

San Diego Jobs Impact Analysis | Summary of Results

Impacts from a Proposed Municipal Energy Implementation Plan and All-electric Reach Code & Considerations for a Longer-term Transition Away from Fossil Fuels

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December 2021

Overview of Project and Key Findings

Under Mayor Todd Gloria, the City of San Diego has committed to an ambitious goal of reaching net zero greenhouse gas (GHG) emissions by 2035. Achieving this goal will require the City of San Diego to decarbonize its building sector by transitioning away from burning natural gas and other fossil fuels throughout the built environment—which is an objective that is shared by both the County of San Diego and the State of California.

The City of San Diego has proposed two initial policies to begin this transition toward building decarbonization: 1) The Municipal Energy Implementation Plan to upgrade all municipal facilities to achieve zero carbon emissions by 2035, and 2) a potential policy for new construction that would require all new buildings to be built “all-electric,” with no use of natural gas (also known as a “Reach Code”).

The Building Electrification Institute (BEI) and Inclusive Economics assessed the near-term, direct impacts of these two specific policies on building construction, building retrofit, gas utility, and broader gas infrastructure jobs in San Diego. Additionally, the team considered the longer-term impacts that a broader building decarbonization effort could have on the countywide gas utility and gas infrastructure workforce. As part of the assessment, BEI, Inclusive Economics, and the City engaged with key labor partners to collaborate on data collection, review the assumptions and methodology, and discuss key questions that could be answered by this research. This analysis is intended to help the City of San Diego and its partners plan for the potential workforce needs and job impacts from these policies.

Table 1: Types of Jobs Assessed

Sector	Types of Workers Included
Building Construction and Retrofit Jobs	Jobs associated with the direct construction of new buildings and retrofits within existing buildings. Includes general construction laborers, HVAC technicians, electrical workers, plumbers, carpenters, insulators, engineers, management jobs, and others.
Gas Utility Jobs	Jobs that are directly employed by the local utility (San Diego Gas & Electric, or SDG&E). Includes pipe trades, operations and maintenance workers, general construction laborers, management jobs, service and sales occupations, and others.
Gas Infrastructure Jobs	All other jobs in the maintenance and expansion of countywide natural gas infrastructure. Includes jobs contracted out by SDG&E to work on pipefitting, trenching, and excavation.

In the near-term, this analysis found that **the Municipal Energy Implementation Plan could create 60-90 average annual building retrofit jobs by 2035**, which will primarily benefit HVAC technicians, electrical workers, and general construction laborers and carpenters. Meanwhile, an all-electric Reach Code policy for new construction could have some negative job impacts for residential building construction, gas utility, and gas infrastructure jobs. **Implementing a Reach Code could result in 60-65 fewer average annual residential building construction jobs in San Diego**, which are expected to primarily affect plumbers. The impacts of the Reach Code should be taken in the context, however, of the fact that the current residential construction workforce totals 32,000 jobs in San Diego County,¹ and the projected new construction indicates that this total workforce will need to increase significantly in the next decade.² An all-electric Reach Code policy would result in a slight reduction in jobs relative to the same number of homes built with gas connections, but this does not necessarily equate to immediate job losses.

Additionally, there may also be some negative impacts from the Reach Code for gas utility and gas infrastructure workers that result from reducing the demand to build out new gas infrastructure. The exact effect on these jobs is difficult to predict, but in the near-term, an estimated 100-175 gas utility workers employed by San Diego Gas & Electric (SDG&E) could see roughly a 5-10% reduction in their work hours, and up to 30 SDG&E workers could see up to a 90% reduction in work hours associated with expanding the gas system.³ These near-term impacts for SDG&E workers are expected to be relatively minimal compared to the total of roughly 800 gas utility workers employed by SDG&E, because most of these total jobs are associated with operating, repairing, and maintaining the existing gas system rather than expansion. Moreover, a workforce reduction could be managed to align with worker retirements to avoid layoffs or other negative impacts. Additionally, there is a portion of countywide gas infrastructure workers contracted out by SDG&E for pipefitting, trenching, and excavation, who could also face some negative near-term impacts from a Reach Code. However, industry interviews suggest that most of these workers also focus on maintenance and operations of existing systems, rather than expanding the system. More data is needed to quantify the impacts of a Reach Code on these gas infrastructure workers.

