

# **Creating local good green jobs in the City of Phoenix**

## **Executive summary**

June 2023





Image Credit: LordRunar, Getty Images

# By investing in climate action, the city of Phoenix has an opportunity to increase the city’s climate resilience and create an economy of the future that will be accessible to all its residents.

Phoenix has an opportunity to stimulate economic activity by creating good local jobs whilst having cleaner air, more green spaces, improved public transport and waste management systems, which will also bring health benefits to residents, plus make the city more resilient to the impacts of extreme weather.

In addition, there is an opportunity to ensure that the employment driven by these

investments in Phoenix also helps to build a better and more resilient economy for everyone, by ensuring that these jobs are accessible by everyone and in particular by those who need them most.

This summary outlines the opportunities for job creation in a broad range of industries that contribute to greening the economy and address climate change.

## Key findings of the research

- Ambitious climate action taken in this decade can create and support nearly **100,000 jobs in Phoenix and its supply chains by 2030, in the sectors of buildings, public transport, clean energy and waste.** Three quarters of these jobs (over 70,000) will happen locally in the city.
- Actions like making homes and buildings more energy efficient, electrifying transportation or increasing solar energy generation are among those with the highest job creation potential.
- In addition, **interventions to make the city more resilient to the impacts of climate change** - such as investing in flood barriers or urban parks could create and support nearly **50,000 additional jobs.** Over 80% of these jobs (40,000) will happen locally in the city.
- It is important to **ensure that these jobs will be accessible to everyone,** as research shows that, for example, women will likely be underrepresented in these jobs, accessing only about one third of these jobs.
- **Significant investment is needed** from public and private sources to realize this opportunity to increase city resilience towards the impact of climate change, create good sustainable jobs, lower energy bills and bring additional benefits for all.

“The climate crisis presents an enormous challenge, but also offers an incredible opportunity for transformation. Cities are implementing policies and programs that empower residents to capitalize on good-paying jobs in emerging markets, like the electric vehicle and solar industries. Phoenix is proud to be part of the global movement that is investing to make training and good jobs accessible, while we maximize potential to improve quality of life and foster a healthier world.”

— Mayor Kate Gallego of Phoenix

**In October 2022, Mayor Kate Gallego of Phoenix joined other fellow cities in the announcement that C40 cities will drive the creation of 50 million good, green jobs by 2030.**

## Context

**The city of Phoenix is characterized by a growing workforce and relatively low unemployment.** As the fifth most populous city in the U.S., Phoenix continues to gain new residents each year. This expansion is reflected in the city’s growing workforce, which increased by 10% between 2017 and 2021. Only about 4.9% of the workforce was unemployed in 2021. Among the unemployed, women, Black people, Hispanic and Latino people, and disabled people have the highest rates. Black women in particular experience high unemployment rates compared to women in other races and men, with about 9.5% of the labor force unable to find work, and approximately 13% of disabled people are also unemployed<sup>1</sup>.

With regards to job quality, it can be highlighted that almost all sectors, including those impacted by climate interventions, are characterized by a persistent gender wage gap. In terms of working conditions, jobs in sectors that are typically thought of as “blue collar”, such as in “mining, quarrying and oil and gas extraction” “manufacturing” and “construction” are male dominated, often characterized by long working hours. Since climate action implementation will support thousands of jobs in these sectors, **there is an opportunity to put in place policies to ensure that the working conditions in these sectors, including health and safety aspects, are improved** at the same time and that the city of Phoenix creates good-quality green jobs.

Most of these jobs that will be created and supported by climate action do not have high educational attainment requirements. It was estimated that over 70% of employees will not need an educational attainment as high as a bachelor’s degree, meaning these jobs could be accessible for a bigger population group.

### Benefits of climate action in Phoenix

The implementation of actions from Phoenix’s climate action plan<sup>2</sup> will drive significant job creation both from the delivery of the interventions in the city (direct jobs, e.g. infrastructure and installation), from the supply chains (indirect jobs) and derived from the increased income of workers (induced jobs).

