SL CLEAR
SALT LAKE
CLEAN ENERGY & AIR

Comprehensive Climate Action Plan

Greater Salt Lake Area Clean Energy and Air Roadmap (SL-CLEAR)

March 17, 2026

SL-CLEAR Project Team

This Comprehensive Climate Action Plan (CCAP) was developed as a collaborative effort with contributions and input from multiple organizations and stakeholders. The project team thanks community members, local governments, and non-profit partners throughout the Salt Lake City Metropolitan Statistical Area (SLC MSA) that provided feedback and guided development of the Greater Salt Lake Area Clean Energy and Air Roadmap (SL-CLEAR website).

The following organizations contributed report drafting and design along with technical analysis during development of the CCAP.

SUSTAINABILITY DEPARTMENT

The Salt Lake City Sustainability Department ("SLCgreen") leads award-winning environmental programs that help the community conserve resources, reduce pollution, slow climate change and ensure a healthy, sustainable future for Salt Lake City. This department oversaw SLC MSA plan development efforts funded by EPA Climate Pollution Reduction Grants (CPRG), including creation of the CCAP, and coordinated engagement with local governments and other stakeholders throughout plan development. SLCgreen contracted with University Neighborhood Partners (UNP) to convene and lead an Environmental Justice Committee to inform equity-related recommendations. SLCgreen also led engagement and analysis for the workforce section of the CCAP.

COLLABORATIVE CLIMATE
ENERGY CONSULTING SERVICES

Collaborative Climate LLC provides consulting services to public, private, and non-profit clients to advance durable solutions to climate change. This includes analysis and strategy for organizational and community-wide planning, plus tailored guidance on clean energy topics ranging from efficiency to renewable energy to electrification. Collaborative Climate led overall report development, select technical analyses, and stakeholder engagement coordination for the CCAP.

ICLEI USA is the first and largest global network of local governments devoted to solving the world's most intractable sustainability challenges. ICLEI USA provides standards, tools, and programs that credibly, transparently, and robustly reduce greenhouse gas emissions, improve lives and livelihoods, and protect natural resources in the communities we serve. ICLEI USA led greenhouse gas (GHG) inventory modelling along with quantification of GHG reduction measures and pollution co-benefits for the CCAP.

Community Planning Collaborative (CPC) combines strong technical skills with a long-standing commitment to inclusive engagement, helping our clients develop responsive and responsible solutions to complex challenges. CPC assisted with stakeholder engagement, project strategy, and design development for the SL-CLEAR CCAP.

Disclaimer: *This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement number 00I01400 to Salt Lake City Corporation. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.*

1. Executive Summary

The Greater Salt Lake Area Clean Energy and Air Roadmap (SL-CLEAR website) is a landmark initiative to create a publicly informed climate action plan with stakeholders and partners across the Salt Lake City Metropolitan Statistical Area (SLC MSA). The SLC MSA encompasses both Salt Lake County and Tooele County and this is the first regional effort of its kind to conduct comprehensive climate action planning for the area.

SL-CLEAR is a story of community solutions that cannot be told without acknowledging the countless co-benefits of reducing greenhouse gas (GHG) emissions. Cleaner air, more affordable utility bills, accessible transportation options, enhanced green space, and economic benefits such as green jobs all contribute to making a compelling case for action. SL-CLEAR informs this endeavor and represents what is possible when communities come together and commit to positive transformations at a regional scale.

This Comprehensive Climate Action Plan (CCAP) developed for SL-CLEAR details 34 distinct solution measures to reduce emissions across major economic sectors in the SLC MSA. If fully implemented, these measures could reduce cumulative carbon dioxide equivalent (CO2e) emissions by over 162 million metric tons by 2050 and lead to a 74% decrease in annual emissions relative to 2021 baseline levels. An ambitious reduction pathway was chosen, in part, as science-based targets require significant and timely reductions in GHGs to mitigate damage from climate change. The largest areas of GHG emissions reduction by 2050 are projected in transportation (60%) along with homes and other buildings (35%), illustrating the connection of solutions to everyday life.

The highest priority actionable solutions to reduce emissions have been packaged into succinct visual summaries titled “solution blueprints” that can guide SL-CLEAR efforts for different actors across the SLC MSA for many years to come. These solution blueprints can be leveraged by stakeholders to present ideas to local government elected officials, engage implementation partners, and seek resources such as funding to pursue solutions.

The plan also documents how climate change is intensifying both environmental and socioeconomic risks across the Salt Lake City MSA, with extreme heat, drought, flooding, and wildfires posing growing threats to public health, infrastructure, and the economy. Frontline communities—already burdened by historic underinvestment, air pollution, limited green space, and economic hardship—are especially vulnerable. A just and urgent transition to clean energy and zero-emissions transportation is essential to improving health outcomes and building resilience in Salt Lake and Tooele counties.

To support this transition, a regional workforce analysis identified significant gaps in skilled trades needed to implement climate solutions, particularly in construction, solar installation, HVAC, and electrical work. Addressing these gaps will require coordinated investment, stronger partnerships, increased public awareness, and equitable workforce development strategies to ensure the region is prepared for a clean energy future that benefits all communities.

In addition to reducing GHGs, measures in the CCAP are expected to significantly improve air quality by cutting emissions of particulate matter, nitrogen oxides, ammonia, sulfur dioxide, volatile organic compounds, and carbon monoxide, all of which contribute to the region's persistent air quality challenges. These improvements are especially critical for portions of the SLC MSA, which have long been designated as non-attainment for particulate matter and are currently non-attainment for ozone.

SL-CLEAR conveys a vision to address interconnected issues and harness opportunities. Bolstered by a consistently improving technological and economic profile for clean energy resources, the time is now for coordinated and sustained action to deliver upon the promise of this plan. With Salt Lake City set to host the 2034 Winter Olympics, SL-CLEAR offers a timely opportunity to cut emissions locally while showcasing northern Utah's leadership and environmental stewardship on the global stage.

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2. Introduction

The Salt Lake City MSA, a metropolitan statistical area defined as Salt Lake and Tooele counties in Utah (see Figure 1), was provided a historic opportunity to create a regional climate plan through the Climate Pollution Reduction Grants (CPRG website) program led by the U.S. Environmental Protection Agency (EPA). This regional effort, titled the Greater Salt Lake Clean Energy and Air Roadmap (SL-CLEAR website), is led by the Salt Lake City Sustainability Department with input and support from local governments across Salt Lake County and Tooele County along with a diverse set of stakeholders across multiple sectors in the region.

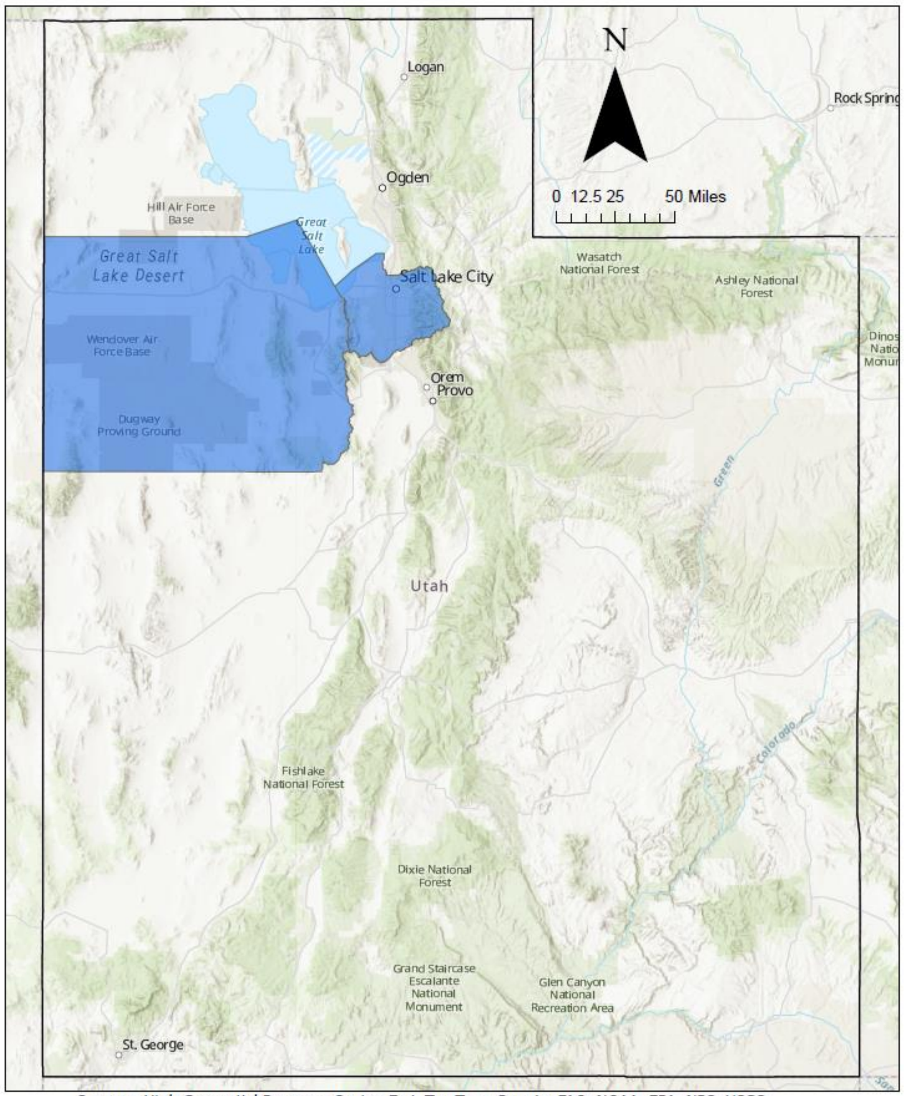
SL-CLEAR is a multi-part, multi-year effort with its first major milestone being the creation of a Priority Climate Action Plan (PCAP) featuring select sectors that was completed in 2024. This was followed by development of the Comprehensive Climate Action Plan (CCAP) which highlights potential measures across additional sectors that reduce greenhouse gas (GHG) emissions while often cutting local air pollution and enhancing energy affordability for households, business, and other organizations. For regional planning purposes and future reference, the CCAP replaces the PCAP as it built off prior content and represents a more thorough vision for reducing emissions.

"SL-CLEAR is the first regional opportunity to holistically focus on climate solutions and deliver stakeholder-informed plans with ambitious goals for the SLC metro area."

This Comprehensive Climate Action Plan (CCAP) details 34 distinct solution measures, and countless additional sub-measures, across the following six sectors:

- Buildings
- Electricity Generation
- Industry
- Transportation
- Waste and Materials Management
- Agriculture, Natural and Working Lands

The plan also includes numerous other defining elements such as a workforce analysis, a benefits analysis detailing air pollution savings, a climate risk assessment of the MSA, and a section that illustrates the potential positive outcomes for frontline communities in the MSA. The workforce analysis identified key occupations needed to achieve emissions reductions and evaluated gaps between forecasted number of workers and workforce needs to support energy, transportation, and other sectors. A detailed list of next steps for regional workforce coordination and development is reflected in the plan, including guidance for catalyzing and sustaining a focus on green job opportunities.



Sources: Utah Geospatial Resource Center, Esri, TomTom, Garmin, FAO, NOAA, EPA, NPS, USGS

Figure 1. Map of the Salt Lake City Metropolitan Statistical Area composed by the Salt Lake and the Tooele counties.

The climate risk assessment highlights the growing threats from climate change to public health, ecosystems, infrastructure, and the economy across the MSA, providing guidance for policies and planning efforts that prioritize the region's most vulnerable communities. A focused analysis of frontline communities was conducted to underscore the disparities—such as disproportionate exposure to pollution—that heightens their vulnerability and must be addressed in designing an equitable clean energy transition. Feedback from a local Environmental Justice Committee is documented in the plan and reflects high priority issues and opportunities, as expressed by those living in these communities.

The CCAP and its solution blueprints should be viewed as a starting point for sustained collaboration across the Salt Lake City metro area on climate and clean air solutions that move our community forward and showcase leadership that can be replicated across the state and beyond.

2.1 Climate Pollution Reduction Grants Overview

The EPA CPRG program was created to provide climate planning and implementation support to states, local governments, tribes, and territories in the U.S. The program encourages the development of ambitious plans that reduce GHG emissions and other harmful air pollution across all sectors.

Salt Lake City chose to participate in the program and lead development of a metro area climate plan addressing emissions across Salt Lake County and Tooele County. This endeavor is a multi-year effort that is informed by input from local governments and other key stakeholders and experts across the region. The CPRG program includes development of two significant plans, a PCAP and a CCAP, plus completion of a status report in 2027. Key elements of the CPRG deliverables are included in the next section.

The Salt Lake City Sustainability Department will continue working with local governments and other stakeholders across the SLC MSA throughout the process to complete all requirements and encourage implementation.

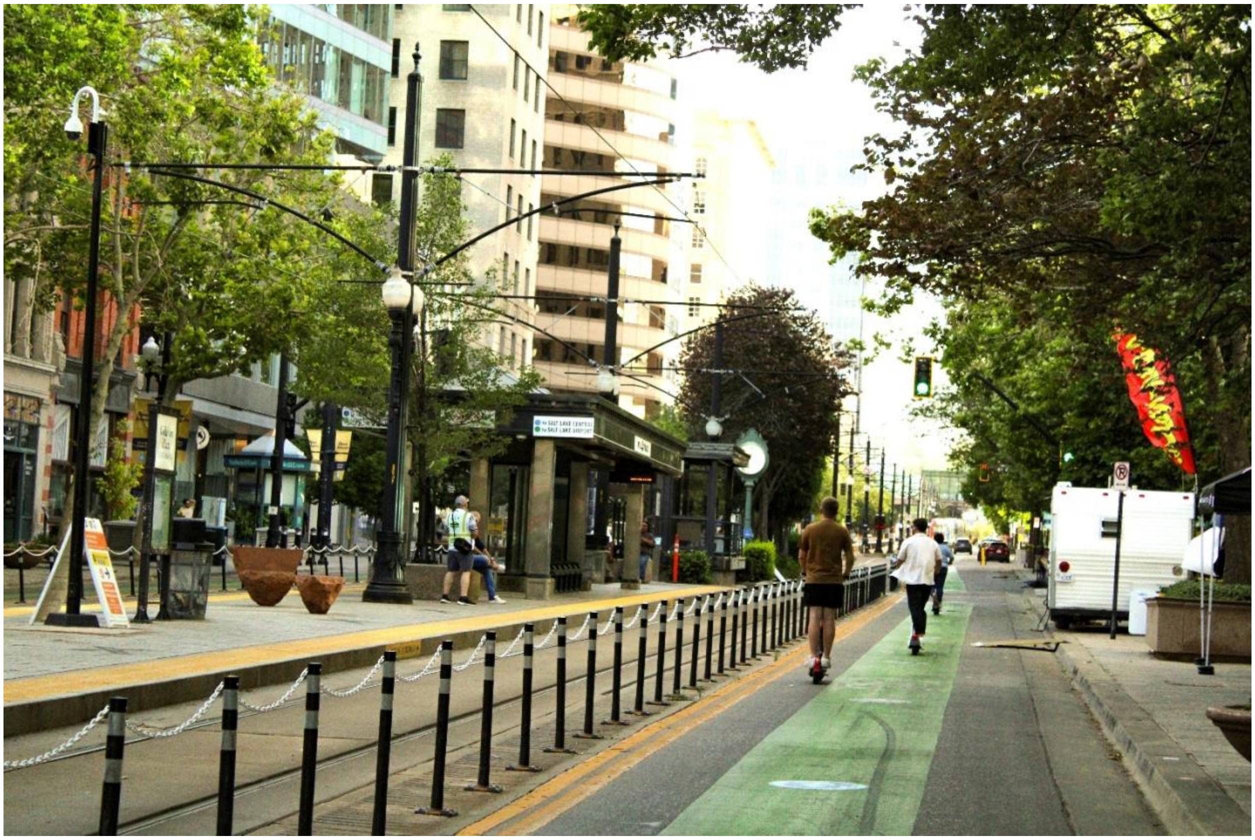


Figure 2. Shared-use lane on Main Street in downtown Salt Lake City (Image Source: Salt Lake City Corporation).

2.2 Comprehensive Climate Action Plan Overview

The SL-CLEAR CCAP includes the following required sections. Additional details on each of these CCAP components are incorporated throughout the plan in subsections for each concept.

- ✓ **GHG Inventory and Emissions Projections**: A GHG inventory and emissions projections for the SLC MSA, including Salt Lake County and Tooele County, was developed.
- ✓ **Near-Term and Long-Term GHG Reduction Targets**: Emission reduction targets for 2035 and 2050 were identified and informed by GHG reduction measure quantification.

- ✓ **Quantified GHG Reduction Measures**: Solutions to reduce GHG emissions across the SLC MSA for the six economic sectors outlined in the introduction were identified through analysis and outreach efforts that included soliciting input from local governments, key stakeholders and experts, and residents living in Salt Lake County and Tooele County. Estimated cost ranges for implementation were also provided.
- ✓ **Benefits Analysis**: Estimates of co-pollutant reduction across all sectors were prepared and published in the CCAP.
- ✓ **Review of Authority to Implement**: Implementation authority for GHG reduction measures is detailed in the CCAP, including whether state or local governments have existing statutory or regulatory authority to implement the measure or if this authority must be obtained.
- ✓ **Intersection with Other Funding Availability**: Funding availability was assessed and summarized for implementation measures.
- ✓ **Workforce Planning Analysis**: An analysis of anticipated workforce shortages associated with implementation was completed and key solutions and partners were identified.

The SL-CLEAR plan leveraged modelling software provided by ICLEI USA that covered all the EPA's identified economic sectors but utilized different sector labels in some instances. More details on modelling and how each sector was evaluated for the CCAP are included in Appendix B.

Additional information on CCAP requirements is available in the following guidance document published by EPA in 2023: CPRG: Formula Grants for Planning, Program Guidance for States, Municipalities, and Air Control Agencies.

2.3 Salt Lake City MSA Overview

The SLC MSA is comprised of two counties, Salt Lake County and Tooele County, and is within the broader Salt Lake City-Provo-Ogden Combined Statistical Area (CSA) in northern Utah. There are a total of 25 separate incorporated municipalities within the SLC MSA plus an additional 11 unincorporated places such as townships[1].

The SLC MSA has an estimated population of 1,266,191 residents which equates to roughly 37% of the total population of Utah. Population density within the SLC MSA is four times the average population density statewide and the vast majority of SLC MSA residents are located in Salt Lake County[2],[3]. Table 1 provides summary statistics and a selection of housing metrics for the SLC MSA. These details informed the potential impact of GHG reduction measures and associated modelling completed for the CCAP.

Table 1. Salt Lake City Metropolitan Statistical Area (SLC MSA): Overview and Housing Metrics. Sources: Census Reporter: Salt Lake City-Murray, UT Metro Area; Wikipedia: Salt Lake City Metropolitan Area.

Metric	Total
Number of Counties - Salt Lake County and Tooele County	2
Number of Incorporated Cities and Towns	25
Geography	7,684 sq miles
Population	1,266,191
Households	448,172
People per Household	2.8
Housing Units	476,147
Estimated Number of Owner-Occupied Housing Units	323,780 (68%)
Estimated Number of Renter Housing Units	152,367 (32%)
Housing Type: Single Unit	333,303 (70%)
Housing Type: Multi-Unit	133,321 (28%)
Housing Type: Mobile Home	9,523 (2%)
Median Household Income	$91,891
Estimated Population Below Poverty Line	93,698 (7.4%)

3. Approach

The SL-CLEAR CCAP was developed through an inclusive, iterative process informed by stakeholder input and prior clean air, clean energy, and climate plans developed within the region and statewide in Utah. This section highlights the process utilized for CCAP development, including reference of existing resources that informed the plan, stakeholder outreach and engagement activities, and key methodologies and frameworks for technical aspects of the report.

3.1 Existing Local Climate Plans and Cross-References

Below are public documents that provided a baseline of analysis and strategic, supported climate activities undertaken by Salt Lake City prior to CCAP development. To our knowledge, other SLC MSA jurisdictions have not published similar comprehensive climate documents. While the SL-CLEAR CCAP focused on broader regional emissions across the entire SLC MSA, findings from these prior, more localized documents were instructive for GHG inventory purposes and the identification of priority solution measures.

Sustainable Salt Lake – Plan 2015 (Published in 2013 by Salt Lake City Corporation)

> *Salt Lake City first published a community greenhouse gas inventory in 2010. This was followed up by a holistic sustainability and climate action plan reflecting strategies that could be pursued to reduce emissions within city operations and community-wide. Sustainable Salt Lake – Plan 2015 reflected strategies for most key sectors included in the CCAP.*

Climate Positive 2040 (Published in 2017 by Salt Lake City Corporation)

> *In 2016, Salt Lake City's Mayor and City Council adopted joint resolutions that established goals to achieve net-100% renewable energy for electricity by 2032 and reduce community GHG emissions 80% by 2040 compared to a 2009 baseline. An interim goal was also established committing to a 50% reduction in community GHG emissions by 2030.*

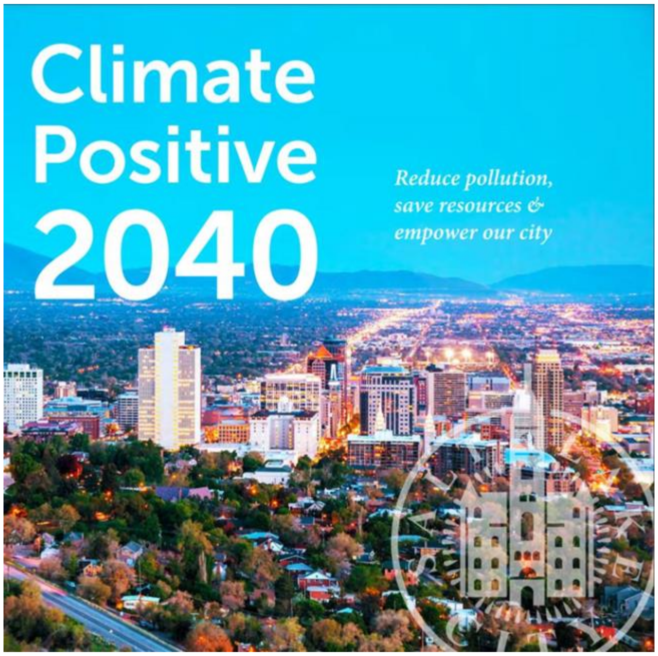


Figure 3. Cover image of the SLC "Climate Positive 2040" Plan (Image Source: Salt Lake City Corporation)

SLCgreen published Climate Positive 2040 in 2017 to highlight ongoing efforts Salt Lake City is taking to reduce emissions from buildings, transportation, electricity generation, food systems, and material waste. Climate Positive 2040 cross-referenced numerous reports and adopted plans with more detail on underlying strategies. In 2019, Salt Lake City leaders adopted an updated goal to achieve net-100% renewable energy for electricity by 2030.

There have also been broader regional and statewide efforts in Utah to develop strategies and reduce emissions. These activities include plans related to energy and transportation systems along with air quality and climate planning efforts. A select list of these plans that provided useful context for the SL-CLEAR CCAP development process is included below.

Your Utah, Your Future: Vision for 2050 (Published in 2015 by Envision Utah)

This report was informed by a multi-year engagement process that solicited input from more than 60,000 Utahns on priority issues and a vision for the future. The website allows users to review summarized outcomes across 11 topical areas such as air quality, energy, and transportation and these themes have direct relevance to sectors prioritized in the SL-CLEAR CCAP. Your Utah, *Your Future focuses on statewide issues and resident values whereas the SL-CLEAR process honed in on issues and attitudes more specific to the SLC MSA.*

2019-2050: Regional Transportation Plan (Published in 2019 by Wasatch Front Regional Council)

This transportation plan reflects trends and solutions for a multi-county region along the Wasatch Front in northern Utah, including the two counties within the SLC MSA plus additional counties and communities further north. This transportation plan is part of a broader Wasatch Choice Vision effort that reflects additional key strategies for housing, parks, public spaces, and city and town centers that are pertinent to climate and clean air planning efforts.

The Utah Roadmap: Positive Solutions on Climate and Air Quality (Published in 2020 by the Kem C. Gardner Policy Institute)

This roadmap was developed in response to a request from the Utah State Legislature and was the second major statewide climate planning effort in Utah, building off outcomes from a 2007 Blue Ribbon Advisory Council on Climate Change. The roadmap was informed by a 37-person technical advisory committee and included a multi-sector GHG inventory and associated emissions reduction strategies to reduce both GHGs and local air pollution.

Beehive Emission Reduction Plan: Priority Plan (Published in 2024 by Utah Department of Environmental Quality)

The State of Utah leveraged funding from the EPA CPRG program to develop a PCAP detailing GHG reduction measures. This was followed by a CCAP that was published in late 2025 and features statewide solutions to reduce emissions for all required sectors.

3.2 Engagement

The above-mentioned planning and outreach efforts provided useful context to serve as a foundation for a metro area-focused CCAP for the SLC MSA. Given the unique geographic focus of SL-CLEAR, a new and targeted stakeholder engagement process was needed to solicit input and represent the priorities of local governments and communities within the SLC MSA. Engagement for the PCAP and CCAP focused on the below four efforts. Processes and participants from each effort were engaged from 2023-25 to inform both the PCAP and CCAP development process:

3.2.1 Jurisdictional Partners and Organizational Stakeholders

A series of eight separate virtual meetings were hosted for SLC MSA jurisdictional partners and stakeholders from April 2023 – February 2024. These meetings included background details on the EPA CPRG process and solicited input for development of the SL-CLEAR plans. Jurisdictional partners included staff from counties, cities, and towns within the SLC MSA. Stakeholders were from non-governmental organizations (NGOs) focused on air quality, climate change, energy, and transportation issues in the region. Additional stakeholders included education sector partners from K-12 and higher education institutions.

For development of the CCAP, these same partners and stakeholders were invited to participate in sector-specific subgroups to further evaluate and define solutions. Subgroups were created for the following sectors and convened virtually multiple times from 2024-25:

- Buildings, Homes, and Renewable Energy
- Local Government and Institutional Operations
- Transportation and Mobility
- Workforce

Select partners and stakeholders were engaged directly to help tailor solutions for the following sectors: agriculture, forestry and natural lands, industry, and waste and materials management. Jurisdictional partners and organizational stakeholders also informed priorities reflected in the implementation blueprints.

3.2.2 Environmental Justice Resident Committee

At the outset of the CPRG planning process, residents from low-income communities, most of them environmental leaders and some affiliated with community-based organizations, were convened by University Neighborhood Partners (UNP) to form the Environmental Justice Resident Committee (EJRC). UNP, funded and associated with the University of Utah, represents low-income communities on the west side of Salt Lake County, commonly referred to as "the Westside."

The Committee convened twice monthly, via in-person assemblies to meet several goals of the CPRG: (1) Ensure low-income residents had a seat at the table in the development of the CCAP; (2) Achieve increased resident knowledge of the risks of adverse climate impacts, and an awareness of greenhouse gas emission reduction measures and impacts; (3) Identify pathways to support resident ideas or address concerns related to climate impacts or mitigation strategies through federal grants, City programs, or other opportunities; (4) Support UNP in building capacity to assist and empower west side residents who are disproportionally affected by environmental and health burdens. The engagement strategy was guided by the EPA's Environmental Justice Collaborative Problem-Solving Model and the principle of Meaningful Engagement.

In alignment with these goals, UNP and the City coordinated reciprocal learning opportunities to identify the key strengths and burdens of Westside neighborhoods and to support the City's applications for two grants, including an EPA CPRG Implementation Grant. Residents identified the top priorities for their neighborhoods and were connected with local experts to support their continued efforts. The Committee's priorities are outlined in Section 8.7, under *Environmental Justice Resident Committee Feedback*. To further amplify community voices and foster individual agency, residents were also invited to participate as experts in community discussions, panels, and permanent exhibitions.

A document (Section 8) was developed to identify the threats posed by climate change and urban growth, as well as current exposures to legacy, traffic, and industrial pollution affecting low-income and disadvantaged communities in the region. It also highlights disparities in socioeconomic burdens and health outcomes to illustrate these communities' heightened vulnerability to climate change and pollution. This information is intended to inform planning efforts and guide equitable energy transition initiatives. The primary areas of concern were identified using the Climate and Economic Justice Screening Tool, the U.S. Climate Vulnerability Index, and direct input from residents.

This document has been incorporated into the CCAP in Section 8, under *Frontline Communities*. The term *Frontline Communities* was chosen by residents to replace "Low-Income and Disadvantaged Communities," which they felt framed their challenges as internal deficiencies, implying the community was responsible for its own struggles. Instead, *Frontline Communities* emphasizes both their heightened exposure to environmental harm and the historical injustices and systemic inequities—such as racial segregation and discriminatory zoning—that have shaped their circumstances. The document was presented to the EJRC and is intended to serve as a guiding resource for their future work.

To amplify the voices of the EJRC and support their desire to educate their communities and highlight stories of hope from the Westside, the City partnered with the Committee to create a dedicated website within the main SL-CLEAR website platform. EJRC members led the development of the webpage's concept and storytelling, which features Westside residents working on initiatives to improve outdoor and indoor air quality, food security, and access to green space in the face of extreme heat. The site also showcases a mural designed by a local artist, depicting Westside's landmarks and environmental burdens. Drawings from local children are also displayed with the goal of making the website a living representation of not only the EJRC, but the broader community it serves.

3.2.3 Public Outreach

An online public survey was utilized to solicit opinions and inform prioritization for the SL-CLEAR PCAP and results were also leveraged for the CCAP. This survey was available in English and Spanish and collected over 900 total responses from individuals living in the SLC MSA. Complete survey results are available as a PDF and as a downloadable Excel file. A selection of survey responses is included in Appendix A.

The results revealed that residents across the MSA are deeply concerned about climate change, air pollution, and their associated health impacts. There was strong support for government investment in clean energy, particularly incentives directed toward local governments, public schools, universities, and residents. Overall, attitudes toward air pollution-reducing technologies such as electric vehicles, e-bikes, solar panels, and heat pumps were positive. However, common barriers cited included high costs, impracticality for individual circumstances, and lack of information.

In addition to the public survey, the City expanded its engagement strategy by participating in community events and conducting intercept surveys—primarily in low-income neighborhoods. General information about SL-CLEAR was shared at more than 15 events, and 215 intercept surveys were collected. These efforts helped identify key resident priorities, including improved and expanded public transit, increased walkability and bikeability, a full transition to 100% renewable energy, support for home solar installations, and energy-saving assistance.

3.2.4 Workforce Analysis

The SL-CLEAR team conducted one-on-one interviews with key stakeholders in the workforce and education sectors throughout the development of the comprehensive climate action plan. In addition, several events were organized to gather direct input on green workforce development. One session focused on community attitudes toward "green" jobs, drawing approximately 35 participants from diverse backgrounds. Discussions explored how individuals define green jobs, what motivates their career decisions, and what factors influence interest in green careers. Key themes included skepticism about green jobs—sometimes perceived as "greenwashing"—limited awareness of opportunities in the field, and the view that environmental considerations are often secondary to economic needs. Participants emphasized the importance of trusted, local career advisors and culturally relevant outreach to improve access to and interest in green career pathways.

A second event, the Energy Workforce Lab, brought together stakeholders from education, government, industry, and community organizations to explore collaborative strategies for building a regional green workforce. Participants discussed opportunities to strengthen networks, pursue joint funding, and align educational institutions with workforce needs. Barriers such as inconsistent funding, organizational silos, regulatory challenges, and cultural resistance to green initiatives were also identified. The group emphasized the need for clear goals, shared strategies, and increased community education to build momentum and ensure inclusive participation in the clean energy transition.

Importantly, the Energy Workforce Lab served as a pilot for a potential advisory board focused on regional workforce development. Participants expressed strong interest in continuing the conversation, with all post-event survey respondents agreeing that regular, quarterly convenings would support their goals and broader workforce development efforts. This early momentum suggests a strong foundation for building a sustained, collaborative effort to guide investment, training, and policy in support of a just and effective green workforce transition in the region.

3.3 Technical Approach: GHG Emissions and Reduction Measures

Technical analyses, including development of a GHG inventory and quantification of GHG reduction measures and pollution co-benefits, were performed by ICLEI USA for the SL-CLEAR CCAP. ICLEI USA is a non-profit organization specializing in climate planning and analysis for local governments and has extensive experience in related protocols, tools, and planning frameworks to assist with the development of GHG inventories and climate action plans.

Additional details on the approach and methodologies utilized by ICLEI USA are included in the Appendix B of this report. Extensive outreach and engagement with jurisdictional partners, stakeholders, and community members informed the GHG reduction measures that were included in the SL-CLEAR CCAP.

3.4 ClearPath 2.0 Modelling and Dashboard

ICLEI USA leveraged ClearPath 2.0 modelling software, powered by ClimateView, to complete the GHG inventory and calculate GHG impacts of reduction measures for each sector. ClearPath 2.0 is a dynamic, next generation climate modelling platform that assists state and local governments with understanding GHGs and developing strategies to mitigate emissions across all key sectors.

A dynamic public dashboard was developed where users can explore emissions and solution impacts across the SLC MSA. Visit the online ClimateView Dashboard and explore climate emissions and solutions in more detail for the SLC MSA.

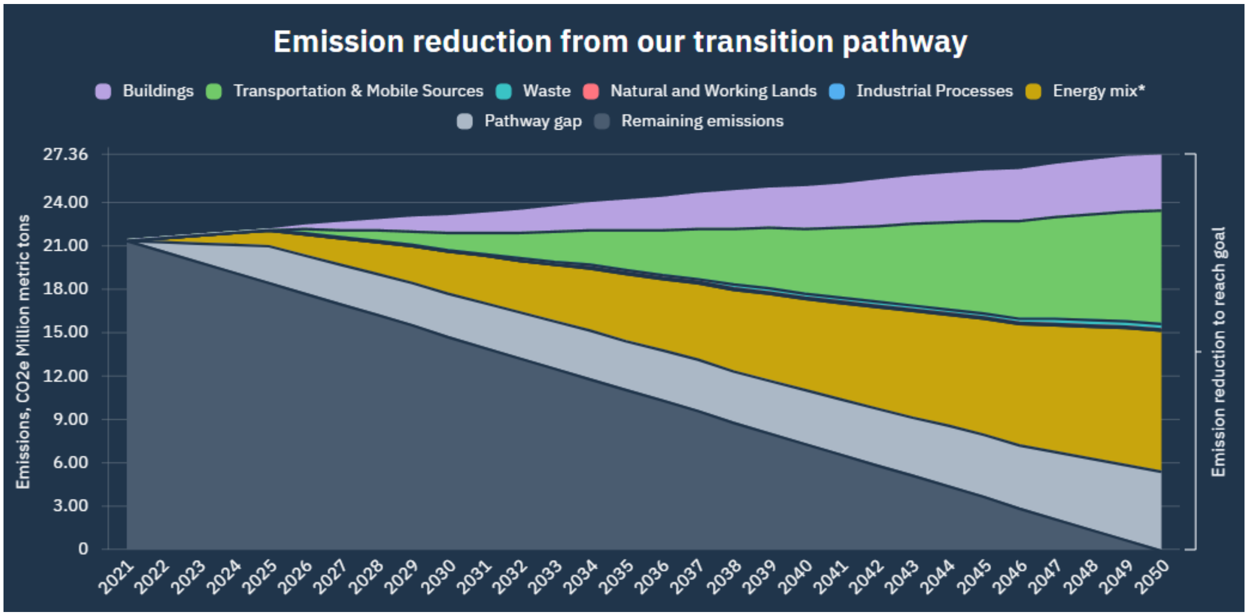


Figure 4. Screenshot from the ClearPath 2.0 online interactive dashboard.

4. Solution Blueprints

Regional solution blueprints were created to feature the highest priority implementation possibilities elevated during the research and engagement process for this project. In total, 14 separate two-page blueprints were created that feature big ideas for positive transformation. Each blueprint includes a list of priority actions, replicable examples, local partners, and resource needs.

Below is a list of all the blueprint titles. Complete details can be found in the blueprints online.

- Growing Resilient Food Systems
- Home Retrofit Market Transformation
- Commercial Buildings Energy Accelerator
- Energy Smart New Buildings
- Solar on Sunny Rooftops
- Clean Industry Hub
- Green Neighborhoods that Keep Us Cool
- Walkable, Bikeable, Interconnected Communities
- Empower the Electric Revolution (EVs)
- Turn Green Waste into Green Goods
- Public Facilities as Role Models
- Clean Electric Public Fleets
- Ensure Our Workforce is at the Leading Edge
- Connect People to Promising Careers

Additional planning and partnerships are needed to successfully implement and scale the solutions detailed in these blueprints. Key roles, resources, and timing will vary depending on the solution. Sign up for the SL-CLEAR email list to stay in touch.

SL-CLEAR BLUEPRINT #2

HOME RETROFIT MARKET TRANSFORMATION

WHAT'S THE BIG IDEA?
Drive market transformation through coordinated public–private action that makes it easy for homeowners to improve energy efficiency, access healthy electric appliances, and save money.

WHY IT MATTERS
- CLEANS OUR AIR
- SAVES MONEY
- IMPROVES HEALTH
- CREATES JOBS

WHAT IT TAKES
CONVENE & STRATEGIZE → WORKFORCE PARTNERSHIP → MARKET DEVELOPMENT & FINANCING → HOME ENERGY ADVISOR PILOT → REFINE & SCALE

Home Retrofit Market Transformation: Making It Happen

SL-CLEAR.SLC.GOV

CONVENE & STRATEGIZE Bring together public and private partners to explore market transformation opportunities, define goals, and develop a roadmap for households to access smart energy upgrades and finance key solutions such as weatherization, efficient electric heat pumps, and rooftop solar.

WORKFORCE PARTNERSHIP Team up with contractors, equipment suppliers, and training programs to develop workforce knowledge and skills in leading technologies, such as HVAC heat pumps, and connect stakeholders with transformation opportunities.

MARKET DEVELOPMENT & FINANCING Pinpoint target markets and housing types plus develop marketing strategies as well as financial tools and incentives to drive customer participation. Ensure appropriate policy support from governments and regulatory bodies to leverage regional economies of scale.

HOME ENERGY ADVISOR PILOT Consider a regional Home Energy Advisor pilot program to test and demonstrate coordinated delivery of energy efficiency upgrades, providing homeowners with a seamless experience from energy audit to upgrade installation and commissioning.

REFINE & SCALE Continue to refine the programmatic, policy, and partnership approach through ongoing collaboration while scaling successes across the region, reporting on results and providing continued financial support and incentives as needed.

RESOURCES & EXAMPLES
- Boulder County EnergySmart and Colorado EnergySmart
- I Heart My Home CT: New Haven Neighborhood Housing Services
- Rocky Mountain Power: WattSmart Homes Program
- Utah Clean Energy and Utah OED: Energy Efficiency Guide for Utah Renters

WHO NEEDS TO BE INVOLVED?
- State and Local Government
- Energy Contractors and Equipment Suppliers
- Philanthropy and Non-Profits
- Energy Utilities
- Financing Partners and Institutions
- Workforce Development and Training Partners

HOW COULD IT BE FUNDED?
- Federal, State, and/or Philanthropic Grants and Incentives
- Energy Utility Incentives
- State and Local Government Budgets
- Financing Products and Solutions
- Program Fees and Revenues

Figure 5. One of 14 solution implementation blueprints created for the SL-CLEAR CCAP.

5. Greenhouse Gas Inventory

A comprehensive GHG inventory for the SLC MSA was developed for the CCAP and this effort was led by ICLEI USA, a non-profit specializing in local government climate planning and action. The Inventory is based on the Greenhouse Gas Protocol for Cities (GPC) and was modeled using ClearPath 2.0 software.

The GHG inventory covers all required sectors in the CPRG program guidance for the CCAP. Emissions were estimated for 2021 across the entire SLC MSA boundary, including Salt Lake County and Tooele County. More information on the methodology, including mapping of EPA required sectors to GPC protocol sectors is included in Appendix B.

Table 2 provides a summary of SLC MSA GHG emissions modelled for the CCAP and a graphical depiction of emissions by sector is included in Figure 6. Emissions are represented in thousand metric tons of CO2-equivalent (TMTCO2e) in this table and throughout the CCAP.

Detailed summaries of 2021 GHG emissions estimates, including more granular metric tons of CO2-equivalent (MTCO2e) totals, for each sector and subsector are included in Appendix B along with associated methodologies and assumptions.

Table 2. SLC MSA Greenhouse Gas Inventory for the baseline year, 2021. Calculations provided by ICLEI USA.

Sector	Thousand Metric Tons CO2e (TMT CO2e)	Percent of Total
Residential Energy	3,940	18.3%
Commercial Energy	5,428	25.3%
Industrial Energy	2,828	13.2%
Transportation & Mobile Sources	7,552	35.2%
Solid Waste	676	3.1%
Wastewater Treatment	12	0.1%

Sector	Thousand Metric Tons CO2e (TMT CO2e)	Percent of Total
Process and Fugitive Emissions	1,093	5.1%
Agriculture, Forestry, and Other Land Uses (AFOLU)	-57	-0.3%
TOTAL	**21,472**	**100.0%**

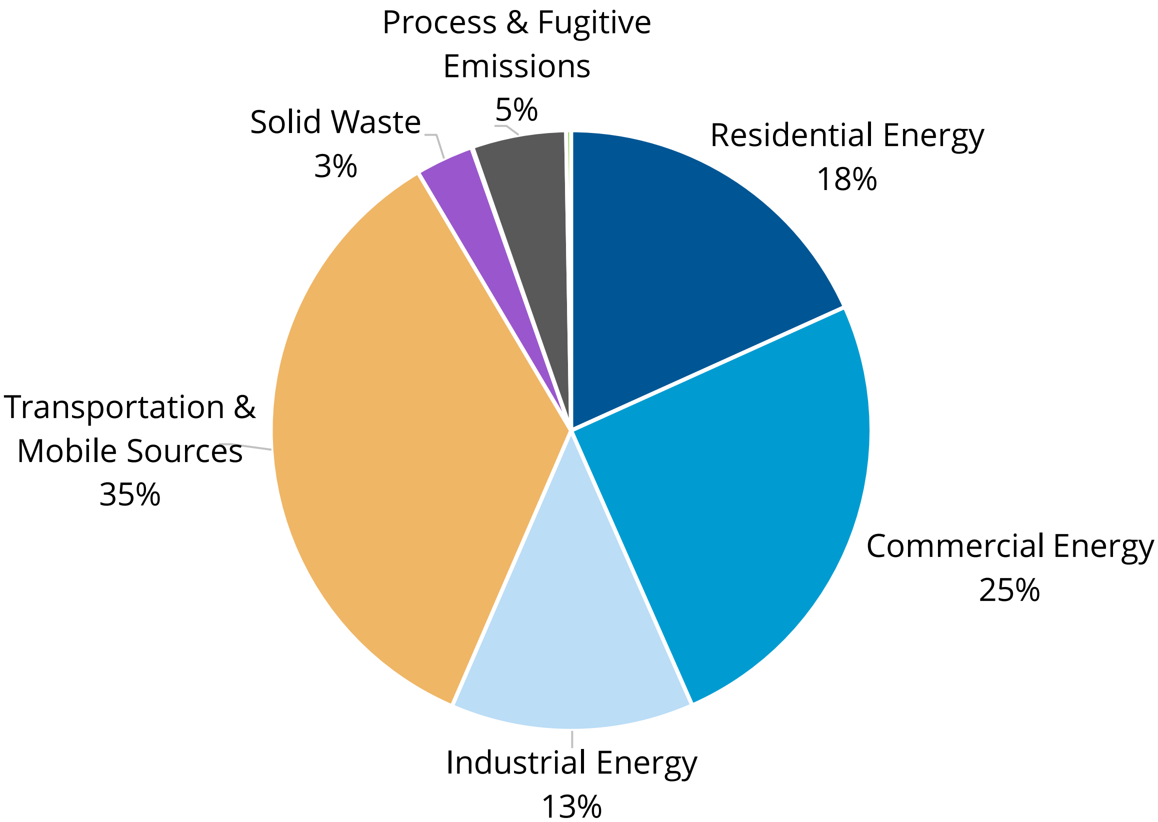


Figure 6. SLC MSA Greenhouse Gas Inventory Summary for 2021. Sectors contributing less than 1% of total emissions—such as Wastewater Treatment and Agriculture, Forestry, and Other Land Use—were excluded from this summary.

In addition to the overall summaries, a breakdown of GHG emissions for the largest sectors is provided in the subsections below. These graphs convey the relative amount of GHG emissions within a sector or subsector and can inform future climate planning and GHG mitigation priorities.