Table 2: Overview of Near-Term Findings from Two City Policies

Net Annual Job Impacts from SD's Municipal Energy Implementation Plan (2022-2035)	60-90 average annual municipal building retrofit jobs created ⁴
Net Annual Job Impacts from a potential All-Electric Reach Code (2023-2035)	60-65 fewer residential building construction jobs ⁵ 100-175 gas utility workers could see a 5-10% reduction in work hours

¹ Sourced from IMPLAN economic data (2019).

² This projection is based on meeting current SANDAG projections for new construction in San Diego County. SANDAG projections were shared directly with the City of San Diego and the BEI team upon request.

³ Based on analysis of IBEW 465 worker data.

⁴ This methodology assumes 1,800 annual work hours for a full time equivalent (FTE) worker for retrofits, totaling roughly 1,410,000 – 2,100,000 work hours over 13 years.

⁵ This methodology assumes 2,000 annual work hours for an FTE new construction worker, totaling roughly 1,450,000 work hours over 12 years. A higher average number of annual hours is assumed for new construction workers because of fewer downtime hours associated with new construction projects.

Net Annual Job Impacts from a potential All-Electric Reach Code (cont.)	<p>Up to 30 gas utility workers could see up to a 90% reduction in work hours⁶</p> <hr/> <p>A portion of Countywide gas infrastructure workers who are contracted-out by SDG&E for pipefitting, trenching, and excavation will likely face some near-term impacts. More data is needed to quantify this impact.</p>
Total SD County Workforce (IMPLAN 2019)	<p>Up to 2,210,000 jobs⁷</p>

Over the long-term, the broader effort to decarbonize buildings and achieve the City’s Climate Action Plan goals will have a much more significant impact, both positive and negative, on the regional workforce. **Additional policies to decarbonize all existing buildings and achieve local and regional climate goals would create thousands of jobs across San Diego County.** With intentional policymaking, it is possible to ensure that these are good, family-sustaining jobs and increase union density across the region. At the same time, **regional gas utility and gas infrastructure jobs will almost certainly be negatively impacted by 2035.** Given the current trajectory of state and regional policy, this is likely to be true regardless of any policies that either the City or County of San Diego enacts. As such, it is important to begin planning a reduced gas workforce now to ensure there is a just transition away from fossil fuels in San Diego.

Ensuring that new jobs are family-sustaining jobs is also critical to help build and sustain the middle class in San Diego—which are jobs that unions are typically able to provide. The City can look to other sectors beyond building decarbonization, such as water and sewer infrastructure, district energy, and other infrastructure projects to create high-quality jobs and ensure union workers can participate. These new jobs could more than make up for the potential job losses of transitioning away from natural gas, as can growing union density across construction activities. Throughout this process, it will be important for the City to work closely with its labor partners on a strategy to identify the range of necessary infrastructure investments to create good jobs for San Diegans.

Project Methodology and Results

Municipal Energy Implementation Plan

The City of San Diego’s Municipal Energy Implementation Plan provides the detailed pathway to achieving net zero carbon emissions in all municipal buildings by 2035, as required by the City’s Municipal Energy Strategy. The Municipal Energy Implementation Plan outlines specific actions for optimizing energy use through the deployment of smart energy technologies, ensuring new municipal construction and major renovation projects lead by example, educating and engaging City staff and community members, and decarbonizing the City’s municipal building portfolio.⁸

⁶ Analysis based on IBEW 465 data on current workforce.

⁷ IMPLAN is an input-output economic model that uses economic data from government surveys, multipliers, and demographic statistics to map industry spending, employment, economic transactions and other impacts in the local economy. This analysis uses IMPLAN’s underlying “study area data” for its findings.

