

Section I - Overall Project Summary and Approach

A. Description of GHG Reduction Measures- *City of Duluth: J40 Wastewater Heat Recovery in a Very Cold Climate* (DuluthWWHR) is an ambitious implementation project that demonstrates thermal decarbonization of Justice 40 (J40) census tracts in the very cold climate of Duluth, Minnesota, through capture of waste heat from the effluent of the regional wastewater treatment plant. The project will result in 181,500 metric tons of GHG reductions through 2050, will improve air quality in northern Minnesota's most environmentally impacted census tracts, takes advantage of a Bipartisan Infrastructure Law (BIL) transportation investments to reduce partial implementation costs by 40%, and demonstrate the efficacy of wastewater heat recovery as a community energy source for the 16,000+ public wastewater system in the United States.

DuluthWWHR has two **GHG reduction measures** including **1) creation of renewable energy district heating systems from captured waste heat in wastewater effluent at a COP of 4.2, and 2) an aligned renewable energy and efficiency small commercial grants program.**

All work will be conducted in and impact J40 census tracts. Features of Duluth WWHR include:

1. Capturing of waste heat from the effluent of WLSSD's wastewater treatment plant.
2. Creation of a new district energy system in the Lincoln Park neighborhood to serve low-income and public housing, Duluth's first resilience hub (including winter shelter for unhoused individuals), small businesses, light manufacturers, post office, recreational facilities, and a planned green jobs and food access training center.
3. Connection to the downtown District Energy System (DES), resulting in periods of 100% renewable energy-based heat for buildings on the Downtown DES hot water loop including city, county, and federal buildings, low-income housing, shelters, and businesses.
4. Pre-heating of make-up water for the DES buildings that remain on the 1-way steam delivery system due to high costs of building conversions.
5. Facilitating environmental justice focused improvements like neighborhood odor reduction and improved access to training and employment in green jobs.
6. Providing analysis and design assistance to commercial building owners and businesses, assisting in navigating to IRA and other implementation resources, and providing a small grants program for project implementation.

This project was chosen as Duluth's priority project because:

1. A **singular moment in time** that can produce cost effectiveness for GHG reductions as the project will be coordinated with two funded climate-forward transportation projects.
2. Its focused impact in J40 neighborhoods and deep community engagement that has prioritized this effort.
3. DuluthWWHR's ability to reduce hard-to-address emissions from heating in a very cold climate.

4. The project support for decarbonization of small businesses, low-income and public housing, and a community resilience hub.
5. It implements top strategies defined under federal planning grants including DOE Communities Local Energy Action Plan and Community Geothermal, CDC Social Determinants of Health Accelerator, and EPA Local Foods Local Places Planning.
6. DuluthWWHR implements multiple State of Minnesota's Priority Climate Action Plan (PCAP) strategies as illustrated in Table 1, as well as City of Duluth and Duluth Citizen's Climate Action Plans.

Table 1. MN Priority Climate Action Plan (PCAP) Strategies Addressed by DuluthWWHR

3.2. Reduce greenhouse gas emissions from commercial and public buildings by promoting energy efficiency, renewable energy, electrification, and lower-carbon design, materials, and fuels

DuluthWWHR implements strategies 3.1-3.6 by establishing renewable energy district heat options and working with businesses to decarbonize buildings. Project pairs decarbonization with air quality and resilience, and provides system-level opportunities to aid in successful green building certifications.

4.1. Increase industrial efficiency, transition to cleaner energy sources, and reduce process emissions;

DuluthWWHR implements strategies 4.1 and 4.4-8 by assisting industrial partners with building decarbonization and supporting industrial process loads, incorporating waste heat capture at the wastewater treatment facility, expanding workforce training in energy-efficiency and renewable design and installation, and providing technical and financial assistance to small business owners to advance climate action.

Measure 1: Wastewater Heat Recovery District Energy Solution- This measure produces 177,000 metric ton of GHG reduction between completion in 2028 and 2050 by establishing a new central heat recovery plant at the Western Lake Superior Sanitary District to capture waste heat from the treatment effluent, creates a new district energy distribution system in the adjacent Lincoln Park neighborhood in conjunction with the rebuild of West Superior Street (USDOT RAISE grant), and connects to the existing Downtown Duluth District Energy System (DES) to support decarbonization of both the DES hot water loop and steam system, in coordination with replacement of the I-35 pedestrian bridge and resurfacing of Railroad Street. The project schedule (Section 3) demonstrates final completion in Q4 of 2028 and is driven by the synergistic transportation projects that create project viability. If Measure 1 project completion is delayed until 2029, predicted GHG reductions experienced in 2025-2030 of 16,900 metric tons would be reduced by 31% to 11,600 and 2025-2050 reductions of 177,000 metric tons would be reduced by 3% to 171,000 tonnes. Major risks and mitigation measures are listed in Table 2.

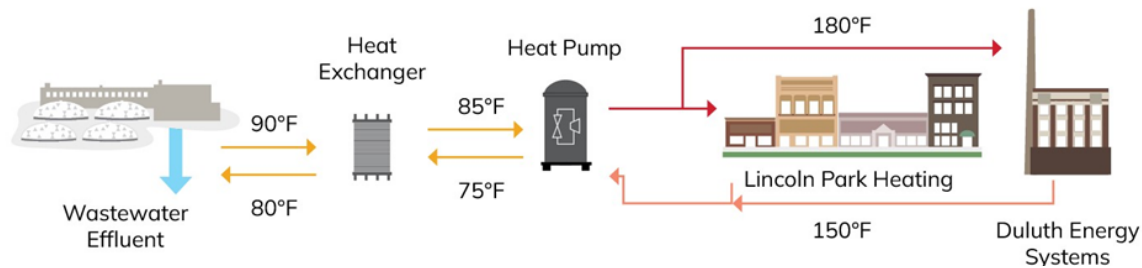


Figure 1. Wastewater heat recovery and district heating system illustration.

Measure 2: Commercial Renewable Energy and Efficiency (REE) Grants Program- This measure produces 4,500 tonnes of GHG reduction from 2025-2050 from direct CPRG investment and sets up additional potential reductions from stacking Inflation Reduction Act, conservation improvement programs, and tax credit resources. The measure de-risks renewable energy and efficiency improvements for small businesses and industry by providing analysis and design grants, resource bundling, and follow-up implementation grants. Two rounds of analysis and design grants will be followed by two rounds of implementation assistance as detailed in Section 3. The Commercial REE Grant program will be informed by results from Duluth's work with the National Renewable Energy Laboratory through Communities-LEAP (Local Energy Action Plan). NREL completed an analysis in 2023 using ComStock to identify the sets of solutions and priority upgrades for commercial buildings in Duluth. Informed by these results, the Commercial REE Grant program will target the top 3 segments which account for 78% of the site energy consumed, and 76% of emissions, see Figure 2. The top three segments targeted will be buildings 1) with rooftop units (non-food service), 2) with rooftop units (food service), and 3) with hydronically-heated multi-zone systems. All projects will be complete by 2027 to accelerate GHG reduction benefits into the key 2025-2030 timeframe.

Although the Commercial REE Grant Program represents just 2% of the project budget and anticipated emission reductions from 2025 to 2050, there are multiple co-benefits to its inclusion. This measure jump starts the City of Duluth's commercial efficiency approach, provides a concrete next step and opportunities for Communities-LEAP (C-LEAP) stakeholders to operationalize 2-years of planning, provides key implementation resources for small businesses, and is designed to demonstrate commercial approaches and incentive processes in the region to stakeholders that will be engaged on commercial and industrial decarbonization through a DOE Energy Futures planning grant (currently under award negotiations with DOE). Risks are listed in Table 2.