Investments in climate action will create new jobs and support the transition of existing jobs both within the city of Phoenix and outside of the city in its supply chains across the rest of the country.

1. Unemployment rate estimates come from author’s calculations based on the American Community Survey five-year data for Phoenix City Census Designated Place (CDP) from 2016-2020

2. [Phoenix Climate Action Plan](#), 2021

# 1. Mitigation actions

It is estimated that over **98,000 jobs** will be created and supported by Phoenix's mitigation climate actions in the city and across its supply chains in the rest of the country. Out of these, 75% (over **73,000 jobs**) will be supported in the city.

**Interventions in electric commuter rail and new energy efficient buildings**, will create most of the green jobs in Phoenix, with an estimated 41% and 27%, respectively, of city-level green jobs being created and supported in these sectors. Making buildings more energy efficient helps to reduce the energy demand and people's energy bills, and could create over 20,000 jobs in the city alone. Investments in commuter rail and electric cars interventions will also create over 33,000 jobs in

the city. Solar photovoltaic (solar PV) is another sector with great potential in Phoenix, which could create nearly 9,000 jobs within the city.

**These types of interventions are crucial, inclusive, fair and bold climate actions** that can also help citizens with their energy bills and ensure everyone can access sustainable transport, whilst generating local jobs and reducing emissions.

**98,000 jobs**

could be created and supported  
in the City of **Phoenix**



National jobs supported by mitigation interventions by 2030			City-level jobs supported by mitigation interventions by 2030		
Intervention	National jobs	Share of total national jobs	Intervention	City-level jobs	Share of total city-level jobs
Electric Commuter Rail	27,298	27.7%	Electric Commuter Rail	30,308*	41.1%
Energy efficient new builds	23,525	23.9%	Energy efficient new builds	20,002	27.1%
Solar photovoltaics (PV)	18,498	18.8%	Solar photovoltaics (PV)	8,778	11.9%
Electric cars	9,296	9.4%	Electric cars	3,079	4.2%
Diesel/ethanol buses	5,835	5.9%	Diesel/ethanol buses	2,489	3.4%
Gasoline/ethanol cars	5,796	5.9%	Gasoline/ethanol cars	2,477	3.4%
Residential heat pumps	3,636	3.7%	Residential heat pumps	2,312	3.1%
Bus Rapid Transit (BRT)	1,536	1.6%	Bus Rapid Transit (BRT)	2,327*	3.2%
Electric buses	1,341	1.4%	Electric buses	853	1.2%
Cycle infrastructure	828	0.8%	Cycle infrastructure	419	0.6%
Advanced recycling	331	0.3%	Advanced recycling	248	0.3%
Wholehouse retrofits	327	0.3%	Wholehouse retrofits	162	0.2%
Hydroelectric power	140	0.1%	Hydroelectric power	95	0.1%
EV infrastructure	94	0.1%	EV infrastructure	63	0.1%
Composting plant	87	0.1%	Composting plant	64	0.1%
Onshore wind	44	0%	Onshore wind	24	0%
<b>Total jobs</b>	<b>98,609</b>	<b>100%</b>	<b>Total jobs</b>	<b>73,701</b>	<b>100%</b>

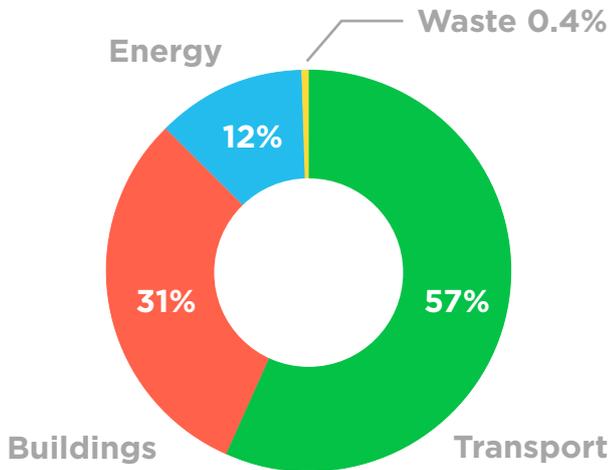
**Source(s):** C40 and Cambridge Econometrics calculations based on estimated expenditure on selected climate interventions in Phoenix by 2030, in line with the city CAP. Includes new calculations provided by the city of Phoenix for measures related to energy efficiency that could be reasonably pursued and were not originally a part of the city CAP.