⁸ City of San Diego, “Municipal Energy Strategy,” 2021. <https://www.sandiego.gov/sustainability/energy-and-water-efficiency/muni-energy-strategy>

Near-term Impacts on Building Retrofit Jobs

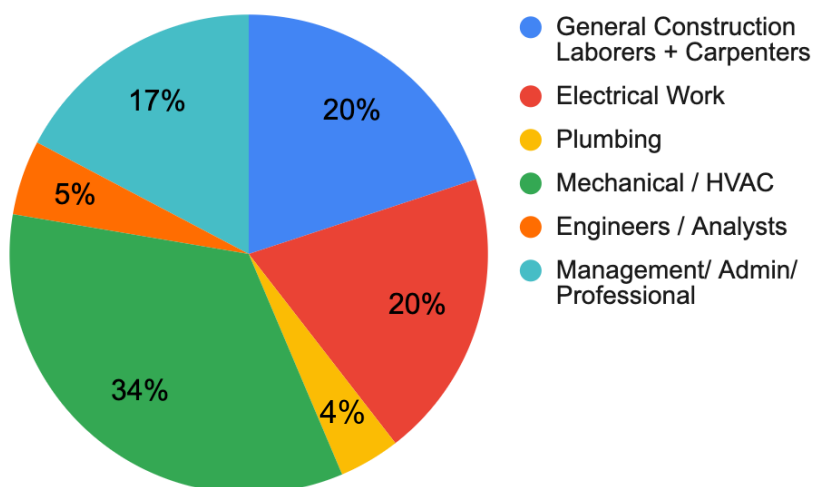
This analysis assesses the direct, near-term impacts on building retrofit jobs from the Municipal Energy Implementation Plan, assuming the City makes sufficient public investments to achieve its targets. The methodology for this analysis begins with San Diego’s municipal building data, including the total number of buildings and square footage owned and operated by the City. The analysis assumes the City will meet its policy goal of increasing energy efficiency and fully electrifying all buildings by 2035. Opportunities for electrification upgrades are determined based on current gas saturation for municipal buildings. The analysis also assumes that 70% of small buildings and 50% of large buildings will require panel upgrades, and that 95% of all buildings need energy efficiency improvements.⁹ Technology pathways and relevant costs are applied to determine total costs of upgrades, which are then converted to jobs based on the building sector and type of retrofit work.¹⁰ This methodology results in job outputs by year (**Table 3**) and by trade (**Graphic 1**).

Table 3: Building Retrofit Job Impact Results from the Municipal Energy Implementation Plan

Average Annual Retrofit Jobs Gained (2022-2035)	60-90 jobs/year ¹¹
Small Municipal Buildings (250 total buildings, <25,000 sq ft)	15-25 jobs/year
Large Municipal Buildings (50 total buildings, >25,000 sq ft)	45-65 jobs/year
Total Upfront Investment Required	\$170M - \$255M

Graphic 1: Building Retrofit Job Impact Results by Trade

TOTAL JOBS GAINED: 60-90 Jobs/Year



Based on this assessment, there are gains of 60-90 average annual building retrofit jobs through 2035 from retrofitting municipal buildings to be highly energy efficient and all-electric. These job gains would primarily go to general construction laborers and carpenters, electricians, and HVAC workers. To ensure

⁹ These assumptions are based on internal analysis by the San Diego Department of Sustainability and Facilities Department.

¹⁰ Calculations use jobs/\$million multipliers from IMPLAN. Full methodology is from Inclusive Economics’ proprietary model.

¹¹ This methodology assumes 1,800 annual work hours for an FTE worker for retrofits, totaling roughly 1,410,000 – 2,100,000 work hours over 13 years.

that these upgrades deliver the projected energy benefits, the City can incorporate skilled and trained labor standards into the projects, which can also help ensure that the jobs created are good quality jobs and the highest quality of work is achieved.

Near-term Impacts on Gas Utility and Gas Infrastructure Jobs

There are no expected near-term impacts to gas utility and gas infrastructure jobs from the Municipal Energy Implementation Plan. This is because municipal buildings account for only 1.3% of citywide gas usage, meaning that eliminating gas usage in these buildings by 2035 would reduce citywide gas use by only one-tenth of one percent annually.

Reach Code Policy for New Construction

To jumpstart the transition away from fossil fuels in buildings and to ensure that new buildings are built all-electric, the City of San Diego is considering following the lead of dozens of cities across the state to develop an all-electric Reach Code policy. A Reach Code is an amendment to the local building code that will strongly encourage or require that all new buildings in the City of San Diego be built to use electricity instead of natural gas for all end uses, including heating, cooling, hot water, and cooking.

