the MWWTP

Output:

- Completed and published comprehensive energy audit & report with recommendations and energy conservation opportunities.

Outcomes:

- CBJ wastewater utility and facilities staff education/awareness of and participation in energy conservation measures
- Long-term:
 - Reduced energy consumption and costs
 - Reduced potential for future wastewater service rate increases to customers
 - Potential for further GHG emission reductions based on report recommendations.

b. Performance Measures and Plan

CBJ will measure track the progress of each of the proposed measures using existing data as a baseline, and measuring cost and energy use efficiencies to calculate and report on its success.

- Performance Measures:
 - *Electric Boiler Installation at the MWWTP*
 - Performance will be measured by the efficiency and effectiveness of the competitive bidding processes for both the design and construction of the project; the management of the selected contractor(s) and their ability to meet the proposed implementation timeline. A critical measurement of progress will whether construction can begin in the spring/summer of 2026.
 - Following construction, performance will be measured primarily by fuel use savings, which will be translated to GHG reductions following the method described in the Technical Appendix of this document.
 - To track and report on fuel use reductions, CBJ will use billing statements and the CBJ Energy Management software to track CBJ facilities.
 - Calculated emissions reductions will be communicated via the project web page and other relevant communications tools (annual report, etc.), as well as the semi-annual and final reports required by this funding program.

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- Performance of community engagement activities will be measured by the number and frequency of communications and the diversity of the audience reached.
 - Reductions in maintenance and repair costs will be tracked and reported once the boiler is fully operational.
- *Energy Audit at the MWWTP*
- Performance will be measured by the efficiency and effectiveness of the competitive bidding processes for a contractor to perform the energy audit.
 - Other performance measures will be tied to the distribution of the final report, as well as the implementation of low cost and immediately available energy conservation opportunities.
 - To track and report on energy use reductions resulting from implemented energy conservation opportunities, CBJ will use billing statements and the CBJ Energy Management software created to track CBJ facilities.
 - Performance and progress will be communicated via the project web page and other relevant communications tools (annual report, etc.), as well as the semi-annual and final reports required by this funding program.
 - Performance of community engagement activities will be measured by the number and frequency of communications and diversity of the audience reached.
- c. Authorities, Implementation Timeline and Milestones (10)

The tables below outline the authorities, implementation timelines and milestones for each proposed measure. As noted, both measures are anticipated to be completed by late 2026 or early 2027. Importantly, if supply chain disruptions or other unforeseen delays in equipment delivery occur, “Construction” as currently noted in Table 2 may be postponed until May – September 2027 due to the fact that boiler installation will require turning off the heat at the MWWTP.

Authorities include the City & Borough of Juneau (CBJ) including the Utilities Division (Utility), the to-be-selected contractors, and the only local electric utility (AELP).

Table 1-2: Measure 1 - Energy Audit at MWWTP

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Electric Boiler Installation at MWWTP - Year One		Fall 2024	24-Nov	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25
Milestone	Authority															
Award Agreement Complete	CBJ + EPA	X														
RFP for MWWTP Electric Boiler Engineering Design Services	CBJ		X	X	X	Design Contract NTP										
MWWTP Electric Boiler Engineering Design	Consultant + CBJ					NTP	X	X	X	X	X	X				
Advertise Construction Bid Documents	CBJ										X	X	Const'n Contract NTP			
Construction	CBJ + Contractor												NTP	X	X	X
RFP for Construction CA&I Services	CBJ										X	X	CA&I Contract NTP			
Construction CA&I	CBJ + Consultant												NTP	X	X	X
Utility Agreement (with AELP) for Design/Construction of Utility Upgrades	CBJ + Utility (AELP)						X	UA Contract NTP								
Utility Service Design/Engineering Work	CBJ + Consultant / Utility (AELP)							X	X	X						
Utility Service Upgrade Construction	Contractor / Utility (AELP)										X	X	X	X	X	X
Semi-annual Report Due	CBJ									X	Energy use tracking...					X
One - Year Report Due	CBJ															X