5.1 Energy Sector: GHG Emissions

GHG emissions from the energy sector are included in Figure 7 and reflect emissions associated with electricity use, natural gas, and other onsite fuel for homes, buildings, and other facilities. The breakdown demonstrates the relative share of GHG emissions from the residential, commercial, and industrial built environment and conveys that commercial buildings and facilities produce the most GHG emissions (45%), with residential properties coming in second (32%).

A more detailed breakdown of GHG emissions by energy source (e.g., electricity, natural gas, etc.) is included for each sub-sector in Appendix B.

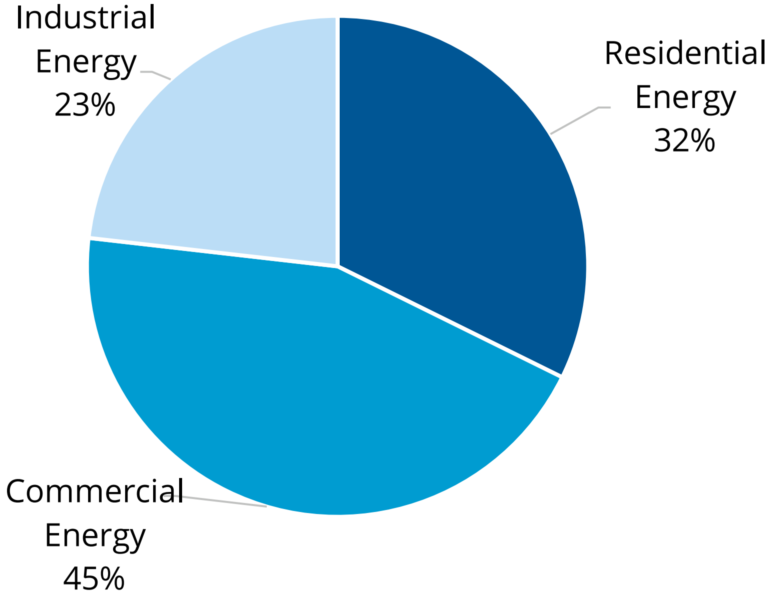


Figure 7. SLC MSA Energy Sector Greenhouse Gas Breakdown by Subsector for 2021.

5.1.1 Residential Energy Use

Residential homes and properties in the SLC MSA primarily create GHG emissions due to electricity use and the combustion of natural gas onsite. An estimated 59% of GHG emissions from residential properties are associated with electricity use (Figure 8). The combustion of natural gas for use in appliances, typically space heating, water heating, and cooking, is the second leading cause of energy-related GHG emissions for residential properties in the SLC MSA with 39% of emissions coming from this source. An additional 2% of GHG emissions are due to the combustion of other fuels onsite (e.g., propane).

As the electric grid continues to become cleaner and powered by renewable energy resources, electricity-based emissions will naturally decrease. Additionally, the electrification of space heating, water heating, and other appliances by installing energy-efficient electric heat pumps can further reduce GHGs for residential properties throughout the SLC MSA. Encouraging all-electric new construction along with the adoption of efficient electric appliances in existing residential properties, combined with a cleaner electric grid, has the potential to significantly reduce residential GHGs in the coming years and decades.

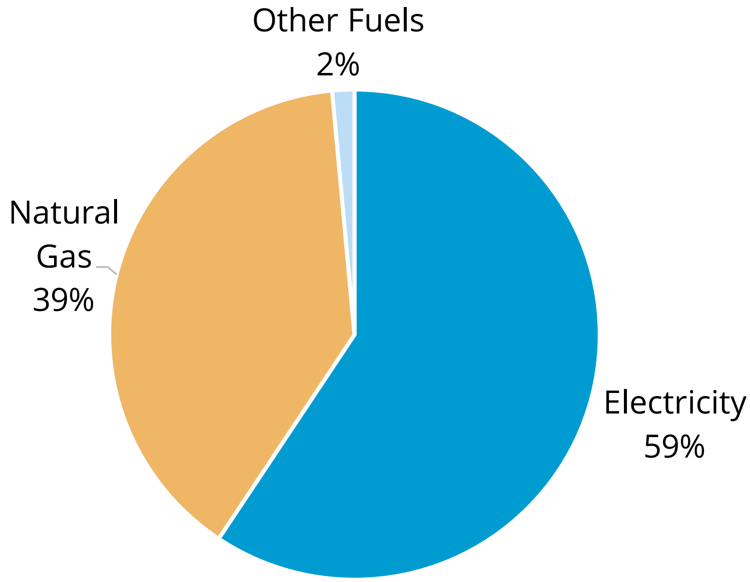


Figure 8. SLC MSA Residential Energy Sector Greenhouse Gas Breakdown by Energy Source and Fuel Type for 2021.

5.1.2 Commercial Energy Use

Commercial properties in the SLC MSA primarily create GHG emissions due to electricity use and the combustion of natural gas onsite. The use of electricity is the leading cause of energy-related GHG emissions for commercial properties in the SLC MSA with 65% of emissions coming from this activity (Figure 9). An additional 31% of GHG emissions from commercial properties are associated with natural gas use and 4% of GHGs emissions are from combustion of other fuels onsite (e.g., propane).

Commercial properties can reduce GHGs through efficiency upgrades and their emissions footprint will naturally decrease as the electric grid becomes cleaner. Electrifying onsite energy uses such as space heating and water heating offers significant potential to reduce GHGs over time. Similar to the residential sector, encouraging all-electric new construction along with the adoption of efficient electric appliances in existing commercial properties, combined with a cleaner electric grid, has the potential to significantly reduce GHGs in the coming years.

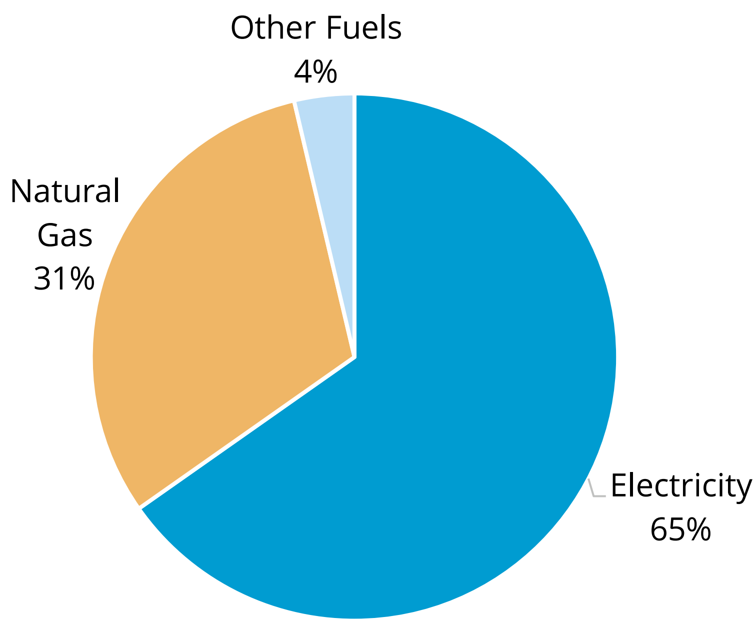


Figure 9. SLC MSA Commercial Energy Sector Greenhouse Gas Breakdown by Energy Source and Fuel Type for 2021.

5.1.3 Industrial Energy Use

Industrial properties account for 23% of GHG emissions from energy used within the built environment in the SLC MSA, but this energy use is concentrated among a relatively small number of locations. Electricity use (79%) is the largest contributor of GHGs from industrial energy use, followed by natural gas combustion (17%) and other fuels (4%) (Figure 10).

Energy efficiency can play a major role in cutting GHG emissions from industrial properties. Emerging technologies and increasingly cost-effective solutions such as electrification and, in some cases, hydrogen, can help further reduce GHGs. Solution possibilities for the industrial sector, as well as other sectors, are included in the GHG reduction measures section of this CCAP.

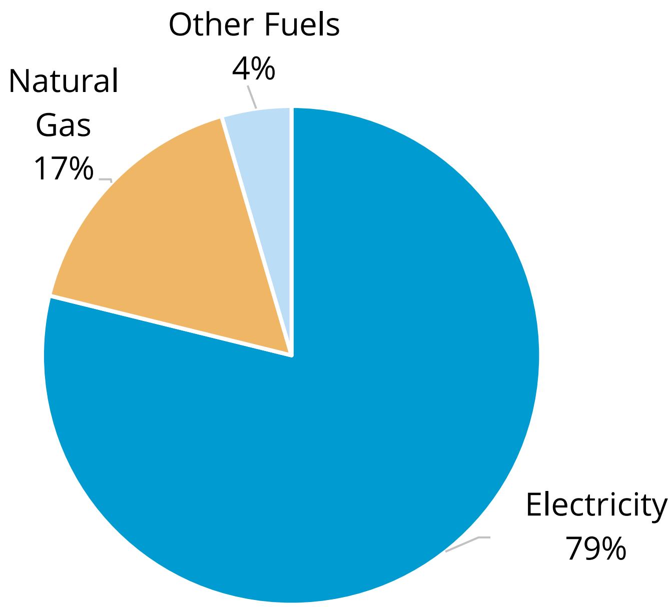


Figure 10. SLC MSA Industrial Energy Sector Greenhouse Gas Breakdown by Energy Source and Fuel Type for 2021.

5.2 Transportation Sector: GHG Emissions

Transportation and mobile sources produce the largest amount of GHGs within the SLC MSA, accounting for 35% of the total emissions footprint in the CCAP. These emissions come from among a handful of activities listed in Figure 11. On-road transportation (63%) contributes the most significant amount of GHGs in this sector, followed by aviation (27%) which primarily contributes emissions from flight activity at the Salt Lake City International Airport. More granular details on the metrics and methodologies used to calculate GHG emissions for this and all other sectors are included in Appendix B.

Similar to the built environment, emissions from transportation and mobile sources can be mitigated through a variety of solutions. The CCAP documents many of these ideas, including active and innovative mobility, transit, and transportation electrification which are featured in the GHG reduction measures section.

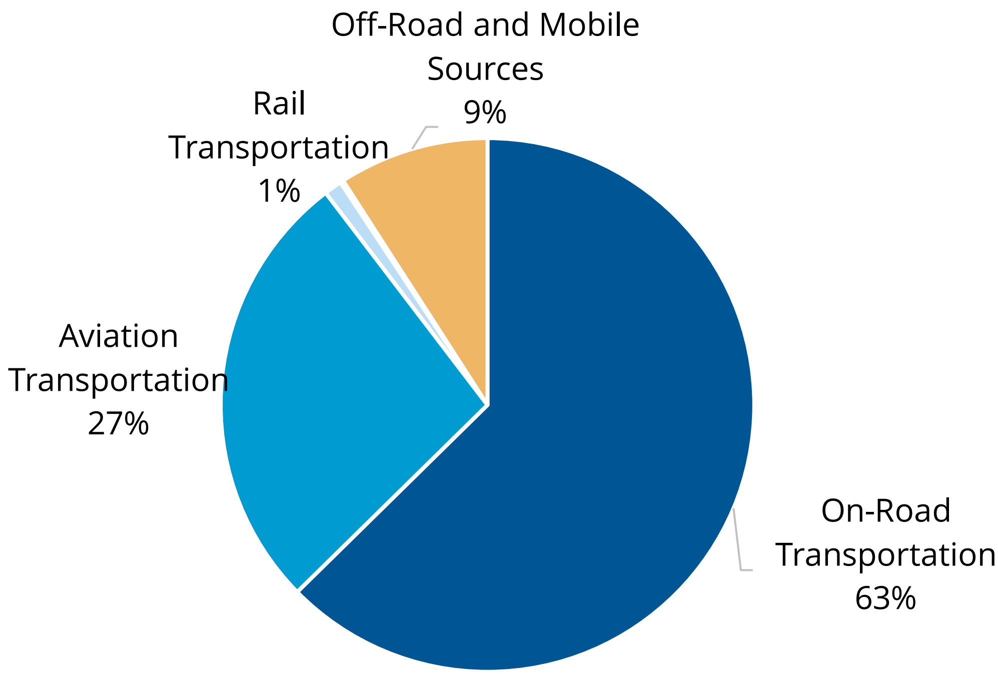


Figure 11. SLC MSA Transportation and Mobile Sources Sector Greenhouse Gas Breakdown by Transportation Type for 2021.

On-road transportation represents the largest share of transportation-related GHGs in the SLC MSA and Figure 12 provides a breakdown of the fuels contributing to these emissions. Combustion of gasoline (85%) creates the highest amount of GHG emissions followed by diesel (15%). CNG vehicles and electric vehicles (EVs) currently contribute a relatively small amount of GHG emissions that round down to 0%. Emissions associated with electricity generation for EVs were factored into the calculations.

A variety of activities can mitigate on-road transportation GHGs and a strong co-benefit of these solutions is the reduction of local air pollutants such as particulate matter and precursors to ozone that harm public health and contribute to chronic illnesses. Estimates for these pollution reductions are included in the Benefits Analysis section of this CCAP.

Active transportation, transit, and solutions that reduce vehicle miles travelled (VMT) are highlighted in the GHG reduction measures section, along with the electrification of transportation which can significantly reduce GHGs over time.

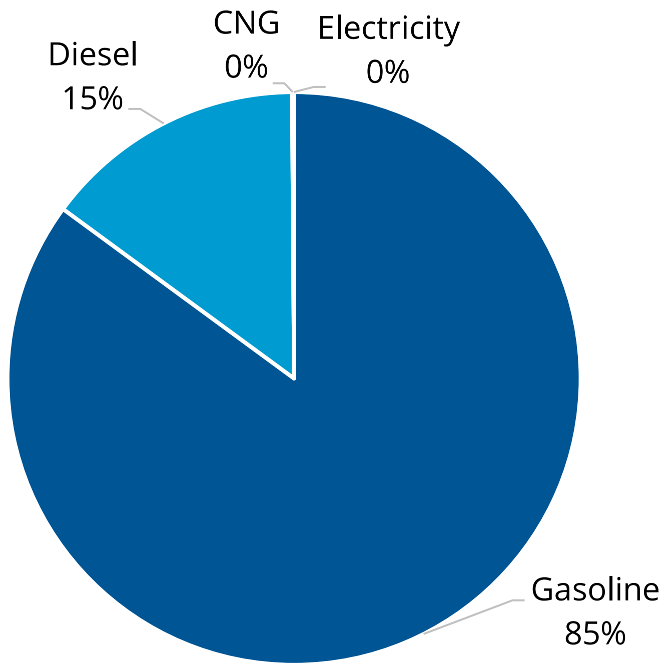


Figure 12. SLC MSA On-Road Transportation Greenhouse Gas Breakdown by Fuel Type for 2021.

5.3 Greenhouse Gas Emissions Projections

A reference scenario of future GHG emissions was created for the SLC MSA. This scenario extends baseline emissions activity into the future using population growth projections, representing an "if we do nothing" pathway on GHGs. This forecast provides a benchmark for evaluating mitigation strategies by showing how emissions would change without additional action. Additional technical details on reference scenario creation are included in Appendix B.

Figure 13 depicts future GHG emissions under a reference scenario. In this example, overall GHG emissions from 21,472 TMTCO2e in 2021 to 27,358 TMTCO2e in 2050, representing a 27% rise. Due to the population scaling factor, emissions increase for stationary energy, transportation, and solid waste which collectively represent all of the total increase in GHGs by 2050.

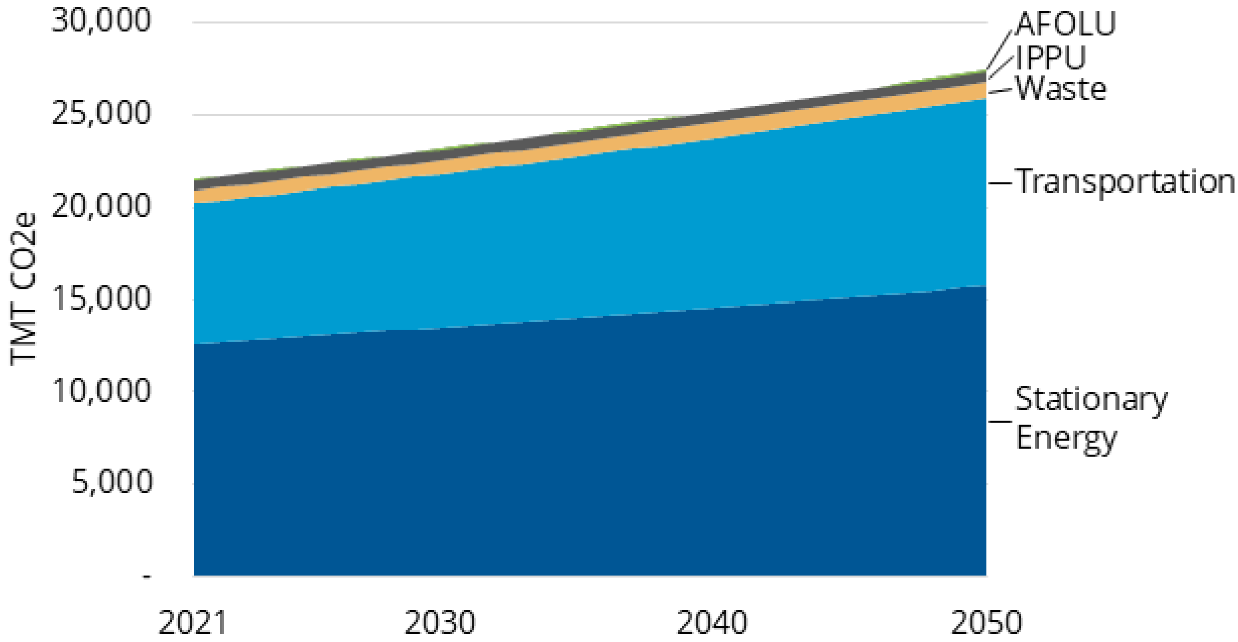


Figure 13. SLC MSA Reference Scenario GHG Emissions Forecast. Stationary energy corresponds to Buildings and Electricity; AFOLU to Agriculture, Forestry, and Other Land Use; IPPU to Industrial Processes and Product Use.

A closer look at stationary energy emissions, representing GHGs from onsite fuel combustion such as natural gas along with electricity use, shows these increasing by 24% from 2021 to 2050 under the reference scenario (Figure 14). Emissions continue to increase for residential and commercial buildings and a cleaner electric grid does not support major GHG reductions as it does in the target scenario. More details on a 74% reduction by 2050 trajectory, including an alternative emissions forecast, are included in the following subsection.

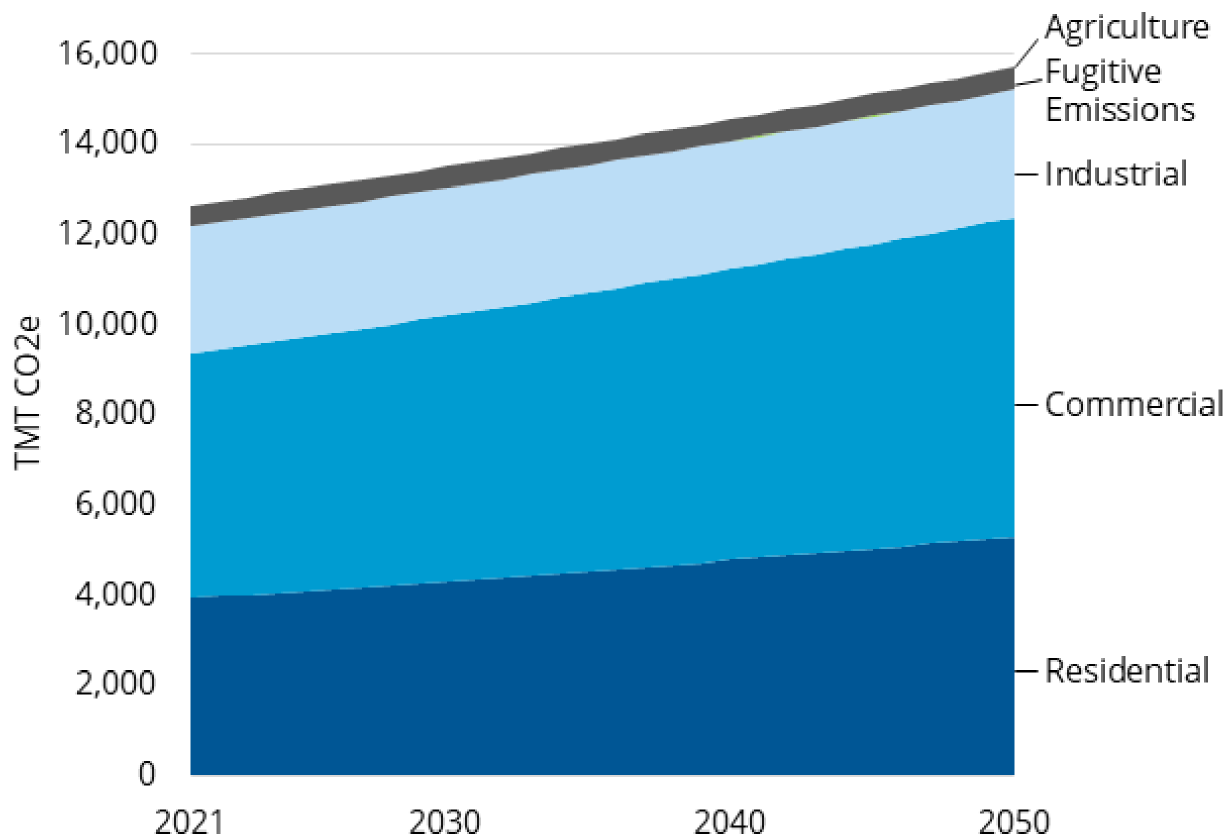


Figure 14. SLC MSA Reference Scenario GHG Emissions Forecast for Stationary Energy. Fugitive emissions refer to those originating from fossil fuel systems. Agricultural contributions are below 2 TMT CO_2e and therefore are not visible in the graph.

Transportation emissions also increase in the reference scenario and Figure 15 depicts growth of 35% from 2021 to 2050. Total annual emissions for on-road transportation reflects the largest increase with 1,637 TMTCO2e more annual emissions in 2050 relative to 2021. Annual aviation emissions also grow by a notable amount, increasing by 34% from 2021 to 2050.

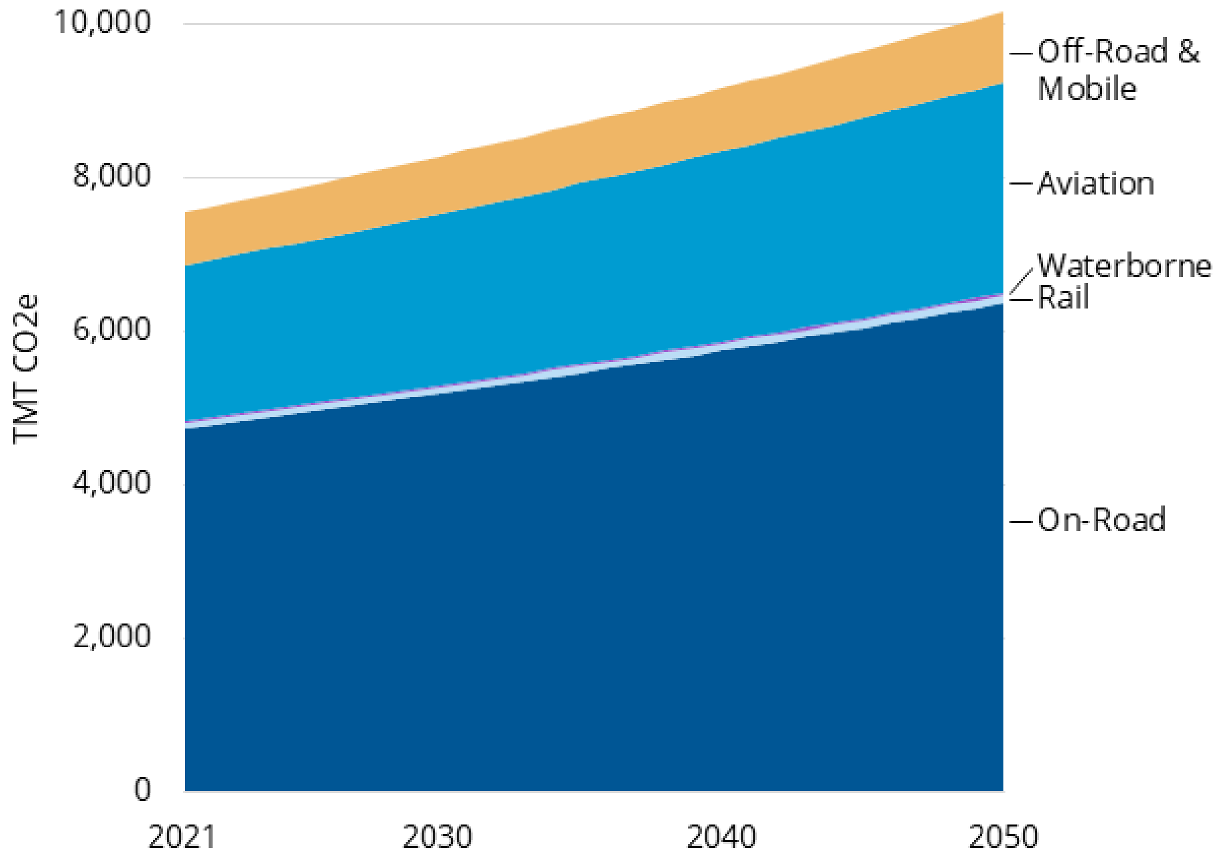


Figure 15. SLC MSA Reference Scenario GHG Emissions Forecast for Transportation.

5.4 Near-Term and Long-Term Greenhouse Gas Reduction Targets

Near-term and long-term GHG reduction targets were established for the MSA in compliance with the EPA CPRG planning grants guidelines. A 2050 reduction of 74% of GHGs relative to the 2021 baseline emissions was selected for the long-term target. The 2050 GHG emissions outcome achieves this 74% reduction relative to 2021 and represents an 80% reduction in 2050 compared to the reference scenario.

The long-term target was informed by an iterative modelling process that evaluated the technical potential to reduce emissions through GHG reduction measures identified by stakeholders. The long-term target pathway informed a near-term reduction target of 32% of GHGs reduced by 2035, also in relation to the 2021 baseline.

Figure 16 reflects achievement of these targets as informed by outcomes of the GHG reduction measures. The sector with the most significant emissions reductions from its 2021 baseline is stationary energy, representing both electricity and onsite fossil fuel use in buildings, where 83% of emissions are reduced by 2050. This is followed by transportation which reflects a 69% reduction in emissions relative to the 2021 baseline for this sector. More details on reductions, including interactive graphics that allow a deep dive into every sector, are available in the online ClearPath dashboard for the SLC MSA.

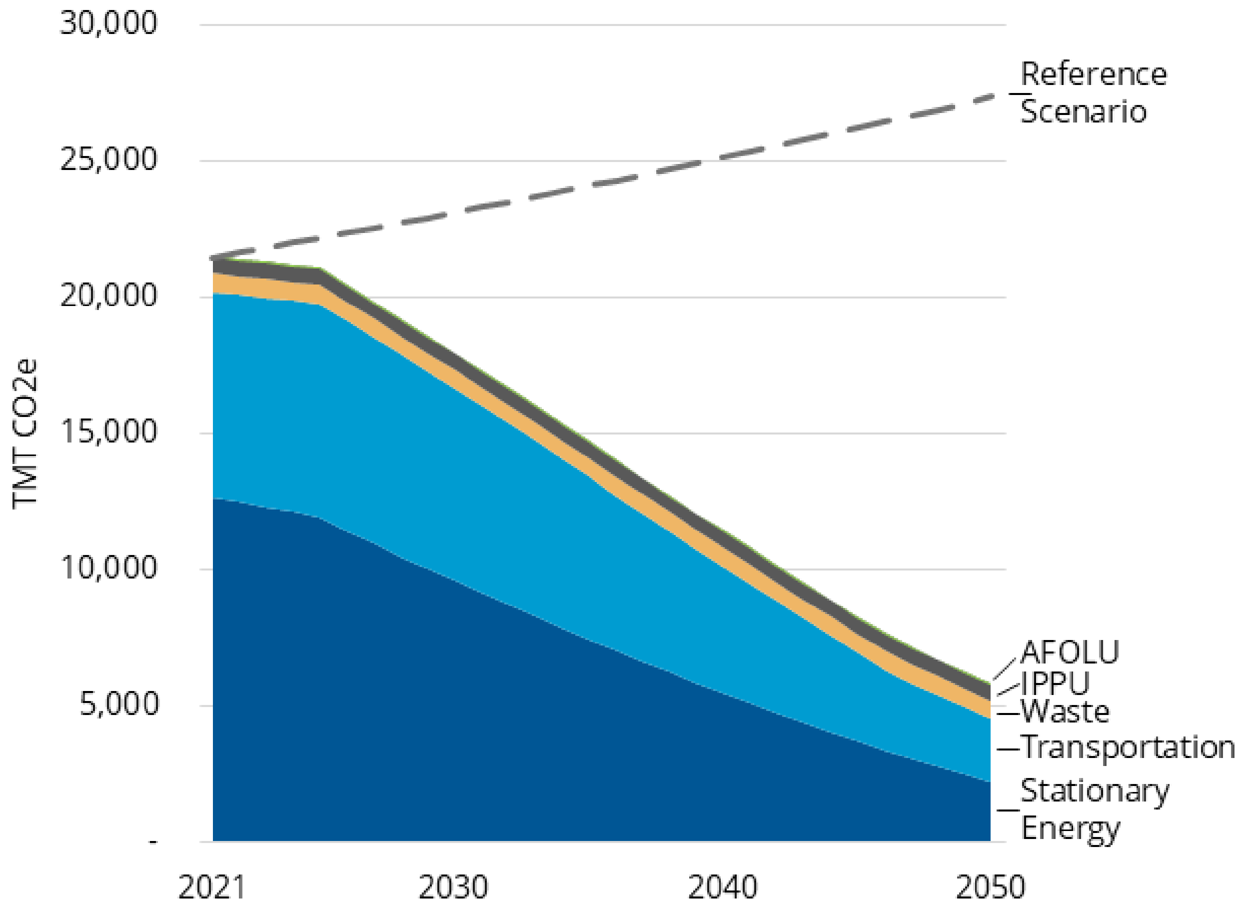


Figure 16. SLC MSA GHG Target Pathway. Stationary Energy corresponds to Buildings and Electricity; AFOLU to Agriculture, Forestry, and Other Land Use; IPPU to Industrial Processes and Product Use.

6. GREENHOUSE GAS REDUCTION MEASURES

GHG reduction measures were developed for the SL-CLEAR CCAP using an inclusive outreach approach that solicited input from local governments within the SLC MSA along with other stakeholders such as non-profit and education sector partners. This approach resulted in a wide range of measures across all key sectors and detailed a pathway to achieving a 74% reduction in GHGs by 2050.

Figure 17. Solar installations on two public facilities in Salt Lake City (Image Source: Salt Lake City Corporation)

Table 3 provides a summary of all measures included within the CCAP along with cumulative GHG reductions by the 2035 and 2050 target dates. Additional details on each measure are included in subsequent sections of the report.

Table 3. Summary of CCAP GHG reduction measures and associated emissions reduced for 2035 and 2050.

Sector(s)	Measure Primary Title	Cumulative GHG Reductions Through 2035 *(TMT CO2e[1])*	Cumulative GHG Reductions Through 2050 *(TMT CO2e[1])*
Buildings	1. Residential Energy Efficiency	2,482	7,040
Buildings	2. Residential Electrification	2,118	17,762
Buildings	3. Commercial Energy Efficiency	3,467	9,353
Buildings	4. Commercial Building Electrification	2,969	22,964
Buildings	5. Local Government and Institutional Facility Performance	Emissions reductions included in commercial buildings	Emissions reductions included in commercial buildings

[1] TMTCO2e = Thousand Metric Tons of CO2-equivalent emissions

Sector(s)	Measure Primary Title	Cumulative GHG Reductions Through 2035 *(TMT CO2e[1])*	Cumulative GHG Reductions Through 2050 *(TMT CO2e[1])*
Electricity Generation	6. Residential Solar PV 7. Commercial Solar PV 8. Clean Grid: Carbon-Free Solutions 9. Utah Renewable Communities Program 10. Biodigester for Combined Heat and Power	Emissions reductions factored into other sectors (e.g., buildings) using dynamic modelling	Emissions reductions factored into other sectors (e.g., buildings) using dynamic modelling
Industry	11. Industrial Facility Decarbonization	219	726
Industry	12. Alternative Fuels 13. Production and Manufacturing 14. Fugitive Emissions 15. Inland Port Pollution Mitigation 16. Small Boiler Conversion to Heat Pumps	Not quantified *(additional details in section below)*	Not quantified *(additional details in section below)*
Transportation	17. Active and Innovative Mobility and Transit	4,366	24,518
Transportation	18. Electrified Transportation: Lighter Duty Vehicles	7,954	55,012

Sector(s)	Measure Primary Title	Cumulative GHG Reductions Through 2035 *(TMT CO2e[1])*	Cumulative GHG Reductions Through 2050 *(TMT CO2e[1])*
Transportation	19. Electrified Transportation: Heavier Duty Vehicles	743	3,599
Transportation	20. Electrification: Off-Road Equipment and Vehicles	780	9,986
Transportation	21. Sustainable Aviation Fuels and Efficiency	138	4,404
Transportation	22. Local Government and Institutional Fleet Electrification	Emissions reductions factored into transportation measures above	Emissions reductions factored into transportation measures above
Waste and Materials Management	23. Green Waste Diversion	340	1,605
Waste and Materials Management	24. Food Waste Diversion	430	2,339
Waste and Materials Management	25. Recycling Services	408	1,463
Waste and Materials Management	26. Wastewater Treatment Facilities	10	64

Sector(s)	Measure Primary Title	Cumulative GHG Reductions Through 2035 *(TMT CO2e[1])*	Cumulative GHG Reductions Through 2050 *(TMT CO2e[1])*
Waste and Materials Management	27. Construction and Demolition Materials Diversion 28. Landfill Methane Capture 29. Low-Carbon Materials 30. General Waste Reduction and Reuse	Not quantified *(additional details in section below)*	Not quantified *(additional details in section below)*
Agriculture, Natural and Working Lands	31. Community Tree Canopy and Urban Forests	287	1,697
Agriculture, Natural and Working Lands	32. Agriculture Equipment Electrification	2	20
Agriculture, Natural and Working Lands	33. Land preservation 34. Sustainable Agriculture	Not quantified *(additional details in section below)*	Not quantified *(additional details in section below)*
Cumulative GHG Reduction Estimates – All Measures	***N/A***	**26,713**	**162,552**

The following sections detail measures to reduce GHG emissions within the SLC MSA. A dedicated section is provided for each sector along with measure-specific tables that include much of the information required for the CCAP by the EPA CPRG program.

Overall, transportation contributes the most cumulative GHG reductions by 2050 with 60% of the total coming from that sector (Figure 18). Buildings are second with 35% of the total GHGs reduced and then is followed by waste and materials management (3%). Agriculture, natural and working lands along with industry each contribute 1% or less of the overall reductions, respectively. The GHG reduction modelling approach leveraged for this CCAP allocated emissions reductions associated with a cleaner electric grid to each of the other sectors.

This dynamic modelling method allowed for allocation of electricity impacts to each sector associated with this energy use (e.g., electricity used in buildings versus for transportation). Commentary on GHG reduction measures for electricity generation are included in a section for that sector below, along with a stand-alone estimate of how much a cleaner electric grid will contribute to GHG emissions reductions over time.

A high-level cost estimate range associated with programs, policies, and other implementation needs is provided for each numbered GHG reduction measure and its sub-measure in order to comply with EPA CPRG CCAP requirements. These cost estimates were derived by leveraging demographic and other data for the SLC MSA and were informed by online research of comparable project and program types. A more rigorous and detailed cost estimate should be completed for any individual measure or sub-measure in the future as part of program design, grant funding development, or other implementation activities.

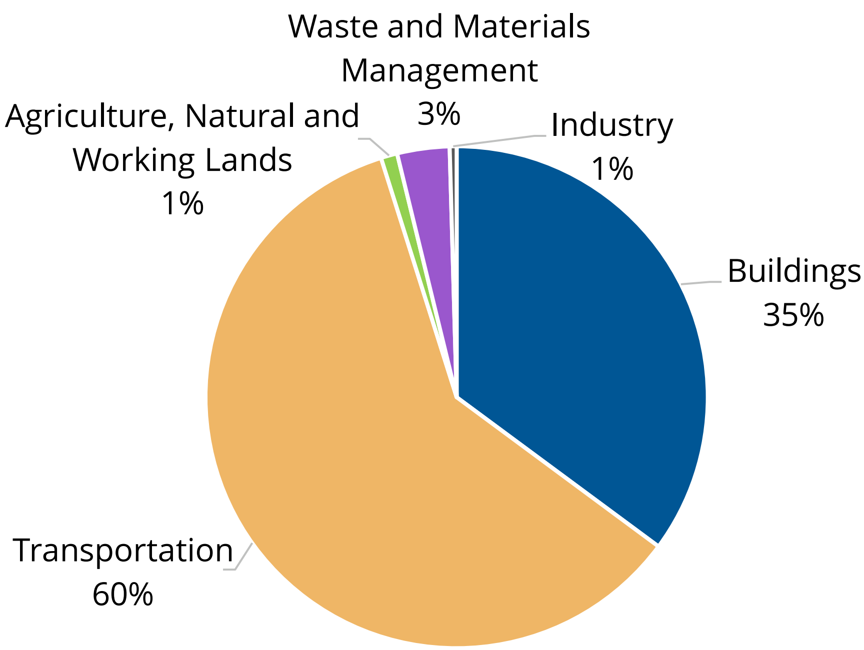


Figure 18. Relative GHG emissions reduction contribution by sector through 2050. Note that electricity generation reductions are incorporated into other sectors depending on where end electricity use occurs.

6.1 Buildings Sector Measures

Building sector GHG reduction measures contribute 35% of the total cumulative GHGs reduced by 2050, according to modelling for this CCAP. The group primarily consists of energy efficiency and electrification measures, along with some other solution approaches such as building audits, financing, and one-stop-shop services.

Figure 19 displays a notable increase in gross GHGs mitigated through 2050 relative to 2035. This is due to an acceleration of solution deployment combined with a cleaner electric grid over time which improves the GHG reduction potential for building electrification solutions such as heat pumps. Details for each measure are included in the tables below.

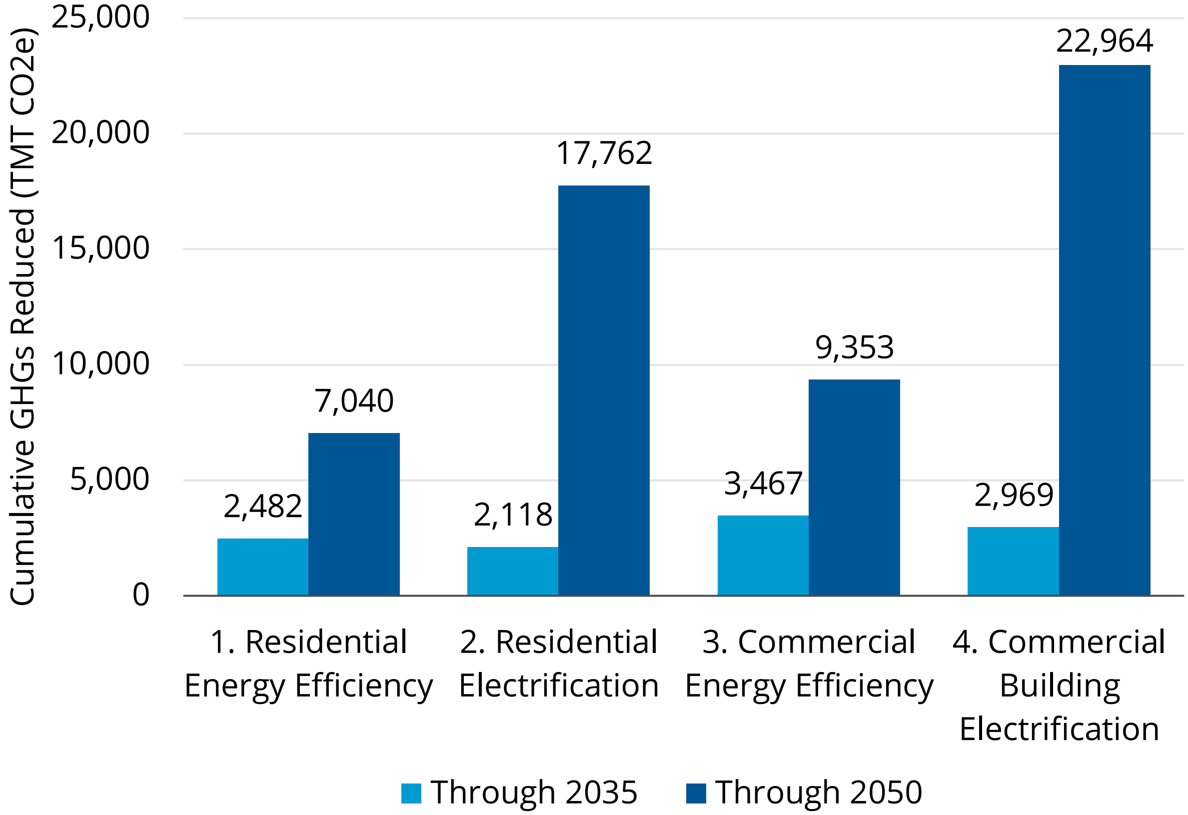


Figure 19. Estimated GHG emissions reduced through 2035 and 2050 for measures in the buildings sector.