While a Reach Code could require both commercial and residential new buildings to be all-electric, this analysis focuses on residential new construction. Significant shifts between capital and labor costs are not expected for new all-electric commercial buildings as compared to mixed fuel commercial buildings, which indicates there would be minimal labor impacts from the Reach Code for commercial construction workers.¹² Additionally, local labor partners reported that the installation of all-electric HVAC equipment is already underway and not causing a discernible change in work hours in commercial construction.¹³

Near-term Impacts on Residential Building Construction Jobs

An all-electric Reach Code would impact the local residential building construction workforce by shifting work involved in new residential construction away from installing gas pipes and infrastructure in buildings. The methodology to estimate these impacts uses the total number of single-family home and multifamily units that the San Diego Association of Governments (SANDAG) projects will be constructed within the City of San Diego between 2023-2035.¹⁴ Using Energy and Environmental Economics (E3) data on the work hours associated with all-electric versus mixed fuel residential buildings, this analysis calculates the difference in total jobs by year and by trade that would be impacted.^{15, 16} The analysis assumes that the City's Reach Code would go into effect beginning in 2023, and that all new residential buildings built through 2035 would be constructed to be all-electric, with no gas end uses.

¹² Based on internal BEI and Inclusive Economics analysis.

¹³ This conclusion is also supported by a 2014 market assessment of commercial building systems in California completed for the California Public Utilities Commission (CPUC), which finds that nearly 60% of existing commercial building heating systems in SDG&E territory are electric resistance or heat pump systems, while less than 30% of commercial heating systems are gas heating systems. See: Itron, Inc., *California Commercial Saturation Survey*, August 2014 (page 373).

http://calmac.org/publications/California_Commercial_Saturation_Study_Report_Finalv2.pdf

¹⁴ SANDAG projections were shared directly with the City of San Diego and the BEI team upon request.

¹⁵ Energy and Environmental Economics, Inc., "Residential Building Electrification in California," April 2019.

<https://www.ethree.com/e3-quantifies-the-consumer-and-emissions-impacts-of-electrifying-california-homes/>

¹⁶ This methodology assumes 2,000 annual work hours for an FTE new construction worker, totaling 1,450,000 work hours over 12 years. A higher average number of annual hours is assumed for new construction workers because of fewer downtime hours associated with new construction projects.

The results of this analysis indicate that an all-electric Reach Code could result in 60-65 fewer direct residential building construction jobs created annually (**Table 4**). The job impacts are particularly concentrated for plumbers, who will no longer be needed to install natural gas piping infrastructure in new residential buildings. Impacts for unionized labor specifically would be concentrated within the large multifamily building sector, where current construction jobs are more likely to be unionized.

Table 4: Residential Building Construction Job Impacts from an All-Electric Reach Code*

Average Annual Job Reductions (2023-2035)	Single Family Homes	Small Multifamily	Large Multifamily	Totals*
General Construction Labor	(0-5)	(0-5)	(10-15)	(15-20)
Electrical Work	0-5	0-5	0-5	5-10
Plumbing	(5-10)	(10-15)	(25-30)	(45-50)
HVAC/Mechanical	0	(0-5)	(0-5)	(0-5)
Totals	(5-10)	(15-20)	(35-40)	(60-65)

*Results are presented as a range based on outputs from the model and rounded to the nearest 5.

The residential building construction job impacts of the Reach Code should be taken in the context of the fact that the current residential construction workforce in San Diego County totals 32,000 jobs, and the projected new construction across San Diego County indicates that this total workforce will increase significantly over the next decade.¹⁷ Although enacting the Reach Code would result in slightly fewer jobs created than without the policy, these losses are smaller than the job gains expected from growth in residential construction jobs more broadly. This means that even under the Reach Code policy, the County would still see a net gain in residential construction jobs over this timeframe. Since all-electric residential construction reduces building costs, the Reach Code could even help spur more development and job creation. Furthermore, ensuring the development of a higher percentage of higher density multifamily housing—which would also support the City’s goals to increase transit-oriented development—would increase job opportunities for more highly skilled and trained union workers.