Electric Boiler Installation at MWWTP - Year Two - Three		Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27
Milestone	Authority															
Utility Service Upgrade Construction - Boiler demo & new boiler install to be in summer when heating needs are low	Contractor / Utility (AELP)	X	X	X	X	X	X									
	Contractor	X	X	X	X	X	X	X	X	X	X	X				
Construction CA&I	CBJ + Consultant	X	X	X	X	X	X	X	X	X	X	X				
Semi-annual Report Due	CBJ						X						X			
Final Report Due	CBJ															X

Table 3: Measure 2: Energy Audit at MWWTP

Energy Audit at MWWTP - Year One		Fall 2024	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25
Milestone	Authority															
RFP for Energy Audit	CBJ		X	X	Contract awarded											
Energy Audit Observations	Contractor					& Site Visits	Data Analysis	Completed								
Energy Audit Published	CBJ								X							
Semi-annual Report Due	CBJ									X	Energy use tracking...					X
One - Year Report Due	CBJ															X

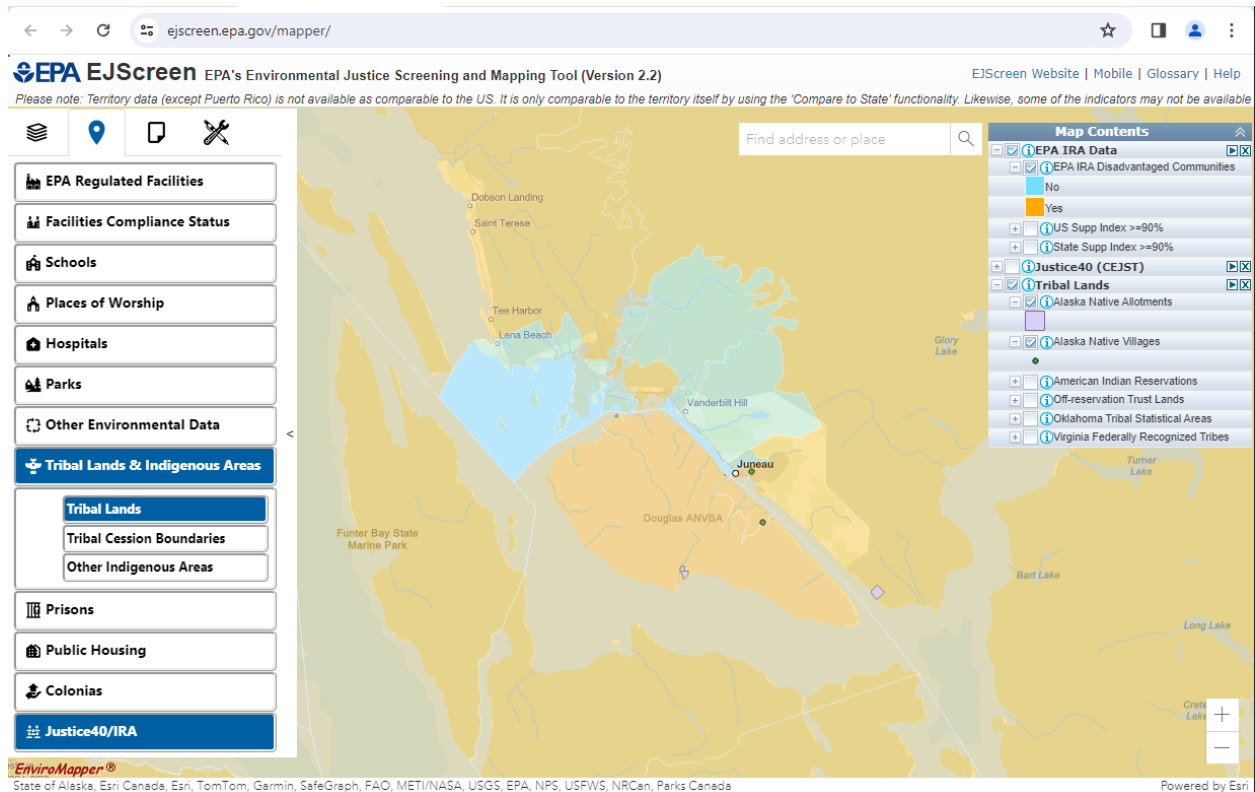
4. Low Income and Disadvantaged Communities

a. Community Benefits

The proposed GHG reduction measures in this application provide community-wide benefits to the City & Borough of Juneau which encompasses Census Tracts 02110000100 thru 0211000700. All seven of those Census Tracts are located on the traditional homelands of the Áak'w Kwáan and T'aaku Kwáan Tlingit peoples represented by the tribal government and sovereign entity,