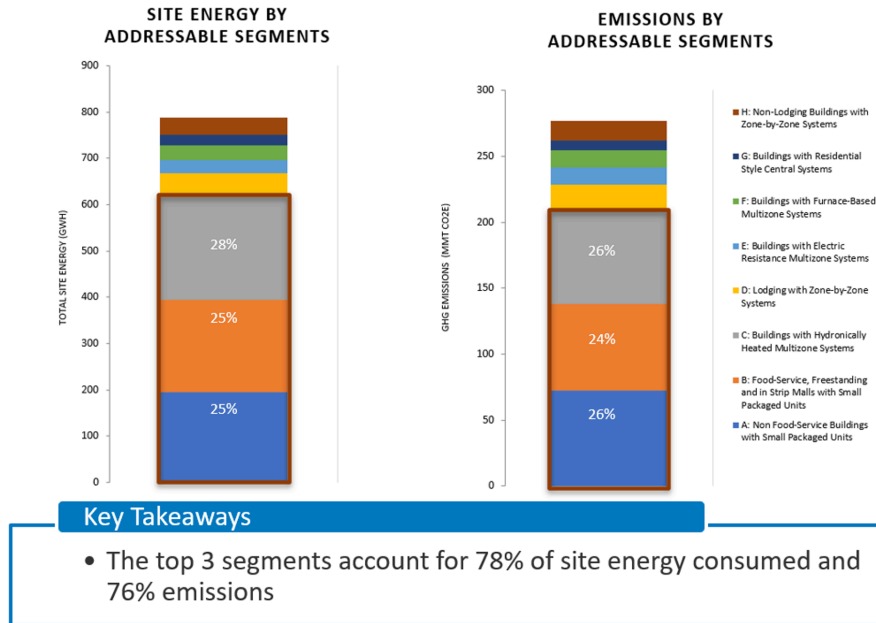


Figure 2. Solutions and upgrades for City of Duluth commercial buildings. (Source: 2023 ComStock analysis, using subset of datasets for very cold climates <https://www.nrel.gov/buildings/comstock.html>)

Table 2. Risks and Mitigations that Could Affect Project and Emission Reductions	
Risks	Mitigations
Distribution- Schedule misaligned with W. Superior Street Reconstruction	Project team includes W. Superior Street Project Manager, phasing of project to align with RAISE project, project partners previous successful on E. Superior Street combined street/district heat project
Distribution- Crossing I-35 requires piping across two bridges	Coordination established with MNDOT, previous success on similar project in Downtown Duluth
Distribution- Costs increases on street resurfacing if timing is off	Railroad Street resurfacing after pipe installation, City has previously delayed/accelerated projects to meet district energy timelines
Building Connections- Not having system ready to heat buildings	Building conversion to start in spring, temporary heat solutions will be available if needed prior to heat season
Building Connections- Customer agreements in new Lincoln Park system not currently in place	Customer agreement work to begin Q1 of grant, DOE Geothermal grant will establish business model during prior to start of CPRG, experience on customer recruitment demonstrated downtown
Central Heat Plant- Siting and process design challenges	Existing planning with City/WLSSD/Ever-Green Energy, co-location determination for Central Heat Recovery Plant and odor improvement system
Commercial REE Grants- Lack of uptake of grants and contractor availability	Measure 2 is designed to de-risk involvement by businesses by providing design support, priority; intervention measures are based on ComStock analysis, resource braiding detailed by NREL through C-LEAP, based on Duluth's EPA Climate Showcase project established for residential properties

B. Demonstration of Funding Need - This project can only proceed with CPRG funds.

Although applying waste heat from WLSSD into a thermal smart grid has been discussed in Duluth for the last two decades, the potential of the project only became a reality when two separate transportation projects were funded to produce a singular moment in time in which significant project cost reductions can be achieved and the impact to the lower income disadvantaged communities (LIDAC) neighborhoods can be minimized. The first grant was a USDOT RAISE grant under Bipartisan Infrastructure Law (BIL) funding for \$25 million to rebuild 1.6 miles of West Superior Street through Lincoln Park. Previous district energy construction projects in Duluth have demonstrated 60% of the costs are related to civil construction. Piping installation costs can be reduced by 40% when implemented as part of a road/utility layer reconstruction. The second was an award to MNDOT for transportation climate funding to rebuild the pedestrian bridge that can carry the pipes over I-35 to connect the Lincoln Park project to the existing Downtown DES. DuluthWWHR builds upon nearly \$30M in system investments over the past 8 years, existing planning grants, and further benefits from EJ and training grants provided under J40 initiatives.

Due to the RAISE grant timeline, which requires initial construction activities on Superior Street to begin in 2025 and be completed by 2028, funding must be secured for the DuluthWWHR project by Q3 of 2024, **or the window of opportunity for this J40 energy transition closes**. The Superior Street schedule restricts the ability for the project to pursue other funding sources like state bonding or other federal grants due to a timing mismatch. It is only through strong partners that have successfully completed complex projects together, and alignment with the DOE Community Geothermal Heating and Cooling Design and Deployment grant awarded last April, that this project is shovel-ready for a CPRG application. Table 3 discusses other funding sources committed, applied for, or investigated.

Table 3. Additional Funding Pursued		
Source	Notes	Amount
USDOT RAISE	Awarded, construction must start in 2025 and be complete by 2028	\$24,999,160
MNDOT	Scheduled for 2026, facilitates co-design with utility project needs	\$2,000,000
DOE Energy Futures	Awarded, not yet contracted. Planning for municipal gas utility business model, stakeholder engagement for commercial and industrial decarb	\$500,000
DOE C-LEAP	Technical assistance from NREL for ComStock analysis, resource braiding pathways, green iron/steel research, W Superior St EV infrastructure plan	\$500,000 TA
State	2015 Investment to create downtown hot water loop, convert buildings, reduce carbon emissions (50%) and water use (20M gal/yr)	\$21,000,000
Regional Exchange District	Expansion of host water distribution to medical district (25% of hot water load) and expand redundancy (hospital boilers dispatchable by system)	\$7,000,000
DOE RACER	Planning and analysis of how renewables (emphasis on solar +	\$977,813

	storage) can increase community resilience, implementation of projects may hasten decarbonization of water pumping costs (not included in GHG calcs)	
DOE Community Geothermal Heating	Design and analysis funding awarded in 2023 which has resulted in CPRG application, 30% design and business model to be completed by Sept 2024, no duplication of expenses with CPRG application	\$700,414
DOE Community Geothermal Heating	In Q4 of 2024, GETO will downselect projects for potentially 90% federal implementation funding, downselect funding available is insufficient for the large district approach (most design projects are small collection of buildings for geothermal, not geo-exchange)	Downselect potential
EPA Cooperative Problem Solving	Funding to Eco3 to create Social, Economic, and Environmental (SEE) Justice fellows program of BIPOC community members that will advise DuluthWWHR	\$500,000
CNCS AmeriCorps	Application submitted to CNCS for creation of Energy Training Corps. Expected award announcement April 2024.	\$617,037/yr
MN State Competitiveness	First two rounds were not aligned with the CPRG timeframe. A third round will be announced and DuluthWWHR can apply at that time.	\$999,999
IRA, tax credits	Per NREL analysis, will be bundled to assist businesses in implementation of efficiency and renewable energy recommendations from design grants, measure 2 de-risks analysis costs, prioritizes improvements and funding/financing bundle for highest ROI, and can address split-incentives	TBD

C. Transformative Impact- DuluthWWHR meets CPRG goals and provides a transformational impact by 1) deploying a new neighborhood-based geothermal-hybrid heating district that optimizes wastewater effluent waste heat as a fuel source and secures the long-term economic viability of an existing district heat system; 2) developing an efficient solution for the hard to abate heating loads in a very cold climate, electrification of heating in a very cold climate where air source heat pump technology cannot yet meet full winter loads; 3) identifying solutions for a J40 community that currently exceeds 60% on 11 of 11 EPA EJScreen indicators, experiences the highest health disparities in the state, and was determined to be Minnesota's most-impacted, most-distressed area with unmet recovery needs for the 2015 HUD National Disaster Resilience Competition; 4) reducing GHG emissions for current hot water customer buildings totaling 8.2 million square feet on the DES loop in Downtown Duluth, positively impacting 4 additional J40 census tracts; 5) connecting to energy transition career training and enhancing workforce opportunities for residents; 6) developing a U.S. case study illustrating how wastewater treatment infrastructure can become a renewable energy source and methodologies for linking two systems (including technical and economic data showing how projects can be replicated by communities throughout the United States); and 7) allowing for the publishing of data and

information about a U.S. geothermal district heating system deployed in a very cold climate community.