It is also important to keep in mind that the state of California’s proposed updates to the Title 24 Energy Code will strongly encourage (but not require) all-electric new construction beginning in 2023. This will result in at least some of the impacts to residential building construction jobs presented in this analysis, regardless of whether an all-electric Reach Code policy is implemented in San Diego.

Near-term Impacts on Gas Utility Jobs

In addition to impacting residential building construction jobs, a Reach Code will also create some minimal negative impacts for gas utility workers employed by San Diego Gas & Electric (SDG&E), which would result from reducing demand for new gas infrastructure expansion. SDG&E’s gas utility workforce includes workers such as equipment technicians, laborers, welders, and repair specialists. This analysis found that

¹⁷ Current residential workforce projection is from IMPLAN (2019). The job growth projection is based on meeting current SANDAG projections for new construction in San Diego County.

across a total of roughly 800 gas utility workers directly employed by SDG&E, an estimated 100-175 workers could face around a 5-10% loss of work hours due to a shift to all-electric new construction. A smaller number of roughly 30 workers who specialize in new gas infrastructure expansion (which include gas underground technicians, service technicians, laborer underground technicians, working foremen, and gas pipe welders) could face up to a 90% reduction of work hours—meaning these workers face the highest, near-term risk from all-electric residential new construction. These near-term impacts are relatively minimal compared to the total gas utility workforce, however, because most gas utility jobs are associated with operating, repairing, and maintaining the existing gas system and serving existing customers. This workforce reduction could also potentially be managed to align with planned utility worker retirements in order to avoid layoffs and help mitigate any other potentially negative impacts.

Near-term Impacts on Gas Infrastructure Jobs

In addition to the workers directly employed by SDG&E, there are an estimated 700-900 workers who complete work that is contracted out by the utility to support both maintenance and expansion of its gas infrastructure. Many of these gas infrastructure workers are union-represented pipefitters and construction laborers who work on pipefitting, trenching, and excavation.

Industry interviews suggest that impacts from a Reach Code policy to this contracted out workforce would also be minimal, since the majority of these workers focus on maintenance and operations of the existing gas system, rather than gas system expansion. However, some portion of these workers may be impacted by a shift in new construction that reduces this demand for gas infrastructure expansion. It is conceivable that some of these workers will face a near-term reduction in hours from Reach Code policy—although it is important to consider that the City’s proposed policy is still only one component in a broader shift away from natural gas in new construction that is already underway.

While the near-term job impacts from a Reach Code policy are expected to be minimal for both gas utility and gas infrastructure workers, it is still important for the City to work with its labor partners to more clearly identify the workers who are most at-risk and collaborate on solutions to prevent or help mitigate possible job losses. In a strong construction market with growing demand for higher density development, there are many new opportunities to create good quality jobs to help mitigate these near-term impacts. Moreover, other critical near-term public investments—such as those needed to upgrade San Diego’s aging water and sewer infrastructure—could more than offset potential job losses for impacted workers. The City should begin working with its labor partners now to plan for these opportunities.

Long-term Impacts from the Broader Transition Away from Fossil Fuels

Over the long-term, the broader effort to decarbonize buildings and achieve the City’s Climate Action Plan goals will have a much more significant impact—both positive and negative—on the local and regional workforce. Policies to retrofit all existing buildings and achieve other local and regional climate goals would create thousands of jobs across San Diego County by 2035. With intentional policymaking, it is possible to ensure that the jobs created in this transition are family-sustaining jobs and to increase union density across more sectors of the economy.

While the clean energy transition will create many new jobs, for gas utility and gas infrastructure jobs specifically, there will almost certainly be significant and negative impacts for these workers. Given the

current trajectory of state and regional policy to address climate change and transition away from fossil fuels, along with rising energy prices and already declining gas usage in the region, gas use is expected to decrease markedly in the coming years—meaning that these risks already exist regardless of any new policies the City of San Diego enacts. As such, it will be critical for the City and other regional policymakers to begin planning as soon as possible for opportunities to mitigate these negative impacts to ensure there is a just transition away from fossil fuels across the San Diego region.