1. Residential Energy Efficiency

Category	Details
Applicable Sector	Buildings
Measure Summary	This group of measures improves energy efficiency within the residential housing stock, including all housing types plus new construction and retrofits.
Cumulative GHGs Reduced Through 2035	2,482 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	7,040 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	**a. Weatherization:** Programs and incentives to support residential air sealing, insulation, and other measures, including pre-weatherization improvements such as addressing health and safety issues. **b. General Efficiency Measures:** Programs and incentives to support additional energy efficiency improvements in residential properties such as energy-efficient lighting, low-flow water fixtures, programmable thermostats, and other improvements. **c. Tariffed On-Bill Retrofit Programs:** Utility-led programs that support efficiency and electrification

Category	Details
	investments in customer properties, including all residential housing types. **d. One-Stop-Shop for Households and Contractors:** Program to engage, educate, and inspire home energy upgrades, including the use of incentives and programming that streamline solutions deployment for households and contractors. This can include encouraging enrollment in utility bill assistance and other energy-related programs. Virtual home assessments might also be supported by a one-stop-shop. **e. New Construction Incentives, Codes, and Solutions:** Initiatives that accelerate the deployment of energy efficient and electrified technologies and building practices in new construction, including education and incentives. This could include voluntary energy stretch codes that are encouraged at a local government or regional level.
Implementing Agencies	Local and/or State Government
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2026-28: Planning, Engagement, and Funding 2028-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*

Category	Details
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs; Tariffed on-bill programs facilitated by investor-owned utilities are subject to regulation by the Utah Public Service Commission; Building codes are adopted by the State of Utah
Progress Tracking Metrics	• Number of properties and square footage receiving efficiency upgrades • Quantity of each measure installed • Estimated annual utility bill savings • Estimated annual energy use and GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

2. Residential Electrification

Category	Details
Applicable Sector	Buildings
Measure Summary	This group of measures promotes efficient electrification within the residential housing stock, including all housing types plus new construction and retrofits.
Cumulative GHGs Reduced Through 2035	2,118 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	17,762 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **HVAC Heat Pumps:** Programs and incentives to encourage the deployment of electric heat pumps for heating, ventilation, and air conditioning (HVAC). b. **Heat Pump Water Heaters:** Programs and incentives to encourage the deployment of heat pump water heaters (HPWH). c. **Electric Cooking:** Programs and incentives to encourage the deployment of electric cooking technologies, including induction cooking and other options. d. **One-Stop-Shop for Households and Contractors:** Program to engage, educate, and inspire home

Category	Details
	electrification upgrades, including the use of incentives and programming that streamline solutions deployment for households and contractors. Virtual property assessments might also be supported by a one-stop-shop. e. **Heat Pump Contractor Support and Training:** Engagement, training, and market development support for HVAC and water heating contractors to encourage market uptake and acceleration of heat pump deployment. f. **New Construction Incentives, Codes, and Solutions:** Initiatives that accelerate the deployment of energy efficient and electrified technologies and all-electric building practices in new construction, including education and incentives. This could include voluntary energy stretch codes that are encouraged at a local government or regional level.
Implementing Agencies	Local and/or State Government
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2026-28: Planning, Engagement, and Funding 2028-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*

Category	Details
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs; Building codes are adopted by the State of Utah
Progress Tracking Metrics	• Number of properties and square footage receiving electrification upgrades • Quantity of each measure installed • Estimated annual utility bill savings • Estimated annual energy use and GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

3. Commercial Energy Efficiency

Category	Details
Applicable Sector	Buildings
Measure Summary	This group of measures improves energy efficiency within the commercial building stock, including private sector, government, education, and other non-residential buildings and facility types. Both new construction and retrofit measures are included.
Cumulative GHGs Reduced Through 2035	3,467 TMT CO_2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	9,353 TMT CO_2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Weatherization:** Programs and incentives to support non-residential property air sealing, insulation, and other measures, including pre-weatherization improvements such as addressing health and safety issues. b. **Efficiency and Commissioning:** Programs and incentives to support energy efficiency improvements and energy commissioning activities in non-residential properties. c. **LED Lighting and Streetlighting:** Programs and incentives to support the installation of energy efficient LED lighting for nonresidential properties

Category	Details
	plus the installation of LED streetlighting for government and other public facilities. **d. Building Performance Standards:** Programs and policies that catalyze energy benchmarking and improvements to reduce and often electrify energy usage, typically within larger building types. **e. Building Efficiency Accelerator:** Technical assistance, professional networking, best practices demonstration, and financial incentives for efficient and electrified new construction, property retrofits, and ongoing energy management. An accelerator could be for a targeted group of properties, such as government and public facilities, or allow for participation by a broader range of building types. **f. Large Facility Assessments:** Professional energy audits and tailored recommendations for large facility types, including suggesting improvements to reduce energy use and electrify. **g. New Construction Incentives, Codes, and Solutions:** Initiatives that accelerate the deployment of energy efficient and electrified technologies and building practices in new construction, including education and incentives. This could include voluntary energy stretch codes that are encouraged at a local government or regional level.
Implementing Agencies	Local and/or State Government; Educational Institutions

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2028-30: Planning, Engagement, and Funding 2030-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs; Building codes are adopted by the State of Utah
Progress Tracking Metrics	• Number of properties and square footage receiving efficiency upgrades • Quantity of each measure installed • Estimated annual utility bill savings • Estimated annual energy use and GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

4. Commercial Building Electrification

Category	Details
Applicable Sector	Buildings
Measure Summary	This group of measures promotes efficient electrification within the commercial building stock, including private sector, government, education, and other non-residential buildings and facility types. Both new construction and retrofit measures are included.
Cumulative GHGs Reduced Through 2035	2,969 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	22,964 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **HVAC Heat Pumps:** Programs and incentives to encourage the deployment of electric heat pumps for heating, ventilation, and air conditioning (HVAC). b. **Heat Pump Water Heaters:** Programs and incentives to encourage the deployment of heat pump water heaters (HPWH). c. **Electric Cooking:** Programs and incentives to encourage the deployment of commercial electric cooking technologies. d. **Building Performance Standards:** Programs and policies that catalyze energy benchmarking and

Category	Details
	improvements to reduce and often electrify energy usage, typically within larger building types. e. **Building Electrification Accelerator:** Technical assistance, professional networking, best practices demonstration, and financial incentives for efficient and electrified new construction, property retrofits, and ongoing energy management. An accelerator could be for a targeted group of properties, such as government and public facilities, or allow for participation by a broader range of building types. f. **Large Facility Assessments:** Professional energy audits and tailored recommendations for large facility types, including suggesting improvements to reduce energy use and electrify end uses. g. **New Construction Incentives, Codes, and Solutions:** Initiatives that accelerate the deployment of energy efficient and electrified technologies and building practices in new construction, including education and incentives. This could include voluntary energy stretch codes that are encouraged at a local government or regional level.
Implementing Agencies	Local and/or State Government; Educational Institutions

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2028-30: Planning, Engagement, and Funding 2030-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs; Building codes are adopted by the State of Utah
Progress Tracking Metrics	• Number of properties and square footage receiving electrification upgrades • Quantity of each measure installed • Estimated annual utility bill savings • Estimated annual energy use and GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

5. Local Government and Institutional Facility Performance

Category	Details
Applicable Sector	Buildings
Measure Summary	Local governments and institutions across the SLC metro area, and more broadly in northern Utah, collaborate to enhance facility performance by implementing efficiency, electrification, and renewable generation solutions. Efforts are supported by a Facility Performance Accelerator that convenes stakeholders, provides technical assistance, and promotes networking to encourage implementation of programs, projects, and policies.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for this measure are embedded in the Commercial Buildings estimates
Measure Subtitles and Descriptions	a. **Facility Performance Accelerator:** Networking, technical resources, and procurement support to accelerate solution adoption across local governments and institutions. b. **Internal Staff Resources and Coordination:** Investing in internal staff capacity and training to support technical analyses, cross-departmental coordination, and capital planning for facility performance. c. **Priority and Pilot Project Implementation:** New construction and retrofit projects to reduce energy use, electrify, and/or generate renewable electricity.

Category	Details
	d. Internal Policy Adoption: Tailored internal policy development to support new construction, facility operations, and energy measure best practices. **e. Goal-Setting and Metrics Tracking:** Adoption of goals and discrete targets plus ongoing tracking and reporting of building performance, emissions, and financial savings.
Implementing Agencies	Local and/or State Government; Educational and Other Institutions
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2026-28: Planning, Engagement, and Funding 2028-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies and institutions have authority to participate and support in these activities
Progress Tracking Metrics	• Number and size of participating agencies and institutions • Number and type of policies and measures implemented • Energy impacts such as kWh saved, Dth saved, and utility cost savings • Estimated annual air quality pollution reduction • Estimated annual GHGs reduced
Geographic Location	Within SLC MSA

Category	Details
Funding Sources	Federal, State, and Local Government Budgets and Grants; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.2 Electricity Generation Sector Measures

Electricity generation solutions were developed through the research and engagement process for this CCAP. The tables below feature five distinct measures along with required information per EPA CPRG guidelines.

The ClearPath modelling software utilized for this plan naturally incorporated GHG reductions associated with the electric grid into other sectors where the end use of electricity occurs. As an example, the emissions reductions estimated for electric vehicles and building electrification inherently reflect all GHG emissions reductions associated with a cleaner electric grid and these are not included in the below measure tables to avoid double-counting and prevent confusion with how emissions reductions are displayed on the ClearPath online dashboard for the SLC MSA.

The modelling approach for this CCAP also evaluated non-measure improvements to the electric grid that were not necessarily tied to specific interventions detailed in this plan, but do support GHG emissions reductions. These cumulative reductions by 2050 were estimated to be 143,855 TMT (thousand metric tons) CO2-equivalent. This emissions reduction total is not incorporated into the GHG emission reduction summary tables due to lack of connection to an otherwise defined GHG reduction measure in the CCAP. However, these non-measure reductions in CO2e are significant and illustrate the importance of transitioning to a clean electric grid, powered by renewable energy resources, over time.

The overall modelling approach assumed achievement of net-zero carbon emissions from the electric grid by 2050. This included a linear reduction in the grid GHG emissions factor starting from the baseline value in 2021 and moving towards net-zero in 2050. Achievement of a low-to-zero emissions electric grid is fundamental to significant reductions in GHGs as more buildings, vehicles, and other aspects of the economy are increasingly electrified. Local governments in Utah do not have direct influence over decisions made for the entire regional electric grid, but can encourage the deployment of renewable energy and other resources to support positive outcomes.

6. Residential Solar PV

Category	Details
Applicable Sector	Electricity Generation
Measure Summary	This group of measures supports the deployment of solar photovoltaic (PV) and energy storage technologies on residential property types.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for electricity generation measures are embedded in other specific measures where electricity is utilized (e.g., buildings) based on a dynamic GHG modelling process
Measure Subtitles and Descriptions	a. **Retrofit Incentives and Programs:** Efforts and initiatives that promote the installation of solar PV technologies for existing residential properties. b. **New Construction Incentives and Programs:** Efforts and initiatives that promote the installation of solar PV technologies for residential new construction properties. c. **Energy Storage Incentives:** Efforts and initiatives that promote the installation of energy storage technologies such as batteries for residential properties. Energy storage may be installed in tandem with solar PV or as a separate measure.
Implementing Agencies	Local and/or State Government

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2026-28: Planning, Engagement, and Funding 2028-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs
Progress Tracking Metrics	• Solar projects completed • kW solar installed • kW battery storage installed • Estimated annual kWh generation • Estimated annual utility bill savings • Estimated annual GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

7. Commercial Solar PV

Category	Details
Applicable Sector	Electricity Generation
Measure Summary	This group of measures supports the deployment of solar photovoltaic (PV) and energy storage technologies on commercial properties, including private sector, government, education, and other non-residential buildings and facility types.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for electricity generation measures are embedded in other specific measures where electricity is utilized (e.g., buildings) based on a dynamic GHG modelling process
Measure Subtitles and Descriptions	**a. Retrofit Incentives and Programs:** Efforts and initiatives that promote the installation of solar PV technologies for existing commercial and other non-residential properties. **b. New Construction Incentives and Programs:** Efforts and initiatives that promote the installation of solar PV technologies for commercial and other non-residential new construction properties. **c. Energy Storage Incentives:** Efforts and initiatives that promote the installation of energy storage technologies such as batteries for commercial and other non-residential properties. Energy storage may be installed in tandem with solar PV or as a separate measure.
Implementing Agencies	Local and/or State Government

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2026-28: Planning, Engagement, and Funding 2028-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have authority to create and implement incentive and engagement programs
Progress Tracking Metrics	• Solar projects completed • kW solar installed • kW battery storage installed • Estimated annual kWh generation • Estimated annual utility bill savings • Estimated annual GHGs reduced • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

8. Clean Grid: Carbon-Free Solutions

Category	Details
Applicable Sector	Electricity Generation
Measure Summary	Transition the overall electric grid to carbon-free resources by 2050.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for electricity generation measures are embedded in other specific measures where electricity is utilized (e.g., buildings) based on a dynamic GHG modelling process; additional non-measure GHG reductions for the electric grid overall are described into the introduction to this section
Measure Subtitles and Descriptions	a. **Renewable Energy:** Through programs, policies, and investments, promote the deployment and integration of clean energy sources such as solar, wind, and geothermal to reduce reliance on fossil fuels and cut carbon emissions. b. **Energy Storage:** Through programs, policies, and investments, encourage the adoption of technologies like batteries and thermal storage to enhance grid reliability and enable greater use of renewable energy. c. **Other Zero-Carbon Resources:** Through programs, policies, and investments, strategically include low-emission technologies such as green hydrogen in certain uses and sectors to complement renewable energy in achieving net-zero emissions.
Implementing Agencies	Utilities; Local and/or State Government

Category	Details
Implementation Schedule and Milestones	Schedule and Milestones 2025-50: Clean electricity generation investments are an ongoing effort that will continue through the planning time horizon.
Authority to Implement	Government agencies and regulatory bodies have the authority to inform and direct clean energy investments and programs; State legislative approval may be needed in certain policy instances
Progress Tracking Metrics	• MW of clean energy installed • MWh of battery and other storage deployed • Percent of electricity generation provided by zero-carbon options
Geographic Location	Within Electric Utility Territory
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

9. Utah Renewable Communities Program

Category	Details
Applicable Sector	Electricity Generation
Measure Summary	Launch a Community Choice Clean Electricity Program in Utah available through the state's largest electricity provider, Rocky Mountain Power. Utah Renewable Communities (URC) is an interlocal cooperative agency representing 19 Utah local governments who are partnering with Rocky Mountain Power to design a new clean energy program. The URC program aims to offer customers a choice to supplement their current energy mix with additional clean electricity, up to a net-100% annual match by 2030, at a minimal cost increase.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for electricity generation measures are embedded in other specific measures where electricity is utilized (e.g., buildings) based on a dynamic GHG modelling process
Measure Subtitles and Descriptions	a. **Utility-Scale Clean Electricity Projects:** The buildout of clean electricity resources sized to meet roughly half of the URC program's net-100% clean electricity target from new resources (modeled as 200 MW of Utah solar PV). Clean electricity projects may include integrated storage. b. **Initial Required Program Administrative Costs:** Administrative costs incurred by the electric utility in connection with launching the URC program. c. **Energy Navigators for Household Support:** up to four energy navigators would educate lower-income and disadvantaged community members

Category	Details
	about: (i) program enrollment, including how to opt-out or exit the program; (ii) available monthly bill assistance programs, including a URC bill credit designed to offset the average monthly cost; and, (iii) available incentives and resources to reduce energy burden.
Implementing Agencies	19 Utah local governments through an interlocal cooperative agency in partnership with Utah's largest electricity provider, Rocky Mountain Power; Once approved, the program will operate subject to the Utah Public Service Commission (PSC); more local governments may join the program at a later time
Implementation Schedule and Milestones	2025-29 Year 1: program approval, participation ordinances adopted, energy navigators hired, and clean electricity resources identified Year 2: resource contracting finalized, resource approval Years 3-5: initial resources online and generating
Authority to Implement	Utah Code 54-17-9 allows for the creation of a Program to enable eligible Utah communities to acquire renewable energy resources to serve participating customers; Final implementation requires Utah PSC approval and final ordinance adoption by participating communities within 90 days

Category	Details
Progress Tracking Metrics	• Number of customers participating in the URC program • MW totals and types of new clean electricity capacity contracted • MWh of clean energy generated annually by URC-supported resources • Estimated annual emissions reductions
Geographic Location	Electric customers in participating Utah communities
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

10. Biodigester for Combined Heat and Power

Category	Details
Applicable Sector	Electricity Generation
Measure Summary	Salt Lake City Department of Public Utilities (SLCDPU) is capturing biogas from a digester at an existing water reclamation facility and using it to generate combined heat and power for the treatment process and space heating. Substantial upgrades or complete replacement of this system is needed to ensure sustained operations.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for electricity generation measures are embedded in other specific measures where electricity is utilized (e.g., buildings) based on a dynamic GHG modelling process
Measure Subtitles and Descriptions	a. **Salt Lake City Public Utilities Clean Energy Project:** Upgrades or replacement of the biodigester system will allow for efficient capture of biogas and generation of heat plus power for the water reclamation facility. This project will reduce energy use at the facility and mitigate GHG emissions associated with operations.
Implementing Agencies	Salt Lake City Department of Public Utilities (SLCDPU)

Category	Details
Implementation Schedule and Milestones	2026 - 2029 (pending adjustments and initiation based on future funding availability such as federal grants) 1. Planning/Design phase: Complete design for CHP Engine Generator Replacement including electrical improvements required to connect into new 13.8kV plant power system and equipment procurement documents - 1 year 2. Procurement Phase: Conduct equipment solicitation and procure new CHP Engine generators and new Hot Water Boilers - 1 year 3. Implementation Phase: Construction of CHP Replacement project including installation of new Engine Generators, new Hot Water Boilers and Electrical Improvements to connect to 13.8 kV plant power system
Authority to Implement	SLCDPU has the authority to invest in capital projects and facilities for its operations
Progress Tracking Metrics	• Quantity of biogas captured annually • kWh of electricity generated annually • Space heating capacity generated annually • Estimated annual GHGs reduced
Geographic Location	SLCDPU Facility Site
Funding Sources	Federal, State, and Local Government Budgets and Grants; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.3 Industry Sector Measures

According to modelling for this CCAP, industry sector emission reduction measures contribute a relatively small percentage of the overall reduction in GHGs by 2050. This is partly due to the modelling approach and building classification at a utility level which to certain GHG mitigation metrics being represented in other measures such as commercial building energy efficiency and electrification. The benefits of off-road equipment and machinery electrification, often used on industrial sites, are captured in the transportation sector section.

Some industry solutions, such as hydrogen applications in industry, were not conducive to modelling in the ClearPath software due to insufficient baseline data in the SLC MSA. A representation of the GHG reduction measure modelled for this sector is included in Figure 20 and details on additional solutions are featured in the following tables.

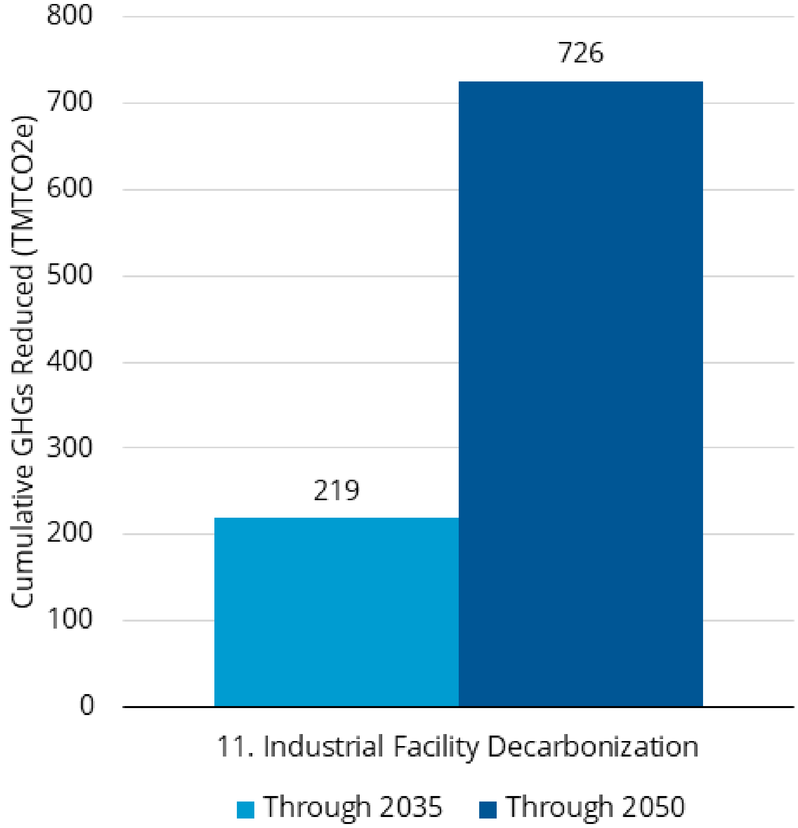


Figure 20. Estimated GHG emissions reduced through 2035 and 2050 for measures in the industry sector.

11. Industrial Facility Decarbonization

Category	Details
Applicable Sector	Industry
Measure Summary	Industrial facility decarbonization describes the use of assessments, energy efficiency and conservation, electrification, and renewable energy to reduce the combustion of fossil fuels for industrial uses. Technological innovation and improving economics, combined with programs and policies, can accelerate the decarbonization of existing facilities plus encourage the use of beneficial technologies when new facilities are being built. Education and outreach, incentives, programs, and policies can all be utilized to accelerate industrial decarbonization outcomes.
Cumulative GHGs Reduced Through 2035	219 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	726 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Clean Industrial Hub:** Convene regional stakeholders to evaluate solutions, develop solutions, support partnerships, and document goals in partnership with industry stakeholders to advance industrial facility performance, encourage innovation, and reduce regional emissions.

Category	Details
	b. Facility Audits and Assessments: Leverage the use of facility audits and assessments to identify innovative and cost-effective solutions that advance facility decarbonization and mitigate pollution. There are two Industrial Training and Assessment Centers (ITACs) in Utah supported by the U.S. DOE Better Plants program. The University of Utah ITAC provides no-cost energy consulting services to manufacturers in the Intermountain Region. Their assessments typically require a one-day site assessment and often identify 10-20% in potential energy and productivity savings. The Weber State University ITAC has a mission to deliver high-quality education and practical training to students, plus offer no-cost assessments and technical assistance to the industrial and manufacturing sectors. **c. Energy Efficiency and Conservation:** Leverage programs, outreach, and incentives to encourage implementation of energy efficiency and conservation measures at industrial sites, including for equipment. **d. Beneficial Electrification:** Leverage programs, outreach, and incentives to encourage uptake of beneficial electrification technologies for onsite uses, off-road equipment, and other needs at industrial sites. **e. Renewable Energy:** Encourage the installation of renewable energy technologies, such as solar PV, to support industrial energy needs. Renewable energy solutions can be pursued onsite or offsite

Category	Details
	through the use of clean energy tariffs and programs.
Implementing Agencies	Local and/or State Government; Educational Institutions
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2030-34: Planning, Engagement, and Funding 2034-38: Initial Implementation 2038-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• Estimated number of energy measures completed • MWh of renewable electricity generated • GHG emissions avoided • Air pollution avoided • Direct and indirect jobs created
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

12. Alternative Fuels

Category	Details
Applicable Sector	Industry
Measure Summary	Evaluate the use and creation of alternative fuels in industrial applications. Alternative fuels might include biogas, biomass, hydrogen, or other technologies. All alternative solutions should be evaluated for lifecycle GHG emissions and air quality impacts, plus technological and financial efficacy, relative to other decarbonization options such as beneficial electrification. Support deployment of validated technologies through the use of programs and policies.
Cumulative GHGs Reduced Through 2035 and 2035	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	**a. Biogas:** Evaluate and selectively support biogas production and utilization for industrial sites through the use of anaerobic digestion and other technologies. Evaluate alternative decarbonization solutions to ensure biogas utilization is the best option prior to investment and implementation. Consider local air quality pollution impacts and GHG lifecycle emissions relative to other solutions as part of the evaluation process and prior to proceeding with any programs or policies.

Category	Details
	b. Biomass: Evaluate and selectively support conversion of organic materials such as wood chips, agricultural residues, and other feedstocks into renewable energy sources. Consider local air quality pollution impacts and GHG lifecycle emissions impacts relative to other solutions as part of the evaluation process and prior to proceeding with any programs or policies. **c. Hydrogen:** Evaluate and selectively support hydrogen for industrial uses and applications, particularly where beneficial electrification is not a suitable solution. Work with industry partners and experts on evaluations and consider local air quality pollution impacts and GHG lifecycle emissions impacts relative to other solutions as part of the evaluation process and prior to proceeding with any programs or policies. **d. Thermal Batteries:** Evaluate and selectively support thermal batteries for industrial uses and applications. These batteries make it possible to decarbonize sectors requiring intense heat, such as steel, cement, and chemicals, by providing a cost-effective alternative to fossil fuel combustion for industrial heating applications.
Implementing Agencies	Local and/or State Government; Educational Institutions

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2030-34: Planning, Engagement, and Funding 2034-38: Initial Implementation 2038-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• MWh of renewable electricity generated • GHG emissions avoided • Air pollution avoided
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

13. Production and Manufacturing

Category	Details
Applicable Sector	Industry
Measure Summary	Support more efficient production and manufacturing approaches that mitigate waste, reduce pollution, and deliver other environmental benefits at industrial sites and facilities.
Cumulative GHGs Reduced Through 2035 and 2035	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.

Category	Details
Measure Subtitles and Descriptions	**a. Material Efficiency:** Optimize the use of raw materials and resources in manufacturing to minimize waste and reduce environmental impacts, including air and water pollution. Encourage the implementation of strategies such as recycling and material reuse along with cleaner production technologies. Utilize education and incentives to decrease demand for material resources while lowering material extraction, production, and disposal to reduce onsite-plus-upstream emissions. Leverage guidance, outreach, and resources from regional ITACs to advance material efficiency at industrial sites. **b. Preferred Purchasing:** Consider the creation of policies and programs that support purchasing from production and manufacturing facilities that are implementing best practices such as GHG tracking and mitigation, reducing lifecycle environmental impacts, and other solutions.
Implementing Agencies	Local and/or State Government; Educational Institutions
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2028-30: Planning, Engagement, and Funding 2030-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*

Category	Details
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• GHG emissions avoided • Air pollution avoided
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

14. Fugitive Emissions

Category	Details
Applicable Sector	Industry
Measure Summary	Encourage the use of strategies and technologies to minimize the unintended release of gases during industrial processes. Effective measures might include regular equipment maintenance, use of advanced sealing technologies, and implementation of leak detection and repair (LIDAR) programs. Encourage improvements in emissions monitoring, accounting, and reporting efforts by state and federal agencies with regulatory jurisdiction.
Cumulative GHGs Reduced Through 2035 and 2035	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback. Reductions in the general use of fossil fuels will also help reduce upstream fugitive emissions.
Measure Subtitles and Descriptions	a. **Energy Production and Pipelines:** Encourage reductions in fugitive emissions from energy production facilities and pipelines. Evaluate and consider the use of non-pipeline alternatives (NPAs) to reduce emissions and avoid investment in natural gas systems when viable alternatives are available. These emissions are typically regulated by federal and/or state government so local government encouragement would be ancillary. b. **Other Industrial Systems:** Encourage reductions in fugitive emissions from other industrial facilities.

Category	Details
	This might include refrigeration systems, cement production, pulp and paper manufacturing, refining activities, and other sources. These emissions are typically regulated by federal and/or state government so local government encouragement would be ancillary.
Implementing Agencies	Local and/or State Government
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2028-30: Planning, Engagement, and Funding 2030-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• GHG emissions avoided • Air pollution avoided
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

15. Inland Port Pollution Mitigation

Category	Details
Applicable Sector	Industry
Measure Summary	The Utah Inland Port Authority (UIPA) was established to explore and define development activities at numerous locations, including the Northwest Quadrant in Salt Lake City. More information is available at InlandPortAuthority.utah.gov, including results of a Sustainability Action Study that summarizes potential ways to mitigate emissions from port activities.
Cumulative GHGs Reduced Through 2035 and 2035	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.

Category	Details
Measure Subtitles and Descriptions	a. **UIPA Sustainability Strategy:** Implementation of priority strategies in the sustainability strategy, including 20 specific solutions in the following areas: air quality and energy; natural and water resources strategies; transportation strategies; land use strategies. b. **Planning and Strategy:** The U.S. EPA Clean Ports Program awarded $2,398,790 in funding to the Utah Inland Port Authority in 2024 to develop an emissions inventory, create an emissions reduction strategy and scenario analysis, plus catalyze a workforce impact analysis that includes stakeholder engagement. These planning efforts will focus on the Salt Lake City Intermodal Terminal site. c. **Electrification and Renewable Energy:** The U.S. EPA Clean Ports Program awarded $110,000,000 to the Utah Department of Environmental Quality to pursue electrification and renewable energy solutions at the Salt Lake City Intermodal Terminal site. Planned investments include electric drayage trucks, locomotives, and cargo handling equipment. Electric charging infrastructure and solar PV generation will also be installed.
Implementing Agencies	Local and/or State Government
Implementation Schedule and Milestones	2025-50: Implementation is underway and ongoing for inland port pollution mitigation planning and implementation.

Category	Details
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• GHG emissions avoided • Air pollution avoided
Geographic Location	Within SLC MSA – Inland Port Site(s)
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

16. Small Boiler Conversion to Heat Pumps

Category	Details
Applicable Sector	Industry
Measure Summary	Small industrial boilers can be converted to electric heat pumps to reduce GHG emissions and mitigate local air quality pollutants. There are an estimated 44 small industrial boilers in the SLC MSA according to a 2025 analysis conducted by the American Council for an Energy-Efficient Economy (ACEEE) and these could be upgraded to heat pumps through targeted approaches and outreach. Industrial heat pump technology continues to mature and traditional boilers can be replaced with the support of education, programs, and incentives.
Cumulative GHGs Reduced Through 2035 and 2035	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	a. **Small Boiler Conversion to Heat Pumps:** Industrial heat pump technology continues to mature and traditional boilers can be replaced with the support of education, programs, and incentives. Heat pumps should also be installed from the outset in new construction and facility applications.
Implementing Agencies	Local and/or State Government

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2028-30: Planning, Engagement, and Funding 2030-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Agencies generally have authority to implement voluntary programs and outreach; regulatory authority exists at the local, state, or federal level depending on the specific issue and measure
Progress Tracking Metrics	• Number of industrial heat pumps deployed • GHG emissions avoided • Air pollution avoided
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.4 Transportation Sector Measures

Transportation sector GHG reduction measures contribute 60% of the total cumulative GHGs reduced by 2050, according to modelling for this CCAP. The group consists of a diverse mix of solutions including active mobility, transit, vehicle electrification and efficiency, plus sustainable aviation fuels and efficiency.

Figure 21 displays a notable increase in gross GHGs mitigated through 2050 relative to 2035. This is due to an acceleration of solution deployment combined with a cleaner electric grid over time which improves the GHG reduction potential for transportation electrification. Complete details for each measure are included in the tables below.

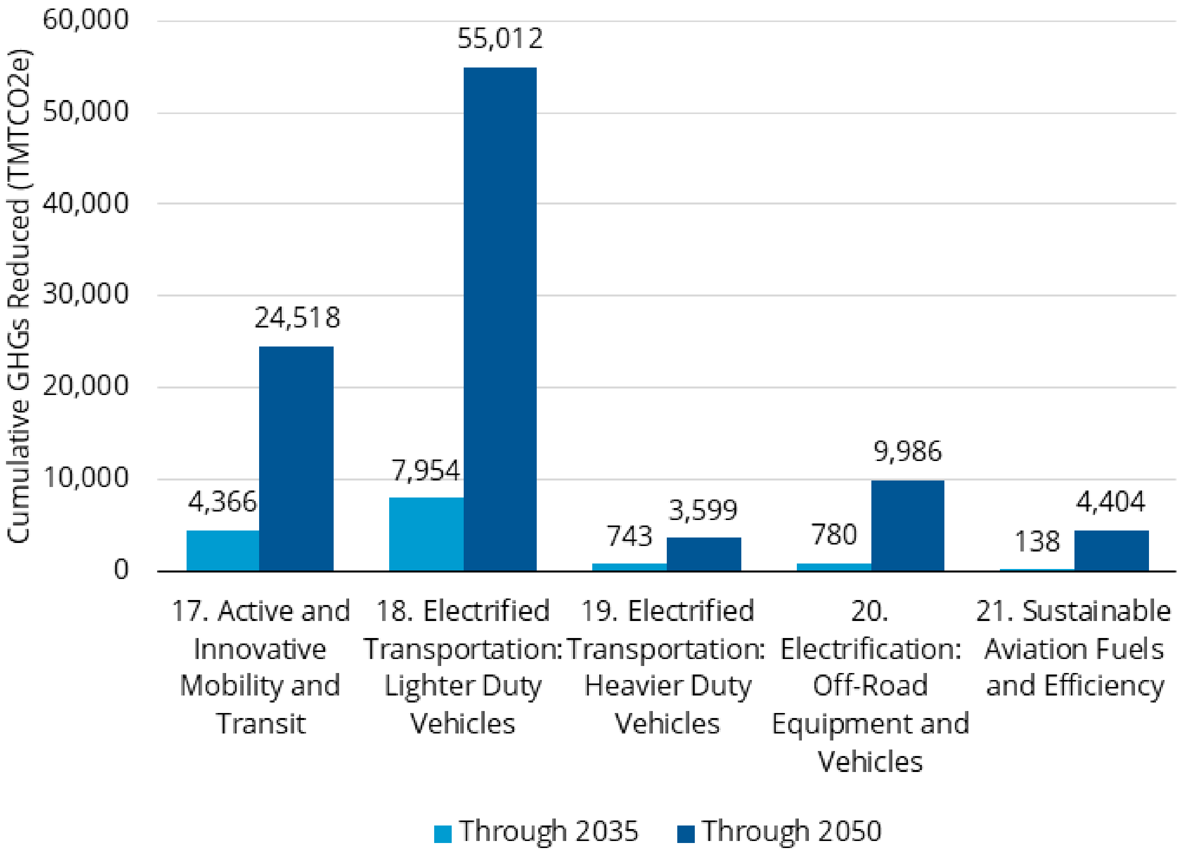


Figure 21. Estimated GHG emissions reduced through 2035 and 2050 for measures in the transportation sector.

17. Active and Innovative Mobility and Transit

Category	Details
Applicable Sector	Transportation
Measure Summary	This group of measures promotes transportation solutions that reduce vehicle miles travelled (VMT) and associated emissions through active transportation, transit, and innovative solutions such as car sharing, micromobility, and other measures to decrease single-occupancy vehicle use.
Cumulative GHGs Reduced Through 2035	4,366 TMT CO_2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	24,518 TMT CO_2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Bicycling Facilities, Infrastructure, Incentives, and Programs:** Programs, incentives, and capital investments that enhance the safety and appeal of bicycling through physical improvements such as trails, roadway enhancements, and facilities, along with initiatives to encourage bicycle use. b. **E-Bike Incentives and Programs:** Programs and incentives that accelerate the deployment of electric bikes (E-Bikes) and related solutions such as bike trailers.

Category	Details
	c. Bike Sharing Facilities, Equipment, and Programs: Programs, staffing, and capital investments in shared bicycles and related facilities, such as adding e-bikes to existing fleet, expanding the number and distribution of docking stations, increasing the efficiency and capacity of maintenance operations, or active programming in Low-Income and Disadvantaged Communities to encourage transportation mode-shift away from GHG-emitting modes. **d. Micromobility Incentives and Programs:** Programs and incentives in micromobility solutions such as electric scooters that can reduce vehicle trips. **e. Complete Streets Infrastructure and Mobility Hubs:** Investments in complete streets that allow for the safe use of multiple modes of transportation, including pedestrian use and bicycling, plus mobility hubs to facilitate use of transit, active transportation, and innovative transportation solutions that can reduce vehicle trips. **f. Car Sharing, Ridesharing, and Vanpool Programs:** Programs and incentives for car sharing, ridesharing, and vanpool programs that reduce single-occupancy vehicle use. **g. Transit Facilities and Bus Rapid Transit Lanes:** Capital investments in transit facilities and supporting infrastructure, along with solutions such as bus rapid transit (BRT) lanes, that

Category	Details
	encourage and streamline the use of transit solutions. h. **Transit Incentives and Subsidies:** Programs and incentives that encourage transit use and reduce costs for participants, including subsidized or free transit use. i. **Enhanced Transportation GHG Planning:** Improvements in local and regional transportation planning analyses and frameworks to ensure inclusion and prioritization of GHG impacts and associated co-benefits as significant influencers of planning outcomes, programmatic solutions, and investment priorities. j. **Public Realm Improvements and Maintenance:** the development of vibrant urban centers, enhancing walkability and attractiveness, and implementing processes to maintain newly established standards.
Implementing Agencies	Local and/or State Government; Educational Institutions; Transit Authority; Association of Governments
Implementation Schedule and Milestones	2025-50: Implementation is underway and ongoing for active transportation and mobility. Implementation schedules will vary by local government based on funding availability and elected official support.

Category	Details
Authority to Implement	Government agencies and other organizations have authority to create and implement incentive and engagement programs plus invest in infrastructure for transportation improvements
Progress Tracking Metrics	• Estimated annual amount of VMT reduced • Estimated amounts of bike use, transit use, micromobility, car sharing, and other transportation measures • Estimated annual GHGs reduced and local air pollution mitigated • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

18. Electrified Transportation: Lighter Duty Vehicles

Category	Details
Applicable Sector	Transportation
Measure Summary	This group of measures supports the deployment of lighter duty electric vehicles (EVs) and supporting charging infrastructure to replace and displace gasoline-powered vehicles. These measures support residential households plus commercial and other non-residential fleets, including those managed by the private sector, government, education, and other sector types.
Cumulative GHGs Reduced Through 2035	7,954 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	55,012 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Residential EV Charging Equipment Incentives:** Programs and incentives to support the deployment and efficient use of EV charging equipment and necessary grid upgrades for residential properties. b. **Commercial and Public EV Charging Equipment Incentives:** Programs and incentives to support the deployment and efficient use of EV charging

Category	Details
	equipment and necessary grid upgrades for non-residential property types. c. **Residential EV Purchase Incentives:** Programs and incentives to encourage the purchase of EVs by households. d. **Commercial and Public EV Purchase Incentives:** Programs and incentives to encourage the purchase of EVs for commercial and other fleets, including private sector, government, education, and other sector types. e. **Education and Training:** Support opportunities for technical assistance, professional networking, and best practices demonstration to encourage the adoption of EVs and EV charging infrastructure for fleets, including private sector, government, education, and other sector types. f. **Incentives for Commercial and Residential EV Utilization:** Incentives for EV utilization, including preferential parking treatment for EVs and other programs to encourage use.
Implementing Agencies	Local and/or State Government; Educational Institutions
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-28: Planning, Engagement, and Funding 2025-34: Initial Implementation 2034-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*

Category	Details
Authority to Implement	Government agencies and other organizations have authority to create and implement incentive and engagement programs
Progress Tracking Metrics	• Number of lighter duty vehicles electrified • Number and type of EV charging equipment installed • Estimated annual VMT of electric vehicles supported by program efforts • Estimated annual GHGs reduced and local air pollution mitigated • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

19. Electrified Transportation: Heavier Duty Vehicles

Category	Details
Applicable Sector	Transportation
Measure Summary	This group of measures supports the deployment of heavier duty electric vehicles (EVs) and supporting charging infrastructure to replace and displace diesel-powered vehicles. These measures support residential households plus commercial and other non-residential fleets, including those managed by the private sector, government, education, and other sector types.
Cumulative GHGs Reduced Through 2035	743 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	3,599 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Commercial and Public EV Charging Equipment Incentives:** Programs and incentives to support the deployment and efficient use of EV charging equipment and necessary grid upgrades for non-residential property types. b. **Commercial and Public EV Purchase Incentives:** Programs and incentives to encourage the purchase of EVs and electric buses for commercial

Category	Details
	and other fleets, including private sector, government, education, and other sector types. **c. Education and Training:** Support opportunities for technical assistance, professional networking, and best practices demonstrations to encourage the adoption of EVs and EV charging infrastructure for vehicle and bus fleets, including private sector, government, education, and other sector types. **d. Incentives for Heavy Duty EV Utilization:** Incentives for heavy duty EV utilization, including preferential parking treatment for delivery vehicles and other programs to encourage use.
Implementing Agencies	Local and/or State Government; Educational Institutions
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2028-30: Planning, Engagement, and Funding 2030-36: Initial Implementation 2036-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies and other organizations have authority to create and implement incentive and engagement programs

Category	Details
Progress Tracking Metrics	• Number of heavier duty vehicles electrified • Number and type of EV charging equipment installed • Estimated annual VMT of electric vehicles supported by program efforts • Estimated annual GHGs reduced and local air pollution mitigated • Additional metrics determined based on specific measure implementation
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

20. Electrification: Off-Road Equipment and Vehicles

Category	Details
Applicable Sector	Transportation
Measure Summary	Programs, policies, and projects to support the electrification of non-road equipment and vehicles, including those used for industrial, institutional, and other uses such as landscaping for all sectors.
Cumulative GHGs Reduced Through 2035	780 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	9,986 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	**a. Non-Road Equipment Electrification:** Shifting non-road equipment currently powered by fossil fuels to electrified options that rely on the electric grid to eliminate onsite pollution and mitigate GHGs.
Implementing Agencies	Local and/or State Government; Institutions

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2028-34: Planning, Engagement, and Funding 2028-40: Initial Implementation 2040-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies and other organizations have authority to create and implement incentive and engagement programs
Progress Tracking Metrics	• Quantity of equipment and non-road vehicles electrified • Estimated annual GHGs reduced and local air pollution mitigated
Geographic Location	Within SLC MSA
Funding Sources	Federal and State Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

21. Sustainable Aviation Fuels and Efficiency

Category	Details
Applicable Sector	Transportation
Measure Summary	Encourage programs, policies, and incentives to promote operational efficiency improvements and the use of low-carbon alternative jet fuels derived from renewable or waste feedstocks.
Cumulative GHGs Reduced Through 2035	138 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	4,404 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Electrified Aviation:** Accelerate deployment of electric and hybrid-electric aircraft technologies to reduce fossil fuel dependence and emissions on short- and medium-haul flights. b. **b. Hydrogen and Other Zero-Carbon Fuels:** Support the development and use of hydrogen combustion, fuel cells, and synthetic e-fuels powered by renewable energy to achieve near-zero lifecycle emissions in aviation. c. **Aviation Efficiency:** Encourage the implementation of aircraft design innovations, optimized flight operations, and other

Category	Details
	management to minimize fuel consumption and GHG emissions per flight.
Implementing Agencies	Government Agencies Supporting Energy and Aviation
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2032-36: Planning, Engagement, and Funding 2034-40: Initial Implementation 2040-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies and other organizations have authority to create and implement incentive and engagement programs
Progress Tracking Metrics	• Quantity of clean fuel planes • Quantity of clean aviation fuel utilized • Quantity of aviation fuel saved • GHG emissions savings
Geographic Location	Within SLC MSA
Funding Sources	Federal and State Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

22. Local Government and Institutional Fleet Electrification

Category	Details
Applicable Sector	Transportation
Measure Summary	Local governments and institutions across the SLC metro area, and more broadly in northern Utah, collaborate to accelerate fleet electrification and efficiencies. Efforts are supported by a Fleet Electrification Accelerator that convenes stakeholders, provides technical assistance, and promotes networking to encourage implementation of programs, projects, and policies.
Cumulative GHGs Reduced Through 2035 and 2050	NA – Emissions reductions for this measure are embedded in the Lighter Duty and Heavier Duty Fleet Electrification estimates
Measure Subtitles and Descriptions	a. **Fleet Electrification Accelerator:** Networking, technical resources, and procurement support to accelerate solution adoption across local governments and institutions. b. **Fleet Electrification Analysis and Prioritization:** Internal analysis of fleet operations to determine electrification pathways and financial, emissions, and operational impacts, plus funding and financing pathways. c. **Targeted Fleet Electrification Investments:** Select implementation of fleet electrification opportunities, including vehicles and equipment plus charging infrastructure. d. **Internal Policy and Best Practices Adoption:** Tailored internal policy development and

Category	Details
	procurement rules to support fleet electrification and guide staff priorities plus investments. **e. Goal-Setting and Metrics Tracking:** Adoption of goals and discrete targets plus ongoing tracking of fleet electrification, emissions, and financial savings.
Implementing Agencies	Local and/or State Government; Educational and Other Institutions
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-28: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies and institutions have authority to participate and support in these activities
Progress Tracking Metrics	• Number and size of participating agencies and institutions • Number and type of policies and fleet measures implemented • Energy impacts such as gallons and type of fuel saved and fleet cost savings • Estimated annual air quality pollution reduction • Estimated annual GHGs reduced
Geographic Location	Within SLC MSA

Category	Details
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; Utility Budgets; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.5 Waste and Materials Management Sector Measures

Waste and materials management GHG reduction measures contribute 3% of the total cumulative GHGs reduced by 2050, according to modelling for this CCAP. As described earlier, embedded carbon in consumer goods and food is not reflected in the GHG inventory according to the GPC protocol and emissions reductions for this sector would be much higher if a consumption-based approach were utilized to calculate emissions reduction potential.

Figure 22 displays GHG emissions mitigated through the 2035 and 2050 target year milestones for quantitatively modeled GHG reduction measures. Complete details for each measure are included in the tables below.

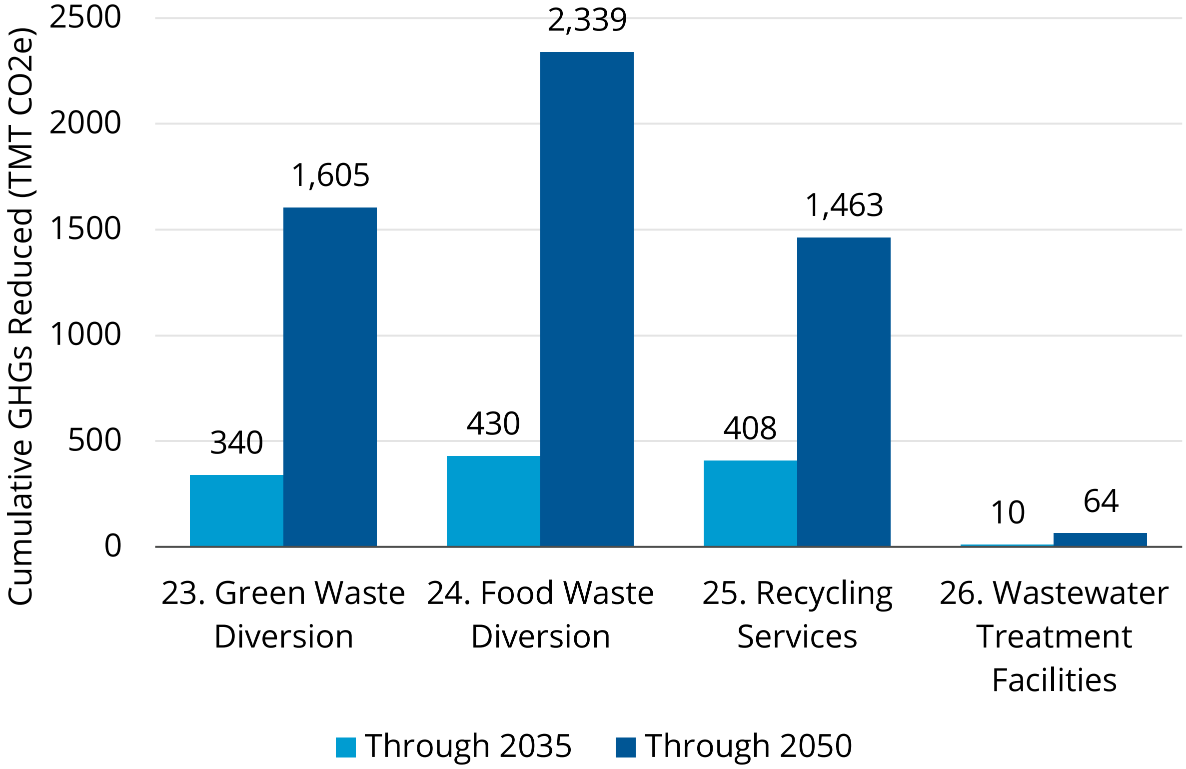


Figure 22. Estimated GHG emissions reduced through 2035 and 2050 for measures in the waste and materials management sector.