Duluth can be a national example of how innovative design and integration across sectors (transportation, energy, wastewater, building, business) can cost-effectively accelerate the transition to clean energy while providing communities with resilient heating solutions even in the coldest of climates. DuluthWWHR would be a first-in-the-nation recovery of waste heat from wastewater effluent to heat a J40 host neighborhood and adjacent LIDACs. Only 7 of these systems exist worldwide (3 Sweden, 3 Finland, 1 China) with none in the U.S. Duluth is a great first-test case because of higher than average effluent temperatures allowing for heat pumps to operate at 420% efficiency, incorporation in the system of industrial waste heat, and tested partnerships that can successfully work through the complexities while responding authentically to community leadership. Over 16,000 public wastewater facilities exist (usually by definition in J40/LIDAC neighborhoods) that can learn from this project.

DuluthWWHR is also designed to scale locally as energy transition and conversion to district heating (by hot water) accelerates. This includes a modularized approach at the plant that can facilitate additional heat pumps to eventually serve the Canal Park and Duluth Convention Center loops of DES. It also includes the potential of the main connecting pipe between Lincoln Park and DES serving the future Wharf at Pier D, Duluth's largest proposed mixed-use development in decades (GHG reductions do not include this expansion.)

DuluthWWHR includes a methodology for assisting businesses, where connection to the system would not be economically viable at this time, by developing a synergistic Commercial Renewable Energy and Efficiency (REE) program. This program will be primed for replication and scaling through a stakeholder planning partnership that includes other city, county, and state governmental representatives (funded under DOE Energy Futures planning grant). The REE will create an implementation program grounded in ComStock analysis and existing commercial building programs like EnergyStar and LEED.

Section 2: Impact of GHG Reduction Measures

Note: This section contains the summary information for the magnitude and cost effectiveness of carbon reduction measures for 2025 through 2030 and 2025 through 2050. The TechAppx_City of Duluth.pdf and GHGcalcs_City of Duluth.xls provide the further detail.

DuluthWWHR addresses hard-to-abate sectors including old main street/downtown commercial buildings in very cold climates. DuluthWWHR demonstrates how wise investment in heat pump-based generation, and in this case waste heat capture, and district energy can accomplish building decarbonization in parallel to a decarbonizing grid. Table 4 shows the impact of DuluthWWHR on commercial square footage for the Lincoln Park and DES portion of the project. Lincoln Park GHG reductions of 79% would apply to 1,027,362 square feet of commercial properties and accomplish an overall emissions avoidance of 6.3 tonnes of carbon per 1,000 square feet. The downtown DES GHG reductions of 68% would

apply to an additional 3,652,100 square feet and accomplish an overall emissions reduction of 3.6 tonnes of carbon per 1,000 square feet.

The lower reductions per square foot for Downtown DES recognizes that the system would be designed to first meet the heating needs of the Lincoln Park neighborhood and then the Downtown system per DuluthWWHR environmental justice design priorities. In addition, the calculations reflect Downtown DES consuming any unused energy generated from the 10MW of heat pumps. For modeling purposes, 3.5 MW of that capacity was applied to DES. Further, it should be noted that the reduction would be higher if calculations began at time of system start up and that once the grid reaches its mandated decarbonization point in 2040, the effective GHG reductions would become 100% for these commercial properties. No other modeled approach can accomplish that in Duluth, creating an expectation of district energy growth and additional heat pumps at WLSSD.

Table 4. Decarbonization Results for DuluthWWHR District Energy Customers				
2025 to 2030 (System online Q3 2028)				
Segment	Natural Gas Consumption Emissions	Scenario Emissions w/ DuluthWWHR	Emissions Avoided	Percent Reduction
Lincoln Park	19,748	13,305	6,443	33%
Downtown DES	37,219	26,802	10,418	28%
Total	59,967	40,107	16,861	30%
2025 to 2050				
Lincoln Park	85,574	18,122	67,452	79%
Downtown DES	161,284	52,219	109,065	68%
Total	246,858	98,502	148,356	72%

A. Magnitude of GHG Reductions: 2025 through 2030- The magnitude of GHG reductions from 2025 to 2030 is summarized in Table 5 by individual measure. The largest impact is Measure 1 which accounts for three-quarters of the emission savings during this period. In order to make the long-term carbon savings as cost competitive as possible, the Measure 1 buildout is inextricably tied to the phasing of the W Superior Street reconstruction that will progress in three phases from 2026 to 2028. The project includes replacement of 140+ year old sewers, upsized water mains to address ongoing issues of business and industry not having sufficient water to sprinkle buildings, significant improvements to green and gray infrastructure to address flooding concerns, and an overall

building-front to building-front renewal for ADA access and improved economic activity. The phasing of the project was prioritized based upon needs of the potable water system, which means the project will progress from east to west, instead of the reverse which would have allowed for the district energy system to come online one year earlier for an additional 5,300 tonnes of GHG reductions (31% for Measure 1). To meet the heating needs of Phase I and Phase II customers, temporary boilers will be used. The project assumes no GHG reductions when using temporary generation. In addition, calculations have carefully been made to account only for GHG emissions related to EPA funding.

Table 5. 2025-2030 Metric Tons of CO2 Emissions Avoided		
Project Component	Tonnes of CO2	Percent by Measure
Measure 1- Wastewater Heat Recovery	16,900	79%
Measure 2- Commercial REE Grants	4,500	21%
Total	21,400	100%

B. Magnitude of GHG Reductions: 2025 through 2050- Table 6 presents the carbon emissions avoided for DuluthWWHR for the full period of 2025-2050 and percent by measure. Supporting the development of Measure 2- Commercial REE Grants, and building City of Duluth staff capacity to assist businesses with navigating other incentives and resources, is expected to produce considerably more savings during both time periods, however, a conservative approach has been utilized to ensure that all savings claimed are directly attributable to CPRG funding. Program design in grant quarters 1 and 2 will further flesh out any additional CPRG-attributable emission reductions.

Table 6. 2025-2050 Metric Tons of CO2 Emissions Avoided		
Project Component	Tonnes of CO2	Percent by Measure
Measure 1- Wastewater Heat Recovery	177,000	98%
Measure 2- Commercial REE Grants	4,500	2%
Total	181,500	100%

The accompanying documentation for GHG reduction calculations illustrates how Measure 1 was calculated based upon 1) the new Lincoln Park distribution system, and 2) the impact that will occur for downtown hot water loop customers at DES. With the system fully online in the fall of 2028, the reduction experienced by Lincoln Park customers from 2025 to 2030 is 33% based on reduced combustion of natural gas for heating, hot water, and process loads. This rises to 79% for the period of 2025 to 2050. For the downtown district

customers the numbers are 28% and 68%, respectively, which is based upon the full load of the loop. If the natural gas consumption that is replaced by heat pump technology was isolated, the emission reductions for DES would result in 33% and 79% reductions respectively.