The scope of this analysis does not include identifying the specific gas utility and gas infrastructure jobs that would be lost over the long-term, in part because this will be highly dependent on the specific policies enacted at the local, regional, and state level. Instead, this analysis reviews county-level data from IMPLAN, SDG&E, and IBEW 465 to better understand the total universe of gas utility and gas infrastructure workers and which occupations could be at risk over the long-term from a building decarbonization effort.

Long-term Impacts on Gas Infrastructure Jobs

Across San Diego County, there are an estimated total of 6,200 jobs associated with the distribution of natural gas, including both the maintenance and expansion of the system.¹⁸ This total includes a vast range of occupations, including office and administrative support, sales, legal services, engineering, and more. This number is also inclusive of the gas utility and gas infrastructure jobs described above, as well as gas appliance repair jobs and gas plumbing in buildings. While this analysis estimated the direct impacts of two specific near-term policies, further analysis would be needed to determine if, when, and how workers in the gas industry could be affected by a broader transition. Additionally, many of the occupations represented in the gas industry are represented across many other industries—indicating that many workers may find employment in non-gas related sectors.

Within the gas distribution industry however, there is a subset of workers who will likely face the most barriers to finding re-employment, because the type of work that they do is more specialized and the skills associated with their work might not be as easily transferable to other positions. **Table 5** displays the occupation categories of workers who are likely most at-risk over the long term from a broader building decarbonization effort. These workers include gas plant operators, pipefitters, steamfitters, pipelayers, roustabouts, gas compressor and pumping station operators, and others.

Table 5: Most At-Risk Gas Infrastructure Industry Jobs*

Total Gas Infrastructure Industry Jobs (Source: IMPLAN, 2019)	6,200 jobs
Installation, Maintenance, and Repair Occupations	1,100 jobs
Production Occupations	400 jobs
Construction + Extraction and Transportation Occupations	400 jobs
Total Most At-Risk Natural Gas Distribution Jobs	1,900 jobs

*Results are rounded to the nearest 100.

¹⁸ Based on IMPLAN (2019) outputs for natural gas distribution jobs in San Diego County.

Long-term Impacts on Gas Utility Jobs

There will also be long-term impacts from a transition away from gas to SDG&E's gas utility workforce. **Table 6** shows the total number of both union-represented and non-union represented SDG&E workers. This worker data is also included in the IMPLAN data, although it is difficult to match these to exact occupations within the IMPLAN dataset.

Table 6: **Total SDG&E-Employed Gas Utility Workers***

Union Represented Gas Utility Jobs (Source: IBEW 465)	600 jobs
Non-Union Represented Gas Utility Jobs (Source: SDG&E)	200 jobs
Total SDG&E-Employed Gas Utility Jobs	800 jobs

*Results are rounded to the nearest 100.

While many gas utility workers will have the necessary skills and training to transition to electric utility and infrastructure jobs, the long-term effort to decarbonize buildings could put some of these workers at risk of job loss, particularly if they are too close to retirement to re-train for other work. Given this reality, it is critical for the City, SDG&E, and their labor partners to understand and implement policies and activities to mitigate those risks. The City has the opportunity to ensure future public investments create new, high quality jobs and support the training and re-employment of all at-risk gas workers. In addition, advanced planning is necessary for securing pensions, supporting bridges to retirement, wage insurance, and other worker protections to ensure a just transition.

Key Opportunities to Mitigate Job Losses and Protect Workers

Over the long-term, achieving the City of San Diego's Climate Action Plan goals and meeting broader environmental and resiliency needs have the potential to create thousands of jobs across the San Diego region. To mitigate the projected job losses from building decarbonization, it can be helpful to look beyond building decarbonization policies and into other sectors where investments are needed, such as water and sewer infrastructure, carbon-free district energy, and other public construction projects that may include project labor agreements (PLAs), prevailing wage standards, and/or skill requirements that ensure employment of a high-skilled workforce. The City and the region can partner closely with its workforce and labor partners to develop and implement a strategy that covers a range of necessary environmental, climate, and resiliency investments to create good jobs for San Diegans.