**Source(s):** C40 and Cambridge Econometrics calculations based on estimated expenditure on selected climate interventions in Phoenix by 2030, in line with the city CAP and new calculations provided by the city of Phoenix for measures related to energy efficiency.

\* **Note:** Interventions marked with an asterisk show higher city-level job numbers than at the national level. This is because the city-level multipliers used for this analysis were higher than national-level multipliers (which provide an indication of the total jobs that could be created in and outside the city based on these investments, and should be used with care, as they refer to national averages). National multipliers can be lower where 1) the average labor wage is higher than in Maricopa County (and therefore the same payments to labor employ fewer people) and/or 2) where manufacturing activity is included in the US but not in the local region

## Profile of job creation potential for climate mitigation interventions for the city of Phoenix, by sector

### Total city-level jobs supported locally by sector in mitigation



Intervention cluster	City-level jobs
Transport	42,015
Buildings	22,477
Energy	8,897
Waste	312
<b>Total jobs</b>	<b>73,701</b>

**Source(s):** Source(s): C40 and Cambridge Econometrics calculations based on estimated expenditure on selected climate interventions in Bogotá out to 2030, in line with the city CAP.

## Investment needed for a green and fair transition

For the mitigation actions, the capital investment (CAPEX) needed for the construction phase, from public and private sources, is estimated to be close to \$60 billion, or around \$12 billion per year for the next 5 years<sup>4</sup>.

It is to be noted that, normally, similar significant investments may be required under a carbon-intensive or polluting scenario, but they would not bring the same benefits across all parts of people's lives nor bring savings in the long term in terms of health impacts and reduced energy demand. This is why it is critical to move current private and public investments from polluting industries and projects into low-carbon ones.

## 2. Adaptation actions

Phoenix is a desert, non-coastal city that will require adaptation actions specific to this climate type and region, which will provide relief from the expected changing conditions of the city.

An additional over **48,000 jobs** could be created and supported in the city of Phoenix

# 48,000

jobs could be created and supported  
in the city of Phoenix from  
climate adaptation actions by 2030,

# About 40,000

of these jobs could happen  
locally in the city.

4. This is based on the assumption that the construction phase, when capital investment is made, will happen over a 5 year period on average.

by 2030 from climate adaptation interventions, and over **40,000 of these jobs (84%) will be supported or created locally** in the city. These actions are critical to ensure that the city is more resilient to the increasing impacts of extreme weather events.

Out of the interventions analyzed, the adaptation interventions with the highest job creation potential are **gray flood barriers and urban parks**. Measures like **gray flood barriers** are critical since, as a result of climate change, more flooding events are expected to occur in this region, leading to the need for significant

investments. Phoenix **urban parks** include mountain preserves within the city boundaries. The city has plans for future urban park space design to resemble the native desert natural landscape that will improve local biodiversity, while still creating park spaces that improve air quality, encourage active transport and combat the urban heat island effect. **Street trees** are another key adaptation action in Phoenix for heat, aiming to place them primarily in areas that will increase access to public spaces, community centers, public transit, and active transportation trails.

### National jobs supported by the adaptation interventions by 2030

Intervention	National jobs	Share of total national jobs
Grey flood barriers	22,634	47%
Urban parks	16,416	34%
Street trees	7,334	15%
Green SuDS <sup>5</sup>	804	2%
White roofs	734	1%
Wastewater reuse	694	1%
<b>Total jobs</b>	<b>48,617</b>	<b>100%</b>

**Source(s):** C40 and Cambridge Econometrics calculations based on estimated expenditure on selected climate interventions in Phoenix by 2030.