As a hard-to-abate sector, DuluthWWRC has an incredible impact on the emission profiles of Duluth's commercial buildings and demonstrates the efficacy of district energy and waste heat capture as a foundational strategy for very cold climate communities with older building stock.

C. Cost Effectiveness of GHG Reductions- As shown in Table 7, from 2025-2050, DuluthWWHR would reduce a total of 181,500 metric tons of GHG emissions, resulting in a cost of \$327 per metric ton over that period. Cost of GHG emission reductions experienced from 2025-2030 is \$2,627 per metric ton.

Table 7. Cost of GHG Emission Avoidance				
	2025-2030		2025-2050	
Project Component	GHG Reduction	\$/tonne of CO2	GHG Reduction	\$/tonne of CO2
Measure 1- Wastewater Heat Recovery	16,900	\$2,843	177,000	\$271
Measure 2- Commercial REE Grants	4,500	\$222	4,500	\$222
Total Grant inclusive of staff and outreach costs not attributed to individual measures.	21,400	\$2,333	181,500	\$275

Project costs and impact for Measure 1 on a square foot basis are demonstrated in Table 8. Because the electricity grid is regulated to be carbon neutral by 2040 in the State of MN, buildings connected to the wastewater heat recovery district will essentially be decarbonized by 2040.

Table 8. Project Costs and Impact for Measure 1 on Hot Water Distribution Customers					
% of CPRG Budget	Cost	Impacted Commercial SF	Cost/SF	Average % GHG reduction 2025-2050	% GHG reduction 2040 and beyond
96%	\$48,038,781	4,680,000	\$10.26	60%	100%

D. Documentation of GHG Reduction Assumptions- Documentation of GHG reduction assumptions and methodologies can be found in grant attachments: TechAppx_City of Duluth.pdf and GHGCalcs_City of Duluth.xlsx.

Section 3: Environmental Results–Outputs, Outcomes, & Performance Measures

A. Expected Outputs and Outcomes- The expected outputs and outcomes for Measure 1 - Wastewater Heat Recovery and Measure 2- Commercial Renewable Energy and Efficiency grants are outlined in Table 9. In addition to outputs and outcomes listed, DuluthWWHR contributes to accomplishing multiple climate strategies under MN PCAP and the City of Duluth's Climate Action Plan and community co-benefits.

Table 9. Expected Grant Outputs		
Measure	Outputs	Quantity
1-WWHR	Metric tons of GHG reductions from 2025-2030	21,400
1-WWHR	Metric tons of GHG reductions from 2025-2050	181,500
1-WWHR	MW of heat pumps installed to capture waste heat from wastewater effluent	10
1-WWHR	Heat Pump central plant located to facilitate WLSSD malodorous reduction process improvements	1
1-WWHR	New renewable energy district heat system installed in J40 neighborhood	1
1-WWHR	Initial connections of commercial structures to renewable district energy system	20
1-WWHR	Units of public housing (214), resilience hubs (1), hospitals (2), shelters (2), grocery (1) connected to renewable heat	varies
1-WWHR	Jobs created due to construction activities. (per BLS estimate)	600
1-WWHR	J40 very cold climate commercial square foot reaching net zero by 2040	1M
2-CREE	Metric tons of GHG reductions from 2025-2030	4,500
2-CREE	Energy analysis and implementation of CREE creates jobs in construction and trades (BLS estimate)	17
2-CREE	Businesses with individualized plans for decarbonization	50
2-CREE	Case studies developed on successful CREE implementation projects	3
2-CREE	Total investment in implementation projects (includes private investment and other bundled resources)-4:1 ratio	\$2M

Table 10. Expected Grant Outcomes
CAP and HAP emission reductions from a stationary source (downtown district energy plant), along with emissions along business corridor in Lincoln Park resulting in improved health of LIDAC communities
District energy system improvements stabilizes future fuel costs, reduces operational expenses and community tax burden, and energy burden for low-income households connected to the system
Construction of energy transfer facility is sized to host new odor blower equipment, resulting in reduced odor pollution in LIDAC and improve health
Demonstration of wastewater heat recovery in a medium-sized City serves as a learning opportunity for 16,000+ communities across US
Engagement with electric, gas, and district energy utilities through CREE design process and implementation produces better alignment for future conservation program offerings
CREE saves energy for building owners in LIDACs, reducing operation and maintenance costs, allowing businesses to reinvest in additional sustainability measures and employees
Renewal of HVAC and energy systems in buildings increases the viability of commercial development in EJ neighborhoods, encourages economic growth low-income areas, and produces healthier work environments
Increase understanding and support for building and energy generation decarbonization

B. Performance Measures and Plan- Project performance shall be tracked against quarterly milestones per the following schedule (grant quarter(calendar year quarter)) and reported on semi-annual and final grant reports to the EPA. Each task and quarter will have a minimum of 1 milestone. Any variance from the overall schedule will be noted:

- Q1 (Q4 2024)-** Initial design document for commercial analysis and design grants complete.
- Q2 (Q1 2025)-** Grant application process launched for Commercial REE Grants program.
- Q3 (Q2 2025)-** Issue bid documents for piping design WLSSD to Superior Street and LNPK Phase I
- Q4 (Q3 2025)-** Issue construction documents for DES Piping.
- Q5 (Q4 2025)-** Issue construction documents for central heat recovery plant at WLSSD.
- Q6 (Q1 2026)-** Issue bid documents for piping design LNPK Phase II.
- Q7 (Q2 2026)-** Award 25 round 1 Commercial REE Implementation Grants.
- Q8 (Q3 2026)-** Complete installation of LNPK Phase I piping.
- Q9 (Q4 2026)-** Complete installation of DES Phase I piping.
- Q10 (Q1 2027)-** 50% complete central heat recovery plant construction.
- Q11 (Q2 2027)-** Award 25 round 2 Commercial REE Implementation Grants.
- Q12 (Q3 2027)-** Complete installation of LNPK Phase II piping.
- Q13 (Q4 2027)-** Complete all Commercial REE Implementation Grant funded projects
- Q14 (Q1 2028)-** Piping material procurement and delivery complete for LNPK Phase III.
- Q15 (Q2 2028)-** Central heat recovery plant at WLSSD is fully operational.
- Q16 (Q3 2028)-** Substantial completion of all generation and distribution assets.
- Q17 (Q4 2028)-** Final completion of all generation and distribution assets with report out to the community.
- Q18 (Q1 2029)-** Final grant report to EPA with ongoing GHG/CAP/HAP reporting agreement.

Included in each semiannual report to the EPA will be cumulative performance on outputs and outcomes referenced in 3A. Energy delivered through the wastewater district heat system will be measured through utility metering and will be converted to GHG reductions based upon the

methodology used in the CPRG application. GHG impacts of installed measures, as part of the Commercial REE Grant Program, will be recorded according to the energy analysis and quality assurance included in the program. Protocols will follow established Commercial Conservation Improvement Program guidelines in the State of Minnesota.

The City of Duluth will include annual public GHG reporting on the Wastewater Heat Recovery measure and a final report on installed measures, GHG reductions, energy savings, and percent energy reductions for all projects completed under the Commercial REE Grants program. A plan will be completed for EPA review of evaluating and reporting on CAP and HAP impacts during the first quarter of the grant performance. Initial reporting plan for CAPs and HAPs will be to use emission factors determined by the EPA related to natural gas combustion.

C. Authorities, Implementation Timeline, and Milestones- The parties involved in implementing the GHG reduction measures currently work together as part of the *Lincoln Park Geothermal Coalition*. This analysis and design project initiated analysis of the wastewater heat recovery system, business model planning, and 30% piping design. This partnership and work is being conducted under a DOE Community Geothermal Heating and Cooling Grant (DE-EE0010666) ending in Q3 2024. Key parties, roles, and authority include (documented by letters of commitment):

City of Duluth: Grantee, utility and street design, system owner, and issuer of construction permits for roadway utility work, central heat recovery plant, and energy transfer station.