23. Green Waste Diversion

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Enhance existing green waste diversion efforts, plus support and scale new solutions and programming. Focus on organic material diversion such as yard waste and other biodegradable items. Provide solutions for both residential and non-residential users, including curbside collection services, community composting sites, and educational outreach programs. Leverage local government resources and policy options along with partnerships with local organizations and businesses.
Cumulative GHGs Reduced Through 2035	340 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	1,605 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Residential Green Waste:** Encourage expansion of residential green waste collection programs to additional municipalities and residential program enrollees. Collected green waste will be composted to lower methane emissions and create compost product. b. **Non-Residential Green Waste:** Encourage targeted expansion of non-residential green waste

Category	Details
	collection to sites and sectors generating the most volume. Collected green waste will be composted to lower methane emissions and create compost product. c. **Composting:** Enhanced operations at Salt Lake Valley Landfill, plus new commercial composting operations. Support market development for compost material. d. **Biochar:** Divert wood waste and produce biochar to sequester emissions and provide other co-benefits. Investigate pilot project opportunities for biochar collection and processing.
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-28: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to green waste diversion

Category	Details
Progress Tracking Metrics	• Tons of green waste diverted to composting operations • Tons of compost produced • Tons of wood waste diverted for biochar production • Tons of biochar produced
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

24. Food Waste Diversion

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Divert food waste from traditional disposal in the landfill towards lower-impact end uses such as composting, anaerobic digestion, and direct consumption. Pursue a multifaceted approach that includes new facilities and programming along with educational campaigns and market development. Partner with regional governments and local organizations to advance new programming and best practices, while also delivering co-benefits such as reduced hunger among vulnerable populations.
Cumulative GHGs Reduced Through 2035	430 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	2,339 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Residential Food Waste:** Encourage expansion of residential food waste collection programs to additional municipalities. Collected food waste will be either composted or processed through an anaerobic digestion process to create biogas and fertilizer. b. **Non-Residential Food Waste:** Encourage expansion of non-residential food waste collection

Category	Details
	by private haulers, starting with high opportunity and high-volume organizations. Collected food waste will be either composted or processed through an anaerobic digestion process to create biogas and fertilizer. **c. Enhanced Composting Operations:** Increase size and production of composting operations at Salt Lake Valley Landfill, plus new commercial composting operations. Support market development opportunities for use of composting product. **d. Anaerobic Digestion:** Process food waste and other materials through biodigestion to produce biogas and fertilizer, including support of current facility and market growth opportunities. **e. Consumable Foods:** Encourage creation and replication of efforts to ensure excess foods are consumed. Per ReFED.org, "38% of all food in the U.S. goes unsold or uneaten and results in 59% of landfill methane."
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-28: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to food waste diversion
Progress Tracking Metrics	• Food Waste Diverted: Composting (Tons) • Food Waste Diverted: Anaerobic Digestion • Food Waste Diverted: Consumables (Tons) • Change in CO2e (MT) • Change in Co-Pollutants (MT)
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

25. Recycling Services

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Promote effective recycling efforts across the MSA and improve recycling rates through the use of new programs, policies, and collaborative efforts. Enhance both recycling pick-up and drop-off options, serving both residential and non-residential customers. Invest in education and monitoring to reduce contamination rates and increase share of collectibles that are suitable for recycling.
Cumulative GHGs Reduced Through 2035	408 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	1,463 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Residential Recycling:** Increase jurisdictional participation in curbside recycling, expand multifamily recycling through programs and policies, plus heighten focus on highest-value materials collection. b. **Non-Residential Recycling:** Implement programs and policies to encourage non-residential recycling. c. **Landfill and Distributed Recycling Services:** Increase locations and opportunity for distributed

Category	Details
	recycling drop-off locations, with a particular focus on highest-value materials.
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-28: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to recycling services
Progress Tracking Metrics	• Tons of recycling materials collected and recycled
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

26. Wastewater Treatment Facilities

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Reduce wastewater flow through policies, programs, and other mitigation measures in order to reduce emissions.
Cumulative GHGs Reduced Through 2035	10 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	64 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Wastewater Treatment Facilities:** Reduction of wastewater flow through technical mitigation measures supported by policies and programs.
Implementing Agencies	Wastewater Treatment Agencies
Implementation Schedule and Milestones	2025-50: Implementation of this measure is an ongoing and iterative effort with future milestones defined by funding and other factors.
Authority to Implement	Wastewater treatment agencies have the authority to implement capital projects and solutions aligned with state and federal rules

Category	Details
Progress Tracking Metrics	• Amount of wastewater and tons of methane mitigated
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

27. Construction and Demolition Materials Diversion

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Enhance market opportunities and improved processing of construction and demolition (C&D) materials through education, partnerships, and policies. Establish clear guidance and requirements for contractors to minimize waste, reuse materials when possible, and recycle valuable resources such as asphalt, concrete, and metals. Leverage momentum from green building certifications and activities to ensure that collected C&D materials are directed towards quality recycling and reuse opportunities. Offer training and resources to the contractor community, including strategies for coordinating C&D collection activities to maximize value to haulers and reuse markets.
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	a. **Collection and Reuse Market Development:** Support market development for recycling and reuse of collection C&D materials. b. **Local Government Programs and Policies:** As C&D collection and processing activities mature, implement new programs and policies, with a focus on highest value and impact materials such as asphalt and concrete and other materials

Category	Details
	depending on processing capabilities and market conditions. Consider opportunities for both internal government and institutional policies to support C&D, plus community-wide approaches.
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-30: Planning, Engagement, and Funding 2025-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to construction and demolition waste diversion
Progress Tracking Metrics	• Tons of C&D material diverted from the landfill • Tons of C&D material recycled • Tons of C&D material reused
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

28. Landfill Methane Capture

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Improve the capture and utilization of landfill methane with enhanced monitoring and facility investments. Partner with users of biogas to ensure efficient captured methane and financially sustainable operations.
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	**a. Landfill Gas Capture:** Enhance landfill gas collection and control systems to recover methane generated by decomposing waste, preventing its release into the atmosphere and converting it into usable energy.
Implementing Agencies	Municipal Waste and Landfill Services
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-27: Planning, Engagement, and Funding 2025-32: Initial and Ongoing Implementation ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition plus other factors and support.*

Category	Details
Authority to Implement	Landfill operators have the authority to implement methane monitoring and capture programs aligned with state and federal rules
Progress Tracking Metrics	• Tons of methane captured and utilized as biogas
Geographic Location	Within SLC MSA - County Landfill Sites
Funding Sources	Federal, State, and Local Government Budgets and Grants; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

29. Low-Carbon Materials

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Promote the use of materials with a lower carbon footprint via education, incentives, and public-private partnerships. Collaborate with builders, contractors, and to scale the use of low-carbon materials, such as building and paving materials, recycled content products, and other innovative alternatives.
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	**a. Low-Carbon Materials:** Local programs, policies and funding support to advance the utilization and scaling of low-carbon materials in new construction, manufacturing, and other uses.
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-32: Planning, Engagement, and Funding 2030-36: Initial Implementation 2036-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*

Category	Details
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to low-carbon materials
Progress Tracking Metrics	• Type and quantity of low-carbon materials utilized
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

30. General Waste Reduction and Reuse

Category	Details
Applicable Sector	Waste and Materials Management
Measure Summary	Pursue opportunities to reduce waste creation and ensure sustained use and reuse of products, including through programs and policies focused on reusable goods, community fix-it fairs, collection of hard to recycle materials, and development of an enhanced local circular economy.
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	**a. Reusable Goods:** Encourage replacement of single-use products with sustainable multi-use alternatives. **b. Fix-It Fairs:** Support and promote fix-it fairs to sustain life of products and encourage reuse. **c. Center for Hard to Recycle Materials (CHaRM):** Support expansion of events and services for the collection of hard to recycle materials, plus a facilities to process items. **d. Household Hazardous Waste:** Programs, events, and facilities to support collection and safe disposal of household hazardous waste. **e. Circular Economy Development:** General development and encouragement of circular

Category	Details
	economy for goods to promote affordability and divert waste from landfill.
Implementing Agencies	Municipal Waste Services; Local Government Agencies; Private Businesses, Contractors, and Other Non-Governmental Organizations
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-30: Planning, Engagement, and Funding 2025-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to general waste reduction and reuse
Progress Tracking Metrics	• Quantity and type of goods and material reused or upcycled to other uses • Number of community members participating in reuse events
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section

Category	Details
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.6 Agriculture, Natural and Working Lands

Agriculture, natural and working lands GHG reduction measures contribute roughly 1% of the total cumulative GHGs reduced by 2050, according to modelling for this CCAP (Figure 23). This is driven by growth and improvements in the community tree canopy and urban forests along with the electrification of select agriculture and land maintenance equipment. Complete details for all measures for this sector are included in the tables below.

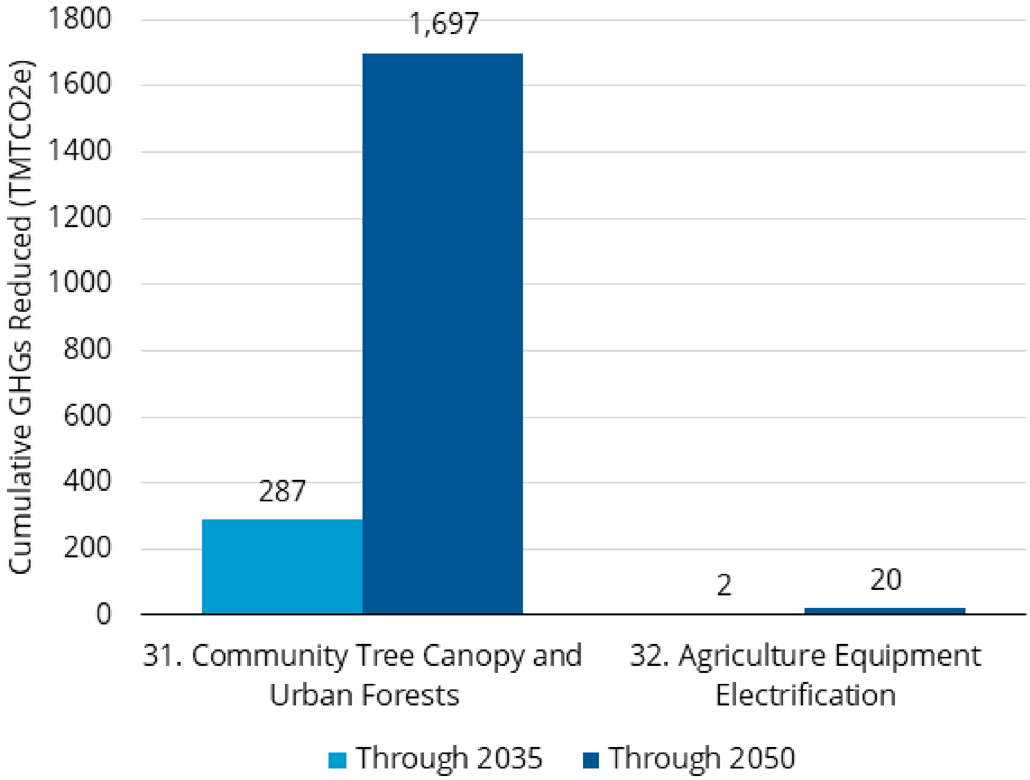


Figure 23. Estimated GHG emissions reduced through 2035 and 2050 for measures in the agriculture, natural and working lands sector.

31. Community Tree Canopy and Urban Forests

Category	Details
Applicable Sector	Agriculture, Natural and Working Lands
Measure Summary	This effort would prioritize tree plantings, urban forestry health, and related tree maintenance in communities across the MSA. Enhancing the tree canopy would deliver GHG and air quality benefits, mitigate the urban heat island effect, enhance community aesthetic, and provide neighborhood benefits within the MSA.
Cumulative GHGs Reduced Through 2035	287 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	1,697 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Focused Tree Plantings and Maintenance:** Strategically plant and care for trees in locations that maximize benefits, particularly in heat-vulnerable or under-canopied areas, to enhance resilience and ensure long-term the health of urban forests.
Implementing Agencies	Local Governments

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-30: Planning, Engagement, and Funding 2025-32: Initial Implementation 2032-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Local governments have the authority to plant and maintain trees on designated properties
Progress Tracking Metrics	• Number of species of trees planted annually • Number of species of trees maintained annually • Number of trees alive annually • Estimated annual GHGs reduced and local air pollution and temperature mitigated • Estimated noise pollution mitigated
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$ = $10,000,000 - $19,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

32. Agriculture Equipment Electrification

Category	Details
Applicable Sector	Agriculture, Natural and Working Lands
Measure Summary	Programs and policies to catalyze replacement of select agricultural and related land maintenance equipment with electric-powered alternatives.
Cumulative GHGs Reduced Through 2035	2 TMT CO2-equivalent (thousand metric tons)
Cumulative GHGs Reduced Through 2050	20 TMT CO2-equivalent (thousand metric tons)
GHG Modelling Assumptions	See Appendix B for details
Measure Subtitles and Descriptions	a. **Agriculture Equipment Electrification:** Electrification programs, policies, and incentives to cut GHG gas emissions, improve local air quality, reduce noise pollution, and lower fuel and maintenance costs for operators.
Implementing Agencies	State and Local Governments

Category	Details
Implementation Schedule and Milestones	Tentative Schedule and Milestones* 2025-30: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	State and local government agencies have the authority to pursue education, incentive, and other programs to inspire electrification of equipment
Progress Tracking Metrics	• Number of fossil fuel units replaced • Number of new electric units purchased • Reductions of GHGs and local air pollutants
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$ = $1,000,000 - $4,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

33. Land Preservation

Category	Details
Applicable Sector	Agriculture, Natural and Working Lands
Measure Summary	Efforts to protect natural lands and help maintain ecosystems which act as carbon sinks. There are numerous programmatic, policy, and engagement approaches to enhance land preservation and these are described below as measure subtitles.
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	a. **Conservation Easements:** Legal agreements that restrict land development to protect its ecological or agricultural value while allowing the landowner to retain ownership. b. **Land Donations:** Providing land to a nonprofit or government entity for conservation purposes. c. **Land Purchases:** Acquisition of land to preserve for conservation and/or public use. d. **Land Trusts:** Organizations that conserve land through acquisitions, holding conservation easements, or facilitating donations for preservation. e. **Educational Outreach:** Programs and initiatives to inform and engage the public about land preservation, including ways to support conservation efforts.

Category	Details
Implementing Agencies	Government Agencies and Non-Profits
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-30: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	State and local government agencies have land preservation authorities to pursue policies and program
Progress Tracking Metrics	• Quantity of Land Preserved / Conserved
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$$$ = $20,000,000 - $50,000,000+ *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

34. Sustainable Agriculture

Category	Details
Applicable Sector	Agriculture, Natural and Working Lands
Measure Summary	Support sustainable and regionally adapted agricultural practices that reduce emissions and increase carbon sequestration through effective management practices on agricultural and agriculture-adjacent lands (e.g., wetlands, rangeland, wildland-urban interface, etc.).
Cumulative GHGs Reduced Through 2035 and 2050	NA – GHG emissions reductions were not quantified due to lack of baseline information and other details needed to accurately forecast for this measure. However, the measure is still listed in the CCAP based on its potential impacts and engagement feedback.
Measure Subtitles and Descriptions	a. **Land Conservation:** Reduce agricultural land loss in the MSA, reduce development of agricultural land, and support agricultural land protection through actions such as: conservation easements, farm transition planning, strategic acquisitions, zoning code changes, and implementing programs for farming on publicly held lands. b. **Soil Health:** Improve soil health to reduce erosion and emissions and improve carbon sequestration capacity through practices such as: cover cropping, reduced application of synthetic fertilizers/herbicides/pesticides, low or no till management, livestock integration through rotational grazing, biochar application, compost application, and soil contamination testing and remediation.

Category	Details
	c. Water Quality and Conservation: Improve water quality and increase conservation of scarce water resources through practices such as: installing efficient irrigation equipment; erosion and run-off prevention and mitigation; reduced application of synthetic fertilizers, herbicides, and pesticides; selecting locally, regionally, and climate adapted crop types; and, effective livestock manure management. **d. Livestock Management:** Reduce emissions from livestock activities through practices such as: effective manure management, adaptive grazing, rotational grazing, ruminant feed practices, and virtual fencing.
Implementing Agencies	Local Governments; State and Federal Agencies - UDAF, NRCS, FSA, Conservation Districts; Local Nonprofits and Community-Based Organizations
Implementation Schedule and Milestones	<u>Tentative Schedule and Milestones*</u> 2025-30: Planning, Engagement, and Funding 2025-30: Initial Implementation 2030-50: Program Evaluation, Updates, and Scaling ** Estimated timing and implementation of all activities are tentative and contingent on funding acquisition and other support.*
Authority to Implement	Government agencies have the authority to create and implement new programs, policies, and incentives related to land use and management.

Category	Details
Progress Tracking Metrics	• Acres of land in farms • Acres of land in conservation • Percent of farms and farmland using sustainable management practices
Geographic Location	Within SLC MSA
Funding Sources	Federal, State, and Local Government Budgets and Grants; Private Sector Investment; More Details are included in the Intersection with Other Funding Availability section
Quantitative Cost Estimate	$$$ = $5,000,000 - $9,999,999 *This cost estimate range is provided for illustrative purposes only. A more detailed assessment, considerate of current capital and program costs, should be conducted in the future for any measure or sub-measure prior to pursuing implementation.*

6.7 Review of Authority to Implement

A review of authority to implement was conducted for each of the included GHG reduction measures and details are reflected in the summary tables. None of the proposed CCAP measures face significant statutory or regulatory barriers to implementation that are not addressable via pathways documented with each individual measure.

6.8 Intersection with Other Funding Availability

EPA CPRG planning grant rules required that the CCAP identify funding sources to potentially support implementation of GHG reduction measures. An analysis was conducted for the SLC MSA CCAP that revealed the below potential funding sources by sector (Table 4). More details for each specific measure are included in the associated tables above.

Future users of the SLC MSA CCAP are encouraged to complete a new funding scan to identify changes in the funding landscape, including newly available resources.

Table 4. Details by sector of intersection with other funding availability.

Sector	Funding Source	Funding Program
Buildings	U.S. Department of Energy (DOE)	Building Codes Support
Buildings	U.S. Department of Energy (DOE)	Home Energy Rebate Programs
Buildings, Electricity Generation, Industry, and Transportation	Commercial Property Assessed Clean Energy	Utah C-PACE

Sector	Funding Source	Funding Program
Buildings, Electricity Generation, Industry, and Transportation	Varies	Private Sector Loans, Leases, and Specialized Financing Solutions
Electricity Generation and Industry	U.S. Department of Energy (DOE)	Energy Infrastructure Reinvestment Financing
Industry	U.S. Environmental Protection Agency (EPA)	Clean Ports Program
Transportation	U.S. Department of Transportation (DOT)	U.S. DOT Funding Navigator
Transportation	U.S. Department of Transportation (DOT)	Pedestrian and Bicycling Funding
Waste and Materials Management	U.S. Environmental Protection Agency (EPA)	Solid Waste Infrastructure for Recycling Grant Program
Waste and Materials Management	U.S. Environmental Protection Agency (EPA)	Recycling Education and Outreach Grants
Waste and Materials Management	State of Utah	Recycling Market Development Zones
Agriculture, Natural and Working Lands	U.S. Department of Agriculture (USDA)	WaterSMART Grant Program
Agriculture, Natural and Working Lands	State of Utah	Agriculture Grants and Loan Programs

Sector	Funding Source	Funding Program
Agriculture, Natural and Working Lands	U.S. Forest Service	Forest Service Grants
Agriculture, Natural and Working Lands	State of Utah	Urban Forestry Grants
Agriculture, Natural and Working Lands	State of Utah	Forestry Defense and Landscape Restoration Grants
Cross-Cutting	State of Utah	Various Air Quality Funding Programs: CPRG Implementation Grant, Clean Ports Program, Clean Heavy Duty Vehicles Grant, etc.

7. Benefits Analysis

EPA CPRG planning grant rules required that a benefits analysis be completed to quantify co-pollutant reductions, along with baseline co-pollutant levels, for all GHG reduction measures included in the CCAP. CPRG rules stipulated that details from this analysis could be represented at a plan level to reflect co-pollutant reduction totals if all modeled measures from the CCAP were implemented. This plan-level approach was utilized for calculating outcomes for the SLC MSA.

Co-Pollutant data for Salt Lake County and Tooele County was obtained from the 2020 U.S. EPA's National Emissions Inventory (NEI) data retrieval tool. Data was collected at both the county and facility levels, then aggregated to estimate emissions for the entire Salt Lake City Metropolitan Statistical Area (SLC MSA). Assuming an annual population growth rate of 1.03%, emissions were projected annually from 2021 to 2050 for categories influenced by population growth. A utility grid decarbonization pathway was also applied to residential and commercial electricity generation within the SLC MSA.

Each GHG reduction measure was analyzed for the years 2035 and 2050 to assess its impact on co-pollutant categories—whether positive (emissions reductions) or negative (emissions increases). All GHG reduction measures were then aggregated to calculate total co-pollutant impacts. These totals were compared against business-as-usual (BAU) or "if we do nothing" forecasts for each target year to determine the net reduction in co-pollutants across the SLC MSA in 2035 and 2050. More information on the co-pollutant modelling methodology, including assumptions for the SLC MSA, is included in Appendix B.

Modeled estimations of co-pollutant emissions for 2021, the baseline year, showed that the highest emissions correspond to carbon monoxide, followed by volatile organic compounds and PM10 as shown in Table 5. These pollutants, along with others listed, are known to exacerbate respiratory and cardiovascular conditions and have contributed to non-attainment designations of the region under the National Ambient Air Quality Standards (NAAQS).

Table 5. SLC MSA co-pollutant levels estimated for 2021, the baseline year, from the 2020 U.S. EPA's National Emissions Inventory.

Co-Pollutant	**Estimated 2021 Annual Emissions** *Short tons*
Ammonia	3,632
Carbon Monoxide	112,043
Nitrogen Oxides	23,791
PM2.5 Primary *(Filterable + Condensable)*	5,435
PM10 Primary *(Filterable + Condensable)*	21,313
Sulfur Dioxide	2,895
Volatile Organic Compounds	27,558

Co-pollutant reduction benefits are expected as early as 2035, with the most significant direct reductions in PM2.5 and PM10 (Table 6). Additional reductions in nitrogen oxides, carbon monoxide, ammonia, and sulfur dioxide—ranging from 10% to 51%—will further benefit public health. These pollutants can cause respiratory issues, and at high concentrations, lead to heart and lung diseases, and even death. They also serve as precursors to PM2.5, making their reduction especially important in a region long designated as non-attainment for PM2.5 under the National Ambient Air Quality Standards (NAAQS).

Notably, nitrogen oxides and volatile organic compounds—key precursors to ground-level ozone formation—are projected to decline by 51% and 20%, respectively, by 2035 if all measures are implemented. This is particularly significant for the Wasatch Front, which has been ranked the 9th worst region in the U.S. for ozone pollution for two consecutive years and remains in non-attainment under the 2015 ozone NAAQS. Reducing these emissions is essential to protecting public health across the region, as ozone—a major component of smog—can cause serious respiratory problems.

Table 6. SLC MSA co-pollutant 2035 forecast and potential reductions if CCAP GHG measures are implemented.

Co-Pollutant	**BAU Forecast for 2035** *Short tons*	**Co-Pollutant Reductions in 2035** *Short tons*	**Co-Pollutant Reductions from BAU Forecast in 2035** *Percent*
Ammonia	3,641	352	10
Carbon Monoxide	124,742	50,338	40
Nitrogen Oxides	17,631	9,036	51
PM2.5 Primary *(Filterable + Condensable)*	5,309	3,081	58
PM10 Primary *(Filterable + Condensable)*	22,508	15,323	68
Sulfur Dioxide	351	103	29
Volatile Organic Compounds	28,756	5,621	20

By 2050, the proposed measures are expected to significantly enhance air quality by reducing carbon monoxide, nitrogen dioxide, and sulfur dioxide by 71%, 77%, and 59%, respectively (Table 7). Important gains in direct reductions of particulate matter, both PM2.5 and PM10, will be also attained with full measure implementation by 2050. These reductions are especially important for the region, long designated as non-attainment for PM2.5, and currently non-attainment for ozone.

Table 7. SLC MSA co-pollutant 2050 forecast and potential reductions if CCAP GHG measures are implemented.

Co-Pollutant	BAU Forecast for 2050 *Short tons*	Co-Pollutant Reductions in 2050 *Short tons*	Co-Pollutant Reductions from BAU Forecast in 2050 *Percent*
Ammonia	3,768	612	16
Carbon Monoxide	144,015	102,744	71
Nitrogen Oxides	20,173	15,510	77
PM2.5 Primary *(Filterable + Condensable)*	5,926	2,287	39
PM10 Primary *(Filterable + Condensable)*	24,996	9,203	37
Sulfur Dioxide	343	204	59
Volatile Organic Compounds	30,405	7,419	24

In addition to benefits associated with plan implementation, potential disbenefits were considered for all measures. These disbenefits might include high upfront costs, even for solutions with lifecycle savings, that can be reduced through accessible rebates, financing, and other new programmatic solutions. Measure implementation may also lead to isolated job losses in certain instances where an activity such as fossil fuel combustion is being replaced. However, associated job growth opportunities are detailed in the workforce analysis section to illustrate new possibilities and training needs. Future potential disbenefits associated with implementation will be tracked, minimized, and mitigated, to the extent possible.

8. Frontline Communities

8.1 Summary

Frontline communities (FC) in the Wasatch Front are diverse, vibrant, and deeply rooted communities. They have been plagued by polluting industries, historic underinvestment, and disproportionate air pollution that is, in part, the legacy of redlining practices. With high rates of asthma, in combination with low percentage of cooling vegetation cover and traffic proximity, they are particularly vulnerable to climate change and aggravated local air pollution. They are also trapped in a cycle of low-wage employment, high housing and energy cost, which combined with a lack of high school education and linguistic isolation, complicate their opportunities to acquire economic resiliency. A prompt energy transformation is essential to provide clean energy and zero-emissions transportation to reduce outdoor and indoor pollution in low-income communities in the Salt Lake and Tooele counties and build thriving, healthy, and resilient communities.

8.2 Introduction

Frontline communities (FC) in Salt Lake and Tooele counties were identified using the Climate and Economic Justice Screening Tool (CEJST)[4] criteria for Low-Income and Disadvantaged Communities (LIDAC). A census tract is considered disadvantaged if it meets the 90th percentile for one or more of the burden indicators (energy, health, housing, legacy pollution, transportation, water and wastewater, or workforce development) and is also at or above the 65th percentile for low-income status. Through direct engagement with residents, we chose to adopt the term *Frontline Communities* rather than *Low-Income and Disadvantaged Communities*. Many residents expressed that the term "disadvantaged" felt stigmatizing, as if it placed blame on the community itself. This framing risks obscuring the broader systemic, historical, and institutional forces—such as segregation, resource inequities, and discrimination—that have contributed to current conditions. This section employs the term "Low-Income Communities" instead of "Frontline Communities" only when income level and not census tract was available.

FC are primarily concentrated in the northern part of the valley—west of I-15 in Salt Lake County and west of the Stansbury Mountains in Tooele County (Figure 24). Notably, these areas also experience the region's worst air quality, a consequence of historical city planning and discriminatory policies dating back to the 1800s. Based on the understanding that emissions from factories near canyon mouths would be carried across the valley, industrial development was concentrated west of the Jordan River—the valley's lowest geographic point[5]. The arrival of freight railroads in 1869 spurred further industrial growth in Salt Lake City during the early 20th century[6], drawing immigrant workers from Central and South America, the Pacific Islands, and other regions, who contribute to the area's rich cultural diversity[7].

In the 1930s, areas near industrial facilities in Salt Lake City became targets of redlining—a discriminatory practice in which the federal government and banks systematically denied loans and services to residents, primarily based on race. This exclusion severely restricted access to housing, financial resources, and economic mobility, shaping where racial and ethnic minorities could live[8,9]. In the 1950s, the construction of Interstate 15 further reinforced this divide, running north to south and physically splitting the valley into the west and east sides. The Westside is home to Utah's most racially and ethnically diverse communities, while the east side remained wealthier and predominantly white[10]. Today, this historical segregation continues to influence disparities in economic opportunity, health outcomes, education, and environmental justice across the region.

The following sections provide a socio-economic and environmental overview of the FC within the Salt Lake City Metropolitan Statistical Area (MSA), examining their energy and transportation burdens, as well as the environmental challenges they face due to the valley's geography and the legacy of historical redlining. Some of these risks were identified through CEJST[11] (Figure 24 and Table 8), the Climate Vulnerability Index (CVI)[12], and other literature sources. Additional topics discussed below were selected based on input from the Environmental Justice Resident Committee—formed through a partnership between the City and University Neighborhood Partners—to ensure fair, meaningful engagement and to provide low-income residents with a voice in shaping the Comprehensive Climate Action Plan.

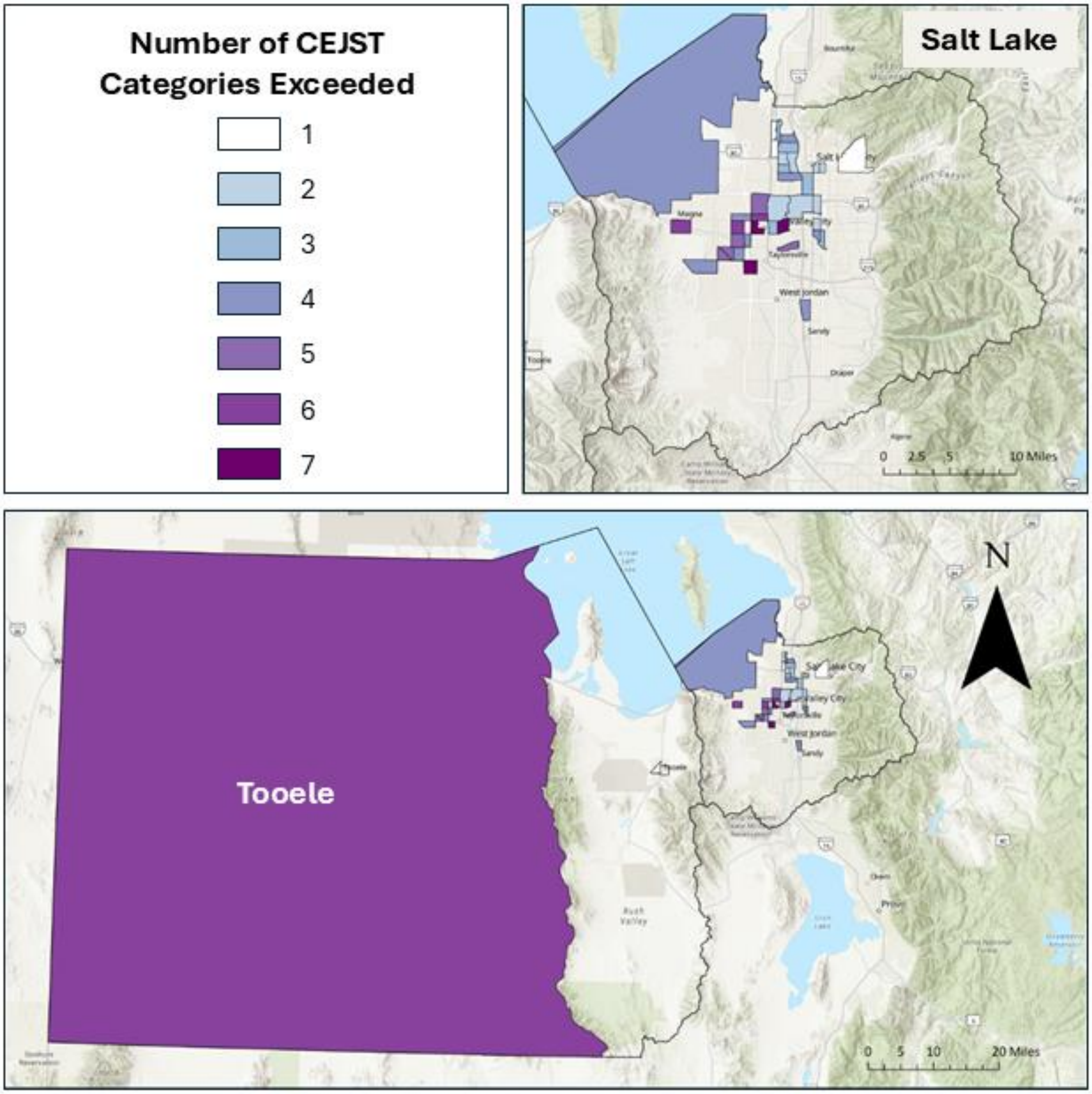


Figure 24. Map of frontline communities in the Salt Lake and Tooele counties and the CEJST categories that each exceeded. (Source: CEJST).

Table 8. Frontline communities in Salt Lake and Tooele counties and their national percentiles for each indicator within some of the categories of burden (energy, transportation, housing, legacy pollution, water and wastewater, health) from CEJST. Perc corresponds to Percentile.

Census Tract	County	# of categories exceeded	Energy burden	Traffic proximity and volume (perc)	Housing burden (perc)	Impervious surface (perc)	Proximity to Superfund sites (perc)	Proximity to Toxic Releases (perc)	Asthma among adults (perc)	Low life expectancy (perc)
00306	Salt Lake	5	3	90	93	88	96	95	91	59
00307	Salt Lake	4	2	87	86	70	91	94	87	NA
00308	Salt Lake	4	3	74	95	56	93	96	93	63
00500	Salt Lake	4	2	88	79	61	95	94	91	70
00600	Salt Lake	3	3	88	82	76	98	95	93	47
01400	Salt Lake	3	2	79	97	37	96	NA	93	52
02000	Salt Lake	3	1	88	84	85	98	84	82	96
02300	Salt Lake	3	1	86	85	92	98	85	88	93
02600	Salt Lake	5	2	98	76	89	99	95	93	96
02701	Salt Lake	3	3	58	83	69	99	95	91	42
02702	Salt Lake	5	3	94	92	87	98	95	94	86
02801	Salt Lake	4	2	62	75	73	99	95	93	27
02900	Salt Lake	4	2	76	87	95	99	91	95	66
11400	Salt Lake	3	2	95	79	80	93	76	88	91
11500	Salt Lake	5	2	94	90	95	94	93	82	91
11701	Salt Lake	4	2	78	93	86	94	93	96	89
11905	Salt Lake	4	2	87	92	78	93	98	91	59

11906	Salt Lake	2	2	59	73	87	92	98	89	86
12402	Salt Lake	1	2	95	59	82	78	88	89	51
13305	Salt Lake	4	2	83	83	79	95	92	93	77
13306	Salt Lake	3	2	93	80	84	84	90	91	71
13307	Salt Lake	2	2	81	75	91	89	84	91	61
13308	Salt Lake	2	2	92	77	74	83	86	91	87
13309	Salt Lake	1	2	55	57	70	78	71	89	45
13406	Salt Lake	2	2	83	72	75	78	NA	94	75
13410	Salt Lake	1	2	52	41	72	73	NA	91	56
13505	Salt Lake	1	2	61	42	67	70	NA	91	60
13509	Salt Lake	2	2	67	55	86	91	95	86	38
13514	Salt Lake	3	2	76	87	73	93	94	94	70
13523	Salt Lake	1	2	86	67	69	75	NA	91	NA
13526	Salt Lake	2	2	52	50	38	60	NA	91	87
13536	Salt Lake	1	2	89	73	79	74	NA	91	62
13600	Salt Lake	1	2	63	74	75	71	NA	87	77
13801	Salt Lake	1	2	71	50	69	64	NA	91	51
13802	Salt Lake	0	2	64	61	80	67	NA	89	60
13905	Salt Lake	2	2	50	64	55	76	95	91	NA
13906	Salt Lake	3	2	36	80	7	87	98	93	83
30600	Tooele	2	3	26	69	0	14	NA	82	NA
30900	Tooele	0	2	55	73	60	69	NA	87	65
31002	Tooele	0	2	45	72	62	63	NA	86	71

8.3 Socioeconomic Risks

8.3.1 Income, race, linguistic isolation, and education

Forty census tracts in the Salt Lake and Tooele Counties were identified as FC as census tracts (Table 8). These communities have incomes that average between $36,369 and $38,660[13], and 48% of the people in these census tracts are below the 200% Federal Poverty Line, and their population is mostly White and Hispanic/Latino[14] (Figure 25). For some, overcoming financial barriers is complicated not only by the lack of necessary resources and opportunities, but also by linguistic isolation (24% for two Salt Lake low-income census tracts), and lack of high school education[15]. Only 21% of adults in FCs, on average, have completed high school in comparison to 93% for the rest of the Salt Lake and Tooele Counties[16].

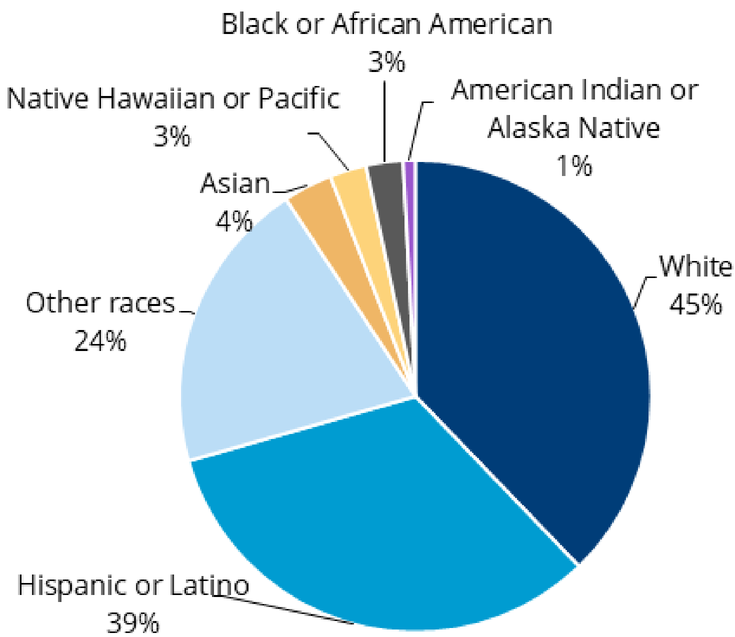


Figure 25. Race and ethnicity composition of the Salt Lake and Tooele Counties' Frontline Communities. Percentages do not total 100% because some individuals identify with two or more categories. Source: U.S. Census Bureau's American Community Survey compiled by CEJST.

8.3.2 Housing, energy, and transportation burdens

In the Salt Lake and Tooele Counties, low-income households spend, on average, 2% of their income on energy costs (Table 8), two times more than non-low-income households[17]. This is below the national average energy burden, which is 6% for low-income households[18]. Low-income compared to non-low-income households in the U.S. spend more on utilities due to inefficient heating and cooling[19]. Low-income households also tend to make lifestyle cutbacks and prioritize keeping the lights on, sacrificing basic needs. This tradeoff aggravates other social issues, such as decreased educational fulfillment and resiliency[20,21].

A study based on two representative datasets found that affordability and accessibility remain serious issues for low-income households in the transition to clean energy[22]. In the Salt Lake Valley, energy efficiency programs have limited participation rates within low-income communities due to high upfront costs, distrust in contractors, more important priorities than home electrification, concern with resiliency of unknown technologies, and lack of access to information and guidance[23].

While most housing units in the MSA are owner-occupied, nearly half of renter households in Salt Lake (50%) and Tooele (42%) counties were cost-burdened in 2024—slightly below the national average of 52%[24]. Almost half of the low-income census tracts are above the 80th national percentile for housing burden (Table 8). Cost-burdened households spend more than 30% of their income on housing expenses. Among low-income households in these counties, 57% are renters[25]. Renters often face barriers to home electrification due to limited control over appliances and property decisions, and landlords lack incentives to invest in energy efficiency[26,27]. However, some renters who pay their own electricity bills may be motivated to adopt energy-saving measures.

Transportation burden, or the proportion of income spent on transportation and/or barriers to transportation accessibility (e.g. cost of fuel, vehicle maintenance, public transit fares and time and effort required to travel), for the Salt Lake and Tooele counties is 2.67% and 3.04%, respectively, which is considered low[28]. However, a few census tracts exceed the counties' averages, and have transportation burdens that are considered high, e.g. Salt Lake County census tracts 49035102702 and 49035113406 reaching 5.12 and 4.40%, respectively[29].

8.3.3 Food Insecurity

In 2025, Salt Lake and Tooele Counties scored 8.6 and 8.5 out of 10, respectively, on the Food Environment Index, which measures access to healthy foods and levels of food insecurity. These scores were notably higher than the national average of 7.4[30]. However, disparities persist. In 2023, food insecurity among Hispanic communities in the region reached 22%—significantly higher than the overall rates for Salt Lake County (13.6%) and the U.S. average (14.5%)[31]. In Tooele County, the overall food insecurity rate was 12% in 2023[32]. Unfortunately, there is currently no disaggregated data available for food insecurity rates among low-income or minority populations in Tooele County.

8.4 Environmental Risks

8.4.1 Green cover

Frontline communities show lower average percent of tree cover (15% versus 19% for non-FC)[33] and higher percent cover of impervious surfaces[34], which are both strong predictors of urban heat islands[35]. In fact, twelve of the FC census tracts are above the 80th percentile for impervious cover in Salt Lake and Tooele counties (see Figure 26 and Table 8), which makes them particularly vulnerable to increases in average and extreme temperatures and heat waves. Extreme temperatures affect health compromising the ability of the body to regulate its internal temperature, which can result in several illnesses, and can also worsen chronic conditions such as cardiovascular, respiratory, cerebrovascular diseases, and diabetes-related conditions[36].

Parks were shown to have lower average air temperature compared to surrounding residential areas in the Salt Lake County due to the cooling effects of vegetation evapotranspiration and shade[37] and could potentially serve as cooling centers during heat waves. Parks can also encourage physical activity and community connections, which are important for overall health. However, a recent study examining walkability and transit access found that parks located in lower-income and more racially diverse neighborhoods on the west side of Salt Lake City are significantly less accessible. This is in comparison to higher-income, majority-white neighborhoods with better infrastructure[38].