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Tlingit & Haida, as well as the Douglas Indian Association, however, the EJScreen mapping tool excludes several Census blocks and tracts in this area.



The following EPA EJScreen Census block group IDs may be affected by the proposed GHG reduction measures. All block groups below are in the municipal jurisdiction of the City & Borough of Juneau

- 021100001001
- 021100002005
- 021100004001
- 021100005002
- 021100006001
- 021100006002

The CBJ Wastewater utility is the only service in the jurisdiction noted above. As such, all households in the disadvantaged census block groups noted above are impacted by operational and fiscal improvements to the wastewater utility, including those at the MWWTP.

Potential community benefits from both measures include:

- *Direct and indirect benefits from mitigating climate impacts through reduced GHG Emissions*
 - i. Juneau is experiencing increasing natural disasters as result of human-caused climate change. The primary threat is related to incidents caused by increased precipitation, including landslides, avalanches and flooding. All of the disadvantaged

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communities above experience increased risk and impact of these disasters and/or have already experienced one or multiple of these disasters in their area.

1. By taking action to reduce climate polluting GHG emissions at CBJ facilities

While EPA’s EJScreen does not include sufficient data to assess the potential impact of projects to disadvantaged communities, the project team recognizes the research that exists to describe the value and impact of renewable energy development generally. According to the Fifth National Climate Assessment, Alaska is warming two to three times the global average. The consequence of this difference is a greater impact of socioeconomic and ecological changes driven by climate change, especially for Alaska’s most remote communities. The report found that Alaska is facing compounding stressors from climate change, growing built environment costs, and economic consequences of ecological disruption (for example, within fisheries). Alaska’s people, and especially its disadvantaged communities, are likely to face a greater impact of climate in the near term than other states and thus a proportionately larger amount of federal funds should be allocated to address the needs for adaptation in Alaska.⁸

- *Decreased energy costs*
 - i. This project estimates \$22,000 in annual energy cost savings with current estimated fuel prices. If the price of oil increases, so will the potential savings. These operational savings, combined with CPRG funding for the initial capital costs of a new electric boiler, will prevent these costs and future from being passed on to rate payers in the EJScreen- identified Census block groups.
 - ii. Conducting a facility energy audit will lay the groundwork for future energy efficiency projects at the facility and beyond, that may have the potential to further reduce energy expenditures and mitigate potential cost increases to customers in the EPA EJScreen Census block groups listed above.
- *Improved energy resilience*
 - i. As a remote and landlocked community, nearly all materials and resources must be shipped into Juneau by barge, including fuel oil. Weather or supply-chain caused shipping disruptions could spike the price and shipping cost of fuel. By shifting from imported fuel to locally-produced renewable and clean hydroelectricity, CBJ will become more energy resilient and stable for its rate payers in the disadvantaged communities noted.
- *Creation of high quality jobs and training opportunities*
 - i. As noted in greater detail in section 5 of this application, this project will partner with local labor organizations which offer robust apprenticeship and training programs. By providing a proven example of transition from imported fuels to locally produced electricity, this will support further local investment in the development,

⁸ <https://www.epa.gov/system/files/documents/2024-03/ak-priority-sustainable-energy-plan.pdf>, p.71

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operation, and maintenance of Juneau's clean and abundant energy resources, and the specialized, good paying jobs that come with it.

CBJ acknowledges that we will need to provide analysis of these benefits as part of our required reporting.

b. Community Engagement

i. *How has community input been incorporated into this application?*

CBJ’s climate actions are guided by several community plans, strategies which underwent robust community engagement processes.