Ever-Green Energy: System designer and operator of Duluth Energy Systems under contract from City of Duluth.

Duluth Energy Systems (DES): Downtown district energy system owned by the City of Duluth and operated under contract by Ever-Green Energy. DES is guided by a citizen advisory board including representation from Lincoln Park and the Duluth Sustainability Officer.

WLSSD: Wastewater systems operator, plant owner, engineering and design of central plant location on WLSSD property.

MNDOT: Owner of the 27th Avenue overpass bridge and project manager for the rebuild of the pedestrian bridge over I-35. Key roles are permitting, structural review, and project management for the reconstruction of the pedestrian bridge (fully funded and scheduled for 2026) and any modifications of the 27th Avenue overpass to carry thermal distribution lines.

Ecolibrium3: Lincoln Park EJ and Community-based organization that administers the Main Street Lincoln Park business group and neighborhood engagement. Serves on DES Advisory Board.

Measure 1 has four tasks that combine for final completion in Q4 of 2028, with reporting and grant close out in Q1 2029. The project will have initial business model determination and 30% design for hot water piping in Lincoln Park completed in Q3-4-2024 as part of the DOE Geothermal grant scope of work. Proper procedures are in place with the City of Duluth to ensure no duplication of funding or effort occurs between the initial DOE analysis and design grant and the CPRG application. Tasks and milestones for EPA CPRG funding include:

1.1.0 Business Structure Planning and Community Engagement (Q3 2024- Q4 2028): Q3 2024 - Q4 2028 ongoing community engagement per community benefits plan, Q3-4 2024 finalize business model and customer contract terms, Q4 2024 - Q4 2028 establish long-term hot water customer contracts.

1.2.0 New Lincoln Park Renewable Energy System (Q1 2025 - Q3 2028):

1.2.1 LNPk WLSSD to Superior St via 27th Ave W Bridge Hot Water Piping: Q1-2 2025 issue bid documents, Q2-3 2025 issue construction documents, Q3 2025 RFP for materials, Q4 2025-Q1 2026 purchase and delivery of materials, Q2-Q3 2026 installation.

1.2.2 LNPk Phase I- Michigan Street to 18th Ave W (Q1 2025 - Q3 2026):

1.2.2.1 Building Connections: Q3 2025 RFP for building connection engineering, Q3-4 2025 building connection engineering, Q4 2025-Q1 2026 building connection construction, Q1 2026 material procurement purchase and delivery, Q2-Q3 2026 hot water system connection installation, Q3 2026 startup and commissioning.

1.2.2.2 Distribution System: Q1-2 2025 issue bid documents, Q2-3 2025 issue construction documents, Q3 2025 RFP for materials, Q4 2025-Q1 2026 purchase and delivery of materials, Q2-Q3 2026 installation.

1.2.3 LNPk Phase II- 18th Ave W to 24th Ave W (Q1 2026 - Q3 2027): Phase II will begin in Q1 2026 and proceed along a similar timeline as Phase I for subtask 1.2.3.1 Building Connections and subtask 1.2.3.2 Distribution System.

1.2.4 LNPk Phase III- 24th Ave W to Carlton St (Q1 2027 - Q3 2028): Phase II will begin in Q1 2027 and proceed along a similar timeline as Phase I for subtask 1.2.4.1 Building Connections and subtask 1.2.4.2 Distribution System.

1.3.0 Duluth Energy System Connection:

1.3.1 Piping (Q3 2025-Q4 2027): Q2-Q3 2025 30% design, Q3-Q4 2025 issue bid documents, Q4 2025 issue construction documents, Q4 2025-Q1 2026 piping material procurement and delivery, Q2-Q3 2026 pedestrian bridge reconstruction and piping installation.

1.3.1.1 DES Phase A Installation: design and procurement included in above, Q2-Q4 2026 installation.

1.3.1.2 DES Phase B Installation: design and procurement included in above, Q2-Q4 2027 installation.

1.4.0 Central Heat Recovery Plant Construction: Q1-Q2 2025 30% design, Q2-Q3 2025 issue permit documents, Q4 2025 issue construction documents, Q4 2025-Q1 2026 contractor selection process and material procurement, Q2 2026-Q2 2027 plant construction, Q2-3 2027 plant commissioning, Q3-4 2027 plant operational. Temporary production sources will be used for LNPk Phase I and Phase II and online by the end of Q3 in 2026 and 2027, respectively.

Measure 2 has three subtasks that allow for strong program design and 2 RFP processes for commercial businesses to apply for initial analysis and design grants, followed by implementation grants responsive to each quantified GHG reduction measure.

2.1 Commercial Program Design and Launch: Q3-4 2024 design of Commercial REE Grant program including procurement of professional services, Q4 2024-Q1 2025 business outreach, Q3-Q4 design of implementation grant program.

2.2 Analysis and Design Grants: Q1-Q2 2025 application process, evaluation, and award of round 1 analysis and design grants, Q3 2025-Q1 2026 REE design and analysis of 25 round 1 businesses, Q1-Q2 2026 application process, evaluation, and award of round 2 analysis and design grants, Q3 2026-Q1 2027 REE design and analysis of 25 round 2.

2.3 Renewable Energy and Efficiency Implementation Grants: Q1-Q2 2026 application process, evaluation, and award of round 1 implementation grants, Q3 2026-Q1 2027 complete REE

implementation for round 1 businesses, Q1-Q2 2027 application process, evaluation, and award of round 2 implementation grants, Q3-Q4 2027 complete REE implementation for round 2.

Reporting includes reporting on project progress, community engagement and benefits, GHG reductions, and impacts on CAPs and HAPs.

5.1 Semi Annual Reporting: To follow EPA contract and guidelines. Assumes award notification in July 2024, contract negotiations and award funding by end of calendar Q3, pre-award authorization may be sought. Semi-annual reporting may shift if contract date varies from assumption.

5.2 Final Reporting: Final reporting will occur within 90-days of project completion, anticipated by end of Q1 2029.

Project Timeline (* milestone date)	2024			2025				2026				2027				2028			
Quarter	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Measure 1- Wastewater District Heating																			
1.0 Business Structure Planning/Engagement																			*
2.1 LNPk WLSSD to Superior St via 27th				*	*				*										
2.2 LNPk Phase I- Michigan to 18th				*	*				*										
2.3 LNPk Phase II- 18th to 24th								*						*					
2.4 LNPk Phase III- 24th to Carlton																*		*	
3.1 DES Piping					*					*									
4.0 Central Heat Recovery Plant						*						*					*		
Measure 2- Commercial REE Grant Program																			
1.1 Grant Program Development Design		*	*																
1.2 Analysis and Design Grants					*														
1.3 Improvements Grants									*				*		*				
Reporting																			
Semi-annual report (final report Q1 2029)																			

Note: business structure planning Q2-3 2024 conducted under DOE Geothermal Grant

Section 4: Low-Income and Disadvantaged Communities

All benefits from the DuluthWWHR project will accrue to J40 census tracts found within the Lincoln Park (156) and Downtown Duluth neighborhoods as shown in Table 10. Of J40 eligible census tracts, the main project location is at the 93rd percentile nationally for “most J40 Categories exceeded.”

Picture 1- Green line shows Lincoln Park-W Superior Street district loop (J40 census tract 156). Red is the DES connection servicing (J40 census tracts 16, 17, 18, 19). Public housing (top building illustrated in Lincoln Park) is in the census block group with 8 of 13 EPA supplemental indexes exceeding 90th percentile.