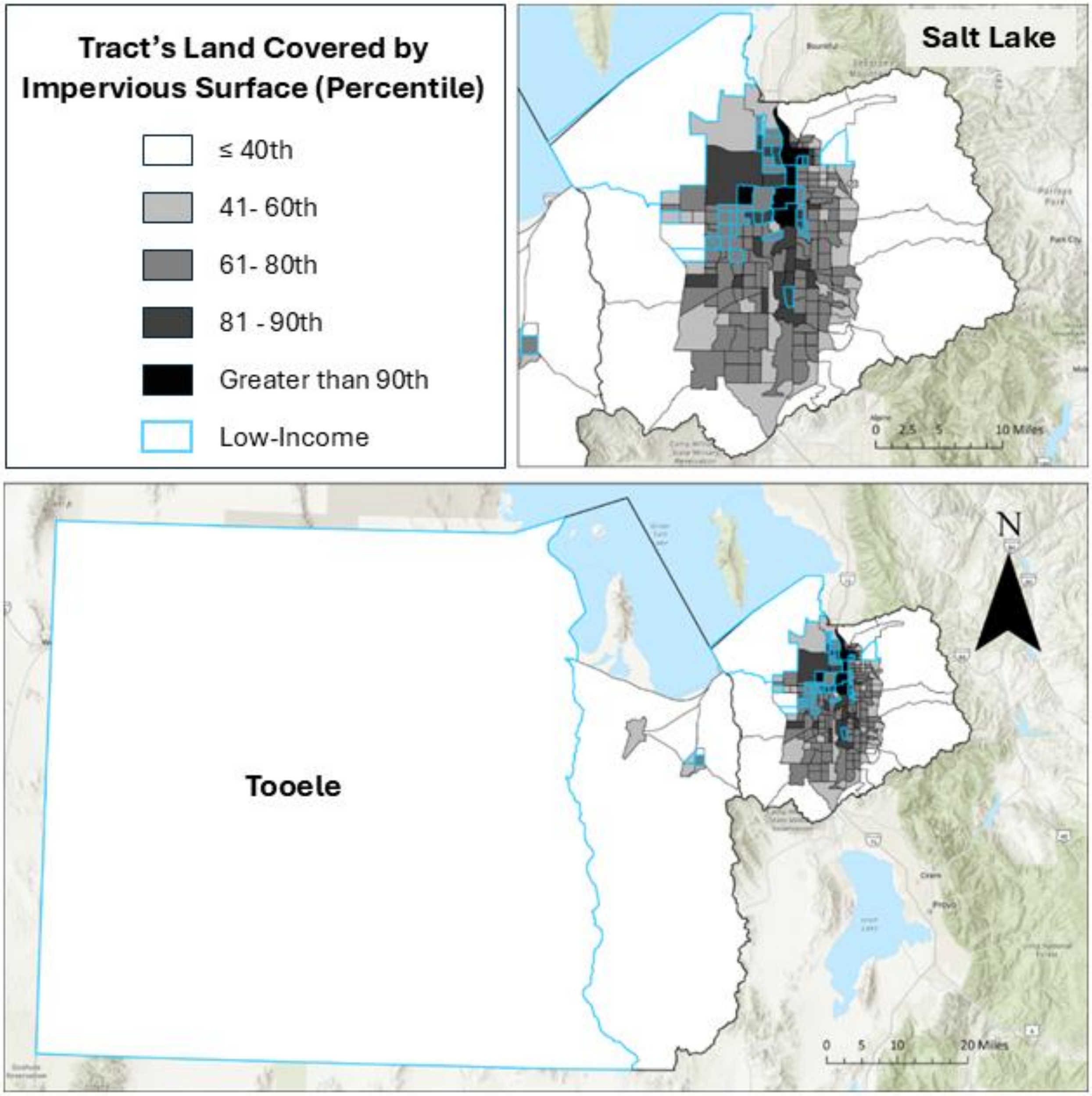


Figure 26. Impervious surfaces in the Salt Lake and Tooele Counties. Source: National Land Cover Database's (NLCD) 2019 Percent Developed Imperviousness dataset. The NLCD dataset was developed by the U.S. Geological Survey and compiled by CEJST.

8.4.2 Outdoor air quality

8.4.2.1 Particulate Matter, PM2.5 and PM10

PM2.5 is tiny air pollutant—2.5 micrometers or smaller—that can reach deep into the lungs and bloodstream, increasing the risk of heart and lung diseases. Major sources of PM2.5 include vehicle exhaust, industrial emissions, and wildfires. Although Salt Lake has recently met the health standard for PM2.5 and is being considered for reclassification to attainment, it remains among the 25 U.S. regions most impacted by short-term PM2.5 pollution[39]. $PM_{2.5}$ exceeding national air quality standards have been associated with school absences[40] and 42% higher rate of emergency department visits for asthma[41] in the Salt Lake County.

The Westside carries the worst burdens as air quality monitors show the most polluted hotspots[42] and pollution exposure has been shown to disproportionally affect socioeconomically disadvantaged schools[43]. This is due, in part, to the interstate highways and rail lines that run through the area, the industries, the dense clustering of warehouses and the associated activity of heavy-duty diesel trucks in surrounding areas, and the jet engines from the Salt Lake City International Airport[44].

Within the Westside, the census tracts with the highest yearly averages of PM2.5 are located next to Interstates I-15, I-215, and I-80 and the airport (Figure 27). Increased built cover has also been shown to be related to higher long-term PM2.5 exposure[45]. 85% of the low-income census tracts are located within the areas with the highest PM2.5 pollution and 8 of them within the 90th percentile for traffic proximity (Table 8). In summer, most PM2.5 exceedances come from forest wildfires[46].

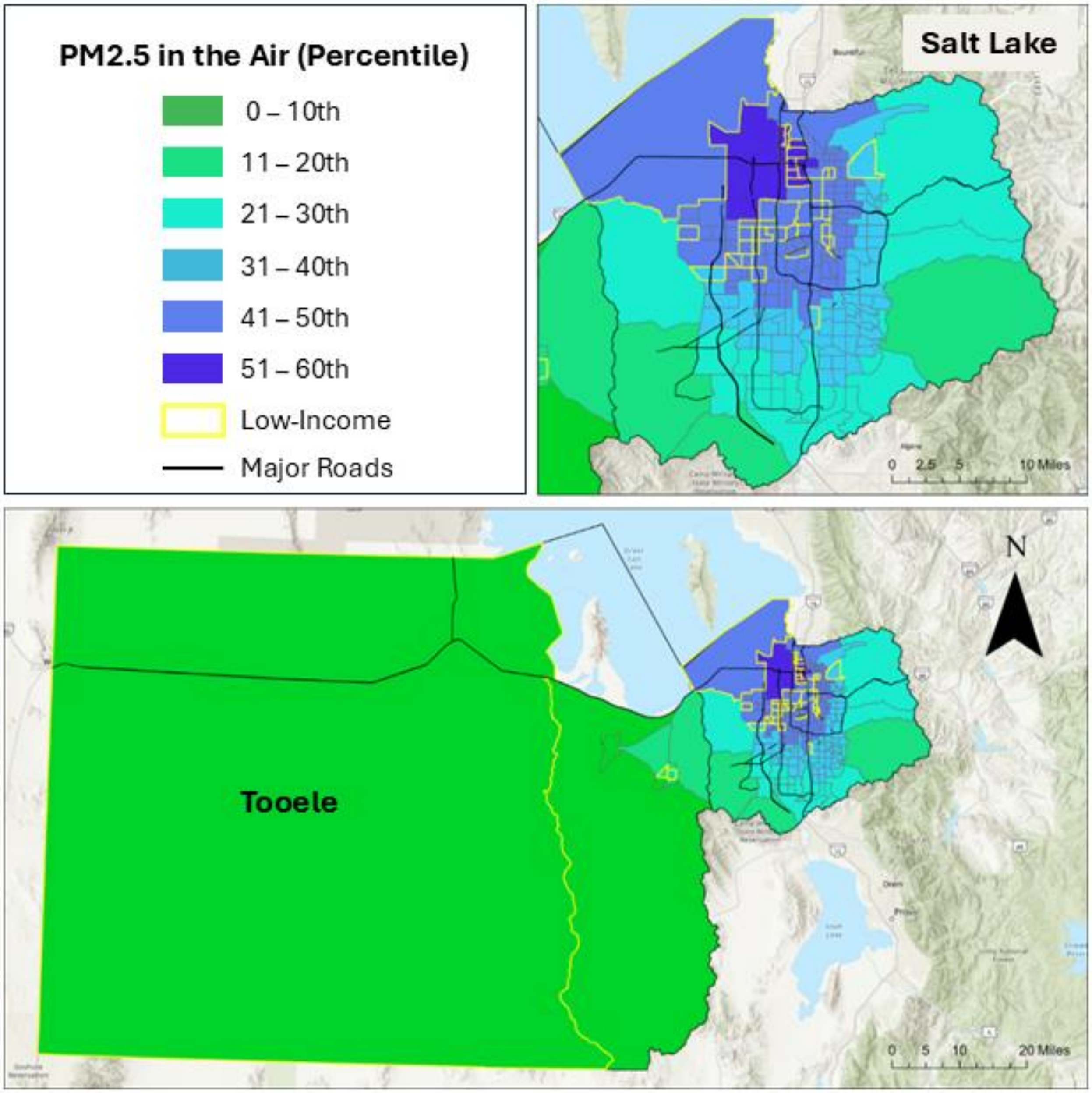


Figure 27. Percentile of exposure per census tract for PM2.5 yearly averages. Source: Fusion of model and monitor data from 2017 as compiled by CEJST, sourced from EPA National Air Toxics Assessment (NATA) and the U.S. Department of Transportation (DOT) traffic data.

Dust or airborne particulate matter (PM2.5 or PM10) pose serious environmental and health risks in the Salt Lake Metropolitan Statistical Area (MSA). These particles can carry not only dirt and soot, but also heavy metals and chemical compounds that, when inhaled, can harm respiratory, cardiovascular, and neurological health.

Dust also accelerates snowmelt by settling on the region's snowpack. Most dust in the Wasatch Front originates from local sources such as mining, construction, and roadways[47]. Its metal content varies by location and is linked to industrial activity: wealthier neighborhoods show higher levels of arsenic and vanadium, while lower-income, more diverse areas have elevated concentrations of lead, thallium, and nickel[48]. Dust concentrations are highest on the west side of Salt Lake County, near the Oquirrh Mountains, close to Kennecott's Bingham Copper Mine, the smelter, and the Black Rock gravel pit (Figure 28). Notably, Kennecott accounts for 90% of Utah's toxic chemical releases, placing the state third in the nation for total toxic emissions[49],[50]. In Tooele County, the highest dust levels are found near undeveloped areas close to the Dugway Proving Grounds and the now-downscaled U.S. Magnesium refinery, with additional sources near Stockton and Tooele City (Figure 28).

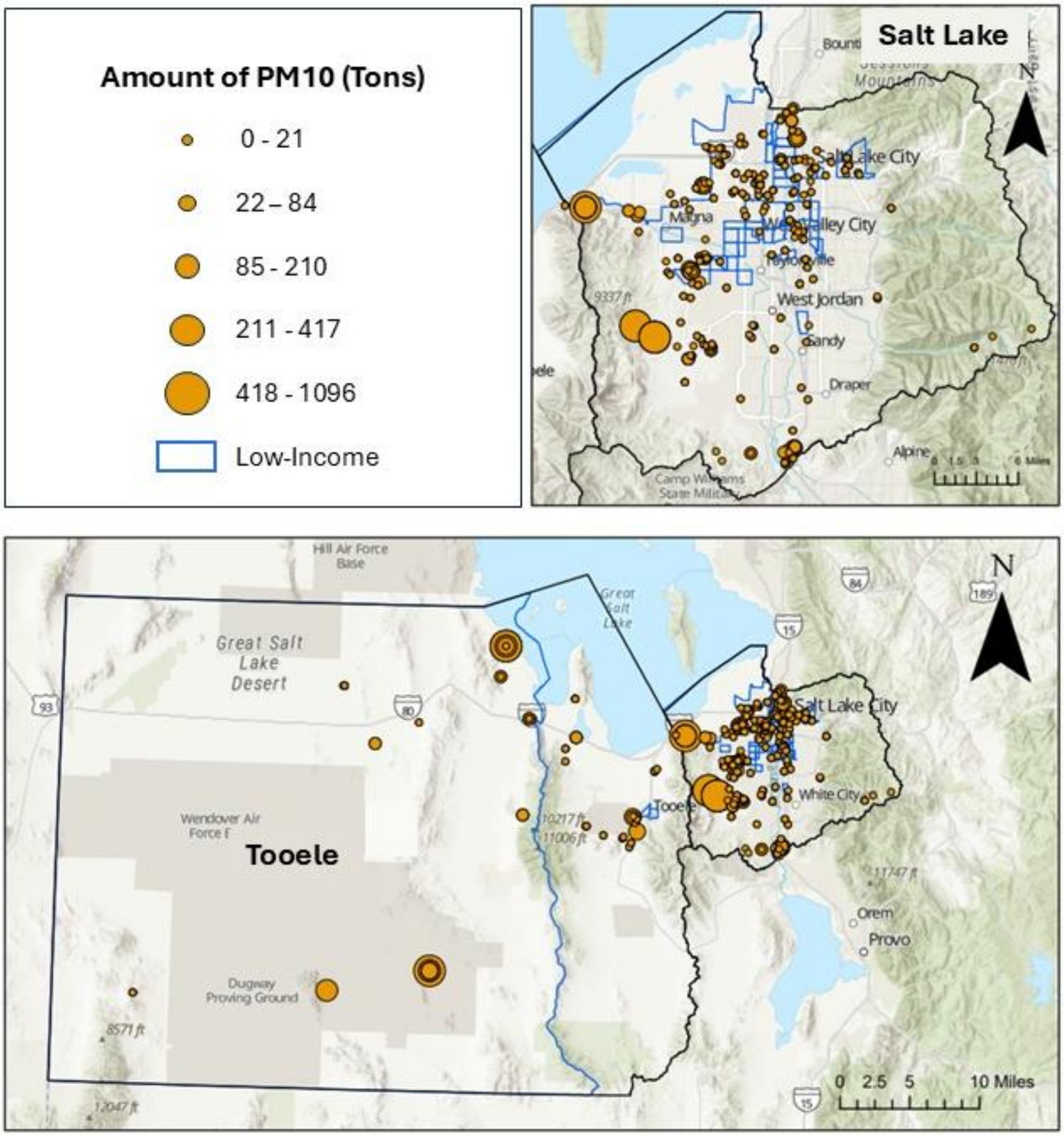


Figure 28. PM10 concentrations are averaged for 2016 to 2024 and represented by the diameter of the circles in the Salt Lake and Tooele counties. Source: Department of Environmental Quality.

Dust pollution from exposed lakebeds—including the Great Salt Lake, Sevier Lake, and the West Desert—is an increasing environmental and public health concern along the Wasatch Front. Sevier Lake, over 120 miles southwest of Salt Lake City, has become a major dust source[51], while the continued decline of the Great Salt

Lake is intensifying dust events[52]. These events disproportionately affect residents in Tooele County, Salt Lake City's west side, and minority communities in the northern Salt Lake Valley[53],[54]. Toxic elements such as arsenic, mercury, and lead—remnants of long-term industrial activity—have been detected in the Great Salt Lake's lakebed[55]. Dust samples have shown arsenic and lithium levels exceeding EPA regional screening thresholds[56]. However, recent data suggest that regulatory efforts may be helping to prevent further increases in heavy metal concentrations[57],[58].

8.4.2.2 Ozone

Ozone pollution remains a serious health issue along the Wasatch Front. In 2025, the Salt Lake City metro area was ranked the 9th worst in the U.S. for ozone pollution for the second year in a row[59]. The region is currently designated as a nonattainment area under the 2015 National Ambient Air Quality Standard[60]. Ozone pollution is driven by chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in sunlight, making it a summertime issue. Although NO_x emissions in Salt Lake City have dropped significantly since 2000, ozone levels have only slightly declined—indicating the region is VOC-*limited*. To effectively reduce ozone, not only NO_x but also VOC emissions must be addressed[61]. The major sources of VOCs in Salt Lake City are traffic, off-road engines (particularly 2-stroke landscaping equipment), biogenic sources, personal care products, industrial solvent use, and biomass burning[62].

Ozone can cause respiratory problems, and along with PM2.5, has been linked to increased school absences—especially among students in socioeconomically disadvantaged communities[63]. Many FC are located in areas with high ozone levels near the southeastern edge of the Great Salt Lake (Figure 29). The lake may contribute to elevated ozone through transported precursors, reflective surfaces that enhance photochemical reactions, and lake breezes that trap and move ozone into urban areas[64]. Ozone distribution is also shaped by mountain breezes[65] and exhibits significant east-west variation across the valley[66]. Notably lower levels have been observed near high-traffic roads due to ozone breakdown by nitrogen oxides[67]. Episodic spikes in ozone can also occur due to wildfire smoke[68].

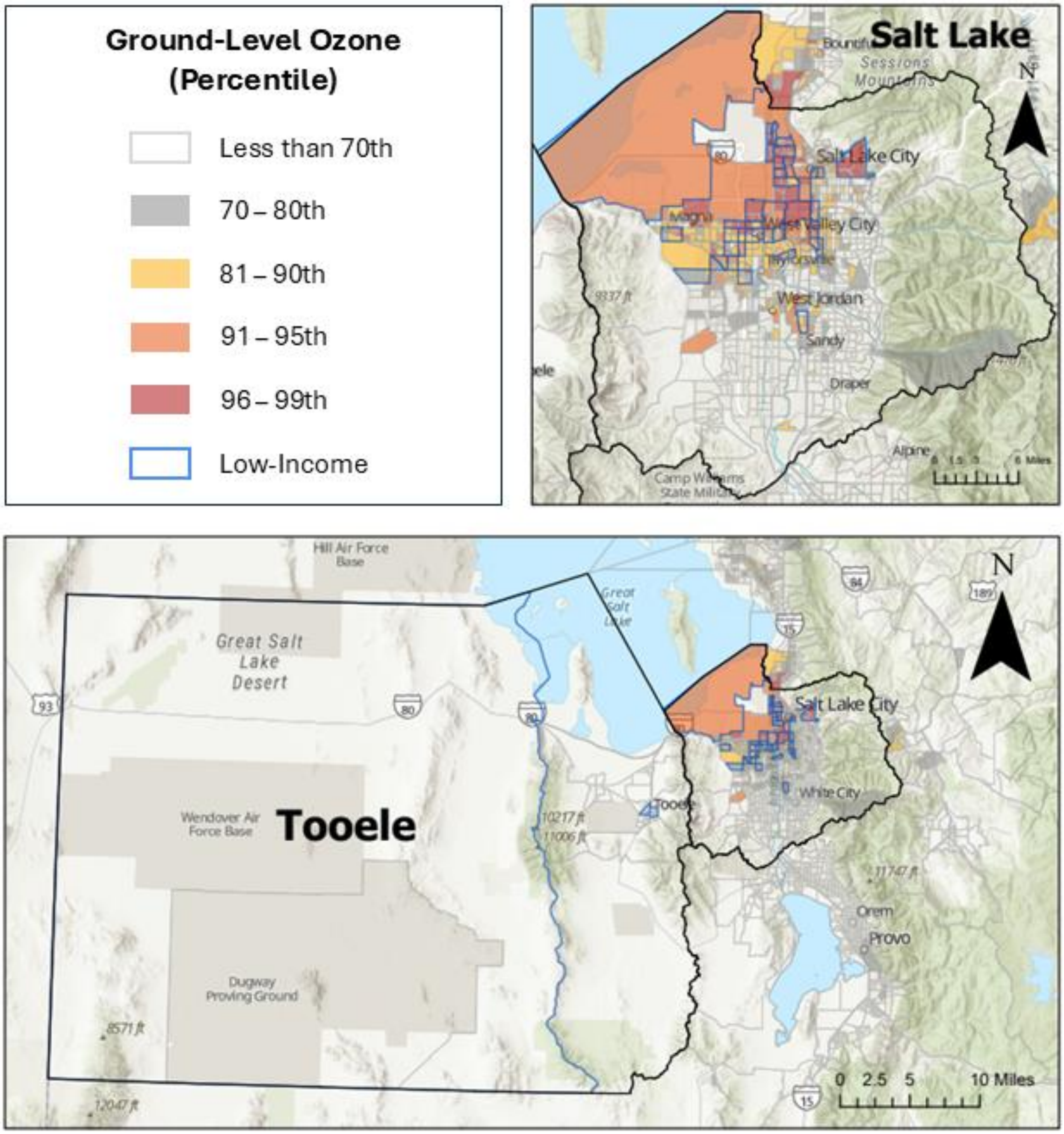


Figure 29. Percentiles of ozone yearly average top 10 of daily maximum 8-hour concentration in air by census block. Source: fusion of monitor data and CMAQ air quality modeling for EJScreen.

8.4.3 Indoor air pollution

Utah, especially Salt Lake and Tooele counties, relies heavily on natural gas for space heating, water heating, and cooking[69], with 75% of low-income households depending on it[70]. While furnaces and water heaters typically vent outdoors, gas stoves release pollutants like nitrogen dioxide, carbon monoxide, and benzene directly into indoor air[71]. These emissions can worsen respiratory conditions and have been linked to increased cancer risks[72] and childhood asthma[73],[74]—particularly in smaller homes with poor ventilation[75]. Many households lack effective exhaust systems, and even existing hoods often recirculate air instead of venting it outside[76]. Low-income households in the Salt Lake City MSA are more vulnerable to indoor air pollution due to smaller living spaces[77] (Figure 30), older homes with poorly ventilated stoves, limited insulation from the outside air, and outdated appliances[78]. These families often lack resources for maintenance and may use kitchen appliances for extra heating, increasing exposure to harmful pollutants[79]. Low-income communities are especially vulnerable to poor indoor air quality due to higher rates of underlying health conditions and limited healthcare access[80].

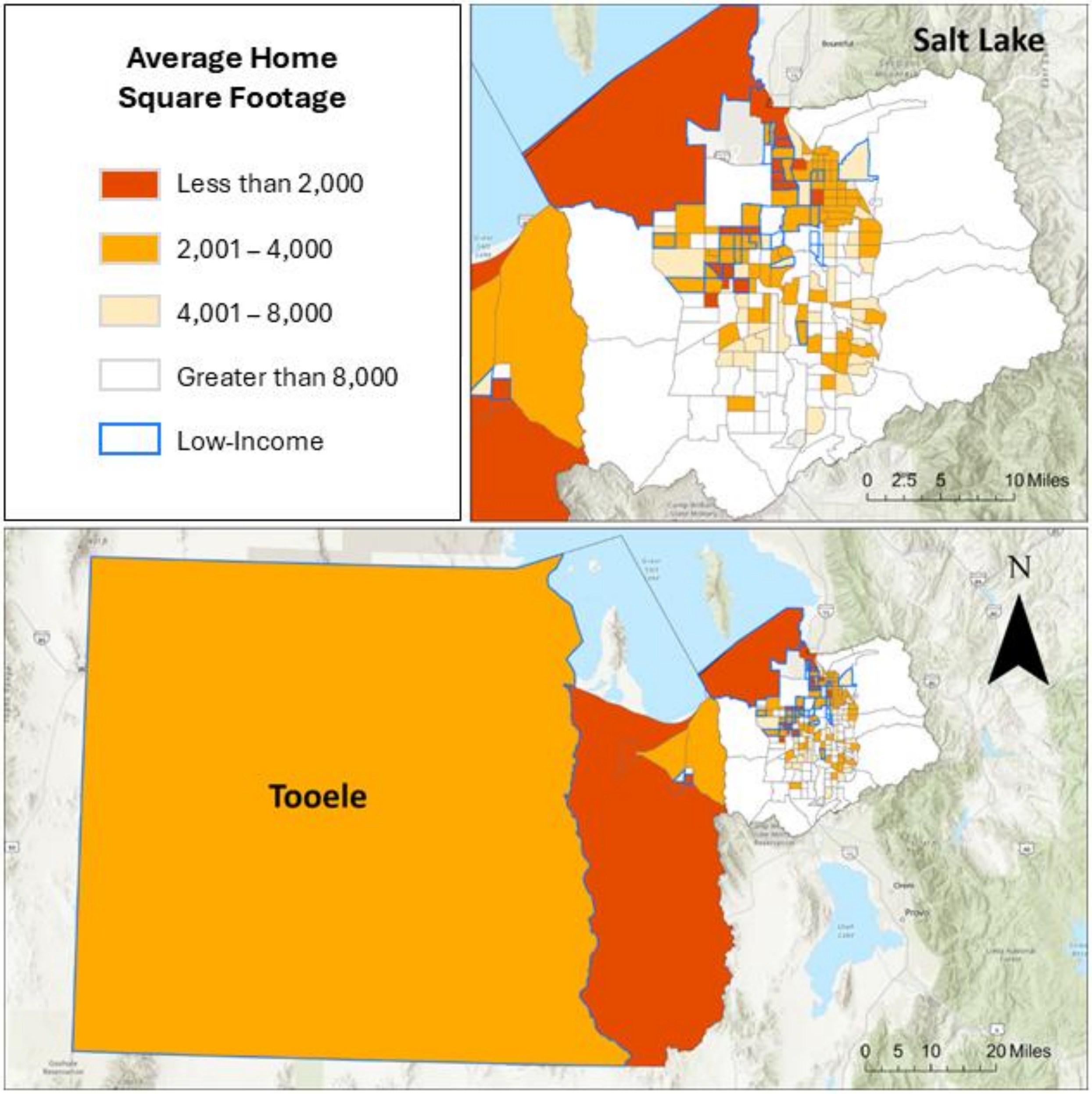


Figure 30. Average home square footage for Frontline and other communities in the Salt Lake and Tooele counties. Source: Utah Geographic Reference Center (UGRC).

Radon is a naturally occurring radioactive gas that can build up indoors without any visible signs, posing serious health risks—including lung cancer. Although Utah has the nation's lowest smoking rate, lung cancer remains the leading cause of cancer death in the state[81]. Alarmingly, about one-third of Utah homes are at high risk for elevated radon levels, with some areas in the Salt Lake City metro—such as West Valley—seeing rates above 50%[82]. Despite the danger, public awareness remains low, especially in low-income and rural communities that often lack the resources for testing. While professional radon mitigation can cost between $1,800 and $2,200, many companies do not offer financing option[83].

8.4.4 Proximity to Superfund sites

Superfund sites are areas designated by the federal government as contaminated with hazardous substances and in need of long-term remediation due to significant risks to human health and the environment. These sites—often former industrial facilities, landfills, or mining operations—are the result of improper waste disposal and environmental mismanagement. The most hazardous of these locations are placed on the National Priorities List (NPL) by the U.S. Environmental Protection Agency (EPA), signaling the need for extensive federal cleanup under the Superfund program. In Salt Lake County, many of these sites are contaminated with toxic substances such as lead, arsenic, mercury, and other harmful pollutants.

Superfund sites in the Salt Lake City MSA are mostly located along the northern part of the I-15 highway in the Salt Lake County (Figure 31), and 50% of the FC census tracts are within 5 kilometers of a proposed or listed Superfund or National Priorities List (Table 8). The release of these contaminants can endanger water supply, air quality, and ground conditions, leading to detrimental community health consequences. The exposure of residents to superfund sites has been associated with serious health risks such as elevated cancer rates, birth defects, developmental delays, and shortened life expectancy. The Environmental Protection Agency has recently strengthened lead standards and cleanup guidelines, now recommending annual lead testing for children under 7 if they live in areas with lead-contaminated soil—including redeveloped former Superfund (NPL) sites.

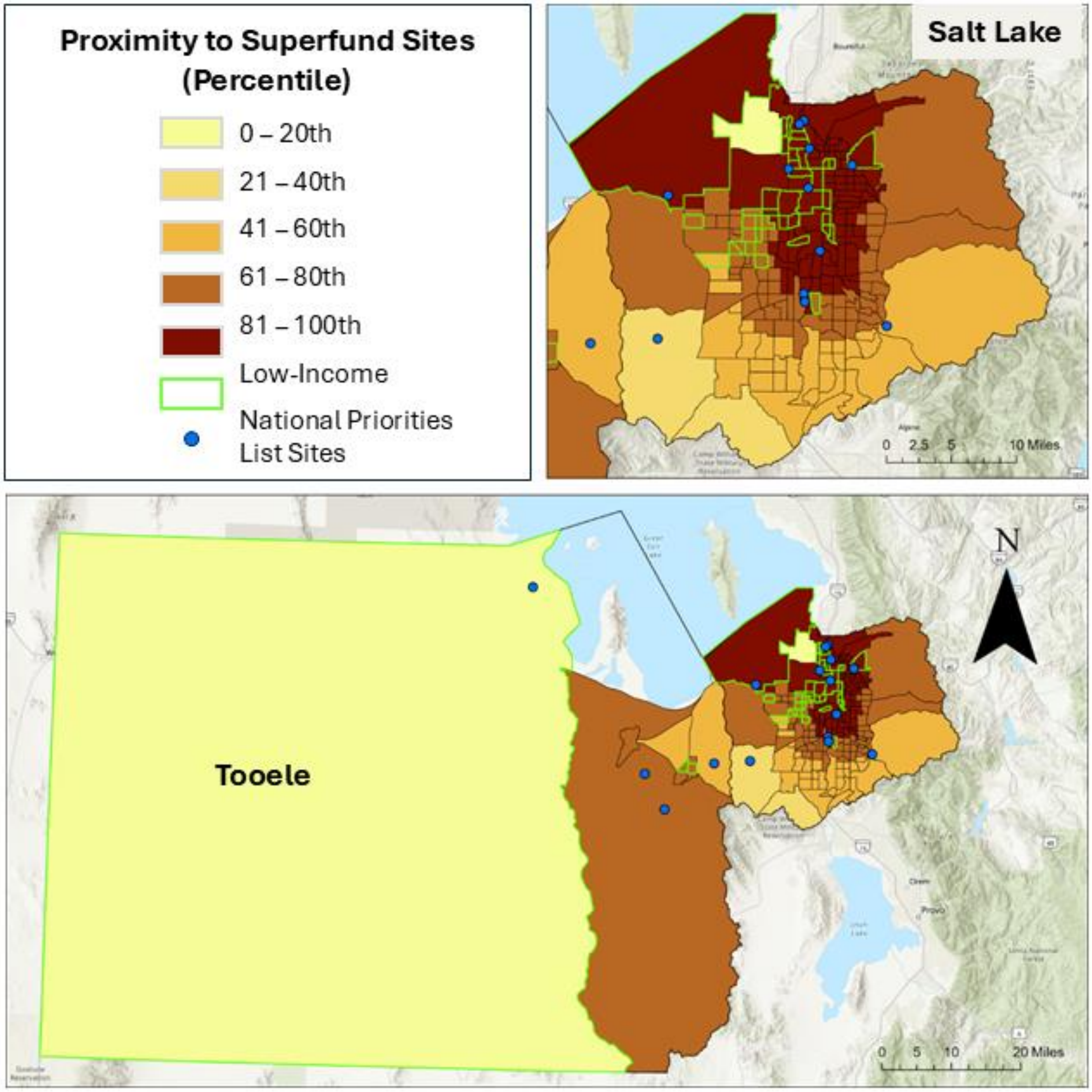


Figure 31. Low-Income census tracts that are within 5 kilometers from a Superfund site. Source: compiled by CEJST from EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database from 2020.

8.4.5 Toxic Release Sites

The U.S. Environmental Protection Agency (EPA) tracks toxic chemical releases from industrial facilities through the Toxics Release Inventory (TRI) program[84]. These pollutants may be released into the air, water, or soil, or transported off-site for treatment or disposal. Once in the environment, they can travel and accumulate, potentially exposing nearby communities over time. While not all TRI-reporting facilities pose an immediate health threat[85], living near those sites can pose serious health concerns, including increased risks of cancer and other chronic illnesses. TRI sites are heavily concentrated in areas like Glendale and along the I-15 corridor in the Salt Lake Valley, with 20 frontline community census tracts located nearby (Figure 32, Table 8).

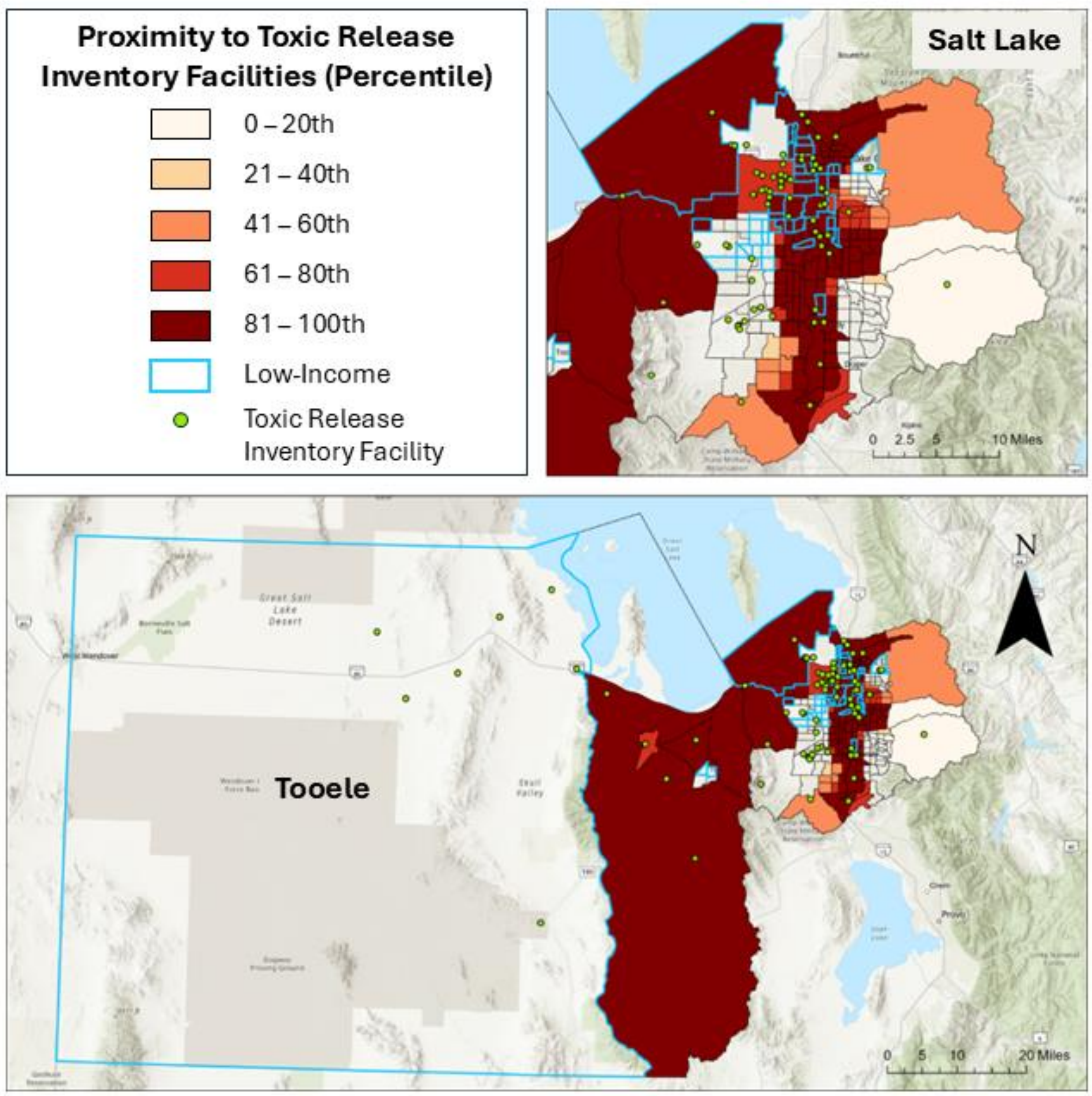


Figure 32. Toxic release sites and national percentiles according to the census tract distance to the release site. Source: compiled by CEJST from the Risk-Screening Environmental Indicators (RSEI) Model from 2020. RSEI model inputs include chemical toxicity data and Toxics Release Inventory.

In 2024, Utah ranked third in the U.S. for total toxic chemical releases—trailing only Alaska and Texas—according to the EPA's latest TRI[86]. Kennecott's Bingham Copper Mine alone accounts for 90% of these emissions[87]. However, over 100 additional TRI sites are scattered throughout the Salt Lake Valley (Figure 32). While some emit pollutants more harmful to human health than mining waste, they rank lower in the TRI because the system reports by weight, not toxicity[88]. Across the Salt Lake City MSA, the primary sources of toxic emissions are the mining and hazardous waste industries. In Salt Lake County, major contributors include mining operations, oil refineries, and metal and materials processing facilities[89]. In Tooele County, key sources include a now-closed magnesium refinery, hazardous waste treatment sites, and gas manufacturing plants[90].

8.5 Health

Frontline communities in the Salt Lake City MSA face significant health disparities, including higher rates of physical and menta health illnesses, lower life expectancy, and limited access to preventive care such as screenings and dental exams. Many residents also lack health insurance, further restricting access to consistent medical care[91]. These disparities are largely driven by social and environmental factors—such as substandard housing, pollution exposure, limited access to nutritious food, and fewer opportunities for physical activity. Together, these conditions highlight the powerful influence of social determinants like income, education, and housing on health outcomes, and emphasize the need for targeted, place-based interventions.

8.5.1 Diabetes

Diabetes is a recurring concern raised by Westside residents participating in the Environmental Justice Resident Committee, and data confirms troubling disparities among minority populations. In 2022, diabetes prevalence was 9.1% in Salt Lake County and 10.6% in Tooele County, compared to the national adult average of 10.8%[92]. While the region remains slightly below the national rate, it reflects a broader trend of rising diabetes cases[93]. Diabetes disproportionately affects low-income and minority communities in Utah[94]. In Salt Lake County, prevalence is significantly higher among Pacific Islander (24.3%), Black/African American (19.1%), American Indian (20.2%), and Hispanic/Latino (12.3%) populations[95]. Disaggregated data for Tooele County is currently unavailable.

8.5.2 Life Expectancy

Life expectancy data also reveal significant disparities. Five low-income census tracts rank above the 90th percentile for lower life expectancy (Table 8). Although life expectancy broken by race for the Salt Lake and Tooele counties is not available, across Utah, there is a striking gap between the populations with the highest and lowest life expectancies—Asians at 87 years and Pacific Islanders at 75.5 years[96]. Additionally, in Utah, infant mortality rates are disproportionately high among Utah's Black, Asian, and Pacific Islander populations, exceeding those of white residents by more than one and a half times[97].

8.5.3 Asthma

Asthma remains a pressing public health issue in Utah, particularly in Salt Lake and Tooele counties, where adult prevalence rates are 9.9% and 10.7%, respectively[98]. Common triggers include air pollution, smoke, mold, and allergens, with PM2.5 pollution linked to a 42% increase in asthma-related emergency visits in Salt Lake County[99]. Asthma disproportionately affects American Indian and Black/African American populations, with significantly higher rates among both adults and children. Income is also a key factor—13.8% of individuals in households earning under $25,000 report asthma, compared to 10.6% in higher-income households[100]. Alarmingly, 63% of low-income census tracts in the Salt Lake MSA rank above the 90th percentile for asthma prevalence (Figure 33, Table 8), underscoring the intersection of environmental exposure, socioeconomic status, and health disparities.

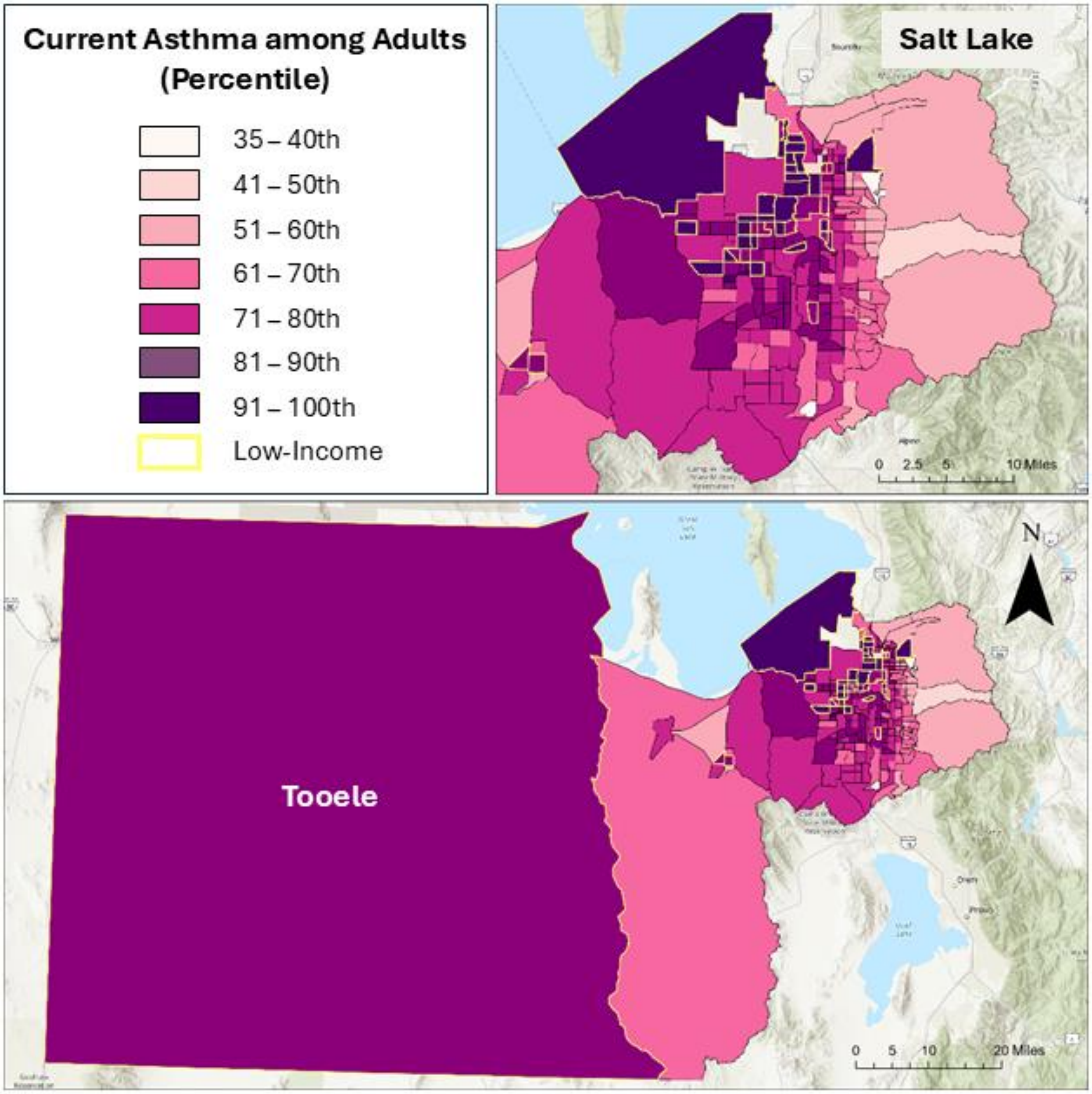


Figure 33. Asthma rates among adults aged 18 years or older. Source: compiled by CEJST from the 2016-2019 PLACES dataset, launched by the U.S. Centers for Disease Control and Prevention.

8.6 Threats from City Growth

Despite PM2.5 and ozone pollution already affecting disproportionately FC census tracts, two large projects planned to be carried out in the area might exacerbate the valley's health disparities. The construction of an inland port and highway expansion are expected to increase truck and vehicle traffic on the Westside and consequently worsen air quality. Additionally, carbon and co-pollutant emissions from commercial and residential buildings projected to the year 2040 under a "business as usual" growth scenario are expected to increase along the I15 highway and the west side of the valley[101]. A swift transition to clean energy and zero-emission transportation is crucial for fostering responsible urban growth, reducing both outdoor and indoor air pollution, and protecting public health—especially in low-income communities.

8.7 Environmental Justice Resident Committee Feedback

During the meetings, residents emphasized that they didn't want to be defined by a single narrative—the one often portrayed in recent news as low-income, disadvantaged communities disproportionately burdened by air pollution. Instead, they wanted to highlight how diverse, resilient, resourceful, and strong their community truly is. We then conducted asset mapping to learn about residents' values and how they describe their community, and the words they most often used were diverse, family, belonging, connected, and proud. When asked about their most pressing issues, they identified health, housing, and pollution, and when asked what single action would make the biggest difference, they emphasized education and planting trees. Other top priorities identified by the residents include:

- **Public transportation**: faster and more frequent public transit routes
- **Carpooling**: with a reward system
- **Mitigate pollution**: from current freeways and projected expansions, refineries, and the inland port
- **Green space**: for community building, as an indigenous sacred site, and for mitigation of air pollution and heat
- **Renewable electrification and electric appliances**: vouchers or incentive programs, eco bikes and windless turbines to generate electricity on campus, schools, and stations
- **Solar alternatives**: for the Westside in partnership with the Goshute Nation
- **Green jobs**: for Westside residents

- **Education**: on environmental issues
- **Recycling and waste**: the Westside needs improvements
- **Contaminated drinking water** in Magna

Residents iterated the importance of "meeting them where they are" and taking the time to understand their real needs and to customize ways to implement solutions. Many organizations have approached them offering solutions that are not practical for their situation. Most residents cannot afford clean energy options, and as renters, they face major barriers to electrification because they lack control over property decisions and landlords have little incentive to invest in upgrades. Other topics were raised regarding basic needs that, for them, are equally pressing to the transition to clean energy, such as the need for clean water, affordable housing, or a high school in their neighborhood. Others expressed their frustration over polluting refineries and projects like the inland port and the highway expansion that, inevitably, are going to affect the air quality of an area already subjected to the worst pollution in the valley. Some feel defeated and opted to identify avenues of mitigation, such as planting more vegetation to filter out the particulate matter, providing air filters to residents, or demanding the refineries to redistribute their profit and/or provide jobs to Westside residents.