1. CBJ Climate Action and Implementation Plan ⁹

a. This was subsequently integrated into the CBJ Comprehensive Plan¹⁰

2. Juneau Renewable Energy Strategy (JRES)

a. CBJ’s GHG reduction goals stated in the Juneau Renewable Energy Strategy (as adopted in CBJ Resolution 2808¹¹). These resolutions specifically call for the implementation of several goals with relevance to this project, including “A reduction in Juneau's dependence on fossil fuels for space heating.”

Public engagement through public meetings held by CBJ’s Assembly as well as appointed advisory boards and commissions were integral to the development of the Climate Action Plan and JRES.

3. Juneau Commission on Sustainability (JCOS)

JCOS is comprised of 9 commissioners appointed by the CBJ Assembly with the mission to promote sustainability in our community, in large part through advising the assembly. ¹²

As noted in the Letter of Commitment provided by JCOS, “Reducing GHG emissions is of the utmost importance for a sustainable economy, and because Juneau’s electricity comes entirely from clean hydropower electrifying our city’s energy usage is always a top priority for JCOS. We advocate for CBJ to switch facilities and vehicles to electric power whenever feasible.”

4. Utility Advisory Board (UAB)

The UAB is a 7-member board of appointed members of the Juneau public with the purpose of advising the Assembly on issues relating to

⁹ https://juneau.org/wp-content/uploads/2018/04/CAP_Final_Nov_14.pdf

¹⁰ <https://juneau.org/community-development/comp-plan-2013>

¹¹ https://juneau.org/index.php?gf-download=2018%2F02%2FRes2808-Final_Adopting_Juneau_Renewable_Energy_Strategy.pdf&form-id=22&field-id=11&hash=61fd1062bc7a840b798ca7a15886c426b1dfca50c2e308a63be6ec8f5b06274a

¹² <https://juneau.org/engineering-public-works/jcos>

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water and wastewater utilities including long range planning and fiscal matters.

As noted in the attached Letter of Commitment provided by the UAB, the Board strong supports the proposed measures and is committed to supporting CBJ in their efforts to reduce emissions, energy expenditures, and costs to customer.

- ii. How will meaningful engagement be continuously included in the development and implementation of the GHG reduction measures throughout the life of this grant?
 1. If awarded, the project and corresponding funding appropriation will be reviewed, discussed and adopted by the Assembly at no less than two public meetings with opportunity for public testimony.
 - a. All funding appropriations are also reviewed by the Systemic Racism Review Committee¹³ before adoption.
 2. The project manager will provide progress updates to JCOS and the UAB at their monthly public meetings, as well as the JCOS Energy Subcommittee meetings.
 3. The final Energy Audit report will be distributed and presented to the Assembly, JCOS and the UAB.
 4. Other Community Engagement Tools
 - a. CBJ will utilize in person, print and digital communication tools to provide opportunities for engagement, input and to share information regarding the status, progress and impact of both proposed measures:
 - a. *UAB annual report*
 - b. *CBJ Annual Water Quality Report/Consumer Confidence Reports*
 - c. *Messages included on printed/PDF Monthly Water and Sewer Bills*
 - a. *Partnering with the electric utility to communicate regarding the project to their customers.*
 - d. *Project Webpage*
 - e. *PSAs to media and community*
 - f. *Social media posts on Facebook and Instagram*

5. Job Quality

CBJ is committed to supporting high-quality, family-sustaining jobs with the free and fair choice to join a union through the proposed project. Collaboration with the local unions, including the International Brotherhood of Electrical Workers (IBEW) Local 1547, will ensure the success of this and subsequent

¹³ <https://juneau.granicus.com/boards/w/c9bbc06356d368e8/boards/38038>

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energy efficiency and beneficial electrification projects resulting from the energy audit. By providing a proven example of transition from imported fuels to locally-produced electricity, this will support further local investment in the development, operation, and maintenance of Juneau's clean and abundant energy resources, and the specialized, good paying jobs that come with it.