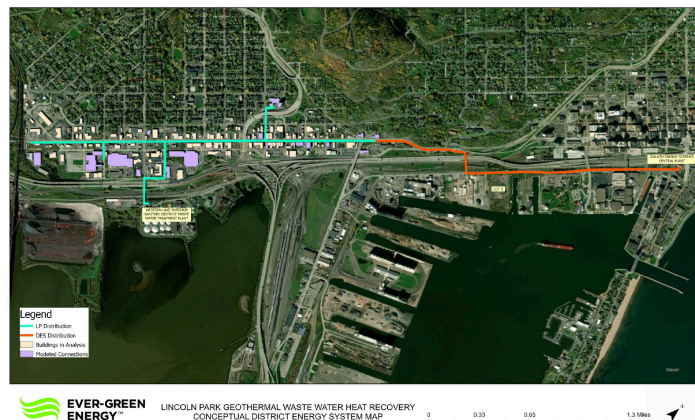


Table 10. LIDAC Community Status			
Census Tract	J40 Categories Exceeded	J40 Threshold Criteria Exceeded	J40 Categories
27137015600 Lincoln Park	4	5	Health, Housing, Water and Wastewater, Workforce Development
27137001600	3	6	Health, Housing, Workforce Development
27137001900	3	6	Health, Housing, Workforce Development
27137001700	2	3	Health, Housing
27137001800	1	1	Housing

A. Community Benefits- DuluthWWHR is a direct result of a J40 neighborhood's request to deepen the opportunity for energy transition, repair past environmental harm, address health disparities, and provide economic opportunity to those traditionally left behind.

Since a Green Jobs Action Planning process, engaged 120 community stakeholders in 2008, the waste BTUs at WLSSD have been part of community conversations. The primary concept has been the potential of adding WLSSD's waste heat to the DES, with a secondary concept of supporting year-round food growth in Lincoln Park. However, before alternate energy sources could effectively be added to the DES, a distribution conversion from one-way steam into looped hot water was essential. After 3 years and nearly \$30 million in investment, that project has now been completed by DuluthWWHR partners Ever-Green Energy, Duluth Energy Systems, and the City of Duluth (awarded the 2021 Minnesota Environmental Initiative Award).

The City of Duluth and Ever-Green Energy have a public-private partnership to operate DES. In an effort to advance the City's Climate Action Plan, Ever-Green had begun discussions with WLSSD to pipe hot water to the downtown system, effectively capturing waste heat as a renewable source that can further the decarbonization of the coal/natural gas-based system, while supporting energy pricing stability for 160 downtown buildings. Although this is a strong environmental choice that will be advanced by DuluthWWHR, it presented EJ challenges because originally it would harvest the benefit of WLSSD waste heat and pipe it out of the neighborhood. Partners convened around that challenge, secured technical and economic feasibility funding, and addressed that challenge head on, resulting in a project that first accrues that benefit to the J40 neighborhood that has faced the burden of processing the waste (wastewater, solid, yard, and hazardous) from a 530 square mile region around Duluth including nine cities and eight surrounding townships.

St. Louis County Census Tract 156 has faced the environmental burdens of the port, significant transportation infrastructure, and an industrial waterfront that includes regional wastewater treatment for industry and communities as far as 30 miles away. Residents are

in the lowest ½ of 1% of life expectancy in Minnesota, live 12-20+ years less than adjacent Zip Codes based on race, face energy burdens over 6%, and have incomes only 42% of the state median. Often transportation, wastewater, and utility projects have further disadvantaged Lincoln Park. DuluthWWHR flips that narrative by demonstrating how transportation, wastewater, and utility projects can synergistically combine for local benefit and national innovation. It is an opportunity that cannot be missed.

DuluthWWHR has been designed through the engagement of diverse community members. The project has multiple diversity, equity, and inclusion components and will provide significant environmental justice benefits. The project:

Leads from Equity: DuluthWWHR creates an innovative geo-exchange heating district that can demonstrate viability in other northern communities and environmental justice neighborhoods. Investing in demonstrating these solutions at the request of a Justice40 neighborhood first, results in leading energy transition from communities that have previously been an afterthought.

Expands on Opportunities: With Justice40, other environmental justice areas will be seeing infrastructure investments like the proposed redevelopment of West Superior Street. This project can serve as a model for increasing the benefit of one investment to meet climate and community energy goals through aligned funding and project implementation. Federally, this project can demonstrate a shared infrastructure approach that should be duplicated when considering infrastructure investments with life cycles exceeding decades.

Captures the Benefit: One of the eleven pollution indicators used by EPA's EJ Screen is wastewater discharge. The LNPK 156 project focuses on turning that potential burden into an energy asset through a hybrid waste heat/geo-exchange project. Reducing the effluent temperature supports the St. Louis River ecosystem most proximate to the Lincoln Park neighborhood, a current Great Lakes Area of Concern.

Equity Impacts: Lincoln Park entered decades of decline when I-35 eliminated housing between the main street district and the waterfront. Currently, the neighborhood business district is revitalizing but challenged by the pandemic and a decade of heavy highway reconstruction as the I-35 interchange is rebuilt to facilitate oversized port traffic, including wind turbines and blades, and the interstate Blatnik Bridge is rebuilt. This is all occurring in one census tract where less than half of the residents have access to a personal vehicle and 27.1% of those 18-64 have a disability. This project extends the idea of human-scale investment to support this neighborhood by reducing natural gas combustion, increasing air quality, and providing economic stability in energy to multifamily properties and small businesses.

Produces Economic On-ramps: Project planning has included leading edge workforce analysis and stackable credential creation for our region through partnership with Lake Superior College, Fond du Lac Tribal and Community College, and the Center for Occupational Research and Development. Funding the implementation project associated with this workforce approach will provide new training and job pathways for J40 residents.

Integrates Impacted Community: DuluthWWHR builds upon existing community engagement efforts that have prioritized the voices of neighborhood residents including the recently concluded Social Determinants of Health Accelerator Planning process hyper localized to the project census tract. DuluthWWHR uses Lincoln Park organization

Ecolibrium3, as the lead for community engagement and will build on the EPA EJ CPS SEE Justice project and BIPOC leadership.

Forms IRA Pathways: System analysis and design will include determination of stacking current available tax incentives, rebates, direct pay, and loans available for implementation of the system. The IRA is already structured to increase opportunities for low-income households, so optimizing the connection to IRA into this project meets equity goals. In addition to the \$25 million secured to address the street rebuild that makes the Lincoln Park project timely, the passage of the IRA extends the potential for private investment to reduce loads and transition the energy needed for heat pumps to site-based solar for the small businesses and light manufacturing within the proposed district.

Demonstrates Efficacy of Justice40 Planning Investments: Justice40 has a priority of providing 40% of the benefit of infrastructure investments into the environmental justice communities. DuluthWWHR is that investment. In addition, it provides implementation support behind multiple federal planning and technical assistance grants designed to assist LIDACs in determining highest quality investments towards a just energy transition.

Specific Benefits to the DuluthWWHR LIDACs include:

- Improved ambient air quality due to reduction in CAPs and HAPs through transition from heating through natural gas/fuel oil combustion to waste heat capture. Reduced instances of asthma and improved health.
- Renewable heating solution possible for planned Green Jobs Training Center aiding in ability for nonprofit partners to achieve sustainable certification.
- The aligned transportation project will provide increased access to transit, increased green space with a minimum of 350 trees over 1.6 miles, new protected bike lanes, ADA accessibility, climate-forward amenities including EV car and bike charging stations.
- Increased resilience for housing on district energy as N+2 heating sources would be available (although the project focuses on providing renewable district energy to DES and the hospitals connected to the downtown loop, the connection can back feed from DES and hospital boilers if needed to meet loads or during heat pump maintenance).
- Co-location of the central heat recovery plant with a proposed malodorous reduction project at WLSSD provides economic viability for implementation of the odor reduction project. Project can reduce odor events in the neighborhood.
- Creation of high-quality jobs and new workforce training opportunities in low-income and disadvantaged communities with an emphasis on expanding opportunities for individuals that face barriers to employment- facilitated by project work agreements, the Geothermal Workforce Analysis, and Energy Training Corps. See Section 5.
- Support of small businesses that will be negatively impacted by construction activities.
- Reduction of ongoing energy burden for businesses, organizations, and households on the system.
- Establishes a renewable energy system for future decarbonized winter food growth within a USDA food desert.