Some residents are committed to building a brighter future and envision transforming the Westside into a healthy and interwoven community. Between residents, there was a widespread desire to implement nature-based solutions to mitigate the impacts of increasing temperatures and airborne pollution, and to beautify the highly impervious Westside urban landscapes. One resident highlighted the nonexistence of green spaces that could serve as an indigenous sacred site to practice their ceremonies and rituals and spread awareness of the land relation through indigenous lens. Another resident noted the potential of this indigenous sacred site to serve as a place to implement a community education model on environmental issues and environmental justice that is different than the traditional academic one. The feeling of the need for a place for gathering, education, and community building in the Westside was prevalent between residents. Some think there is a massive loss of identity and belonging between current generations and the best way to take care of the environment, is "understanding we are part of it and knowing the history of the land".

Another common thread invoked their roots in these communities – some shared memories of growing up fishing in the lake for food, growing a garden. Now, worried about the effects of air pollution, they do not let their kids play outside. They expressed their preoccupation with the coming generations losing their identity and sense of belonging to these communities and their surrounding nature: "when you don't belong, you belong to money". They love their neighborhood, "that is where our history is, we built so much out of nothing" and they don't see as an option to move out, "we are not quitters". Instead, they want to stay and make a difference, find solutions, and as their future selves, be able to answer to their kids asking: "what did you do to improve the air we breathe?".

Salt Lake City is sensitive to the Westside community's concerns and is committed to facilitating their involvement in the decision-making process towards finding well-fitting solutions. The City identified two of the resident ideas as implementation-ready and with a fair potential to receive funding from the EPA as part of the Implementation grants and submitted two applications, which, unfortunately, were not selected. For residents' ideas that were neither implementation-ready nor related to greenhouse gas reduction measures or mitigation strategies, the City is working on identifying federal grants, City programs, City Departments and other avenues to facilitate a resolution. With the objective of reaching other low-income communities, the City collaborated with the EJRC to create their own website, which is hosted under the general CPRG Salt Lake Clear website. The purpose of this website is to educate the general community on burdens that residents of the Westside face such as air pollution, lack of green space, asthma, food desert/apartheid through resident stories.

9. Climate Hazards

9.1 Summary

Climate change is increasing risks across the Salt Lake City Metropolitan Statistical Area, with extreme heat, drought, flooding, and wildfires threatening public health, infrastructure, and the economy. Alarmingly, 96% of census tracts rank above the 90th percentile nationally for expected population loss from natural hazards. Extreme heat is a growing concern, as it exacerbates other hazards like drought and wildfire. While flooding remains Utah's most frequent and costly hazard, wildfires now endanger more properties and degrade air quality. Drought also threatens water supplies and the Great Salt Lake. These risks are intensified by urban development patterns, underscoring the need for local governments to adopt equitable resilience strategies through climate risk assessments.

9.2 Introduction

The SLC MSA is especially vulnerable to climate change due to its distinctive geography and unique ecological systems. Located next to the Great Salt Lake—the largest saltwater lake in the Western Hemisphere—the region depends on this ecosystem not only as a critical habitat for migratory birds, but also as a key driver of local precipitation. This lake-effect moisture is essential for sustaining the Wasatch Front's snowpack, which in turn supports Utah's ski industry and broader winter economy. As a semi-arid area with hot, dry summers and limited precipitation outside of winter snowfall, the area is especially prone to drought[102]. This arid climate drives high water demand for agriculture and landscaping.

The region's urban centers sit within mountain basins that trap air pollution and intensifies heat waves[103],[104]. The MSA's land cover—dominated by impervious, heat-absorbing surfaces like concrete and asphalt and lacking sufficient vegetation—intensifies the urban heat island effect and increases flood risk due to reduced natural water absorption[105],[106]. As one of the fastest-growing regions in the U.S., driven by strong economic activity, the MSA faces mounting pressure on its limited water resources, rising energy demands, and expanding urban sprawl. This rapid growth leads to habitat loss, increased pollution, and infrastructure expansion, all of which compound the region's exposure and sensitivity to climate-related hazards.

9.3 Extreme heat

The Salt Lake City's MSA is undergoing a significant warming trend[107]. In recent years, the region has experienced record-breaking temperatures[108], with average summer temperatures rising by 3.4°F since 1895[109]. These rising temperatures are contributing to a variety of challenges. The risk of heat-related illnesses is growing, particularly for individuals who work outdoors. Hotter conditions also make wildfires more likely to ignite and spread rapidly. In addition, air quality is deteriorating, as higher temperatures accelerate the formation of ground-level ozone[110] —an invisible pollutant that poses serious health risks. Furthermore, increased heat drives higher rates of evaporation, which can intensify drought conditions in some areas while leading to heavier rainfall and flooding in others[111].

Rising average temperatures raise the baseline for extreme heat, increasing the likelihood of dangerous temperature spikes. These extremes can trigger acute impacts such as heat-related deaths, power grid failures, and agricultural collapses. High heat can trigger power outages by both increasing electricity demand—especially from air conditioning—and straining the infrastructure that delivers it[112]. Between 2019 and 2024, 11 people in Salt Lake County died from heat exposure, according to the Utah Department of Health and Human Services[113]. Projections estimate that the Salt Lake and Tooele Counties will see around 46 and 68 days per year with temperatures exceeding 90°F—nearly three times the average days from 1976 to 2005[114]. These high temperatures pose significant health risks, especially for vulnerable populations[115]. This trend is particularly alarming, as Salt Lake County is expected to rank above the 94th percentile nationally for vulnerability to extreme daily maximum and yearly average temperatures by 2050[116].

Heat waves—prolonged periods of unusually high temperatures—are also becoming longer. The likelihood of a heat wave longer than 3 days went up from 17% thirty years ago to 58% today[117]. These extended periods of heat not only pose health risks but also carry significant economic costs. Each summer, the U.S. spends an estimated $1 billion on heat-related healthcare expenses[118]. Roads are also not meant to withstand extremely high temperatures, and costs rise when more maintenance and replacements are required[119]. In 2024 alone, the global potential income loss from labor capacity reduction due to extreme heat was US$ 1.09[120], highlighting the growing toll of extreme heat on both public health and the economy.

Salt Lake City ranks among the top three metropolitan areas in the U.S.—alongside Miami and Louisville—for urban heat island (UHI) intensity[121]. The urban heat island effect measures the temperature difference between urban areas and their surrounding rural regions, highlighting the impact of human-made features on local climate. Factors such as dark surfaces like roads and rooftops, waste heat from vehicles and air conditioning, the trapping of warm air between buildings, and limited vegetation all contribute to elevated urban temperatures. The extent of impervious surfaces and the lack of vegetation are two of the strongest predictors of UHI intensity[122]. Lack of vegetation reduces natural cooling by shading and evapotranspiration, and impervious surfaces absorb and retain heat, both intensifying local temperatures. The SLC MSA is above the 75th percentile nationally for vulnerability due to its high percentage of impermeable surfaces[123], making it especially prone to the effects of urban heat.

Rising temperatures in the SLC MSA are not impacting all residents equally. Vulnerable populations—particularly low-income communities—are disproportionately affected by extreme heat (Figure 34). As of 2024, 55% of low-income census tracts experience severe heat and temperatures above the city average, compared to 42% of non-low-income tracts[124] (Appendix C). These disparities are closely linked to environmental conditions. Low-income neighborhoods in the Salt Lake County have significantly less tree cover, averaging only 15%, while medium to high-income areas average 19%[125]. For Tooele County there is no disparity between income groups, having in all cases 1 or less trees per person[126]. These communities also tend to have a higher concentration of impervious surfaces, which absorb and retain heat, intensifying local temperatures and potentially increasing ozone. Forty percent of low-income census tracts in the area fall above the 80th percentile nationally for impervious surface coverage[127] (Table 8). As a result, low-income communities in SLC MSA face heightened vulnerability to the health and environmental impacts of rising temperatures and more frequent heat waves.

Winter temperatures in the region are steadily rising, causing snowpack to melt and evaporate earlier in the year, reducing the amount of water that ultimately reaches the reservoirs[128]. Since much of Utah's water supply depends on snowpack and its gradual melt, this shift has serious implications. A slow, sustained release of snowmelt is essential for maintaining streamflow and supporting ecosystems throughout the growing season. When snow melts too early, less water is available during the hot, dry summer months, disrupting natural cycles. Native grasses and wildflowers may emerge prematurely, which can alter the timing of animal migrations and hibernation. Subalpine tree species may begin shifting upslope, shrinking alpine tundra habitats and threatening species uniquely adapted to high elevations. Warmer stream temperatures also endanger cold-water fish, such as the native cutthroat trout. Warmer and drier conditions caused by earlier snowmelt stress forests, making them more vulnerable to pests like bark beetles[129].

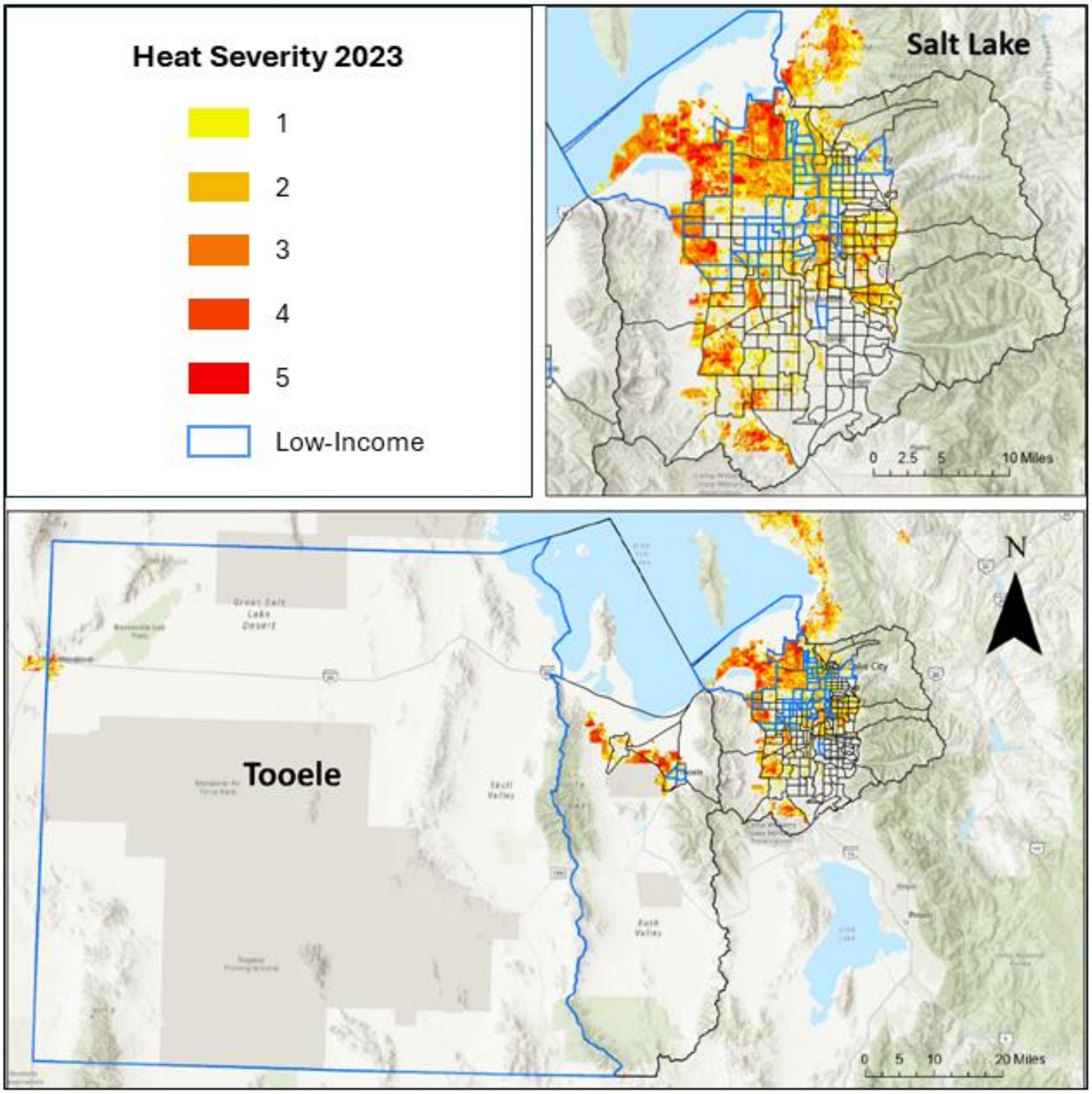


Figure 34. Heat severity in Salt Lake and Tooele Counties. Severity is measured on a scale of 1 to 5, with 1 meaning an area is slightly above the mean temperature for the county and 5 meaning an area is significantly above the mean for the county. Source: The Trust for Public Land[130].

9.4 Drought

Drought has become a long-term challenge in the southwestern U.S. Over the past two decades, increasing temperatures have intensified the atmosphere's evaporative demand or its capacity to store water[131], fueling what experts refer to as a megadrought—the driest period in over 1,200 years[132]. Since 2000, the 2 counties have experienced drought conditions during 71% of the weeks across at least part of its area, with Tooele experiencing longer periods of extreme or exceptional drought (Figure 35)[133]. During the 2020-2022 drought, evaporation accounted for 61% of the drought's severity, while reduced precipitation only accounted for only 39%[134].

Rising winter temperatures are expected to shift winter precipitation from snow to rain, leading to reduced snowpack levels[135]. While the winters of 2022–2024 brought above-average snowfall, long-term data since 2000 shows a declining snowpack trend; a pattern projected to continue[136]. Additionally, the continued shrinkage of the Great Salt Lake is expected to weaken the "lake effect," which generates localized snowbands responsible for some of the region's heaviest snowstorms. This poses a significant threat to Utah, where the population, economy, and water supply are heavily dependent on consistent, seasonal snowfall.

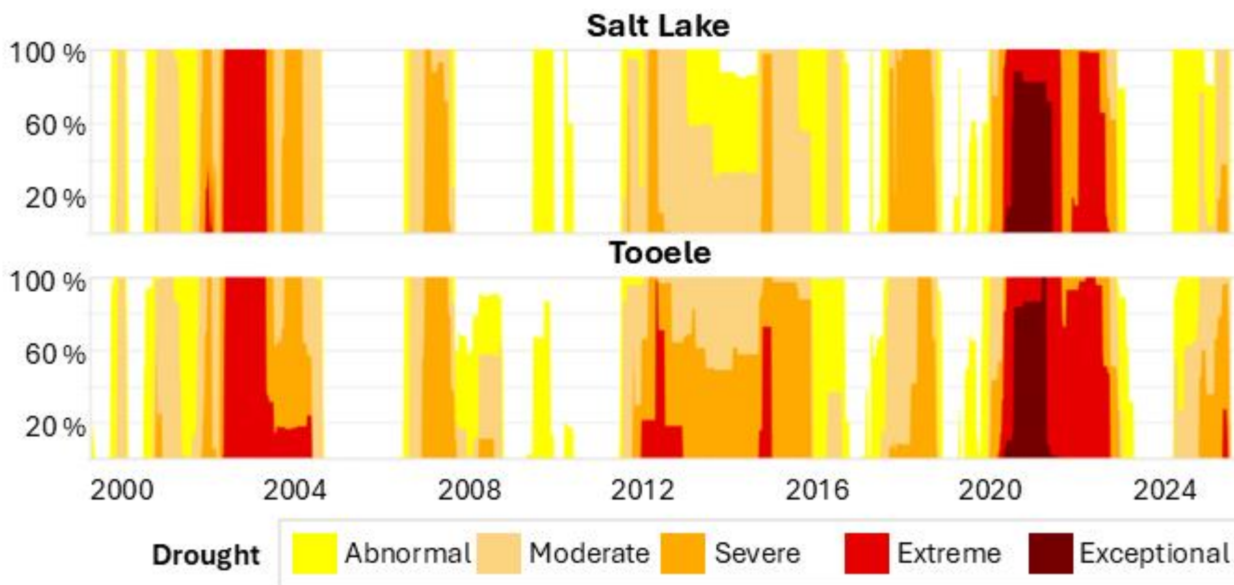


Figure 35. Weekly percentage area of the Salt Lake and Tooele Counties experiencing drought from 2000 to 2025. Source: U.S. Drought Monitor.

Projections from the 2025 Water Conservation Plan for Salt Lake City show that water demand in 2060 could exceed supply by 14% if no additional conservation is achieved, partly due to population growth[137]. Within all the potential risks identified, impacts from climate change bring the widest range of variables, potentially impacting both water supply and demand projections. Beyond water scarcity, droughts also cause widespread environmental, social, and economic disruptions, including habitat loss, wildfires, reduced crop yields, and threats to public health and safety.

Climate-driven aridification, combined with water diversions for human use and ongoing challenges related to farmers' water rights, have exposed large portions of the Great Salt Lake's lakebed[138]. Dust emissions from the lakebed are raising public health concerns. The lake's sediments contain fine particulate matter (PM2.5) and toxic heavy metals such as arsenic, mercury, and lead—pollutants that have accumulated over centuries of industrial activity[139,140]. As winds blow across the dry lakebed, these contaminants can be transported into nearby communities, posing serious health risks. This threat is especially acute for minority populations, including Hispanic and Pacific Islander communities in northern Salt Lake City, who will be disproportionately exposed[141]. Additionally, low-income neighborhoods in Salt Lake County are already vulnerable to air pollution, with over 60% of low-income census tracts ranking above the 90th percentile for asthma prevalence[142].

The shrinking lake could also worsen regional drought, as much of the Wasatch Front's precipitation is generated by weather systems that form over the lake[143]. The ski industry, a cornerstone of Utah's winter economy, is highly vulnerable to declining snowpack caused by ongoing drought. In the 2022-2023 ski season, visitors spent $1.94 billion dollars on skiing, which brought in $197 million dollars in state and local tax revenue[144]. In addition, the brine shrimp industry could face annual losses of up to $67 million if the Great Salt Lake remains at unhealthy levels[145]. The mineral extraction sector is also at risk, with potential losses exceeding $1 billion and more than 5,000 jobs if lake conditions continue to deteriorate[146] (Parker, Daniels, Allen, & Doerner, 2022). The lake also serves as a vital habitat for more than 10 million migratory birds, representing 338 species—many of which rely on brine shrimp that live in the lake (Kropelnicki, 2024). As water levels drop, salinity increases, endangering the survival of brine shrimp and, in turn, the birds that depend on them (Malmquist, 2022).

The hydrology of the Great Salt Lake is complex. Rising temperatures and a two-decade-long drought in Utah have led to low soil moisture and depleted groundwater levels. Since snowmelt first replenishes groundwater, less runoff has been reaching lakes and reservoirs, including the Great Salt Lake (Brooks, 2025). This partly explains why, despite a heavy snow year in 2023, streamflow and flooding were not record-breaking, and the lake's water levels did not rise significantly (Potter, 2024). As water levels stay low, surrounding wetlands continue to shrink, degrading habitat quality. This creates favorable conditions for invasive species like Phragmites australis to outcompete native plants, reducing biodiversity and threatening the birds and wildlife that depend on these ecosystems.

9.5 Precipitation and Flooding

Precipitation in the Salt Lake and Tooele Counties is projected to increase by 0.3-0.7 inches by 2050[147]. However, expected increases in precipitation will be overwhelmed by rising temperature and evaporation[148]. However, rising temperatures in the region are contributing not only to increased evaporation and prolonged dry spells, but also more intense and short-duration rainfall events, as warmer air holds more moisture. These heavy downpours can overwhelm stormwater systems and trigger floods. Heavy storms and saturated soils also significantly increase landslide risk in Salt Lake City due to the steep Wasatch Range slopes and unstable, water-sensitive geologic materials[149], with mudslides posing especially severe threats due to their speed and destructive force. Additionally, the region faces increased vulnerability to power outages during storms, with high winds, lightning, and heavy snow already causing widespread disruptions in recent years.

Warmer winter temperatures are arriving earlier, causing more precipitation to fall as rain instead of snow. This shift accelerates snowmelt and increases spring runoff[150]. Dust from exposed areas like the Great Salt Lake lakebed further speeds up melting by darkening the snow surface, increasing heat absorption, and shortening the snow season by up to two weeks[151]. As a result, the mountain snowpack melts more rapidly, reducing its function as a natural water reservoir. Rapid snowmelt can overwhelm rivers, streams, and stormwater systems, increasing the risk of flooding. It also leaves less time for water to soak into the ground, resulting in drier soil later in the summer and higher wildfire risk[152].

Salt Lake and Tooele Counties are ranked as having a major to moderate flood hazards, respectively[153]. They face a high risk of flooding due to a combination of natural and human-made factors. Intense, localized cloudburst storms—with rainfall rates exceeding 3.9 inches per hour—can trigger sudden flash floods[154]. Shallow groundwater in some areas, combined with heavy precipitation, can raise the water table and cause flooding[155]. The region's steep mountain slopes, and snowmelt further contribute to runoff and flooding[156]. Prolonged droughts leave soil dry and compacted, reducing their ability to absorb rain and increasing surface runoff[157]. Urban development has also intensified flood risks, with many neighborhoods built along natural waterways and floodplains now constrained by narrow canals and impermeable surfaces like concrete and asphalt.

While recent flooding caused by record-setting rainfall overwhelmed local storm drains and flooded Salt Lake City's residential areas, it did not reach the scale of the Salt Lake City's historic 1983 flood. That year, a rapid spring thaw following record snowpack led to catastrophic flooding, turning streets into rivers[158]. The reduced impact of the recent event is partly due to major infrastructure improvements made in the aftermath of 1983, including widened creek and riverbeds, expanded storm drains, and new reservoirs to manage runoff. While further system upgrades are planned, additional improvements are needed to handle increasingly extreme weather[159]. Long-term initiatives include a 100-year plan to daylight buried creeks[160] and reduce impervious surfaces through green infrastructure such as rain gardens and permeable pavement[161].

By 2050, areas along the Jordan River, next to the Great Salt Lake, and at the base of the Wasatch Mountains are projected to face the highest flood risk (Figure 36). On average, 21% of properties in the area are at risk of flooding in the next 30 years[162], highlighting the vulnerability of a significant portion of the buildings. Flooding in 30 years will affect low-income communities in lower proportion (30% of census tracts), compared to 40% of more affluent census tracts (Appendix C).

Flooding remains the most frequent, costly, and destructive natural hazard in Utah on an annual basis[163]. Since 1923, 16 major flood events have caused over $1.3 trillion in damage[164]. The 1983 flood alone resulted in $102.4 million in property damage (adjusted to 2017 dollars) and injured 12 people. Since 1847, flood-related hazards have claimed at least 101 lives—80% from floods and flash floods, 15% from debris flows, and 5% from dam or water infrastructure failures[165]. Despite these risks, only 3% of Utahns carry flood insurance, even though just one inch of water can cause up to $25,000 in home damage[166]. Rising levels of the Great Salt Lake—if they reach 4,210 feet—could also threaten critical infrastructure[167]. Water damage can escalate quickly, leading to mold, warped floors, and structural issues. Prolonged exposure to damp indoor environments and mold is also linked to respiratory illnesses such as asthma.

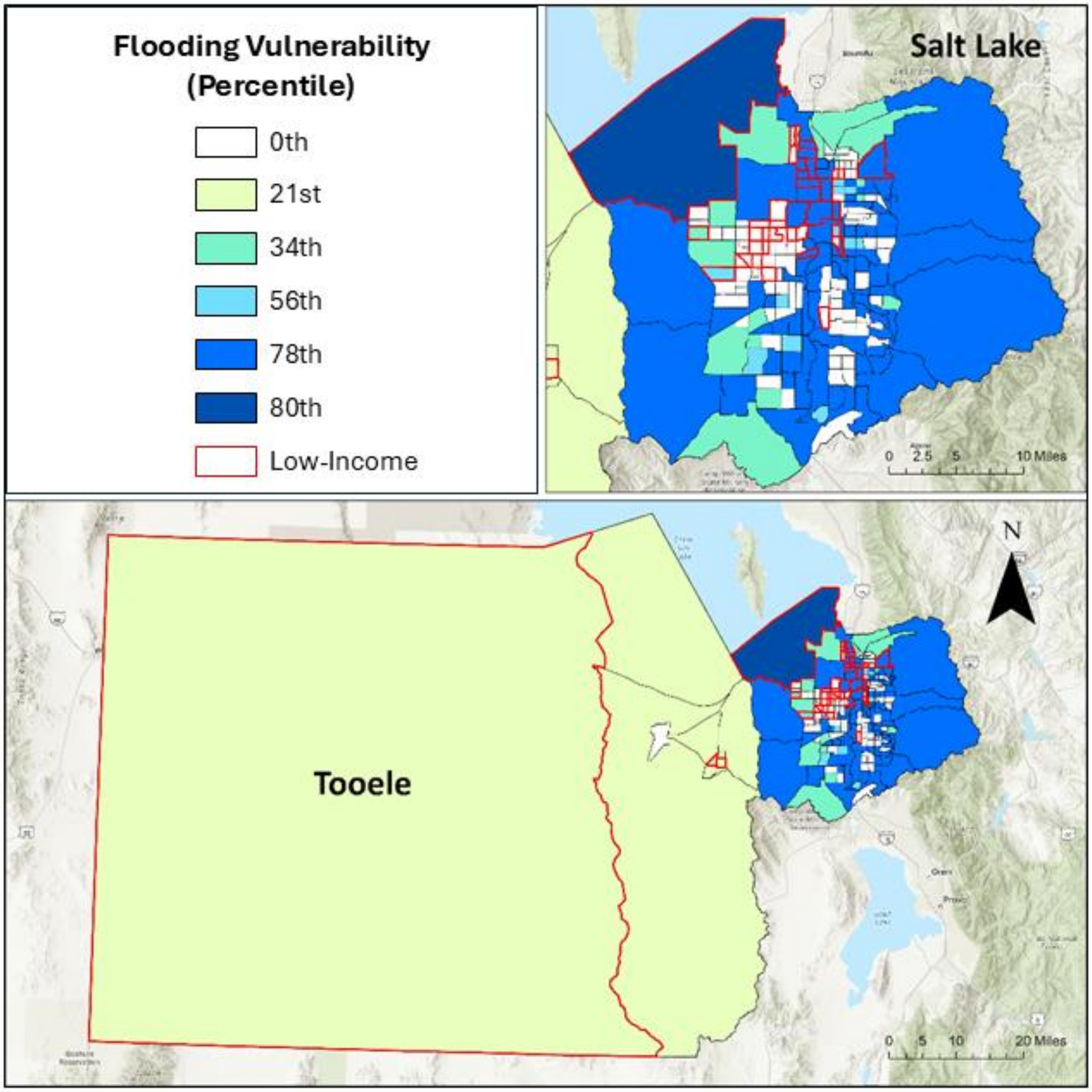


Figure 36. Future flooding risk in Salt Lake and Tooele Counties measured by how floods could change from the past to 2050. Source: The U.S. Climate Vulnerability Index.

9.6 Wildfires

Salt Lake and Tooele Counties face a higher wildfire likelihood than 93% to 100%, respectively, of U.S. communities[168], primarily due to their proximity to vast, dry wildlands that provide ample fuel, along with hot, dry summers, and frequent winds. The areas' topography contributes to the high likelihood, as fire travels uphill. Wildfire represents major to severe risk in the area, with 52% of all Salt Lake County properties having some risk of being affected by wildfire over the next 30 years. Meanwhile Tooele has a much higher risk, with 98% of all properties at risk[169]. The highest wildfire threats are concentrated in neighborhoods in the foothills and adjacent to wildland areas, which span 31 census tracts (Figure 37, Appendix C). Continued development in foothill and mountain areas places more people and homes in high-risk zones.

Wildfire risk in Utah varies from year to year, influenced by factors such as vegetation fuel loads, snowpack levels, precipitation, soil moisture, and temperature. Once a fire ignites, its spread is driven by vegetation, topography, and weather conditions[170]. Significant changes in both the length and severity of wildfire seasons began around 1970 in the western U.S. In the Southwest, the area burned increased by 668% in the 1990s and by 1,266% in the 2000s[171]. In Utah, the fire season lengthened from 82 days in the 1970s to 182 days in the 2000s, and the average burn duration rose from 3 to 41 days[172]. These trends are expected to continue as temperatures rise and droughts become more frequent[173]. The projected increase in wildfire risk is largely due to earlier spring onset, earlier snowmelt, and declining seasonal snowpack, all of which contribute to a longer fire season[174]. However, over half of the annual wildfires in Utah are human caused[175], which means that most wildfires are preventable and that public education is critical.

While some of the Salt Lake County urban areas are less likely to face direct wildfire damage, smoke travels across the valley, impacting all communities. The main concern is PM2.5, a fine particulate matter linked to serious health risks, along with carbon monoxide, volatile organic compounds, nitrogen oxides, and ozone[176]. Although the region has recently improved its PM2.5 levels after years of non-compliance with federal standards, increasing wildfire smoke threatens this progress[177]. By 2050, the region is expected to rank slightly above the 80th percentile nationally for PM2.5 vulnerability[178]. The Salt Lake City MSA is also non-attainment area for ozone and ranks 9th worst in the U.S. for ozone pollution[179]. These pollutants contribute to respiratory issues, heart and lung diseases and premature death, as seen in California, where wildfire smoke was linked to over 50,000 premature deaths between 2008 and 2018[180].

Although wildfire smoke spreads across the Salt Lake Valley, its impact is not felt equally. Exposure varies based on proximity to fire-prone areas, weather patterns, and the ability to afford protective measures. Certain demographic groups—particularly low-income communities—are more vulnerable to the health effects of smoke, compounding existing environmental and health disparities. These communities often live in less airtight homes, lack access to costly air purifiers, and face barriers to healthcare despite higher rates of respiratory illnesses like asthma[181]. As a result, wildfire smoke is likely to disproportionately affect low-income populations.

Wildfires carry substantial economic costs, including damage to property and infrastructure, business interruptions, supply chain disruptions, and rising healthcare and insurance expenses. They can also harm food production and drive-up prices and negatively impact tourism and recreation. Recovery and rebuilding efforts further strain state and local budgets. Overall, the annual economic toll of wildfires in the U.S.—including losses from property damage, health impacts, watershed degradation, and insurance payouts—is estimated at $394 to $893 billion[182]. Wildfires are also expensive to suppress, with each ignition averaging $29,600[183]. The 2024 Sandhurst Fire in Salt Lake City cost $980,000 to contain[184].

Wildfires can also significantly impact water quality and reservoir operations. When forested areas burn, the loss of vegetation and soil stability increases runoff, carrying debris, sediment, excess nutrients, and heavy metals into water sources. This can strain treatment systems, increase sedimentation in reservoirs, decrease water quality, and raise treatment costs[185]. Wildfires may also directly damage water infrastructure—such as pipes, dams, and treatment facilities—disrupting service.

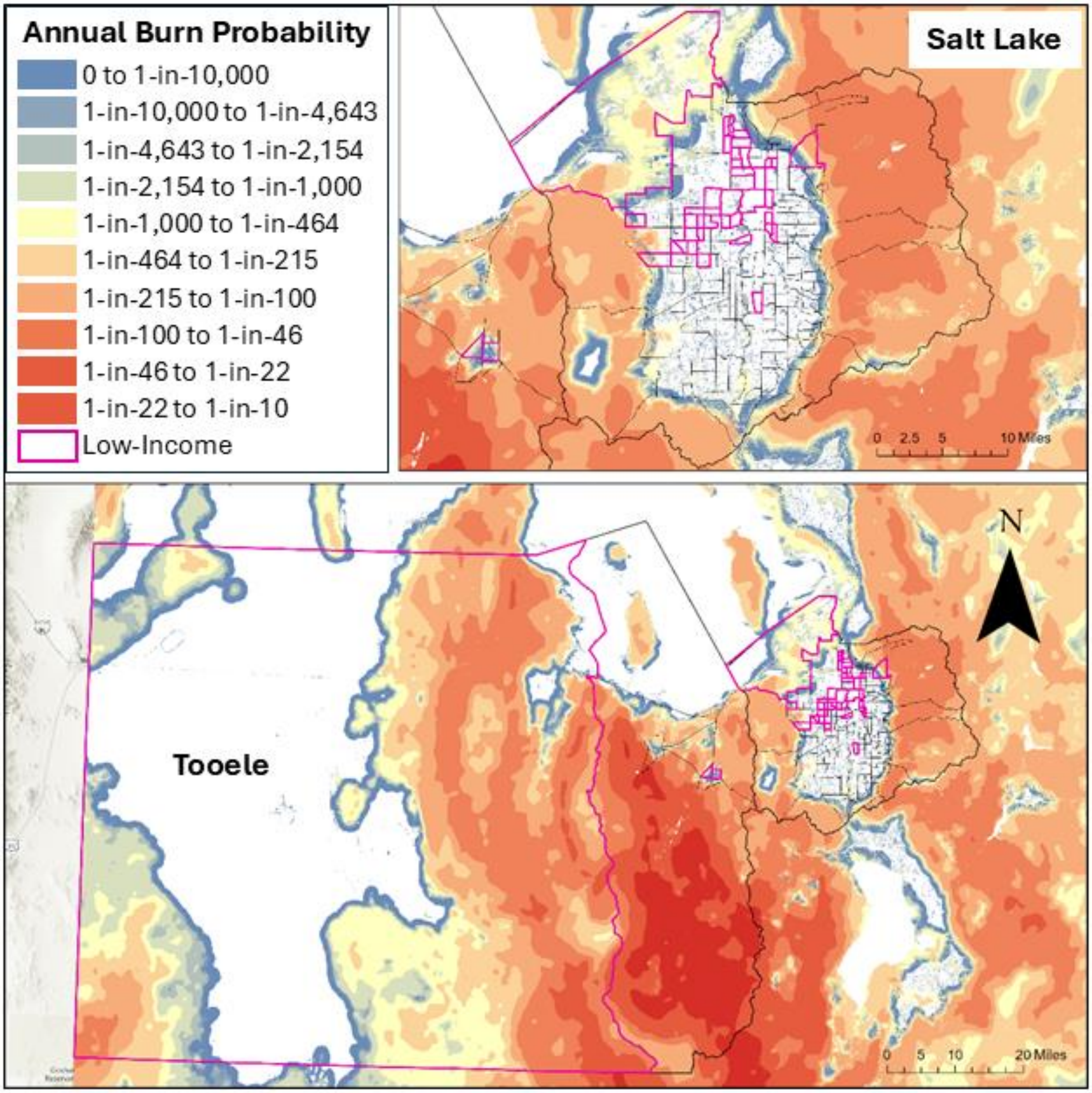


Figure 37. Current annual wildfire burn probability in Salt Lake and Tooele counties. Source: U.S. Forest Service.

9.7 Great Salt Lake

The Great Salt Lake in northwestern Utah is the largest saltwater lake in the Western Hemisphere and is a critical wetland habitat for the Intermountain West. Positioned in the lowest part of the Bonneville Basin, it is the last remaining remnant of ancient Lake Bonneville. The lake spans five counties—Box Elder, Davis, Tooele, Weber, and Salt Lake—and receives water from the Bear, Jordan, and Weber Rivers[186]. Between 1989 and 2018, the Bear River provided nearly half (49.9%) of the lake's natural inflow, followed by the Jordan (24.5%), Weber (19.8%), and West Desert (5%)[187]. Water levels have fluctuated historically, averaging 4,198.6 feet (1903–2022), with a high of 4,210.4 feet (1987) and a record low of 4,190.1 feet (2022). Currently, the lake sits at 4,191 feet—7 feet below the healthy threshold—leaving 54% of the lakebed exposed[188]. Human water consumption accounts for 67–73% of the decline, with natural variability and climate-driven evaporation contributing 15–23% and 8–11%, respectively[189]. On average, since 1991, water consumption from agriculture has accounted for 64.5% of water depletion, while municipal/industrial, and mineral extraction for 17.7% and 8.2%, respectively, of water depletion.

Declining water levels in the Great Salt Lake are having serious ecological impacts, particularly on migratory birds. Each year, 10–12 million birds from over 330 species stop at the lake to feed and rest. It supports 50–90% of North America's eared grebes and over one-third of the world's Wilson's phalaropes[190], which rely on brine flies and shrimp that thrive in the lake's salty waters. The lake also supports 80% of Utah's wetlands, home to 123 unique plant species[191]. As water levels drop, salinity rises—threatening the lake's food web and bird populations[192]. Invasive Phragmites australis are also spreading, displacing native plants, consuming 60,000–100,000 acre-feet of water annually, and blocking water flow into the lake[193]. A Utah Geological Survey study identified land use change, invasive species, and soil metals as major threats to wetland health[194]. While wetlands typically filter pollutants, metals like selenium and arsenic can accumulate in the food chain and harm birds.

The ongoing exposure of the Great Salt Lake's dry lakebed is not only a threat to air quality and public health, but also a growing source of greenhouse gas emissions. In 2020, the lakebed released an estimated 4.1 million tons of greenhouse gases—94% carbon dioxide and 6% methane—potentially increasing Utah's anthropogenic emissions by 7%[195]. This is due to soil drying, cracking, and increased microbial activity, which release carbon stored deep in the soil. Emissions peak in summer when temperatures exceed 25°C and are expected to rise as Salt Lake City continues to warm[196,197]. Historically, the lake was not a source of emissions, but its current output is comparable to global averages from 196 lakes[198]. The Great Salt Lake's emissions surpass those of California's Salton Sea, due to its much larger exposed lakebed. If the lake were to fully dry up, it could emit 7.1 million tons of greenhouse gases annually[199]. These emissions would further intensify climate impacts like drought and extreme heat, creating a dangerous feedback loop.

Preventing the Great Salt Lake from reaching a critical tipping point requires urgent action to commit conserved water and restore wetlands. Coordination is complex, involving 10 state agencies and multiple municipalities, as well as interstate collaboration due to the Bear River's path through Idaho and Wyoming. The Great Salt Lake Strike Team recommends setting a target elevation range, and Governor Cox has committed to restoring the lake to a healthy level by the 2034 Olympics[200],[201]. Reaching this goal would require an additional 5 million acre-feet of water. Proposed strategies include agricultural water optimization, water banking and leasing, and revising municipal and industrial water pricing. These efforts depend on widespread public support and behavioral change. Other solutions include creating new wetland preserves to combat invasive phragmites and reduce dust. In 2025, the Great Salt Lake Rising coalition and Ducks Unlimited each pledged $100 million toward restoration[202]. Continued investment and collaboration are essential for a healthier lake and community.

10. Workforce Planning Analysis

10.1 Introduction

The U.S. is undergoing a major clean energy transition driven by ambitious policies, technological innovation, and supportive government investment. This shift is not just about replacing fossil fuels—it represents a fundamental restructuring of the nation's energy systems, requiring new power plants, transmission lines, modernized buildings, and design of more resilient communities. To achieve this vision, a large and skilled workforce is essential, as the transition is projected to create over 25 million jobs in the next 15 years. Already, solar and wind roles rank among the fastest-growing occupations in the country[203].

However, the current labor market faces significant challenges. Many infrastructure and construction workers are aging and retiring at rates far above average, and these sectors remain dominated by older, white males[204]. Demographic shifts and declining interest among younger generations exacerbate the problem: applications for skilled trade jobs have dropped nearly 50% since 2020[205], and analysts forecast a growing shortfall, with a 500,000-worker gap in construction projected for 2023 alone[206]. Addressing these gaps will require systemic changes in workforce development and recruitment strategies. Without intervention, the U.S. risks severe shortages in critical trades like plumbing, electrical work, and construction, threatening progress on clean energy goals.

The Salt Lake City MSA is uniquely positioned to lead the clean energy transition. Nearly half of Utah's clean energy jobs—primarily in energy efficiency—are concentrated in Salt Lake County. The region boasts a strong, resilient economy, consistently ranking among the best U.S. metros for job and wage growth, supported by pro-business policies, low taxes, and collaboration across sectors. With low unemployment, rising wages, and a young, educated workforce, the SLC MSA also serves as a major tech hub and innovation center anchored by institutions like the University of Utah and Intermountain Healthcare.

The region is already advancing through initiatives like the Utah Renewable Communities Program, which aims for net-100% renewable electricity across 19 local governments, and large-scale projects such as the 80-megawatt Elektron Solar Project. Abundant renewable resources—solar, wind, and geothermal—

alongside progressive policies like energy benchmarking, electrified fleets, and residential solar support further strengthen its position. In 2022, Utah ranked 10th nationally for the share of its workforce in green jobs, with 2.7% (about 43,000 jobs) in clean energy—though nearly 70% are tied to ENERGY STAR® appliance manufacturing[207].

Utah's clean energy sector has grown in recent years (3.1% in 2022), but at a pace slightly slower than the national average (4%)[208]. While clean energy workers earned 25% more than the national average in 2020, wages still trail those in fossil fuel industries in the U.S. due to stronger union representation in traditional energy sectors, leaving workers with less bargaining power[209]. Workforce demographics also reveal significant gaps: only 11% are under 24, 19% are women, and 30% are people of color, highlighting a lack of diversity. As the green economy expands, the challenge lies in balancing sustainable energy advancements with fair wages, job security, and equitable working conditions.

To address these challenges, SL-CLEAR conducted a regional workforce analysis to benchmark current capacity, forecast workforce needs, and identify occupational shortages related to greenhouse gas reduction measures. These efforts aim to align workforce development with climate goals, ensuring the region not only meets clean energy targets but also builds an inclusive, skilled labor force for long-term sustainability. Recommendations include targeted training programs, certification pathways, and partnerships outlined in Appendix D of the report.

10.2 Benchmarking the Regional Workforce

GHG reduction measures with the most significant workforce needs were prioritized based on scale of emissions reductions and two other main criteria: their potential impact on labor demand across occupations and the timing of expected need for workforce interventions and support (timing ramp up in Table 9). This prioritization reflects the expected scale of workforce impact, from significant changes requiring substantial support to minimal or no immediate need for intervention.

Table 9. Prioritization of GHG reduction measures based on impact and expected timing ramp up on labor demand.

GHG Category	GHG Measure	New Workforce Priority	Impact / Timing Ramp Up
Buildings	Energy Efficiency	High	High / High
Buildings	Building Electrification	High	High / High
Electricity	Solar PV	High	High / High
Transportation	Electric Vehicles	High	Moderate / Moderate
Electricity	Electric Grid	High	High / Moderate
Waste	Waste Diversion	Medium	Moderate / Low
Natural Lands	Tree Canopy and Urban Forests	Medium	Moderate / Low
Transportation	Active Transportation (trades)	Low	Low / Low
Varies	Waste, industry, and other measures	Limited or N/A	Limited or N/A

Table 10 lists occupations needed to support the measures detailed in the preceding table. These are utilized in upcoming sections to analyze baseline and forecasted workforce impacts.

Table 10. List of occupations categorized by GHG reduction measure.

GHG Measure	Focus Occupations
Energy Efficiency and Electrification	• Electricians • HVAC Tech • General construction and infrastructure • Management • Plumber • Energy auditors
Solar Photovoltaic (PV)	• PV installers • Electricians with PV and energy storage certifications • PV and energy construction • Battery technicians
Electric Vehicles	• EV Tech • Electrician • Battery technicians
Electric Grid	• Engineers • Power line installers and technicians • Electricians
Waste Diversion	• Drivers
Tree Canopy and Urban Forests	• Apprentices and pre-apprenticeships
Active Transportation (trades)	• General construction and infrastructure

Table 11 lists current workforce size, annual worker demand and projected demand growth for the next 5 years for certain key occupations important to implementation success of the GHG measures. Statistics were derived from federal agencies and surveys such as those conducted by the U.S. Bureau of Labor Statistics and only reflected occupational categories reported. As such, not all focus occupations listed in the table above are included.

Table 11. SLC MSA regional workforce baseline and annualized growth estimates.