The labor needed to develop Juneau's local energy-related projects are family wage earning unionized jobs that are epitomized by the vision to build the "workforce by ensuring every American—whether they go to college or not—will have equitable access to high-quality training, education, and services that provide a path to a good career without leaving their community."¹⁴ These trade work and utility positions are filled through apprenticeships and on-the-job training through local recruitment. These apprenticeships pay wages and benefits from day one, making them accessible options for all.

As noted in the attached letter of commitment from the IBEW Local 1547, CBJ has worked with union-labor on many successful projects that benefit the community: *"As an example of CBJ's commitment to supporting union labor, CBJ crafted and approved an ordinance that addresses use of union labor on complex projects that have a construction estimate of \$4.6M or greater. The Project Labor Agreement ordinance was developed and implemented to foster and support the growth and retention of skilled trade workers in the Juneau community. CBJ also follows all State of Alaska requirements for wage rate compliance and includes Alaska Department of Labor wage rate compliance regulations in all contracts over \$25,000... Utilizing IBEW Local 1547 members throughout the life of this and related projects will help CBJ meet its GHG reduction goals."*

To uphold the principles of fair compensation, the project will adhere to Title 23 regulations, including compliance with the Davis-Bacon Act and prevailing wage requirements. These labor standards guarantee that workers involved in the project receive appropriate compensation for their contributions.

In order to promote diversity and inclusivity, all project solicitations will actively encourage participation from Disadvantaged Business Enterprises (DBEs). Additionally, local unions and their associated registered apprenticeship and training programs regularly engage in outreach efforts to increase participation from underrepresented populations, fostering diversity and providing equal opportunities for individuals from all backgrounds to contribute to the project's success.

CBJ applies high standards for job quality for its existing and future government workforce as well. Non-exempt CBJ employees working on this project are represented by a collective bargaining unit. All CBJ employees are offered family-sustaining wages and comprehensive benefits, including but not limited to comprehensive health coverage, retirement and reimbursement for childcare expenses.

CBJ also provides relevant OSHA, health and safety training as relevant to workplace hazards, as well as anti-harassment training and protections for all employees.

By emphasizing fair compensation, training opportunities, and promoting inclusivity through DBE participation and outreach efforts, the project demonstrates its commitment to job quality in Juneau. These measures contribute to overall economic growth, job creation, and empowerment of

¹⁴ <https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/16/biden-harris-administration-roadmap-to-support-good-jobs/>

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underrepresented groups, such as women, people of color, individuals with disabilities, and those with convictions, fostering a more inclusive and prosperous community.

6. Programmatic Capability and Past Performance

CBJ has the programmatic capability and successful past performance of federal and non-federal assistance agreements from numerous awarding agencies. Several recent assistance agreements which CBJ is currently performing or has performed in the last three years are included below. The first three of the four examples provided include federal award agreement procedures, progress reporting requirements, procurement rules and other project and fiscal management processes which would directly relate to those outlined as part of the CPRG Implementation grant program. The fourth example (NREL Waste-to-Energy Technical Assistance Program) required project coordination and information between the CBJ's Engineering Department and the Wastewater Utility, which is relevant to the needs of this application.

a. Past Performance

FY2022 FHWA Safe Streets and Roads for All (SS4A) Action Plan Grant

- Project Title: *SS4A Action Plan Grant to the City & Borough of Juneau*
- Assistance Agreement Number: NA
- Agency and Listing/CFDA number: *USDOT FHWA, 20.939*
- Description: *CBJ received SS4A funding to conduct a full road safety analysis, taking inventory of all previous crashes, historical trends, conditions, severity of injuries, community and partner input and other factors across the entire jurisdiction. The safety analysis will produce a list of projects prioritized by these data points to guide implementation of the Comprehensive Safety Action Plan.*
- Contact: *Christine McNally, FHWA Alaska Division, 907.586.7148*

CBJ has a history of meeting all reporting requirements under our assistance agreements and of submitting acceptable final technical reports for those that are completed. CBJ worked closely with the FHWA to complete the grant agreement process and is reporting progress on the project in a timely manner and in accordance with the grant agreement guidelines.