B. Community Engagement- The basis of the DuluthWWHR project comes from intense community engagement over the past 15 years with an emphasis on project design that is responsive to community concerns in Duluth's J40 neighborhoods. Each process was led by

a DuluthWWHR partner and has included a mixture of public meetings, stakeholder interviews, surveys, J40 canvasses, and design charrettes. Engagement includes:

Green Jobs Action Planning (Community-led/2007-2008): Led by Ecolibrium3's CEO under funding from the City of Duluth and local foundations, over 120 community stakeholders determined priority actions for climate mitigation and jobs development. Reducing carbon emissions of the downtown district energy system through conversion from 1-way steam to looped hot water distribution, where possible, and fuel transition from coal to natural gas were identified as top priorities and have been completed. Distribution change designed to facilitate future incorporation of renewable BTUs.

City of Duluth Comprehensive Plan Update (City-led/2016-2018): For the first time, the City's Comprehensive Plan Update included a special working group with an energy and conservation focus. This group had the highest level of community engagement and resulted in DuluthWWHR aligned policies including: #1 Increase community involvement in decisions about energy and infrastructure investments (which has led to an Energy Plan Commission and Citizens Advisory Board for the Duluth Energy System); #3 Incentivize commercial, anchor institutions, and large residential buildings owners to reduce energy use; #5 Encourage community-wide investment in appropriate renewable energy sources; and #7 Increase efficiency of utilities and services.

LNPK 156 Local Foods Local Places (Community-led/2019): An EPA supported technical assistance project, awarded to Ecolibrium3, to determine priority actions to advance food access and health within the Lincoln Park neighborhood that included citizen engagement and a two-day workshop with dozens of neighborhood participants. "Action 3.3: Work with Western Lake Superior Sanitary District on the Possibility of creating a year-round, deep-winter greenhouse complex that uses waste BTUs from their system."

Duluth Citizens' Climate Action Plan (Community-led/2020-ongoing): Duluth CCAP is a citizen-led effort to inspire community-wide action to reduce Duluth's greenhouse gas emissions and envision a future for Duluth that is sustainable and equitable. Duluth CCAP actions include expanding renewable heating through heat pump adoption and capture of waste heat, commercial and residential building efficiency improvements, and district heating decarbonization.

City of Duluth Climate Action Plan (City-led/2021-2022): In response to the Duluth City Council passed Climate Emergency Declaration requested by community and environmental organizations, 5-year priority actions were adopted by the City which included completing shovel ready projects like the increased efficiency of the Duluth Energy System, acceleration of sustainable building renovations, integration of resilience in capital improvements, enabling increased installation and procurement of clean energy for residents and businesses, seeking funding to engage vulnerable communities in city resilience planning, and collaborating with local partners to identify green job opportunities. Each of these actions are advanced through DuluthWWHR.

LNPK 156 Social Determinants of Health Accelerator Plan (Community-led/2021-2022): Supported by the CDC and co-led by St. Louis County Public Health and Ecolibrium3, a hyper-local (1 census tract) social determinants of health planning project was conducted over 1-year with 19 organizations and hundreds of Lincoln Park residents to determine actions to address the extreme health disparities. The plan used a policy, systems, and

environment approach (PSE) and identified improvement of building stock, electrification, turning neighborhood burdens into benefits, and pursuing energy transition on active transportation funding as priority actions.

Duluth Communities Local Energy Action Plan (Community-led/2022-2024) and LNPK 156 Geothermal Collaborative (2023-2024): The US DOE has supported the creation of an energy transition plan for the Lincoln Park neighborhood and conducted ComStock analysis of Duluth to inform this application under an Ecolibrium3-awarded Communities Local Energy Action Plan technical assistance grant. Analysis and initial design of the DuluthWWHR proposed system has been conducted under a Community Geothermal Heating and Cooling grant. Both grant projects have involved EJ community engagement and have the community-based organization (Ecolibrium3's CEO Jodi Slick) and City (Sustainability Officer Mindy Granley) as Co-PIs.

Leading ongoing community engagement during project implementation will be Ecolibrium3, a project-funded community-based organization from the Lincoln Park neighborhood that has led neighborhood and broader community environmental justice and energy transition efforts. Ecolibrium3's neighborhood engagement, advocacy, and strong partnership, including co-authoring federal grant applications, has led to the alignment of the DOT RAISE implementation grant, and several planning grants including DOE Geothermal grant, C-LEAP grant, and Energy Futures for which a CPRG funded DuluthWWHR will support implementation. Ecolibrium3 is the trusted community voice for MNDOT's Twin Ports Interchange and Pedestrian Bridge design and implementation committees and was awarded the inaugural Main Street America Forward Award in 2021 for their work with Lincoln Park businesses. Ecolibrium3 administers Main Street Lincoln Park program where 40-50 businesses have met monthly to advise development of each of the above named projects and the DuluthWWHR application.

Ecolibrium3 will continue to lead project partners, stakeholders, and community members to 1) develop an outreach and engagement strategy guided by the Jemez Principles of Democratic Organizing; 2) establish a project website for ongoing updates and opportunity for project feedback; 3) incorporate ongoing project guidance from the SEE Justice fellows- an 2024-2026 EPA EJ CPS- supported BIPOC environmental advisory council designed to enhance EJ leadership and abilities to lead community engagement, visioning, risk mitigation, and cross cultural awareness; 4) host an annual public information session in alignment with neighborhood EcoFest; 5) incorporate DuluthWWHR into community benefits planning; and 6) conduct training on the project with Energy Corps members.

In addition, the project will be advised through quarterly updates to the City of Duluth's Energy Plan Commission (citizens) and the Duluth Energy System Advisory Board (citizen and organizational stakeholders).

Section 5: Job Quality

Job quality for DuluthWWHR will be advanced through the following:

- Construction under DuluthWWHR is covered by Davis Bacon requirements.
- The baseline commitment for construction projects within the City of Duluth is a Project Workforce Agreement that requires projects with \$150,000 or more of federal funds to

achieve 15% or better of total construction work hours to be from eligible workers defined as women and individuals who are considered socially disadvantaged, including people of color, low income workers, individuals who are homeless, at risk youth, disabled veterans, public benefits recipients, and individuals with a criminal background.

- City of Duluth Workforce Development will work with Lincoln Park-based nonprofit Ecolibrium3, the Eco3 Energy Training Corps, and labor partners to expand opportunities to recruit and train individuals from the J40 project area through the training corps, pre-apprenticeship, and apprenticeship programs.
- Implementation of stackable credentials and training protocols as identified through the workforce development component of the DOE-funded *LNPK 156 Geothermal Coalition Project* that includes DuluthWWHR partners the City of Duluth, Ever-Green Energy, Duluth Energy Systems, and Ecolibrium3.
- Inclusion of labor and job quality standards into procurement activities.
- Required training for commercial businesses participating in the commercial renewable energy and efficiency grants programs to include diversity, equity, and inclusion, anti-harassment training, and health, safety, and resilience plans.
- Documented participation in project design and implementation by trade unions including Duluth Building Trades, Plumbers, and Pipefitters (letters attached).