Occupation	2024 Workforce Size	Annual Worker Demand	Annualized Growth in Demand (5-years)
Heavy vehicle drivers (apprentice)	12,704	1,481	1.1%
General construction / infrastructure	8,705	1,271	5.8%
Electrician	5,004	676	4.2%
HVAC technician	2,686	421	5.6%
Plumber	2,785	329	3.1%
Front-line supervisors	2,730	291	2.5%
Solar PV installer	270	69	12.8%

Electric vehicle service (EV) technicians were also evaluated using separate datasets as this occupation is not separately defined by some of the federal surveys and resources. Initial analysis suggested a need of nearly 500 EV technicians by 2030, growing to over 2,500 later that decade as electrified solutions become a dominant mode of vehicle transportation.

Tree canopy and urban forestry experts and related workforce is another occupational group that was difficult to quantitatively assess but is important for local climate solutions. This includes both mitigating GHGs and enhancing local resiliency to heat through a robust and healthy urban forest environment. Given its importance, this occupational group should be included when evaluating next steps and solution implementation across the SLC MSA.

10.3 Occupational Forecasts and Projected Gaps

This section examines the scale of need for new labor and enhanced training for occupations serving the SLC MSA. A 2030 demand scenario for key occupations is presented in Table 12 based on anticipated workforce needs to begin meeting GHG measure targets. Within each of the occupations identified, training should prioritize clean energy technology and low-to-no pollution outcomes. Examples would be clean, electrified solutions for drivers and technicians and priority technologies such as heat pumps for the HVAC and plumbing trades.

Table 12. SLC MSA regional workforce baseline, growth forecast, and gaps.

Occupation	2024 Workforce Size	2030 Workforce Demand	Gap Between 2024 Baseline and 2030 Demand
Heavy vehicle drivers (apprentice)	12,704	13,437	733
General construction / infrastructure	8,705	12,159	3,454
Electrician	5,004	6,345	1,341
HVAC technician	2,686	3,677	991
Plumber	2,785	3,322	537
Front-line supervisors	2,730	3,149	419
Solar PV installer	270	539	269

10.4 Qualitative Evaluation of the Regional Workforce Landscape

A qualitative evaluation of the regional workforce landscape was also completed through research and engagement efforts as detailed in Section 3.2.4. This regional assessment was complemented by a literature review of numerous studies and workforce support models from across the U.S. Both the local assessment and broader scan of best practices informed the following strengths and weaknesses for the SLC MSA.

Strengths:

- Strong Utah Higher Education System (USHE) institutional ecosystem with 11 regional workforce certification programs of varying types (18 statewide)
- Talent Ready Utah: a statewide workforce development program working within the USHE system
- Relevant workforce certifications at the following higher educational institutions: University of Utah, Utah State University, Salt Lake Community College, and Weber State University (see Appendix D for more details)
- University of Utah – Resilient Energy Engineering
- Utah State University – Advancing sustainability through Powered Infrastructure for Roadway Electrification (ASPIRE), with pathway partners
- Solar Installation, Energy Management, and related mature programs at Salt Lake Community College
- Weber State University – The National Center for Automotive Science and Technology (NCAST) supports hybrid vehicles and EV solutions, among other technologies.
- Mature Industrial Assessment Center (IAC) at the University of Utah, capable of running building efficiency assessments and training new professionals; new IAC center awarded at Weber State University (with a planned focus more on teaching than assessments)
- Low regional unemployment and strong overall economic
- Unified city school district, with a strong secondary Career Technical Education (CTE) program and existing model for industry partnerships

Weaknesses

- Limited regional funding for clean energy and GHG reduction workforce development; limited higher education and state funding for skilled trades workforce development
- Overall regional green workforce coordination, pathing, and partnership is mostly absent
- Low community awareness of green jobs as fast-growing and potentially higher paying opportunities
- Limited workforce studies at state or regional level on the key trends, gaps, and potential solutions
- No mid- or long-term resources for implementation

10.5 Recommendations

The evaluation of strengths and weaknesses, combined with quantitative analysis of the workforce environment in the SLC MSA, informed the following key considerations and guiding principles for a workforce strategy and partner-led approach in the region.

Measured Green Job Growth: Accelerating green technology certifications and training without also increasing demand for these occupations can contribute to wage deflation and poor employment rates. Many experts recommend starting with broad occupational certifications and training to ensure new workers have attractive, well-rounded skillsets and complement this with more specific green certifications.

Durable and Consistent Approach: Programs that support consistent, sustained progress are better local labor markets than aggressive, short-term programs and projects. Similarly, overtraining or over-supplying certifications or labor for key trades could be harmful.

High-Road Jobs: Many studies indicate little-to-no impact in project costs when policies supporting "high road" jobs are enacted. According to the National Renewable Energy Laboratory, labor accounts for roughly 23 percent of total industry project costs on average and just 11% percent of solar projects. Wage increases to support workforce could have minimal impact on construction costs, even before accounting for improved productivity with enhanced training.

Broader Benefits: There are broad economic benefits to clean energy investments. For example, economic modeling in Colorado supported by Inclusive Economics projected that for every 100 direct jobs created due to decarbonization activities another 92 to 97 jobs would be created in the broader economy.

To inform the workforce analysis, the SL-CLEAR project team organized and hosted several community events, plus targeted engagements with workforce industry stakeholders, that solicited input on workforce priorities and needs. These events confirmed a high degree of enthusiasm for sustained engagement on climate and clean energy workforce needs in the SLC MSA. The convenings also informed a vision for how and who to convene on immediate next steps for workforce solutions.

10.6 Next Steps and Partners for Regional Workforce Solutions

The following steps provide a framework for potential workforce action at the regional level. These steps should be investigated further and pursued through an iterative process that prioritizes needs and resources over time.

1. **Build on the Climate and Energy Workforce Lab convening to launch a regional advisory group to forecast demand and align training.** Workforce development requires close collaboration between industry, education, government, and community. An initial recommended step is to establish a standing advisory group or, at a minimum, a regularly convened informal collaborative network. This group should include representatives from the labor sector, private firms, training and education partners, utilities, governments, and community-based organizations.
2. **Build a durable partner network.** Sustainable workforce development requires a wide-ranging network of partners, each contributing specific expertise. Employers, unions, and others provide certain training

infrastructure while colleges and technical schools add classroom instruction and accreditation. Municipal agencies bring a vision, policy, and programmatic resources while community-based organizations can supply wraparound services such as childcare, transportation, and mentorship, for participants. Numerous national case studies and program examples are available to inform local efforts in the SLCA MSA.

3. **Create a grant and funding coalition to launch pilots and other programs.** Local partners will need to identify funding and ensure there is dedicated staff support to pursue financial resources by cultivating partnerships and writing grants. This funding objective should be a high priority in the near term for any new regional workforce effort.
4. **Design programs around recognized credentials.** Any program launched should be anchored in widely recognized pathways and credentials and be informed by forecasts, advisory forum input, and regional training program capacity. An initial review of relevant certifications for the Salt Lake City region is included in Appendix D.
5. **Raise awareness of high-growth, high-opportunity pathways.** While apprenticeships provide paid, debt-free training awareness of these opportunities remains limited and this was emphasized in our community listening session. Many residents who could benefit from such programs yet remain unaware of related opportunity pathways into these jobs. A regional strategy must therefore include outreach that builds awareness, trust, and clarity of the opportunities for a broad base of residents seeking new opportunity.
6. **Elevate job quality, opportunity, and holistic support.** Workforce development succeeds only when programs address real barriers that cause attrition. Transportation, childcare, equipment costs, and academic preparedness can prevent otherwise capable candidates from starting or finishing programs, as noted in our community listening sessions. Budgeting for supportive resources and programs will be essential as programs scale and support underserved areas and community members.
7. **Leverage procurement and policy levers.** Local governments and other organizations harbor much power with their procurement authority. By embedding workforce goals into contracts, these organizations can

ensure that their projects generate predictable demand for apprenticeships and provide fair wages to workers.

8. **Build transparent data-driven tools to guide success.** Public dashboards can provide transparency into goals, progress, and emerging opportunities for stakeholders and the community at large. Importantly, these data systems must be flexible for regular updates to reflect the changing nature of climate and clean energy job markets and forecasts. Envisioning and supporting such a dashboard, or other online tool, could be a key task of the regional advisory board.

Research and engagement conducted for the SLC MSA CCAP has crystalized the need for a new and sustained focus on climate and clean energy jobs in the metro region. The above recommendations and analysis provide an initial foundation for follow-through work and partnership formation. Leadership of these efforts is still to be determined, but project partners are hopeful that next steps can be catalyzed in 2026 and beyond.

11. STATUS REPORT

The EPA CPRG planning grants require that a status report be published four years from grant award date, which would be in August 2027 for the SLC MSA. Per EPA, the status report must:

1. Identify next steps that the grantee expects to take to continue implementation of its CCAP following closeout of the CPRG planning grant;
2. Identify those actions and measures that the applicant would hope to pursue if additional funding were made available; and,
3. Provide a detailed budget, complete with a description of any staffing needed, that would be required to execute the next steps detailed in the plan.

Salt Lake City and the SL-CLEAR project team will deliver a status report in 2027 with these details. In the meantime, stakeholders can access all published reports and documents, plus sign up for updates, on the SL-CLEAR website.

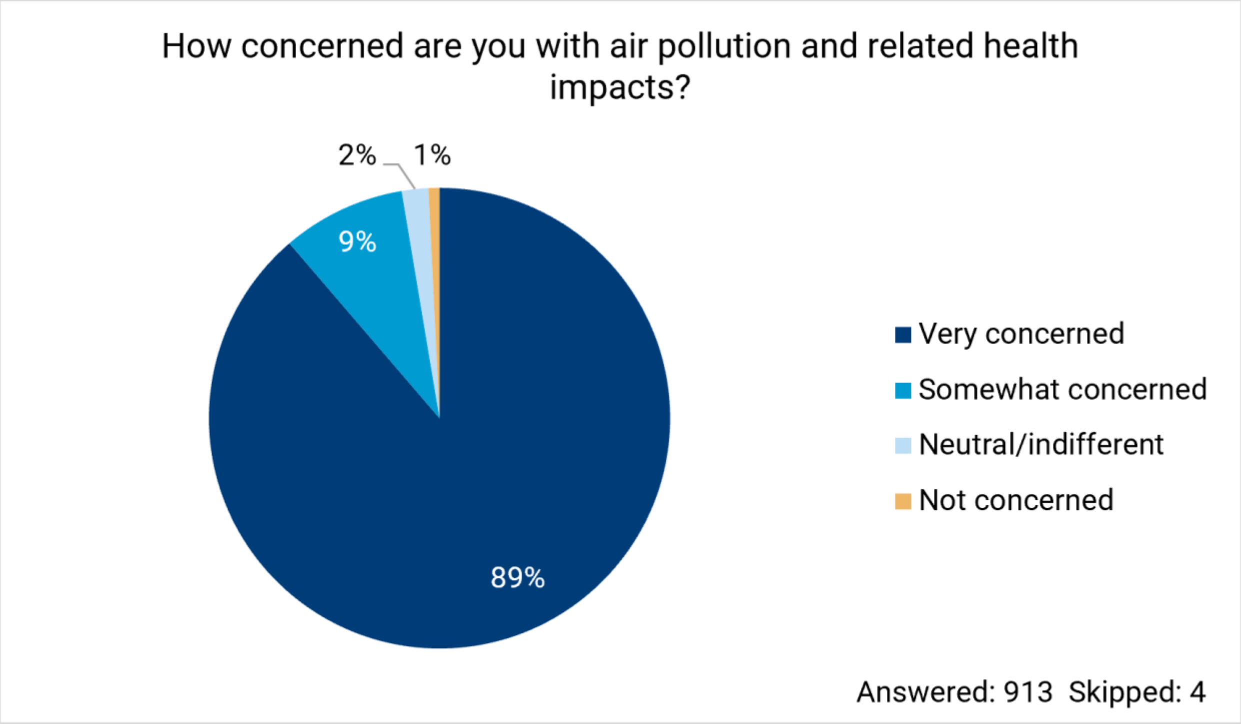
Figure 38. Image of an event at Library Square in downtown Salt Lake City (Image Source: Salt Lake City Corporation)

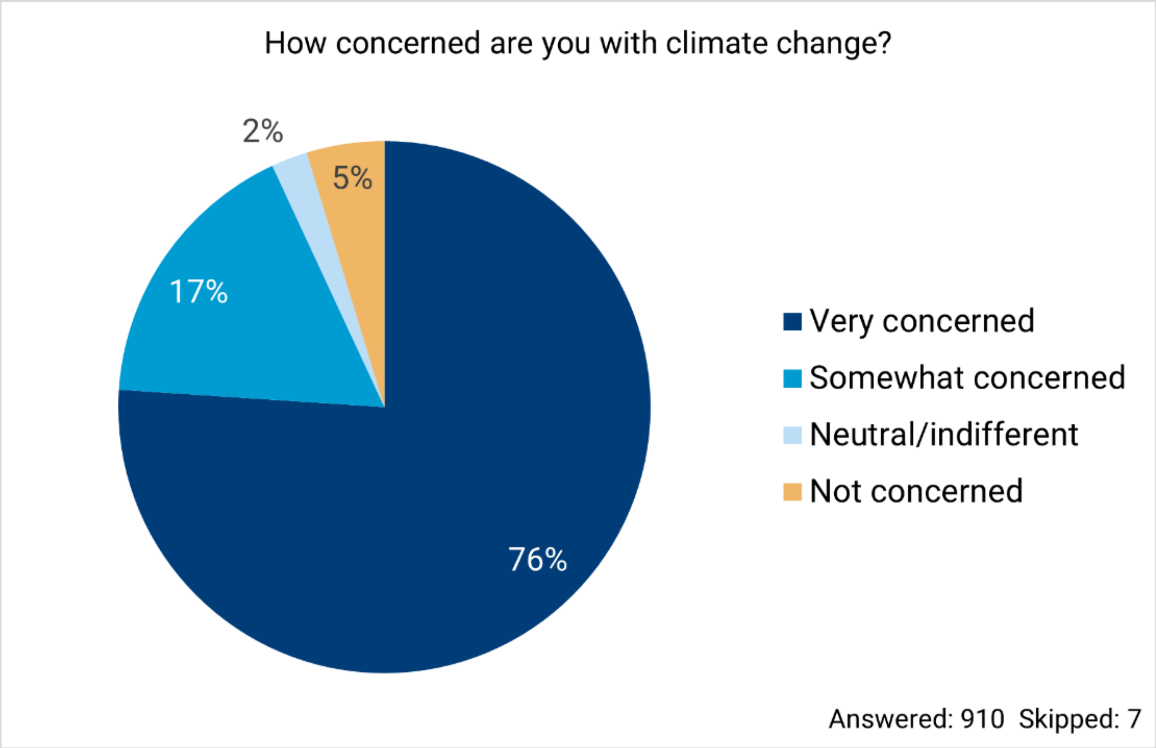
12. Appendices

Appendix A: Public Survey Results

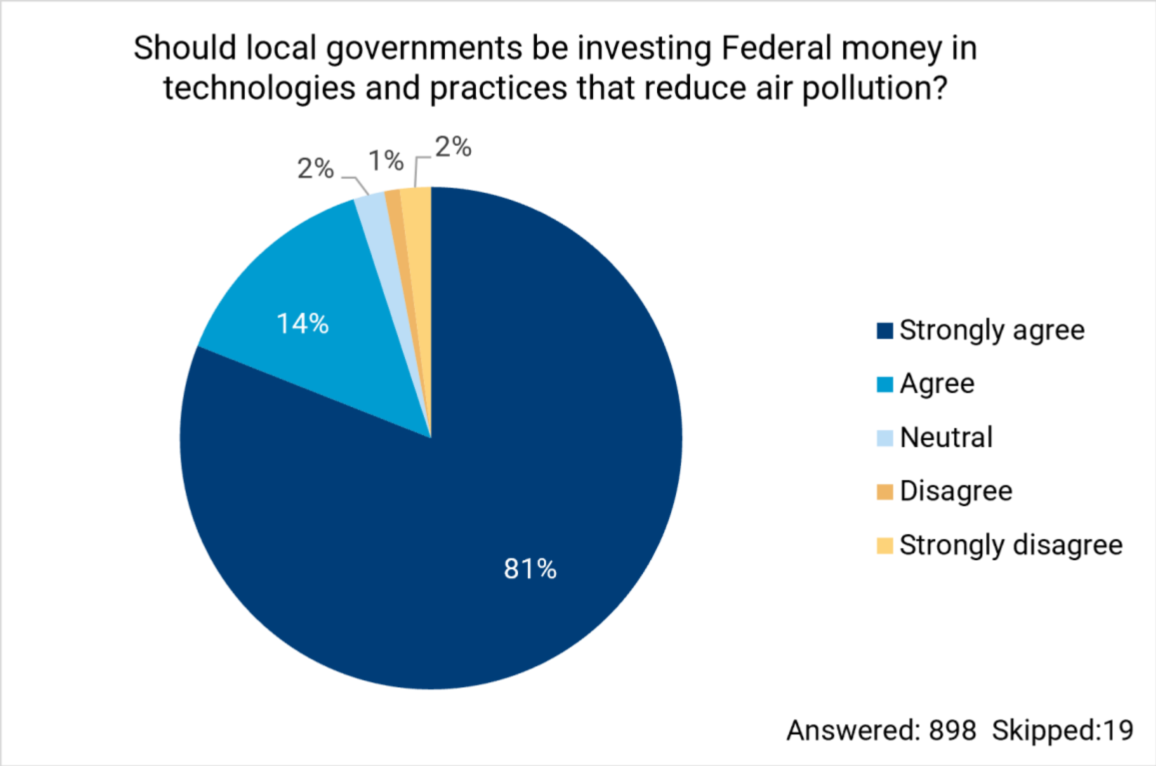
An online public survey was utilized to solicit opinions and inform prioritization for the SL-CLEAR PCAP. This survey was available in English and Spanish and collected over 900 total responses from individuals living in the SLC MSA. The complete survey questions and public input are available as a PDF and complete survey results are available for review in this downloadable Excel file.

A small selection of survey questions and associated responses from SLC MSA residents is displayed in the graphs below.

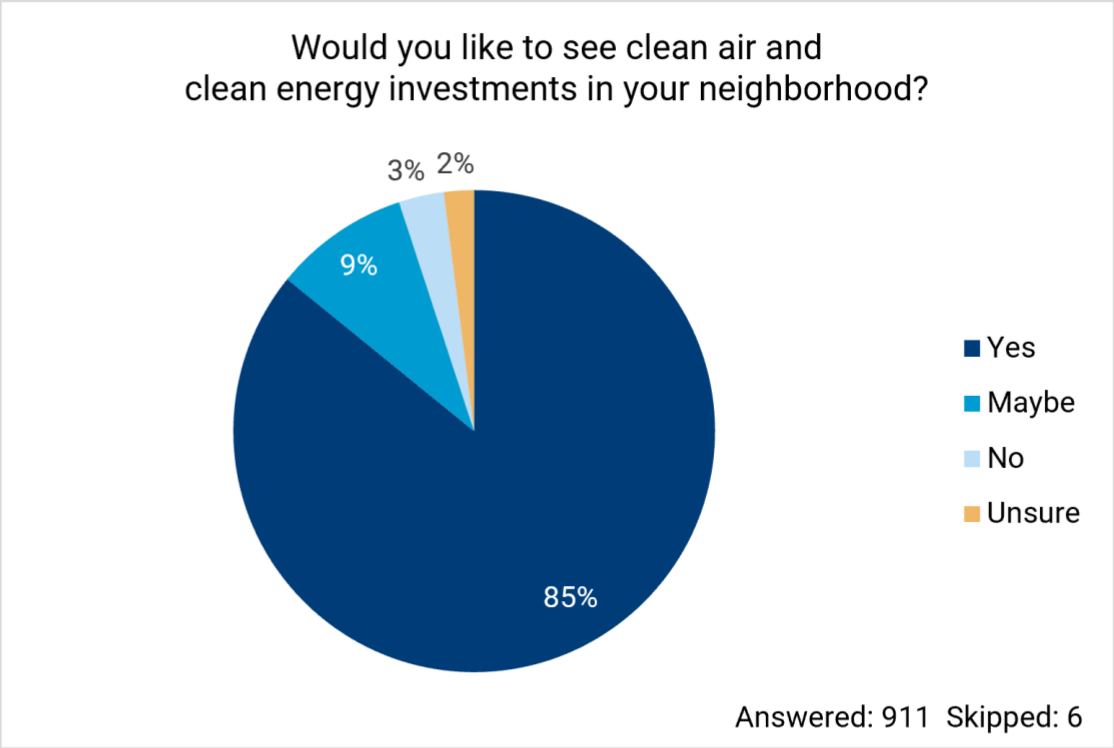




How concerned are you with climate change?
2%
5%
17%
76%
Very concerned
Somewhat concerned
Neutral/indifferent
Not concerned
Answered: 910 Skipped: 7



Should local governments be investing Federal money in technologies and practices that reduce air pollution?
2%
1%
2%
14%
81%
Strongly agree
Agree
Neutral
Disagree
Strongly disagree
Answered: 898 Skipped:19



Do you support clean energy and clean air dollars from the Federal Inflation Reduction Act being directed toward...			
	Strongly support %	Support %	Total support %
Residents	52%	36%	88%
Local governments and public infrastructure	59%	33%	92%
Businesses and indusry	36%	33%	69%
Public schools and universities	55%	34%	89%

Attitude toward technologies to reduce air pollution			
	Familiarity (very and somewhat) %	Attitude (very positive and positive) %	Most cited barrier
EVs	94%	75%	Too expensive (62%)
Electric bikes	90%	80%	Not practical (42%) Safety Concern (39%)
Solar panels	93%	90%	Too expensive (57%)
Heat pumps	54%	61%	Lack of knowledge (44%) Too expensive (35%)

Appendix B: GHG and Co-Pollutant Modelling and Methodologies

Salt Lake City MSA Greenhouse Gas Inventory 2021: Detailed Table

Sector/Activity	Fuel or Source	2021 Usage/ Activity	Units	Metric Tons CO2e (MTCO2e)
Residential Energy	Natural Gas	29,078,111	MMBtu	1,544,462
Residential Energy	Electricity	3,866,602	kWh	2,337,833
Residential Energy	Oil	43,508	MMBtu	3,311
Residential Energy	Propane	694,091	MMBtu	43,807
Residential Energy	Biomass	3,096,064	MMBtu	10,269
Residential Energy Total	N/A	N/A	N/A	**3,939,682**
Commercial Energy	Natural Gas	31,743,009	MMBtu	1,686,007
Commercial Energy	Electricity	5,857,434,708	kWh	3,541,533
Commercial Energy	Oil	1,271,309	MMBtu	96,754
Commercial Energy	Propane	1,585,683	MMBtu	100,080
Commercial Energy	Biomass	954,233	MMBtu	3,165
Commercial Energy Total	N/A	N/A	N/A	**5,427,539**
Industrial Energy	Natural Gas	8,226,829	MMBtu	436,962
Industrial Energy	Electricity	3,430,016,836	kWh	2,073,864
Industrial Energy	Oil	40,819	MMBtu	3,029
Industrial Energy	Propane	1,839,356	MMBtu	116,091
Industrial Energy	Gasoline	650	MMBtu	46

Sector/Activity	Fuel or Source	2021 Usage/ Activity	Units	Metric Tons CO2e (MTCO2e)
Industrial Energy	Unspecified Emissions from Industry	-	-	198,145
Industrial Energy Total	N/A	N/A	N/A	**2,828,137**
On-Road Transportation	Gasoline	57,130,982	MMBtu	4,024,712
On-Road Transportation	Diesel	9,434,773	MMBtu	700,628
On-Road Transportation	CNG	63,634	MMBtu	3,380
On-Road Transportation	Electricity	3,118,320	kWh	1,886
Aviation Transportation	Aviation Fuel	27,908,001	MMBtu	2,022,345
Aviation Transportation	Aviation Gas	51,059	MMBtu	3,548
Aviation Transportation	Unspecified Emissions from Aviation	-	-	12,167
Rail Transportation	Diesel	783,740	MMBtu	58,157
Rail Transportation	Electricity	38,377,959	kWh	23,210
Waterborne Transportation	Gasoline	166,016	MMBtu	11,695
Waterborne Transportation	Diesel	39,024	MMBtu	2,949
Off-Road Transportation & Mobile Sources	Gasoline	2,517,732	MMBTU	177,367
Off-Road Transportation & Mobile Sources	Diesel	5,862,983	MMBTU	435,062

Sector/Activity	Fuel or Source	2021 Usage/ Activity	Units	Metric Tons CO2e (MTCO2e)
Off-Road Transportation & Mobile Sources	CNG	147,587	MMBTU	7,839
Off-Road Transportation & Mobile Sources	LPG	1,082,401	MMBTU	67,060
Transportation & Mobile Sources Total	N/A	N/A	N/A	**7,552,005**
Solid Waste	Disposal of Solid Waste	-	-	669,662
Solid Waste	Biological Treatment of Waste	-	-	6,473
Solid Waste Total	N/A	N/A	N/A	**676,135**
Wastewater Treatment	Wastewater Treatment	-	-	12,712
Wastewater Total	N/A	N/A	N/A	**12,712**
Process and Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	244,730	MMBtu	127,493
Process and Fugitive Emissions	Fugitive Emissions from Oil and Gas Production and Processing	637,543	MMBtu	332,130
Process and Fugitive Emissions	Industrial Process	**-**	**-**	186,556
Process and Fugitive Emissions	Product Use	**-**	**-**	447,105

Sector/Activity	Fuel or Source	2021 Usage/ Activity	Units	Metric Tons CO2e (MTCO2e)
Process and Fugitive Emissions Total	N/A	N/A	N/A	**1,093,284**
Agriculture, Forestry, and other Land Uses (AFOLU)	Livestock	-	-	43,590
AFOLU	Land	-	-	-113,275
AFOLU	Non-CO2 emissions on land	-	-	12,323
AFOLU Total	N/A	N/A	N/A	**-57,362**
2021 SLC MSA GHG Emissions	N/A	N/A	N/A	**21,472,132**

Greenhouse Gas Inventory: Methodology

The Greenhouse Gas Protocol for Cities (GPC) provides the standardized framework used in this inventory to quantify and report regional-scale emissions. It defines common accounting rules for boundary setting and reporting, ensuring that results are consistent, transparent, and comparable across jurisdictions. The GPC requires that emissions be calculated using activity data in combination with scientifically recognized emission factors, consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines.

The CPRG guidance categories of industry, electricity generation and use, transportation, commercial and residential buildings, agriculture, natural and working lands, and waste and materials management align closely with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), though the two differ in framing. The CPRG guidance reflects broad sectors commonly used in U.S. climate planning, while the GPC organizes emissions into sectors such as stationary energy, transportation, waste, industrial processes and product use, and agriculture forestry and land use. Both approaches capture the same core emission sources and sinks, but the GPC provides a globally consistent framework with standardized definitions and clear rules to avoid double counting. The GPC was selected because it is the international standard widely used by US cities, counties, and regions, and ensures comparability and transparency while still encompassing the sectors required by EPA guidance.

Greenhouse Gas Calculation Methodology

ClearPath 2.0 was utilized for GHG inventory and GHG measure impacts modelling. Within ClearPath 2.0, the GPC framework is operationalized by structuring activity data into:

- Operations: the purpose of energy or resource use (e.g., heating buildings, moving freight, treating wastewater, or disposing of waste).
- Work: the fuels and energy consumed to carry out certain operations (e.g., natural gas for heating, diesel fuel for freight, electricity for wastewater treatment).

Some activities, such as waste disposal, do not involve direct energy consumption. In these cases, only Operations is required (e.g., tons of waste landfilled), and emissions are estimated directly through process-based emission factors rather than a Work calculation.

Operations × Work Intensity = Work × Emission Factor = Emissions

The following examples use arbitrary, simplified numbers to display calculation methods.

Example 1: Stationary energy (heating buildings)

1. Operations: 100,000 square feet
2. Work intensity: 40 kBtu per square foot
3. Work: 100,000 × 40 kBtu = 4,000,000 kBtu = 4,000 MMBtu
4. Emission factor: 50 kg CO_2e per MMBtu
5. Emissions: 4,000 × 50 kg = 200,000 kg CO_2e = 200 metric tons CO_2

Example 2: Transportation (freight movement)

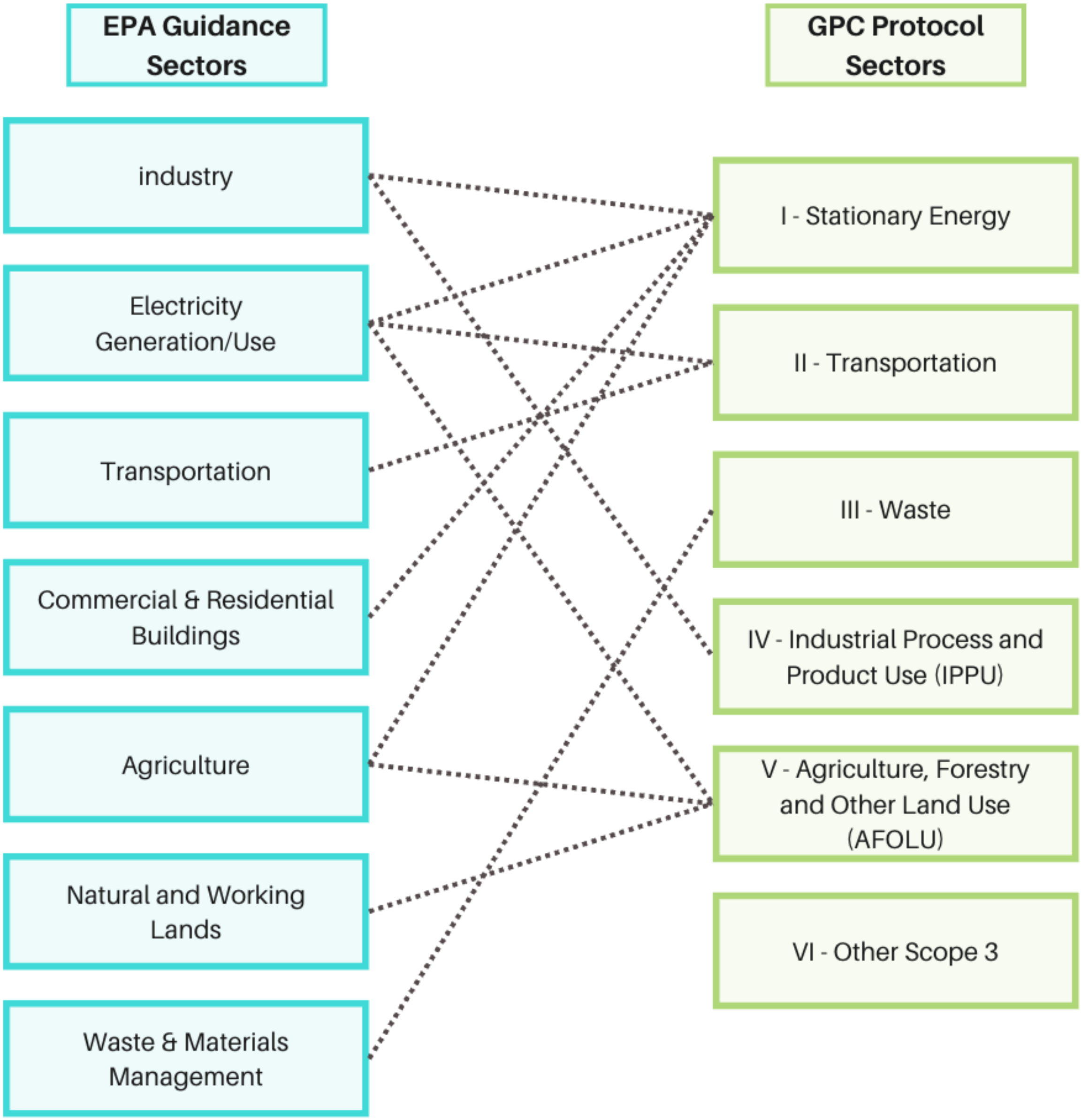
1. Operations: 1,000,000 ton-miles
2. Work intensity: 0.003 gallons diesel per ton-mile

3. Work: 1,000,000 × 0.003 = 3,000 gallons diesel
4. Emission factor: 10 kg CO_2e per gallon diesel
5. Emissions: 3,000 × 10 kg = 30,000 kg CO_2e = 30 metric tons CO_2e

Example 3: Waste (landfilling, no Work entry)

1. Operations: 10,000 tons of solid waste landfilled
2. Process emission factor: 2.0 metric ton CO_2e per ton waste
3. Emissions: 10,000 × 2.0 = 20,000 metric tons CO_2e
   This approach operationalizes the GPC within a data system designed for consistent reporting, streamlined analysis, and alignment with regional, national, and global inventories.

The figure below displays the connections between EPA CPRG required sectors for the CCAP and how these map to GPC protocol sectors. All required sectors are covered in the GHG footprint created for the SLC MSA and addressed by GHG reduction measures documented in this CCAP.



Appendix Figure: EPA CPRG CCAP Required Sectors Mapped to GPC Protocol

Greenhouse Gas Reference Scenario Methodology

The reference scenario is a forecast and the neutral starting point for GHG reduction modeling. It extends baseline activity levels into the future using population growth projections, representing an "if we do nothing" pathway. This forecast provides a benchmark for evaluating mitigation strategies by showing how emissions would change without additional action.

The reference scenario is generated by scaling inventory activity levels forward from the baseline year using population growth. The process works as follows:

1. Define population growth: The baseline population is entered along with a compound annual growth rate (CAGR) that reflects projected population change.
2. Set per-capita growth assumptions: For most inventory activity, the platform applies user-specified growth rates for operations per capita (for example, residential energy use per person, vehicle travel per person, or waste generated per person). We deemed that some activities do not correlate with population growth and are therefore held constant in the forecast. For example, emissions from forestry conversion to settlement are not scaled with population.
3. Scale operations: Each activity's operations are scaled according to its per-capita growth assumption and the projected population change.
4. Estimate emissions: On the backend, the platform applies the inventory's emissions calculation methodology:

Future Annual Operations × Work Intensity = Work × Emission Factor = Future Annual Emissions

This approach ensures that the forecast reflects how activity levels evolve with population change while maintaining consistency with the underlying GPC-based emissions accounting framework.

Numerical Examples (arbitrary numbers utilized for clarity):

Stationary Energy (Heating):

- Baseline year population = 100,000, End Forecast population = 110,000 (10 percent growth)
- Residential heating operation = 1,000,000 sq ft of building area, growing by 0.5 sq ft per person
- Additional operations from population growth = 10,000 × 0.5 = 5,000 sq ft
- Total future operations = 1,000,000 + 5,000 = 1,005,000 sq ft

- Work and emissions are then calculated using the standard inventory methodology.

Transportation (VMT per capita):

- Baseline year population = 100,000, End Forecast population = 110,000 (10 percent growth)
- Vehicle miles traveled (VMT) per person = 9,000 miles per capita
- Forecast VMT = 110,000 × 9,000 = 990,000,000 miles
- Work and emissions are then calculated using the standard inventory methodology.

Greenhouse Gas Reduction Modelling Methodology

The Transition Element Framework (TEF) is an open-source methodology developed to codify the Intergovernmental Panel on Climate Change (IPCC) Mitigation Options into actionable planning information. It organizes climate actions into a mutually exclusive and collectively exhaustive structure, where each "Transition Element" represents a standardized mitigation option. At the center of the TEF is the concept of an Activity Shift: the transformation of a high-emitting activity into a lower or no-emitting one.

We used the TEF in this analysis because it provides clarity, precision, and comparability in greenhouse gas reduction planning. By separating the means (interventions) from the ends (activity shifts), and by enforcing a mutually exclusive and collectively exhaustive structure, it avoids redundancy and ambiguity. This allows the region to model scenarios consistently across sectors while still tailoring the results to local circumstances. The TEF also provides a transparent causal chain that connects policies and investments to emissions outcomes, making the reductions traceable, defensible, and communicable.

The GHG reduction modeling follows the TEF's Outcome Logic, which links interventions to emissions reductions through a layered causal chain. Each layer builds on the previous one, ensuring that outcomes can be traced back to specific actions and assumptions.

1. Interventions

The outcome logic begins with interventions, the decisions or actions taken by governments, utilities, community members, or other stakeholders. These include policies (for example, building codes), incentives (for example, subsidies for EV adoption), investments (for example, renewable energy installations, cycling infrastructure), programs (for example, composting educational programs).

- Mechanics: Interventions modify system conditions and catalyze community attributes in ways that are measurable.
- Example: A city implements a retrofit subsidy that reduces insulation costs by 30 percent.

2. Attributes

Each intervention alters one or more attributes of the system. Attributes are measurable characteristics that affect how individuals and organizations behave, such as cost, safety, convenience, availability, or social status.

- Mechanics: Attributes are represented as parameters in the platform, such as fuel cost per gallon, or efficiency of building stock.
- Example: The retrofit subsidy lowers the cost per square foot of insulation, making retrofits more financially attractive.

3. Behavioral Changes

Shifts in attributes lead to behavioral changes by households, businesses, and institutions. People and organizations respond to changes in cost, safety, convenience, and social norms.

- Mechanics: Behavioral changes are modeled through elasticities or adoption curves tied to attribute shifts.
- Example: With lower costs, retrofit adoption rates rise from 1 percent to 5 percent of households annually, as an example.

4. Activity Shifts

Behavioral changes aggregate into activity shifts, which are the measurable transitions from high-emitting activities to lower or no-emitting activities. This is the core unit of the Transition Element Framework.

- Mechanics: Each shift is defined by an origin activity (such as gasoline vehicle travel or natural gas heating) and a destination activity (such as EV travel or heat pumps). The platform tracks the shift size and scales it through the modeled period.
- Example: Households switch from inefficient gas furnaces (origin) to efficient electric heat pumps (destination).

5. Outcomes

Each activity shift produces outcomes, both in terms of emissions reductions and co-benefits. The same inventory logic applies here:

- Mechanics: An activity shift reduces operations in one activity and/or increases them in another. The net effect is calculated as the emissions outcome.
- Example: Retrofits lower household energy use by 20 percent, reducing natural gas consumption, cutting CO_2e, and lowering household bills.

6. Handling Scale and Overlaps

- Scaling: Each Transition Element is parameterized with adoption curves, maximum saturation, and time ramps that define how fast and how far a shift can scale.
- Avoiding overlaps: Because the TEF is mutually exclusive and collectively exhaustive, each activity shift is clearly bounded, avoiding double counting across elements (for example, EV adoption and mode shift to cycling both reduce gasoline use, but are treated as separate and non-overlapping shifts).

7. Integration with the Platform

In the platform, the TEF is operationalized through a Periodic Table of Transition Elements. Each element is pre-parameterized with attributes, interventions, and potential shifts. Users can:

- Select set local targets (for example, 30 percent of car trips shifted to transit by 2030).
- Adjust adoption curves and rates to reflect local context.

- Combine multiple elements into scenarios that represent coherent pathways.

On the backend, these shifts feed directly into the Operations–Work–Emissions engine, ensuring that all reductions are physically consistent with the GPC-based inventory.

8. Demonstration Scenario (arbitrary numbers for clarity)

Suppose a city introduces two interventions: an EV rebate and a cycling infrastructure program.

- Population: 100,000, growing to 110,000 by 2030
- Current VMT: 900 million miles (all gasoline vehicles)
- Intervention 1: EV rebate increases EV adoption to 20 percent of new sales by 2030
- Intervention 2: Cycling lanes increase cycling mode share by 5 percent by 2030

Step 1: Attributes

- EV rebate lowers cost → more EVs adopted
- New bike lanes → improve convenience and safety

Step 2: Behavioral Change

- Households choose EVs more often
- Commuters shift some short trips from cars to bikes

Step 3: Activity Shifts

- 100 million miles shift from gas cars to EVs
- 50 million miles shift from cars to bikes

Step 4: Outcomes

- Gasoline avoided: 150 million miles ÷ 25 mpg = 6 million gallons
- EV electricity demand: 100 million miles ÷ 3 mi/kWh = 33 million kWh

- Cycling requires no energy input
- Net emissions reduction: ~40,000 metric tons CO_2e

This example illustrates how interventions move through attributes and behaviors into measurable activity shifts, producing quantifiable emissions outcomes.

Outcome Logic and Why It Makes Sense

The TEF's outcome logic ensures that every emissions reduction modeled in the platform has a clear causal chain. Instead of embedding assumptions about efficiency improvements or grid decarbonization into the baseline, the platform explicitly models how decisions lead to changes in attributes, which drive behaviors, which in turn create activity shifts.

This approach is sensible for local climate planning because:

- It avoids hidden assumptions and keeps forecasts transparent.
- It provides a clear link between local decisions and outcomes.
- It helps highlight co-benefits such as cost savings, air quality improvements, and health outcomes.
- It keeps complexity where it matters: in the Transition Scenarios, not in the baseline.

In the platform, this logic is implemented through the Transition Elements, each carrying its own causal chain, scaling parameters, and outcome factors. By combining these elements into pathways, users can create scenarios that are transparent, comparable, and aligned with both local conditions and international standards.

Mapping Transition Elements to SLC MSA GHG Reduction Measures

The SL-CLEAR plan utilized an iterative stakeholder engagement process over the CPRG planning time horizon to develop GHG reduction measures based on input and expertise across the SLC MSA. This process resulted in the documentation of GHG reduction measures for each sector required for consideration in the CCAP. These measures were then mapped back to specific TEs from the ClearPath 2.0 platform where their GHG reduction impacts were quantified.

This mapping process did not result in a perfect 1:1 correlation between stakeholder-identified measures and quantified TEs, but it did allow for characterization of most key measures and associated actions. This produced an estimation of GHG reductions within each sector for the two goal years of 2035 and 2050. More details on GHG reduction estimates for sector measures are included in the main body of this CCAP report. Readers can read more about associated TEs in the online and interactive ClearPath 2.0 dashboard for the SLC MSA.

Benefits Analysis: Co-Pollutant Reduction Estimates Methodology

Co-Pollutant data for Salt Lake County and Tooele County was obtained from the 2020 U.S. EPA's National Emissions Inventory (NEI) Data retrieval tool. Details were downloaded for both County level and Facility level pollution. Co-Pollutant Emissions were then combined to create estimates for the entire SLC MSA.

Assuming an annual population growth rate of 1.03%, annual increases in emissions were calculated from 2021 to 2050 for the following categories:

- Residential Stationary Fuel Combustion
- Commercial Stationary Fuel Combustion
- Transportation On-Road
- Transportation Off-Road/Mobile
- Transportation Rail
- Transportation Waterborne
- Solid Waste Landfills
- Solid Waste Composting
- Water/Wastewater Wastewater Treatment
- Airport

Annual population growth and a utility grid decarbonization pathway was assumed for the SLC MSA and then applied to the following categories:

- Residential Electricity Generation (via combustion)

- Commercial Electricity Generation (via combustion)

No growth rate was applied to the following activities as these are not as strongly influenced by local population growth:

- Industrial Stationary Fuel Combustion
- Process & Fugitive - IPPU
- Process & Fugitive - Oil & Gas Processes
- AFOLU - Crop
- AFOLU - Livestock
- AFOLU - Forestry
- AFOLU - Trees
- Activities Not Included in a Standard GHGI
- Industrial Electricity Generation (via combustion)

Each GHG reduction measure, for 2035 and 2050, was then analyzed to see which co-pollutant category was being impacted either positively (reduced emissions) or negatively (increased emissions). For example, for 2035, shifting to electric cars had a reduction in co-pollutant emissions in the Transportation On-Road category, but also had an increase in co-pollutant emissions in the Residential Electricity Generation category. All GHG reduction measures were then summed to get an overall total of each co-pollutant. These totals were then deducted from a business-as-usual forecast for each target year to determine the amount of remaining co-pollutants in the SLC MSA in 2035 and 2050.

GHG Inventory Data Sources and Assumptions

Transportation & Mobile Sources

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
On-Road	Vehicle/Fuel Mix Breakdown - Wasatch Front Regional Council (WFRC) 2019 MOVES Model County-wide VMT - Utah Dot Annual Vehicle Miles Traveled Year to Date	Used WFRC 2019 MOVES data to build out count-wide Vehicle/Fuel Type Breakdown. Applied percentages from the vehicle type breakdown to 2021 VMT data provided by UDOT	On-Road Activity Categorization: ClearPath 2.0 categorizes on-road activity into two primary groups: Personal Transport and Road Freight. Personal Transport includes all vehicles used primarily for moving people — such as personal vehicles, motorcycles, and buses. Road Freight includes all vehicles used for moving goods or services — including Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs). Reclassification from ClearPath 1.0: In ClearPath 1.0 (used for the PCAP GHG Inventory), vehicle activity was categorized based on more traditional classifications (passenger, light duty, or heavy duty).