FY2021 FTA Buses and Bus Facilities Projects Grant (5339b)

- Project Title: *Reducing Harmful Emissions by Running on Rain; Capital Transit Harnesses Local Hydro Power to Fuel Electric Buses and Charging Infrastructure for a Resilient Capital City.*
- Assistance Agreement Number: *2511-23-0200*
- Agency and Listing/CFDA Number: *Federal Transit Authority/ 20.526*
- Award amount: *\$1,446,827*
- Description: *The City and Borough of Juneau (Capital Transit) received funding to purchase on-route EV charging equipment for the Juneau Valley Transit Center to support the*

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transition diesel to electric buses. This project will improve air quality as well as safety and reliability for the 32,000 residents who live in Alaska's capital city.

- Contact: FTA Region 10 Office, (206) 220-7954

FY2020 Low or No Emission (Low-No) Bus Program Project Grant (5339c)

- Project Title: *Strengthening Renewable Energy with a Fleet of Clean Hydropower Fueled Electric Buses and Charging Infrastructure for a Resilient Capital City, Juneau, Alaska*
- Assistance Agreement Number: 2511-20-0700
- Agency and Listing/CFDA Number: *Federal Transit Authority / 20.526*
- Award amount: \$5,014,400
- Description: *The City and Borough of Juneau received funds to purchase new electric buses to replace aging diesel buses and associated charging infrastructure.*
- Contact: FTA Region 10 Office, 206.220.7954

Progress on the two active FTA agreements described above is being reported in a timely manner and includes progress on achieving expected outputs and outcomes.

FY2023 NREL Waste-to-Energy Technical Assistance Program

- Project Title: *Biosolids Incineration and PFAS Destruction*
- Assistance Agreement Number: NA
- Agency and Listing/CFDA number: *National Renewable Energy Laboratory (DOE)*
- Description: *NREL is assisting CBJ by providing 40 hours of technical assistance to investigate whether a biosolids Waste-to-Energy incinerator would also be able to destroy or significantly reduce PFAS in the final waste product from CBJ's wastewater treatment facility. They will also prepare economic and logistical feasibility for selected technologies.*
- Contact: Anelia Milbrandt, Sr. Research Analyst, 303.275.4633

CBJ worked collaboratively to provide all information and meet all designated timelines for the technical assistance program and is currently awaiting the final report from NREL for the project.

- i. Past performance in successfully completing and managing the assistance agreements:
 1. *CBJ and Capital Transit have the technical, legal and financial capacity to successfully deliver on the above-described FHWA, NREL and FTA projects as demonstrated by fulfilling all the grant requirements for each respective funding opportunity. Through inter-agency and interdepartmental collaboration, CBJ is adeptly managing all aspects of the grants to legally and fiscally responsible management of the funds according to the respective grant agreement guidelines. All assistance agreements described above have been successfully completed and managed.*
- b. Reporting Requirements

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CBJ has a history of meeting all reporting requirements under our assistance agreements and of submitting acceptable final technical reports for those that are completed. Progress on the above-mentioned agreements is being reported in accordance with each respective assistance agreement, in a timely manner and includes discussion of progress on achieving expected outputs and outcomes. Project reporting is a collaborative effort between CBJ's finance, procurement, engineering, legal departments, and the department leading the project management. CBJ believes close and transparent communication with the awarding agency is key to successful award management. Please see the Other Attachments form for a full third-party accounting of the CBJ's federal financial assistance reports for FY 2020-2022.

c. Staff Expertise

The City & Borough of Juneau includes 19 departments offering a variety of services and expertise to support the success of this project. These include but are not limited to a legal department, engineering division for project design and construction oversight, a full finance department with purchasing and procurement divisions and grant controller services. CBJ's Engineering Department staff, including those working on this effort, have completed numerous projects from conception through construction and operation, including extensive work at the MWWTP and boiler replacement projects.