BEI and Inclusive Economics identified several initial opportunities that could support high quality job creation in San Diego, which the City can evaluate further together with key stakeholders. These potential opportunities include, but are not limited to:

- **Invest in higher-density housing construction and transit-oriented development.** Not only will this strategy help San Diego reach its housing and climate goals by providing more housing options and improving access to walking, biking, and transit, but these investments can also help support the creation of more good quality jobs in San Diego. Currently, taller buildings require more highly-

skilled and trained workers who can command higher wages for their skills. Additionally, there is already greater union density in this sector to help ensure that these jobs provide family-sustaining wages and benefits.

- **Accelerate existing building retrofits and ensure there is a high-skilled workforce to complete this work.** To meet the City's ambitious goal of phasing out natural gas use in 90% of existing buildings by 2035, the City will need to rapidly accelerate retrofits across its buildings, which has the potential to create thousands of local jobs. The vast majority of San Diego's existing building stock is made up of single-family homes or small residential buildings, which do not typically employ unionized workers or create family-sustaining jobs. As such, a key opportunity will be to help ensure this work is performed by skilled and trained workers who will be able to complete high quality installations and who are compensated accordingly.
- **Encourage or require onsite water reuse for buildings.** Given the San Diego region's water supply challenges, which will be exacerbated by climate change, a promising opportunity is to encourage more on-site water reuse systems for both new and existing buildings. These systems reclaim water used within a building, treat it, and then reuse it for other on-site purposes such as irrigation. This option was deployed in San Francisco, where an ordinance requiring water reuse in all newly constructed buildings over 100,000 square feet was enacted after the passage of the City's all-electric Reach Code.^{19, 20} The San Diego County Board of Supervisors is currently considering a separate ordinance to make it easier to install water reuse systems, which could pave the way for more opportunities across San Diego.
- **Continue to invest in needed citywide water and sewer upgrades.** The City has recently prioritized water and sewer investments to address a backlog of infrastructure needs, which are already generating good quality jobs across the region. One prime example is the Pure Water recycling project, which will help San Diego withstand future droughts and will also create thousands of good-paying, local jobs thanks to its project labor agreement (PLA). The City projects an additional need of at least \$3.2 billion over the next five years for its water, wastewater, and stormwater infrastructure needs.²¹ These investments are necessary to protect San Diegans against water pollution and the rising threat of flooding as a result of climate change, and they also have the potential to create thousands more good-quality local jobs for residents, especially if they include appropriate skill and labor requirements for workers.
- **Continue enabling utility-scale renewable energy and energy storage projects.** Thanks to San Diego Community Power, San Diego is well-positioned to achieve 100% renewable electricity by 2035, which is essential for achieving net zero emissions in the city and broader region. Delivering on this promise will require continued investments in new utility-scale renewable energy and

¹⁹ "Supes Increase Water Reuse Requirements For New Buildings," The San Francisco Chronicle. September 22, 2021.

<https://www.sfgate.com/news/bayarea/article/Supes-Increase-Water-Reuse-Requirements-For-New-16478961.php>

²⁰ "Onsite Water Reuse," San Francisco Public Utilities Commission. <https://sfpuc.org/construction-contracts/design-guidelines-standards/onsite-water-reuse>

²¹ "Fiscal Year 2022-2026: Five Year Capital Infrastructure Planning Outlook," slide 8. City of San Diego, Active Transportation and Infrastructure Committee (2021).

<https://onbase.sandiego.gov/OnBaseAgendaOnline/Documents/ViewDocument/Item%205.pdf.pdf?meetingId=4267&documentType=Agenda&itemId=195399&publishId=449181&isSection=false>

energy storage projects over the coming years. It will be important to ensure that developers and utility and corporate buyers of this power include appropriate skill and labor standards for these projects, both to ensure they provide a clean and reliable regional electricity supply and to create good-quality jobs that pay living or prevailing wages.