Section 6: Programmatic Capability and Past Performance

A. Past Performance- Five current or past projects demonstrating the City of Duluth's ability to successfully complete federal projects include:

West Superior Street Active Transportation Corridor Project

Assistance agreement number: Pending

Federal opportunity number: DTOS59-22-RA-RAISE

Description: \$24,999,160 grant to reconstruct and improve main artery through the Lincoln Park EJ neighborhood- facilitates application for DuluthWWHR.

Contact: Rachel Broughton, Rachel.Broughton@state.mn.us. Pass-through MN DOT

Progress towards listed agreements: All milestones on track, 30% design to date to include location for district energy distribution lines to facilitate DuluthWWHR.

Canal Park/Lakewalk Mitigation Project

Assistance agreement number: N/A

Federal disaster funding number: MN 4414

Description: US Dept. of Homeland Security Hazard Mitigation grant of \$21,326,428 to mitigate storm damage at Canal Park.

Contact: Wayne Lamoreaux - Wayne.lamoreaux@state.mn.us Homeland Security & Emergency Management.

Progress towards listed agreements: Completed a project to restore damage and armor 3,026 LF (.5 mile) of coastline.

Seawall Rehabilitation Project

Assistance agreement number: 06-79-06294

Federal assistance number: 11.307 Economic Development Adjustment Assistance

Brief description of the agreement: Economic Development Agency \$4,938,067

Contact: Robert Lee, Lee@eda.gov

Progress towards agreements: Nearing completion. Recent audit found no findings.

Perch Lake Habitat Restoration Project in the St. Louis River Area of Concern, MN

Assistance agreement number: EPA- 00E02356

Federal funding agency and assistance listing number 66.469 - Great Lakes Program

Description of the agreement: Awarded \$3, 737,700: Complete habitat restoration at Perch Lake, necessary for delisting the St. Louis River Area of Concern.

Contact: Rajen Patel patel.raj@epa.gov Phone: 312-886-5741.

Progress towards listed agreements: Phases 1 and 2 were completed and Phase 3 was added with unspent grant funds.

Greater Minnesota Regional Parks and Trails

Assistance agreement number: N/A

Non-federal funding agency: Greater Minnesota Regional Parks and Trails Commission.

Assistance listing number: N/A

Description of the agreement: \$4,931,078 grants for recreation facilities including trails, buildings, energy upgrades, and habitat restoration.

Contact: Renee Matson: renee.mattson@gmrptcommission.org

Progress towards milestones: All outcomes and projects were completed on time or are on schedule for completion.

B. Reporting Requirements- The City of Duluth has successfully administered tens of millions of Federal and State grant dollars. ARP funding alone was over \$50 million. The Duluth Finance Department employs a professional staff, provides quality services, and practices financial integrity. Sound financial practices and other improvements have led to an increase in the City's bond rating. Annual audits consistently present no findings. Information specific to each grant listed above includes:

West Superior Street Active Transportation Corridor Project

Submitted acceptable interim reports: Yes

Adequately and timely reported on progress: Yes

If progress not made, did applicant adequately report why not: N/A

Canal Park/Lakewalk Mitigation Project

Submitted acceptable interim and final reports: Yes

Adequately and timely reported on progress: Yes

If progress not made, did applicant adequately report why not: N/A

Seawall Rehabilitation Project

Submitted acceptable interim reports: Yes

Adequately and timely reported on progress: Yes

If progress not made, did applicant adequately report why not: N/A

Perch Lake Habitat Restoration Project in the MN St. Louis River Area of Concern

Submitted acceptable interim reports: Yes

Adequately and timely reported on progress: Yes

If progress not made, did applicant adequately report why not: N/A

Greater Minnesota Regional Parks and Trails

Submitted acceptable interim and/or final reports: Yes

Adequately and timely reported on its progress: Yes

If progress not made, did applicant adequately report why not: N/A

C. Staff Expertise- Duluth's team has the knowledge, expertise, qualifications, and resources to successfully complete the renewable district energy project within the 5-year CPRG timeframe. Team members have worked together in the analysis and initial design of the project to incorporate effluent waste heat, determine project integrations to support an existing system, and lead a national conversation on stackable credentials to increase the knowledge, skills, and abilities of workforce participants related to geothermal system design, deployment, and operations. Key personnel resumes are included as an attachment, a summary of roles and credentials include:

Mindy Granley- PI and grants management. Duluth's Sustainability Officer integrates sustainability into City policies, programs, and initiative; created Duluth's Climate Action Work Plan; oversees the Duluth Energy System performance and is a Certified Energy Manager.

Jim Benning- Street and utility engineering coordination. Duluth's Director of Public Works and Utilities manages 6 divisions including general, utility engineering, and transportation engineering, utility operations, customer service, and street maintenance; oversaw the overall award-winning reconstruction of the downtown portion of Superior Street which integrated with the Duluth Energy System steam-to-hot water conversion.

Duluth Energy Systems is a City-owned district energy system managed by Ever-Green Energy. **Justin Reid** is general manager of Duluth Energy Systems and will lead the local team and connection to DES. **Ryan Johnson** is lead engineer for Duluth Energy Systems district heating, district cooling, and cogeneration systems operated and managed by Ever-Green. He will lead waste heat recovery analysis and interface design, customer building review and qualification. **Dustin Paulsen** manages projects, accounts, maintenance, and data analysis. He will provide project coordination, and co-lead customer building review and qualification.

Ever-Green Energy is a district utility system operator and designer. **Ken Smith**, President and CEO will provide implementation oversight/support. **Michael Auger** is Senior V.P. and Chief Business Officer and led customer contract development and negotiations for the Duluth Energy System and will provide implementation oversight/support. **Sean McFarling** was the project manager and construction project liaison, as well as the Engineer of Record for the Duluth Energy Systems hot water distribution conversion. He will provide distribution system analysis and design, coordination with the West Superior Street rebuild project, and waste heat recovery interface design.

Duluth Workforce development administers a number of employment, training, and career development programs supported by the federal Workforce Innovation and Opportunity Act. **Elena Foshay**, Workforce Development Director will serve as liaison between City, neighborhood training efforts, and labor unions.

DuluthWWHR Project Coordinator- Coordinates the Commercial REE Grants program, grant compliance, administrative tasks, and report writing under the supervision of the PI.

Western Lake Superior Sanitary District will provide waste BTUs, help plan the placement for heat and distribution pumps, and improve air quality and efficiency through odorous air system improvements. **Carrie Clement** Operations and Maintenance Manager, oversees the wastewater treatment system including the regional treatment plant and 75-mile network of large interceptor sewers and 17 wastewater pumping stations. **Marianne Bohren**, Executive Director, will provide strategic planning as well as leadership for all aspects of WLSSD's operational, environmental and financial performance. **Nathan Hartman**, Engineering Supervisor, will lead the WLSSD engineering Team to support the capital construction project and ensure the operational effectiveness and longevity of WLSSD's facilities.

Ecolibrium3 is Lincoln Park's lead community-based organization operating at the intersection of energy, equity, and environmental justice and awardee of the DOE's Community Local Energy Plan grant that modeled commercial properties across Duluth. **Jodi Slick** serves as Co-PI with Mindy Granley on the DOE Community Geothermal Heating and Cooling Design grant. She will oversee community engagement, connections to green jobs training programs, and serve as liaison to Main Street Lincoln Park.

Section 7: Budget

DuluthWWHR's budget is a total of \$49,038,781 with 96% expended for Measure 1, 2% for Measure 2, and 2% for grant management and an EJ outreach subaward. Budget details and narrative are included in Budget_City of Duluth.pdf with supporting documentation in BudgetCalcs_City of Duluth.xlsx.