With regard to project execution, CBJ Facilities Maintenance (CBJ Parks & Rec) staff have extensive first-hand experience with a variety of heating and power systems throughout CBJ's dozens of municipal facilities and have been monitoring municipal building energy use to identify opportunities for efficiency and improvements. These monitoring tools will provide a baseline for accurate observations and reporting on reductions in fossil fuel use and subsequent GHG reductions.

The Wastewater Utility operations staff at the MWWTP have in-depth knowledge of the 1960's facility and facility operations and will work with Facilities Maintenance, the project designers, contractors and project managers to efficiently reach project milestones and mitigate potential operational impacts and/or scheduling conflicts.

CBJ anticipates following EPA-compliant procurement guidelines for an open and competitive process to contract for the electrical engineering, design and construction services required to successfully complete the project alongside CBJ staff.

Project Team:

Alan Steffert, PE: Engineer II; BForSc at University of Canterbury; MF Logging Engineering at Oregon State University; 18 years with CBJ; 32 years' experience in the environmental and civil engineering fields; licensed in the State of Alaska as a Professional Civil Engineer in 2011.

Nate Abbott: Facilities Maintenance Supervisor, Energy Management Certificate Northwest Energy Education Institute, 17 years with the CBJ with multiple sustainability projects

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completed over that time ranging from simple LED lighting retrofits to large scale diesel to electrical conversions.

Brian McGuire: CBJ Utilities Superintendent; BS Chemical Engineering at Georgia Institute of Technology; 28 years' experience in various leadership roles in engineering, manufacturing management, technical SME, Sales and Procurement in Fortune 100 companies and Public Utility.

Dianna Robinson: Environmental Project Specialist; BA Michigan State University; MSc Environmental Sustainability, University of Edinburgh; 13 years' experience in the sustainability field

Denise Koch: Deputy Director of Engineering and Public Works; BA from University of Virginia; MS Public Health at University of Washington; 22 years' experience in environmental science and public health.

Ashley Heimbigner: Grants Manager; BA Willamette University, 15 years' experience in community engagement, public communications, and federal grant management.

Breckan Hendricks: Administrative Officer II; AAS in Business Administration; 8 years in administration at CBJ in the Engineering and Public Works Department, with a background in purchasing, human resources, and budgeting.

7. Budget

- a. **See Budget Narrative and Spreadsheet Attached**

Technical Appendix – Documentation of GHG Reduction Assumptions

Measure 1: Electric Boiler Installation at the Mendenhall Wastewater Treatment Plant

The existing fuel boilers at the Mendenhall Wastewater Treatment Plant (MWWTP) currently burn approximately 80,000 of fuel per year¹⁵, and it is assumed that conversion to an electric boiler using 100% renewable hydropower will offset all of the emissions currently produced by the fuel oil boiler. Assuming the project follows the estimated implementation timeline, the boiler will be fully operational by the fall of 2026.

A: Annual CO₂e Emission Reduction Calculations

Several EPA GHG emission calculation resources were used to quantify the annual projected emission reductions for this measure.

- 1.) EPA’s calculation for gallons of diesel consumed¹⁶ (heating fuel is closest in composition to diesel)

$$\mathbf{10,180 \text{ grams of CO}_2/\text{gallon of diesel} = 10.180 \times 10^{-3} \text{ metric tons CO}_2/\text{gallon of diesel} \times 80,000 \text{ gallons} = \mathbf{814.4 \text{ MT CO}_2 \text{ saved.}}$$

- 2.) The following calculations were derived from EPA’s *Emission Factors for Greenhouse Gas Inventories*¹⁷ for Distillate Fuel Oil No. 1:

$$\text{Annual Methane (CH}_4\text{) Reduction} = 80,000 \text{ gallons} \times 0.00042 \text{ kg CH}_4/\text{gallon} = 33.60 \text{ kg CH}_4$$

$$\text{Annual N}_2\text{O Reduction} = 80,000 \text{ gallons} \times 0.00008 \text{ kg N}_2\text{O}/\text{gallon} = 6.4 \text{ kg N}_2\text{O}$$