- **Accelerate investments in electric vehicle (EV) charging infrastructure.** Transitioning away from fossil fuels in vehicles will require scaling up the use of electric vehicles (EVs) and accelerating the installation of EV charging infrastructure. To help reach its goals, the City could add EV charging requirements for new construction to ensure new housing has access to EV chargers. The City can also direct public investments in EV charging infrastructure to public spaces and communities of concern, which are often under-served by private market investment for this infrastructure, to help correct disparities, accelerate EV adoption, and create new, high-quality jobs for workers.
- **Pilot renewable district thermal energy systems and/or microgrids.** District thermal energy systems and microgrids can help manage electric grid loads and increase energy system reliability while reducing GHG emissions. District thermal systems provide shared heat, hot water, and/or cooling for multiple buildings, and across the country, a growing number of district thermal projects use renewable energy sources such as solar, waste heat from wastewater, or geothermal.^{22, 23} Microgrids are local electric grids that are often powered by renewable energy and can disconnect from the traditional electric grid to operate autonomously, for example during blackouts. While district thermal and microgrid systems can be expensive to construct, they are efficient and often cost-effective over the long-term. Hospital and university campuses, industrial parks, and high-density mixed use developments tend to offer promising locations for these systems. Piloting district thermal systems and/or microgrids in key locations can provide clear resiliency benefits for San Diego's energy system while also creating hundreds or even thousands of high-skilled jobs—including for laborers and pipefitters already skilled in installing and operating an underground network of pressurized pipes. An analysis in Los Angeles, for example, found that if 5-10% of existing buildings were connected to a modern carbon-free district energy system, the construction would create 22,000-44,000 direct construction jobs, and would require 1,000–2,600 ongoing operations and maintenance jobs.²⁴
- **Deploy appropriate labor and skills standards across all city capital projects.** Ensuring high-skilled workers are employed on capital projects is critical for achieving San Diego's climate and resilience goals. Employing lower-skilled workers that lack appropriate training for the work can result in project delays, higher costs, and can also put desired climate and resiliency outcomes at risk.²⁵ Across the country, project labor agreements (PLAs) have proven to be a powerful tool to ensure high-skilled workers are employed for city capital projects. However, PLAs are not currently

²² "Stanford Energy System Innovations," Stanford University, 2015. <https://news.stanford.edu/features/2015/sesi/>

²³ Note that geological studies may need to be completed first to evaluate geothermal potential in San Diego.

²⁴ Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities. Inclusive Economics, June 2021. <https://drive.google.com/file/d/117bFbCLccCdu316IJAIHkRyoLMhQTQd3/view>

²⁵ For example, workers who are not trained to handle refrigerants may improperly install electric equipment with refrigerant lines, which could result in refrigerant leaks that may more than offset the greenhouse gas benefits of the electric equipment. See more information in: *Variable Refrigerant Flow market Strategies Report*, Northeast Energy Efficiency Partnerships (NEEP), September 2019. https://neep.org/sites/default/files/resources/NEEP_VRF%20Market%20Strategies%20Report_final5.pdf

legal on City-funded capital projects in San Diego—which may also put San Diego at risk of losing out on state and federal funding that includes labor standards. At a minimum, the City can prioritize including appropriate skills standards on its capital projects to ensure the work is completed properly and by qualified workers compensated at living or prevailing wages.

There are many opportunities to ensure that throughout the clean energy transition, San Diegans are employed in good quality, family-sustaining jobs, which can more than offset the potential negative impacts of this transition. To identify the most promising mix of policies and programs that achieve these goals, additional research and stakeholder engagement will be required. San Diego’s workforce and labor partners should be at the table every step of the way to help develop these policies to ensure they benefit workers and that appropriate plans are in place to protect against any potential negative impacts.

Where new climate and resiliency investments cannot mitigate negative direct job impacts to certain workers, just transition policies may be also needed to protect these workers. Just transition policies can include, for example: long-term planning to avoid layoffs, worker retention and retraining, pension security, salary bridges to retirement, wage guarantees for workers seeking new employment, training and upskilling programs, and priority hire programs for displaced workers. By beginning to consider these options now, the City can put itself in a strong position to coordinate with state and federal agencies on shared policy goals and apply for future funding to support these efforts.

As the City of San Diego works toward the goals of its Climate Action Plan and accelerates the transition toward a carbon-free economy, the City must be ready to put the appropriate resources into successful implementation of both job mitigation and just transition policies—which includes both funding and staff resources—to realize the intended outcomes. With the right planning and engagement over the coming years, the City can lead the way for how to transition away from fossil fuels while also reinvesting in a thriving middle class that will create a more sustainable, just, and equitable future for all San Diegans.