### City-level jobs supported by the adaptation interventions by 2030

Intervention	City-level jobs	Share of total city-level jobs
Grey flood barriers	10,811	26%
Urban parks	24,227*	59%
Street trees	4,045	10%
Wastewater reuse	984*	2%
Green SuDS	399	1%
White roofs	400	1%
<b>Total jobs</b>	<b>40,865</b>	<b>100%</b>

**Source(s):** C40 and Cambridge Econometrics calculations based on estimated expenditure on selected climate interventions in Phoenix by 2030.

\* **Note:** Interventions marked with an asterisk show higher city-level job numbers than at the national level. This is because the city-level multipliers used for this analysis were higher than national-level multipliers (which provide an indication of the total jobs that could be created in and outside the city based on these investments, and should be used with care, as they refer to national averages). National multipliers can be lower where 1) the average labor wage is higher than in Maricopa County (and therefore the same payments to labor employ fewer people) and/or 2) where manufacturing activity is included in the US but not in the local region.

5. Sustainable Urban Drainage Systems. These include the installation of plant-based drainage solutions including retention/detention basins, swales and rain gardens, among others.

### 3. Who will get these jobs?

#### More needs to be done to ensure that everyone can access these jobs equitably

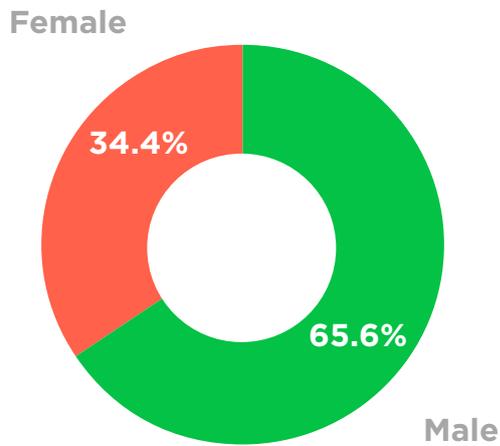
- For example, it is estimated that **women** would occupy only approximately 35% of these green jobs on average, which is lower than the city’s workforce average, where nearly half of the workers are women. This is partially because sectors that would experience higher green job growth tend to be male-dominated, such as in occupations related to construction and manufacturing. This shows that more needs to be done to

ensure that policies look at an equitable distribution of these jobs in the city and truly guarantee a fair transition away from polluting industries.

- The **race distribution** in green jobs seems to be in line with the current distribution of overall jobs in the city. However, in the waste sector, Asian and Black workers tend to have a bigger presence in green jobs compared to the city average, and White workers a smaller presence.
- The **Hispanic population** seems to occupy slightly more green jobs on average than in the city’s overall workforce, being particularly higher in the green jobs related to adaptation (adaptation infrastructure construction and parks).

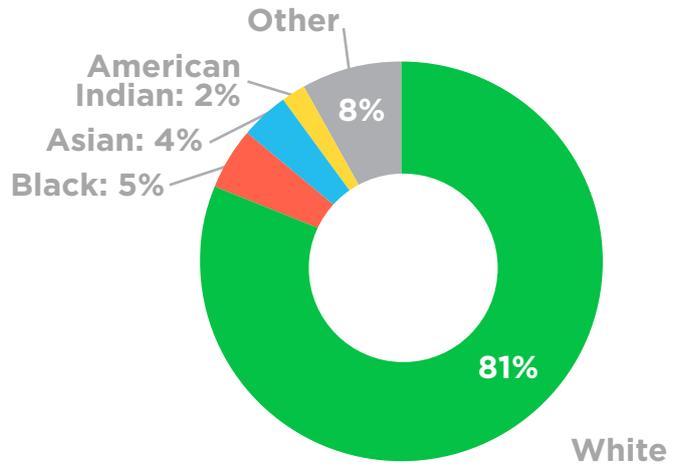
Intervention cluster	City-level jobs	City level jobs for women	City level jobs for Asian	City level jobs for American Indian	City level jobs for Black	City level jobs for White	City level jobs for Other	City-level jobs for ethnicity (Hispanics)
Adaptation - Construction and parks	28,672	30.4%	2.7%	2.3%	5.1%	80.6%	9.3%	43.0%
Adaptation - Water	12,193	31.6%	3.2%	1.8%	4.7%	82.1%	8.2%	37.2%
Buildings	22,477	31.2%	3.2%	1.8%	4.6%	82.2%	8.2%	37.4%
Energy	8,897	30.3%	3.6%	1.9%	4.4%	81.6%	8.5%	37.1%
Transport	42,015	36.2%	4.4%	1.6%	5.9%	80.1%	8.0%	31.1%
Waste	312	49.2%	5.2%	1.6%	6.6%	79.0%	7.6%	26.4%
<b>Total jobs</b>	<b>114,565</b>							
<b>Average:</b>		<b>34.8%</b>	<b>3.7%</b>	<b>1.8%</b>	<b>5.2%</b>	<b>80.9%</b>	<b>8.3%</b>	<b>35.4%</b>
<b>Overall city workforce average</b>		<b>46%</b>	<b>4%</b>		<b>5%</b>	<b>82%</b>	<b>9%</b>	<b>33%</b>