Fuel Oil Savings (gallons)	Fuel oil Savings MMBtu	Carbon Dioxide CO₂ kg / MMBtu	Carbon Dioxide CO₂ kg	Methane CH₄ kg / MMBtu	Methane CH₄ kg	Nitrous Oxide N₂O kg / MMBtu	Nitrous Oxide N₂O kg
80,000	11,120	73.25	814,400	0.003	33.36	0.0006	6.4

- 3.) The 100 year GWP as identified in the IPCC’s Fifth Assessment Report were used to identified CO₂-equivalent for CH₄ and N₂O.

$$\text{Methane CO}_2\text{e} = 33.36 \text{ kg} \times 28 = 934.08 \text{ kg} \times 0.001 = 0.934 \text{ MT CO}_2\text{e}$$

$$\text{Nitrous Oxide CO}_2\text{e} = 6.4 \text{ kg} \times 265 = 1696 \text{ kg} \times 0.001 = 1.696 \text{ MT CO}_2\text{e}$$

¹⁵ https://juneau.org/wp-content/uploads/2023/08/2021-GHG-reports_08012023_FINAL.pdf (p.15)

¹⁶ <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

¹⁷ <https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf> (Updated February 13, 2024)

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Annual CO₂e = 814.4 MT CO₂ + 0.934 MT CO₂e (CH₄) + 1.696 MT CO₂e (N₂O) = 817.03 MT CO₂e

- 4.) The EPA's Greenhouse Gas Equivalencies Calculator¹⁸ was used to verify the numbers above. See screenshot below.

Step 1 - Enter and convert data

Select data to convert: ☐ Energy data ☒ Emissions data

Enter data for one or more gases:

Carbon Dioxide or CO ₂ Equivalent*	814.4	Metric Tons
Carbon		Metric Tons
CH ₄ - Methane	33.36	Kilograms
N ₂ O - Nitrous Oxide	6.4	Kilograms
Hydrofluorocarbon gases		Metric Tons
HCFC-22		
Perfluorocarbon gases		Metric Tons
CF ₄		
Anesthetic gases		Metric Tons
HCFE-235da2 (isoflurane)		
SF ₆ - Sulfur Hexafluoride		Metric Tons

*If your estimated emissions of methane, nitrous oxide, or other non-CO₂ gases are already expressed in CO₂ equivalent or carbon equivalent, please enter your figures in the row for CO₂ or carbon equivalent.

Step 2 - View results

817 Metric Tons of Carbon Dioxide (CO₂) equivalent

This is equivalent to greenhouse gas emissions from:

B: GHG Reductions for 2025 – 2030 and 2025 - 2050

Assuming the project follows the estimated implementation timeline, the boiler will be fully operational by the fall of 2026. This means that no fuel emissions will be offset by the measure, only one quarter of fuel emissions will be offset in 2026, and the full annual 817 MT CO₂e will be offset for the subsequent years.

Per Year CO₂e Emissions Reduced (MT)

2025	2026	2027	2028	2029	2030
0	204.25 MT	817 MT	817 MT	817 MT	817 MT

Total GHG Reductions from 2025 through 2030 = 817 MT x 4.25 years = **3472.25 MT CO₂e**

Total GHG Reductions from 2025 through 2050 = 817 MT x 44.25 years = **19,812 MT CO₂e**

C: Calculations Uncertainties

¹⁸ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

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CBJ conducted the preliminary research regarding project equipment lead times to develop an informed implementation timeline, however, future supply chain disruptions have the potential to cause unforeseen delays. Juneau's northern location requires that the boiler replacement can only take place in the summer months when it is possible to turn off the heat. For this reason, equipment delays could require the project to be delayed by up to a year.

If this were the case, the total GHG reduction from the measure would decrease in alignment with the length of the project delay, with an 817 MT reduction for each year of delay.

Measure 2: Energy Audit of the Mendenhall Wastewater Treatment Plant (MWWTP)

While the comprehensive energy audit of the MWWTP is likely to result in significant energy use reductions at the facility, as well as key learnings for applications in other facilities, it is not possible at this time to quantify GHG emission reductions as a direct result of the measure.

As such, the GHG reduction calculations for measure 1 are also the cumulative for both measures combined.