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			To align with the ClearPath 2.0 structure, the following adjustments were made: The MOVES model defines two light-duty vehicle types: Passenger Truck (classification 31) and Light Commercial Truck (classification 32). For consistency, Vehicle Miles Traveled (VMT) previously assigned to Passenger Trucks under the light-duty category have been reclassified under Personal Transport, while Light Commercial Trucks remain classified as Light-Duty Freight.
On-Road Transit	UTA Bus Data from FTA National Transit Database	- Enter Vehicle Miles Traveled reported from the NTD	Because both buses and paratransit vehicles are classified as heavy-duty based on gross vehicle weight, wheelbase, and axle/wheel

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			configuration, the reported transit VMT has been subtracted from the total heavy-duty VMT to avoid double counting.
Rail	EPA's 2020 National Emissions Inventory UTA Bus Data from FTA National Transit Database	Extracted county data by GHG type, estimated MMBtu using MT CO2/MMBTU emissions factor -Entered passenger UTA rail passenger miles	Because the NEI does not provide activity data, MMBtu was estimated using the emissions factor expressed as MT CO_2 per MMBtu.
Aviation	Salt Lake City Department of Airports' Impact Tracker	Aggregated fuel consumption by fuel type	Assumed all aviation activity is transboundary, as the Salt Lake City International Airport (SLCIA) is classified as a Class B airport. Assumed all aviation activity is passenger-related, except for military operations, because ClearPath 2.0

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			requires distinguishing between passenger and freight activity, and the available source data did not allow for that differentiation. Categorized military aviation activity as "unspecified emissions from aviation" and excluded it from GHG reduction modeling, as military activity is generally not influenceable through local or regional climate action measures.
Waterborne	EPA's 2020 National Emissions Inventory	Extracted county data by GHG type, estimated MMBtu using MT CO2/MMBTU emissions factor	Because NEI does not provide activity data, we estimated MMBtu using the MT CO2/MMBTU emissions factor
Off-Road/Mobile	EPA's 2020 National Emissions Inventory	Extracted county data by GHG type, estimated MMBtu using MT	Because NEI does not provide activity data, we estimated MMBtu using the MT CO2/MMBTU emissions factor

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
		CO_2/MMBTU emissions factor	
Emissions factors	EIA's Annual Energy Review, Bureau of Transportation Statistics Average Fuel Efficiencies, and EPA's Emission Factors Hub	N/A	N/A

Grid Electricity

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
Residential Electricity	Rocky Mountain Power (PacifiCorp) Murray City Power US Census - House Heating Fuels & Units in Structure tables EIA - Residential Energy Consumption Survey (RECS)	RMP provided sector-based data by county, which was then combined with Murray City Power data for entry. We calculated Murray City Power residential energy use by subtracting their reported commercial electricity consumption (kWh) from their total customer consumption. Since we only had residential data at the overall sector level and ClearPath 2.0 further divides electricity use into heating, cooling, and other appliances, we used the U.S. Census Units in Structure	We did not have direct residential electricity data from Murray City Power. We assumed the provided methodology was sufficient since their website indicates they serve residential, commercial, and industrial customers, reported total electricity consumption, and specifically list commercial and industrial electricity consumption. Following the methodology, we applied regional average energy intensities and estimated square footage per residential structure type to disaggregate residential kWh data into usage for cooling, heating, and other appliances, as well as to estimate the square

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
		data, along with the EIA RECS survey, to estimate the square footage, energy intensity, and disaggregate the kWh of residential buildings using electricity for heating, cooling, and other appliances.	footage and energy intensity of regional residential buildings.
Commercial Electricity	Rocky Mountain Power (PacifiCorp) Murray City Power EIA - Commercial Building Energy Consumption Survey (CBECS)	RMP provided sector-based data by county, which listed Public Street and Highway Lighting as well as irrigation separately. These were included in the commercial sector under institutional/public lighting and water pumps. Commercial sector data (excluding water pumps and Public Street and Highway	Murray City Power combined commercial and industrial electricity data, and we did not have a reliable method to disaggregate it into sector-specific values. Following the methodology, we applied regional average commercial energy intensities and estimated square footage to disaggregate commercial kWh data

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
		Lighting) was then combined with Murray City Power data to determine total commercial kWh consumption. Since we only had commercial data at the overall sector level and ClearPath 2.0 further divides electricity use into heating, cooling, and other appliances, we used various CBECS datasets to estimate square footage, energy intensity, and disaggregate the kWh of commercial buildings using electricity for heating, cooling, and other appliances.	into usage for cooling, heating, and other appliances, as well as to estimate the square footage and energy intensity of regional commercial buildings.

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
Industrial Electricity	Rocky Mountain Power (PacifiCorp) Murray City Power	RMP provided sector-based data by county, which was then prepared for data entry.	Murray City Power combined commercial and industrial electricity data, and we did not have a reliable method to disaggregate it into sector-specific values. We assume all industrial electricity is used for "other appliances" rather than space heating or cooling, since on average, the share of industrial electricity consumption is overwhelmingly associated with process loads and equipment rather than comfort conditioning. "Other appliances" include process heating, machine drives and motors, on-site process controls, etc. This assumption aligns with the latest U.S. EIA Manufacturing Energy

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
			Consumption Survey (MECS 2018), which shows that over half of industrial electricity use is attributed to machine drives and other process equipment, while less than 10 percent is used for space heating or cooling.
Electricity Generation	EPA FLIGHT	Extracted site-specific data per county and directly entered raw metric tons (per GHG)	This data is recorded outside of the platform and emissions are not considered in the GHGI total because the majority of electricity generation emissions are assumed to be captured in the residential, commercial, and industrial electricity emissions.
Emissions factors	Rocky Mountain Power (PacifiCorp)	N/A	Rocky Mountain Power (PacifiCorp) emission factors were used for all electricity emissions calculations because, at the time of the analysis, ClearPath 2.0 only

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
			allowed for a single grid electricity emission factor. We selected this approach instead of using a weighted average since approximately 97% of total kWh consumption was delivered by Rocky Mountain Power.

Solid Waste

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
Municipal Solid Waste	Utah Department of Environmental Quality, Division of Waste Management and Radiation Control	Utah Department of Environmental Quality, Division of Waste Management and Radiation Control, provided solid waste, composting, and recycling disposal totals and we filtered the data for the applicable regional counties.	Data from UDEQ represents waste disposal rather than direct waste generation within the inventory boundary. Because solid waste is often transported across county lines for processing or disposal, these figures may not perfectly align with local generation. However, we consider this dataset sufficient for inventory purposes, assuming that the majority of regional waste is both generated and disposed of within the county. This dataset was selected as it is the only representative source covering both counties and originates from a reliable, government agency.
Compost	Salt Lake City Waste & Recycling Division	Because we did not use UDE's reported composting data, we	We assumed Salt Lake City's composting rate for the entire region due to limited

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
		applied SLCWRD's current composting rates to our solid waste baselines to estimate the recycling baseline.	composting data available across the area.
Recycling	Salt Lake City Waste & Recycling Division	Because we did not use UDE reported recycling, we used SLCWRD's current recycling rates and applied it to our solid waste baselines to estimate the recycling baseline	Data is not included in the inventory emissions calculations given that recycling does not generate emissions in the same manner as landfill disposal or composting. Any emissions from recycling processes (such as sorting, processing, or material reconstitution) are assumed to be captured within the stationary energy sector, as they occur at industrial or commercial facilities consuming electricity or fuel. However, recycling baselines are still used as starting points for strategy modeling, where we assess shifts in activity, specifically diverting recyclable materials

Activity/Source	Data Source	Methodology	Data Gaps/ Assumptions
			from landfill disposal to recycling pathways, to estimate the potential emissions reductions from increased material recovery.
Emissions factors	EPA's Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) Salt Lake City Solid Waste Characterization and Program Analysis (2012)	The report's waste composition percentages for each waste type were converted and aggregated into ClearPath's categories per the assumptions.	Newspaper, office paper, and magazines/third-class mail are each calculated by multiplying "Paper" by 32% (the ratio of paper products) and then dividing that amount by three to evenly distribute it among the three categories. Corrugated cardboard is determined by multiplying "Paper" by 68%, representing the ratio of corrugated cardboard within paper products. Food scraps are categorized entirely as "Food Waste." Grass, leaves, and branches each represent one-fourth of "Other Organic."

Other Source

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
Residential Stationary Fuel	Dominion Energy	Dominion provided sector-based data by county. Since we had residential data at the overall sector level and ClearPath 2.0 further divides natural gas use into heating and other appliances, we used the U.S. Census House Heating Fuels and Units in Structure data, along with the EIA RECS survey, to estimate the square footage, energy intensity, and disaggregate the fuel usage of residential buildings using natural gas for heating and other appliances.	Following the methodology, we applied regional average energy intensities and estimated square footage per residential structure type to disaggregate residential natural gas usage data into usage for heating, and other appliances, as well as to estimate the square footage and energy intensity of regional residential buildings.
Commercial Stationary Fuel	Dominion Energy	Dominion provided non-residential natural gas consumption so we subtracted estimated industrial natural gas	Our team assumed that industrial natural gas reported in EPA FLIGHT accounts for the majority of industrial natural gas consumption. Accordingly,

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
		data (from EPA's FLIGHT database) and subtract that from Dominion's reported non-residential to estimate commercial natural gas. Since we only had commercial data at the overall sector level and ClearPath 2.0 further divides natural gas use into heating and other appliances, we used various CBECS datasets to estimate square footage, energy intensity, and disaggregate the fuel use of commercial buildings using natural gas for heating and other appliances.	we subtracted these reported values from Dominion Energy's total non-residential category to estimate the commercial portion.
Industrial Stationary Fuel	EPA FLIGHT	Pulled facility natural gas usage data from EPA FLIGHT	Our team assumed that industrial natural gas reported in EPA FLIGHT accounts for the majority of industrial natural gas consumption. We assume all industrial natural gas consumption

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			(MMBtu) is used for “other appliances” rather than for comfort space heating since the majority of industrial natural gas use is associated with process heating, drying, and other production-related activities. “Other appliances” include process heating, drying, kilns, furnaces, ovens, and other direct fuel uses integral to industrial operations. This assumption aligns with the latest U.S. EIA Manufacturing Energy Consumption Survey (MECS 2018), which indicates that more than 70 percent of industrial natural gas consumption is attributed to process heating and related applications, while less than 10 percent is used for facility space heating or cooling.
Fugitive emissions from natural	Energy Information Administration	Enter natural gas consumption (MMBtu) per county	Used the default value of 0.3% obtained from EDF User Guide for

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
gas distribution	State Energy Summaries & FLIGHT		Natural Gas Leakage Rate Modeling Tool.
Fugitive emissions from oil and natural gas systems	EPA FLIGHT	Extracted site-specific data per county and directly entered raw metric tons (per GHG)	We aggregated emissions from various processes including gathering, boosting, and compressing. Assumed any emissions from natural gas distribution is captured in "Fugitive emissions from natural gas distribution"
Industrial Process & Product use	EPA FLIGHT EPA Greenhouse Gas Inventory Data Explorer EPA eGRID US Census Bureau State Populations	Extracted site-specific data per county and directly entered raw metric tons (per GHG)	Process: GHGs are captured internally and entered as CO2 equivalent (CO2e) Product: We aggregated product emissions into Unspecified fluorinated emissions and Unspecified SF6 emissions. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and carbon dioxide (CO2) are used as alternatives to several 17 classes of ozone-depleting substances (ODSs) that are being phased out under the

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			terms of the Montreal Protocol and the Clean Air Act Amendments of 1990.50 F 18 113 Ozone-depleting substances—chlorofluorocarbons (CFCs), halons, 19 carbon tetrachloride, methyl chloroform, and hydrochlorofluorocarbons (HCFCs)—are used in a variety of 20 industrial applications including refrigeration and air conditioning equipment, solvent cleaning, foam production, 21 sterilization, fire extinguishing, and aerosols. Although HFCs and PFCs are not harmful to the stratospheric ozone 22 layer, they are potent greenhouse gases. The EPA's GHGI Data Explorer contains the refrigeration and air-conditioning sector, which includes a wide variety of equipment types that have historically used CFCs or HCFCs.

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			End-uses within this sector include motor vehicle air-conditioning, retail food refrigeration, refrigerated transport (e.g., ship holds, truck trailers, railway freight cars), household refrigeration, residential and small commercial air-conditioning and heat pumps, chillers (large comfort cooling), cold storage facilities, and industrial process refrigeration (e.g., systems used in food processing, chemical, petrochemical, pharmaceutical, oil and gas, metallurgical, and other industries).
Water Treatment Energy	Rocky Mountain Power (PacifiCorp)	N/A	It is assumed that all energy used for water treatment and conveyance is accounted for within the commercial energy sector.

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
Wastewater Treatment Energy	Rocky Mountain Power (PacifiCorp)	N/A	It is assumed that all energy used for wastewater treatment and conveyance is accounted for within the commercial energy sector.
Wastewater Treatment	US Census Bureau	Used ClearPath's population-based calculations	Due to the unavailability of site-specific wastewater treatment operations data, we assumed the following: Yes Nitrification/Denitrification, an Industrial Commercial Discharge Multiplier of 1.25, WW generated and treated in boundary, systems are predominantly Anaerobic, Effluent discharge goes into stream/river
Agriculture: Livestock and Crops	U.S. Department of Agriculture's (USDA) 2017 Census of Agriculture, County Data	Extracted livestock headcounts and crop counts and utilized the EPA's State Inventory Tool, Agriculture Module to estimate emissions	Due to the differing categorizations of the EPA's SIT Agriculture Modules and the USDA's 2017 Census of Agriculture county data, the following categories were grouped together/assumptions were made: Milks Cows = Dairy Cows, Cows and

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
			heifers that calved = Feedlot Heifers, Cattle/calves = Calves, Beef cows = Beef Cows, Other cattle = Heifer Stockers, Hogs are all assigned to the "Market 120-179 lbs." category, Layers = Layers, Pullets for laying flock replacement = Pullets/ Chickens, Broilers and other meat-type chickens = Broilers, all sheep = Sheep on Feed
Forestry and Land Use	Land Emissions and Removals Navigator (LEARN) Tool	Extracted county-level emissions and removals for forests, changes in forestry, urban trees, etc.	Data were updated from PCAP to reflect the most recent 2021 NLCD dataset. The inventory accounts for both forestry and urban tree carbon sequestration as well as associated emissions, thereby representing net emissions. Used Albuquerque, NM as the “representative urban area" for emissions factors

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
Stationary Fuel Emissions Factors	EPA Emissions Factor Hub	N/A	N/A
Fugitive emissions from natural gas distribution	Environmental Defense Fund's (EDF) User Guide for Natural Gas Leakage Rate Modeling Tool.	N/A	N/A
Wastewater Treatment Emissions Factors	IPCC Methods for Greenhouse Gas Inventories ICLEI USA's US Community Protocol, Appendix F USDA	N/A	N/A
Agriculture Emissions factors	EPA's State Inventory Tool	N/A	N/A

Activity/Source	Data Source	Methodology	Data Gaps/Assumptions
	Agriculture Module		
Forestry and Land Use	U.S. Forest Service's Forest Inventory and Analysis (FIA) database	N/A	N/A

Appendix C: Census Tracts Impacted by Climate Hazards

Hazards affecting each census tract, along with their low-income status, were identified using the Climate and Economic Justice Screening Tool (CEJST) and data from The Trust for Public Land (79). Census tracts flagged for extreme heat experience above-average temperatures relative to their county. Those identified for wildfire risk have a greater than 1-in-464 chance of a fire occurring in a given year. Tracts with flood risk rank above the 78th percentile nationally for flood vulnerability. Drought was excluded from the analysis due to its widespread impact across the region.

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035100100	Salt Lake	Yes	No	No	No	1
49035100200	Salt Lake	Yes	Yes	No	No	2
49035100306	Salt Lake	Yes	No	No	Yes	1
49035100307	Salt Lake	No	No	No	Yes	0
49035100308	Salt Lake	No	No	No	Yes	0
49035100500	Salt Lake	Yes	No	No	Yes	1
49035100600	Salt Lake	Yes	No	Yes	Yes	2
49035100700	Salt Lake	No	No	No	No	0
49035100800	Salt Lake	No	No	No	No	0
49035101000	Salt Lake	No	No	No	No	0
49035101101	Salt Lake	No	No	No	No	0
49035101102	Salt Lake	No	No	No	No	0
49035101200	Salt Lake	No	No	No	No	0
49035101400	Salt Lake	Yes	Yes	Yes	Yes	3
49035101500	Salt Lake	No	No	No	No	0
49035101600	Salt Lake	No	No	No	No	0
49035101700	Salt Lake	No	No	No	No	0
49035101800	Salt Lake	No	No	No	No	0
49035101900	Salt Lake	Yes	No	No	No	1
49035102000	Salt Lake	No	No	No	Yes	0
49035102100	Salt Lake	Yes	No	No	No	1
49035102300	Salt Lake	Yes	No	No	Yes	1

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035102500	Salt Lake	Yes	No	Yes	No	2
49035102600	Salt Lake	Yes	No	Yes	Yes	2
49035102701	Salt Lake	Yes	No	Yes	Yes	2
49035102702	Salt Lake	Yes	No	Yes	Yes	2
49035102801	Salt Lake	Yes	No	Yes	Yes	2
49035102802	Salt Lake	Yes	No	Yes	No	2
49035102900	Salt Lake	Yes	No	Yes	Yes	2
49035103000	Salt Lake	No	No	No	No	0
49035103100	Salt Lake	No	No	No	No	0
49035103200	Salt Lake	Yes	No	No	No	1
49035103300	Salt Lake	Yes	No	Yes	No	2
49035103400	Salt Lake	No	No	No	No	0
49035103500	Salt Lake	No	No	Yes	No	1
49035103600	Salt Lake	No	No	No	No	0
49035103700	Salt Lake	No	No	Yes	No	1
49035103800	Salt Lake	No	No	No	No	0
49035103900	Salt Lake	No	No	No	No	0
49035104000	Salt Lake	No	No	Yes	No	1
49035104100	Salt Lake	No	No	Yes	No	1
49035104200	Salt Lake	No	Yes	Yes	No	2
49035104300	Salt Lake	No	No	No	No	0
49035104400	Salt Lake	No	No	Yes	No	1
49035104700	Salt Lake	No	No	No	No	0
49035104800	Salt Lake	No	No	No	No	0
49035104900	Salt Lake	No	No	No	No	0
49035110102	Salt Lake	No	Yes	Yes	No	2
49035110103	Salt Lake	No	Yes	Yes	No	2
49035110104	Salt Lake	No	Yes	Yes	No	2
49035110200	Salt Lake	Yes	No	Yes	No	2
49035110300	Salt Lake	Yes	No	No	No	1
49035110401	Salt Lake	Yes	No	Yes	No	2
49035110402	Salt Lake	Yes	No	Yes	No	2
49035110500	Salt Lake	Yes	No	Yes	No	2
49035110600	Salt Lake	Yes	No	No	No	1
49035110701	Salt Lake	Yes	No	No	No	1

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035110702	Salt Lake	Yes	No	No	No	1
49035110800	Salt Lake	Yes	No	Yes	No	2
49035110900	Salt Lake	No	No	No	No	0
49035111001	Salt Lake	No	No	Yes	No	1
49035111002	Salt Lake	Yes	No	Yes	No	2
49035111101	Salt Lake	No	No	Yes	No	1
49035111102	Salt Lake	Yes	No	Yes	No	2
49035111103	Salt Lake	No	No	No	No	0
49035111201	Salt Lake	Yes	No	Yes	No	2
49035111202	Salt Lake	Yes	No	Yes	No	2
49035111302	Salt Lake	Yes	No	No	No	1
49035111304	Salt Lake	No	No	Yes	No	1
49035111305	Salt Lake	Yes	No	No	No	1
49035111306	Salt Lake	No	No	Yes	No	1
49035111400	Salt Lake	No	No	Yes	Yes	1
49035111500	Salt Lake	Yes	No	Yes	Yes	2
49035111701	Salt Lake	No	No	No	Yes	0
49035111702	Salt Lake	No	No	Yes	No	1
49035111801	Salt Lake	Yes	No	Yes	No	2
49035111802	Salt Lake	Yes	No	No	No	1
49035111903	Salt Lake	Yes	No	No	No	1
49035111904	Salt Lake	Yes	No	Yes	No	2
49035111905	Salt Lake	Yes	No	Yes	Yes	2
49035111906	Salt Lake	Yes	No	No	Yes	1
49035112001	Salt Lake	No	No	Yes	No	1
49035112002	Salt Lake	No	No	Yes	No	1
49035112100	Salt Lake	Yes	No	Yes	No	2
49035112201	Salt Lake	No	No	Yes	No	1
49035112202	Salt Lake	Yes	No	No	No	1
49035112301	Salt Lake	Yes	No	Yes	No	2
49035112302	Salt Lake	Yes	No	No	No	1
49035112402	Salt Lake	Yes	No	No	Yes	1
49035112403	Salt Lake	Yes	No	Yes	No	2
49035112501	Salt Lake	No	No	No	No	0
49035112502	Salt Lake	No	No	Yes	No	1

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035112503	Salt Lake	No	No	No	No	0
49035112604	Salt Lake	Yes	No	Yes	No	2
49035112605	Salt Lake	Yes	No	Yes	No	2
49035112608	Salt Lake	Yes	No	No	No	1
49035112609	Salt Lake	No	No	Yes	No	1
49035112610	Salt Lake	Yes	No	No	No	1
49035112611	Salt Lake	No	No	No	No	0
49035112612	Salt Lake	Yes	No	No	No	1
49035112613	Salt Lake	Yes	No	Yes	No	2
49035112614	Salt Lake	No	No	Yes	No	1
49035112615	Salt Lake	No	No	No	No	0
49035112616	Salt Lake	No	No	No	No	0
49035112617	Salt Lake	Yes	No	Yes	No	2
49035112618	Salt Lake	No	No	Yes	No	1
49035112619	Salt Lake	Yes	No	No	No	1
49035112700	Salt Lake	Yes	No	No	No	1
49035112804	Salt Lake	Yes	No	No	No	1
49035112805	Salt Lake	Yes	No	No	No	1
49035112810	Salt Lake	Yes	Yes	Yes	No	3
49035112812	Salt Lake	Yes	No	No	No	1
49035112813	Salt Lake	Yes	No	Yes	No	2
49035112814	Salt Lake	No	No	Yes	No	1
49035112815	Salt Lake	No	Yes	Yes	No	2
49035112816	Salt Lake	Yes	Yes	Yes	No	3
49035112817	Salt Lake	Yes	No	Yes	No	2
49035112818	Salt Lake	Yes	No	No	No	1
49035112819	Salt Lake	Yes	No	Yes	No	2
49035112820	Salt Lake	Yes	No	No	No	1
49035112821	Salt Lake	No	Yes	Yes	No	2
49035112822	Salt Lake	Yes	No	No	No	1
49035112823	Salt Lake	Yes	No	No	No	1
49035112904	Salt Lake	No	No	No	No	0
49035112905	Salt Lake	No	No	No	No	0
49035112907	Salt Lake	No	No	No	No	0
49035112912	Salt Lake	No	No	Yes	No	1

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035112913	Salt Lake	No	No	No	No	0
49035112914	Salt Lake	No	No	No	No	0
49035112916	Salt Lake	No	No	No	No	0
49035112917	Salt Lake	No	No	No	No	0
49035112918	Salt Lake	No	No	Yes	No	1
49035112920	Salt Lake	No	No	Yes	No	1
49035112921	Salt Lake	No	No	Yes	No	1
49035113007	Salt Lake	No	No	No	No	0
49035113008	Salt Lake	No	No	No	No	0
49035113010	Salt Lake	No	No	No	No	0
49035113011	Salt Lake	No	No	Yes	No	1
49035113012	Salt Lake	No	No	Yes	No	1
49035113013	Salt Lake	No	No	Yes	No	1
49035113014	Salt Lake	No	No	Yes	No	1
49035113016	Salt Lake	Yes	No	No	No	1
49035113017	Salt Lake	No	No	No	No	0
49035113019	Salt Lake	No	No	Yes	No	1
49035113020	Salt Lake	Yes	No	No	No	1
49035113101	Salt Lake	No	No	No	No	0
49035113102	Salt Lake	No	No	Yes	No	1
49035113105	Salt Lake	Yes	Yes	Yes	No	3
49035113107	Salt Lake	Yes	No	Yes	No	2
49035113108	Salt Lake	No	No	No	No	0
49035113305	Salt Lake	No	No	Yes	Yes	1
49035113306	Salt Lake	No	No	No	Yes	0
49035113307	Salt Lake	No	No	No	Yes	0
49035113308	Salt Lake	No	No	No	Yes	0
49035113309	Salt Lake	No	No	No	Yes	0
49035113310	Salt Lake	No	No	No	No	0
49035113406	Salt Lake	No	No	No	Yes	0
49035113407	Salt Lake	Yes	No	No	No	1
49035113408	Salt Lake	No	No	No	No	0
49035113409	Salt Lake	No	No	No	No	0
49035113410	Salt Lake	No	No	No	Yes	0
49035113411	Salt Lake	No	No	No	No	0

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035113412	Salt Lake	No	No	No	No	0
49035113413	Salt Lake	No	No	No	No	0
49035113505	Salt Lake	No	No	No	Yes	0
49035113509	Salt Lake	No	No	No	Yes	0
49035113510	Salt Lake	Yes	No	No	No	1
49035113511	Salt Lake	Yes	No	No	No	1
49035113512	Salt Lake	No	No	Yes	No	1
49035113513	Salt Lake	Yes	No	No	No	1
49035113514	Salt Lake	No	No	Yes	Yes	1
49035113515	Salt Lake	No	No	Yes	No	1
49035113520	Salt Lake	No	No	No	No	0
49035113521	Salt Lake	No	No	No	No	0
49035113522	Salt Lake	No	No	No	No	0
49035113523	Salt Lake	Yes	No	No	Yes	1
49035113525	Salt Lake	Yes	Yes	No	No	2
49035113526	Salt Lake	Yes	Yes	No	Yes	2
49035113527	Salt Lake	No	No	No	No	0
49035113528	Salt Lake	No	No	No	No	0
49035113532	Salt Lake	No	No	No	No	0
49035113533	Salt Lake	No	No	Yes	No	1
49035113534	Salt Lake	Yes	No	No	No	1
49035113535	Salt Lake	Yes	No	No	No	1
49035113536	Salt Lake	No	No	No	Yes	0
49035113537	Salt Lake	No	No	No	No	0
49035113538	Salt Lake	No	No	No	No	0
49035113539	Salt Lake	No	No	No	No	0
49035113600	Salt Lake	Yes	No	No	Yes	1
49035113701	Salt Lake	No	No	No	No	0
49035113702	Salt Lake	No	No	No	No	0
49035113801	Salt Lake	Yes	No	No	Yes	1
49035113802	Salt Lake	Yes	No	No	Yes	1
49035113803	Salt Lake	No	No	No	No	0
49035113903	Salt Lake	Yes	No	No	No	1
49035113904	Salt Lake	Yes	No	No	No	1
49035113905	Salt Lake	Yes	Yes	No	Yes	2

Census Tract	County	Extreme Heat	Wildfires	Flooding	Low-income	Total Hazards
49035113906	Salt Lake	Yes	Yes	Yes	Yes	3
49035113907	Salt Lake	Yes	Yes	Yes	No	3
49035114000	Salt Lake	Yes	No	Yes	No	2
49035114100	Salt Lake	No	No	Yes	No	1
49035114200	Salt Lake	No	No	Yes	No	1
49035114300	Salt Lake	Yes	No	Yes	No	2
49035114500	Salt Lake	Yes	No	Yes	No	2
49035114600	Salt Lake	No	No	Yes	No	1
49035114700	Salt Lake	Yes	Yes	Yes	No	3
49035114800	Salt Lake	No	Yes	No	No	1
49035115106	Salt Lake	Yes	Yes	No	No	2
49035115209	Salt Lake	Yes	Yes	No	No	2
49035980000	Salt Lake	Yes	Yes	Yes	No	2
49045130600	Tooele	No	Yes	No	Yes	1
49045130701	Tooele	No	Yes	No	No	1
49045130702	Tooele	Yes	Yes	No	No	2
49045130703	Tooele	Yes	Yes	No	No	2
49045130800	Tooele	No	Yes	No	No	1
49045130900	Tooele	Yes	Yes	No	Yes	2
49045131001	Tooele	No	Yes	No	No	1
49045131002	Tooele	No	Yes	No	Yes	1
49045131100	Tooele	No	Yes	No	No	1
49045131200	Tooele	No	Yes	No	No	1
49045980000	Tooele	No	No	No	No	0

Appendix D: Workforce Certification and Regional Landscape

Certifications Landscape

The table below lists key certification types needed to support SL-CLEAR measures. We anticipate using this research both to help prioritize programs and partners that can offer or scale up programs offering these certifications, as well as help promote and raise awareness for them.

While we discuss specific certifications that are especially applicable for each measure, we note that well-rounded training approaches are still critical to ensure new workers have attractive, well-rounded skillsets, including the relevant CCAP-related certifications. Additionally, accelerating market supply of specific tech certifications & training without increasing demand can contribute to wage deflation and poor employment rates.

GHG Reduction Measure Category	Relevant Trade(s)	Key Certifications
Building Energy	HVAC	• ASHRAE Building Energy Assessment Professional (BEAP), Building Energy Modeling Professional (BEMP) Certified Decarbonization Professional (CDP); High-Performance Building Design Professional (HBDP) • EPA Section 608 certification (required to handle refrigerants in heat pump and AC systems) • NATE certifications (North American Technician Excellence) in relevant specialties (eg, Heat Pump Service and Installation certification that is highly relevant as more homes install heat pumps) • Refrigeration Service Engineers Society (RSES) Certification

GHG Reduction Measure Category	Relevant Trade(s)	Key Certifications
		• HVAC Excellence Certification • Leadership in Energy and Environmental Design (LEED)
Building Energy	Electricians	• BPI (Building Performance Institute) • Certified Energy Manager (CEM) • Electric Vehicle Infrastructure Training Program (EVITP) certification is a key credential • High-voltage safety training (e.g. NFPA 70E certification) for 400V+ systems technicians work with.
Building Energy	Plumbing	• Certified Plumbing Design Technician (CPDT) offered by the American Society of Plumbing Engineers. including sustainable designs. • CPDT • International Association of Plumbing and Mechanical Officials (IAPMO) • American Society of Plumbing Engineers (ASPE), including green plumbing design (GPD) for sustainable plumbing practices, including water conservation and energy efficiency. • ASPE and their GPD certification is nationally recognized. • National Association of Plumbing-Heating-Cooling Contractors (NAPHCC) offers professional development resources for plumbers. • NAPHCC is nationally recognized

GHG Reduction Measure Category	Relevant Trade(s)	Key Certifications
		• LEED
Building Energy	General Industrial Decarbonization and Energy Auditors	• Certified Energy Manager (CEM) certification offered by the Association of Energy Engineers • Energy Management Systems (CP EnMS) to help facilities implement ISO 50001 • Association of Energy Engineers (AEE) Certifications, including Certified Energy Auditor (CEA) and the CEM certification (mentioned above). • Building Performance Institute (BPI) Certifications, including BPI Building Analyst (whole-house energy analysis) and the BPI Home Energy Professional (HEP) Energy Auditor, supported by DOE and the National Renewable Energy Laboratory (NREL) • BPI certification • Building Energy Assessment Professional (BEAP), an ANSI-Accredited Personnel Certification Program that validates competency to assess building systems and site conditions, analyze and evaluate equipment and energy usage, and recommend strategies to optimize building resources utilization • Building Analyst Technician (BA-T) and Building Analyst Professional (BA-P)

GHG Reduction Measure Category	Relevant Trade(s)	Key Certifications
Building Energy	Installers and Electricians	• Utah S202 license for PV systems or S215 license for Solar Thermal systems (or general electrical contractors with S200 or S201 licenses) • NABCEP PV Installation Professional certification demonstrates competence in system installation, design, and troubleshooting. • NABCEP offers an entry-level Photovoltaic Associate certification, which can be earned after a training course and exam. • Solar Energy International (SEI) installer training • Interstate Renewable Energy Council (IREC) accreditation • Utility-scale solar: Additional training in high-voltage operations (NFPA 70E electrical safety certification may be relevant. • Optional training: National Electrical Code (NEC) Article 690 (solar PV)
Building Energy	Technician and Fleet Maintenance	• ASE certifications for Electric/Hybrid Vehicle specialties (e.g. ASE L3 – Light Duty Hybrid/Electric Vehicle Specialist) • Manufacturer-specific EV training and certifications (e.g., Tesla's service technician training or GM's EV dealership technician certification programs) for those working on their electric models

GHG Reduction Measure Category	Relevant Trade(s)	Key Certifications
		• Fleet maintenance personnel may also seek certifications in electric powertrain maintenance • NAFA Certified Automotive Fleet Manager • Electric Vehicle Infrastructure Training Program
Building Energy	Battery Technician	• Electric Battery Safety Courses, including from Recycled Materials Association (ReMA) in collaboration with the Energy Security Agency (ESA). • Certified BESS Technician (CBESST) • Electric Vehicle Battery Packaging and Assembly (EVBPA) certification, offered by the Society of Manufacturing Engineers (SME) • EVBPA
General Support	Construction and Infrastructure Systems	• BREEAM (Building Research Establishment Environmental Assessment Method) • National Green Infrastructure Certification Program (NGICP)
Trees and Urban Forests	Various	• The International Society of Arboriculture (ISA) certifications for arborists, including Certified Arborist, Certified Tree Worker Climber Specialist, and ISA Certified Tree Worker Aerial Lift Specialist. • Tree Care Industry Association (TCIA) certifications, such as Certified Treecare Safety Professional (CTSP)

Regional Workforce Development Landscape

To support ongoing workforce development for CCAP measures and priorities, Salt Lake City also mapped regional programs focused on high-priority trades and occupations, based on the landscape and gap analysis. As with the Certifications Landscape, this table is meant as a starting point, highlighting major programs for potential outreach and partnership with the city in coming years. It is intended to capture most major providers and programs, but is not intended as comprehensive.

Electricians

Program Name	Description
Bridgerland Technical College — Electrical Apprenticeship	Provides classroom instruction for Residential Journeyman (360 hours + 4,000 OJT hours) and Journeyman Electrician (720 hours + 8,000 OJT hours) pathways. Courses follow the National Electrical Code and are taken over eight semesters while apprentices gain paid on-the-job experience with employers.
Davis Technical College — Electrical Apprenticeship	Offers NEC-focused training, electrical systems instruction, and safety practices as the classroom component of an electrical apprenticeship. Complements on-the-job learning with an employer to meet licensing requirements.
Independent Electrical Contractors (IEC) of Utah — Electrical Apprenticeship	Local chapter of the national IEC association, offering merit-shop (non-union) apprenticeship training. Uses an earn-while-you-learn model combining paid OJT with classroom instruction at the IEC training facility in Midvale.

Program Name	Description
Salt Lake Community College — Electrical (Independent) Apprenticeship	Delivers at least 576 hours of required classroom instruction through day, evening, or Saturday classes. Does not place apprentices in jobs; students must secure employment and a sponsoring employer separately.
Tooele Technical College — Electrical Apprenticeship	Covers NEC concepts, electrical theory, and safety, providing classroom training required for licensure. Apprentices complete OJT with employers while meeting Utah's licensing requirements.
WECA Utah — Commercial Electrical Registered Apprenticeship	Federally approved commercial electrical apprenticeship recognized by Utah's Division of Professional Licensing. Apprentices earn paid OJT with member contractors while completing structured classroom blocks in Woods Cross.
Weber Tech College (Ogden-Weber Technical College) — Electrical Apprenticeship	Offers related instruction in NEC application, blueprint reading, and hands-on competencies like conduit and controls. Leads to a 24-credit Certificate of Program Completion through a defined course sequence.
Uintah Basin Technical College — Electrical Apprenticeship Classroom Training	Provides the classroom component for journeyman licensing over four years (two courses per year). Students must hold a Utah apprentice license after starting the program.

Program Name	Description
Utah Electrical Training Alliance (UTETA) — IBEW 354/NECA Apprenticeship	Union JATC program training Inside Wireman and Telecommunications Installer-Technicians. Combines paid OJT with classroom instruction, preparing apprentices for industry credentials and state licensing.
Mountainland Technical College (MTECH) — Electrical Apprenticeship	Four-year, 720-hour related instruction program that meets Utah's educational requirements. Complements paid, employer-based OJT and prepares apprentices for state licensing exams.
Salt Lake City Department of Airports (SLCDA) — Electrical Apprenticeship	Employer-sponsored program providing all prerequisites for journeyman licensing. Apprentices gain paid OJT on complex airport systems while attending trade school for classroom hours.

Heating, Ventilation, and Air Conditioning (HVAC)

Program Name	Description
Apprenticeships.utah.gov	The state's registered apprenticeship system supports "earn-and-learn" training models across trades, including HVAC, combining paid on-the-job experience with classroom instruction. Apprentices earn industry-recognized credentials.
Utah Career Center — HVAC&R Apprenticeship	A five-year apprenticeship program administered with UA Local 140 and Utah Mechanical Contractors Association. Includes ~1,800 hours of paid OJT per year and night classes three times weekly, culminating in journey-level certification.

Program Name	Description
Weber Technical College — HVAC Technologies Apprentice Related Instruction	Offers related classroom instruction to complement HVAC apprenticeship programs. Includes hands-on curriculum tailored to support apprentices in HVAC roles.
Salt Lake Community College (SLCC) — Heating, Cooling, and Refrigeration (HVAC) Apprenticeship	A four-year HVAC apprenticeship requiring 8,000 hours of OJT and at least 576 hours of related instruction. Prepares students for certifications such as EPA, RMGA, NATE, and others.
Fortis College (Salt Lake City) — HVAC-R Training Program	A career-focused HVAC-R training program offered at the Salt Lake City campus combining classroom instruction and lab hands-on work. Prepares students for entry-level HVAC positions and certification.
Mountainland Technical College (MTECH) — HVAC Apprentice/Certificate Programs	Offers a 360-hour HVAC apprenticeship-related instruction program for apprentices, plus a 60-hour automotive HVAC certificate. Designed for hands-on and theory-based learning while employed.
Ogden-Weber Technical College — HVAC/R Service Technician Commercial Apprentice	Provides a certificate-based HVAC/R apprenticeship program with classroom and hands-on instruction (~740 hours reported). Evening classes available.
Davis Technical College — Heating and Air Conditioning Program	A shorter-term certificate program (approx. 720 hours) in HVAC covering system installation, maintenance, and troubleshooting. Highly practical with a strong foundation.

Program Name	Description
UVU (Utah Valley University) — HVAC Technology Certificate & Associate Degree	Offers certificate and associate degree programs in HVAC technology focusing on diagnostics, system design, and energy efficiency. Tuition ranges approximately $3,500–$5,000 per year for residents.

Plumbers

Program Name	Description
Utah Apprenticeship (Statewide)	The state's registered apprenticeship system supports "earn-and-learn" training models for plumbing and other trades, combining paid on-the-job training with classroom instruction. A statewide framework for apprenticeship.
Utah Career Center — Plumbing Apprenticeship	A five-year, union-affiliated apprenticeship with UA Local 140 and Utah Mechanical Contractors Association. Includes ~1,800 hours of OJT per year and three weekly night classes combining lecture and hands-on learning.
Ogden-Weber Technical College — Plumbing Apprenticeship	Offers the related classroom training component for plumbing apprentices. Students must be employed and hold an apprentice license; employer registers apprentice with DOL if desired.
Bridgerland Technical College — Plumbing Apprenticeship	Requires 8 semesters (720 hours) of classroom instruction and 8,000 hours of on-the-job training for journeyman plumber pathway. Also includes a residential journeyman option with 6 semesters and 6,000 hours.

Program Name	Description
Davis Technical College — Plumbing Apprenticeship	Delivers the classroom training required (576 hours) to sit for the State Journeyman Plumber Exam and complements apprentices' on-the-job training. Apprentices must find employment independently.
Mountainland Technical College — Plumbing Apprenticeship	Fulfills the educational requirements for the State Journeyman Plumber Exam. Apprentices must work under a licensed master or journeyman plumber to complete program.
Salt Lake Community College — Plumber (Independent) Apprenticeship	Provides the related instruction (576 hours) required for journeyman licensing; apprentices must arrange their own on-the-job training under supervision to qualify for the exam.

Solar PV Installers

Program Name	Description
Intermountain Weatherization Training Center (Clearfield)	Intermountain Weatherization Training Center (Clearfield)
Salt Lake Community College – Solar Photovoltaic Programs (continuing ed, advanced systems, basics)	Offers certificate programs in Solar Sales (17 weeks), Solar Installation (26 weeks), and a one-week Solar Commercial Installation workshop. Approved for NABCEP and DOPL recertification credits, with hands-on labs for both residential and commercial systems, and partially funded through STIT for eligible Utah residents

Program Name	Description
Solar Energy International (SEI)	Offers online and limited in-person courses in solar energy and vocational certificates, including Renewable Energy Applications and Commercial Photovoltaic Systems. Widely recognized and flexible; available remotely.
Solar Ready Vets	A solar workforce development program funded by the U.S. Department of Energy (DOE) Solar Energy Technologies Office (SETO) that connects veterans, transitioning military service members, and military spouses with career training, professional development, and employment opportunities in the solar industry.
SolPowerPeople	Provides entirely online micro-class training modules in topics like photovoltaics, solar design, and fundamentals—flexible for self-paced learners entering the solar field.
UVU – Solar Panel Installer Training	A 40-hour fully online course covering solar panel installation, including components such as inverters, charge controllers, and batteries—designed for practical installer skill development. careertraining.uvu.edu

Electric Vehicle Technicians

Program Name	Description
Weber State University – EV Boot Camp / Hybrid & Electric Vehicle Training	A three-phase training path: Phase I (online High-Voltage Safety), Phase II (online Hybrid & Electric Vehicle Systems), and Phase III (one-week hands-on Boot Camp on campus). Participants learn to service, diagnose, and repair BEVs, PHEVs, and HEVs using real vehicles and PPE safety practices. Also offers Certificate of Proficiency program offering advanced training in hybrid and electric vehicle systems, designed to meet industry needs for skilled EV technicians.
Utah Clean Cities / U-REDI – EV Maintenance Technician Train-the-Trainer	Workforce development initiative supporting high schools and colleges to adopt EV maintenance curricula by providing training and EVs for hands-on instruction—part of broader efforts by U-REDI to expand regional energy workforce capacity.
EVITP (Electric Vehicle Infrastructure Training Program)	Nationally recognized course focused on training certified electricians to install and maintain EV charging infrastructure (EVSE). Covers standards, customer relations, NEC, and charging technology. Utah has participating providers.
UVU – Electric Vehicle Fundamentals (EVF) Course	An introductory course preparing learners for the EVF credential, suitable for entry-level careers in the electric vehicle industry.

Drivers

Program Name	Description
Apprenticeship Utah	The Utah Department of Workforce Services offers apprenticeship programs in the transportation sector, including for heavy truck drivers. These programs combine on-the-job training with related instruction, leading to industry-recognized credentials and a nationally recognized certification from the U.S. Department of Labor.
Associated General Contractors of Utah	AGC of Utah provides apprenticeship programs for various construction-related trades, including truck driving. These programs involve on-the-job training hours and related instruction, with curricula from the National Center for Construction Education and Research (NCCER).
Salt Lake Community College (SLCC) – Professional Truck Driving Program	SLCC offers a Class A CDL truck driving program that spans six weeks (9 credit hours) and covers basic driving, safety, and other essential skills.
Mountainland Technical College (MTECH) – Commercial Driver's License Class A	Designed for aspiring professional truck drivers, this program prepares students with the essential skills and knowledge to confidently navigate the roads. The program length is 4-7 weeks, with a total cost of $2,330.
Davis Technical College – Commercial Driver's License Class A	This program provides professional driver training with classroom theory and in-vehicle hands-on training, meeting the Entry-Level Driver Training (ELDT) requirements set forth by the Federal Motor Carrier Administration (FMCSA).

Program Name	Description
Utah State University (USU) – Commercial Driver's License (CDL) Program	USU offers a Technical Certificate in Commercial Driver's License (CDL), providing one-on-one driver training with instruction in laws and regulations, preparing students for a career in this field
Bridgerland Technical College – Commercial Driver's License Class A	This program prepares students with the skills and knowledge needed to join the professional driving industry, fulfilling Entry-Level Driver Training requirements

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