**Expected distribution of Green jobs in Phoenix by 2030, by gender, race and ethnicity (Hispanics)**



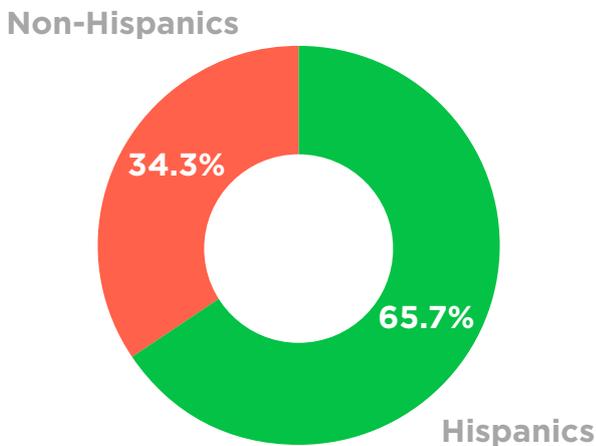
Gender distribution expected for city-level green jobs

Source(s): C40 and Cambridge Econometrics



Race distribution expected for city-level green jobs

Source(s): C40 and Cambridge Econometrics



Ethnicity distribution (Hispanic population) expected for city-level green jobs

Source(s): C40 and Cambridge Econometrics

- **Green jobs can be for everyone.** Most of the jobs supported by climate actions do not have high educational attainment requirements. For all intervention sectors except waste, a high school degree or less is sufficient for about 40% of the workforce. Approximately 30% will be expected to have completed some college or received an associate degree. These jobs will be accessible by a larger group of the population and thereby the interventions can help reduce unemployment in the city.
- **It is also important to note that not all green jobs are anticipated to provide a living wage or have good job stability without additional measures in place.** Based on current wages, buildings and parks adaptation and waste jobs may not always provide a living wage for single workers. These quality shortcomings represent an opportunity for the city to improve and ensure that, with the right policies in place, green jobs supported by climate actions can be good quality and decent jobs.

## 4. Key recommendations



**Start with the interventions with the greatest job creation potential, like transport, adaptation or building retrofits, and ensure that its implementation is fair, addresses existing inequalities, and creates good green jobs (with decent pay and working conditions).**

- Big city programs that have an immense green job creation potential present a key opportunity to address existing inequalities, such as the low representation of women in the construction sector. For this, its implementation must be accompanied by workforce policies and mechanisms like specific hiring targets, and education and training programs that ensure that women, young workers and other groups are equally represented in these good jobs.
- Specifically with the buildings sector, ensure that the green codes and regulations extend their benefits beyond retrofit-related jobs, and apply to any new building and built stock in the city, impacting other green jobs such as those related to efficient lighting, solar water heaters, solar PV, green/white roofs and water efficiency systems.



**Develop a fair plan of action that involves all stakeholders in the transition to a green economy.**

The implementation of climate action plans will be more effective and supported by citizens if a wide variety of stakeholders are

engaged, including unions, youth and women organizations, informal workers, unemployed people and workers who are or may be negatively impacted by the phase-out of fossil fuel industries, and develop plans based on their perspectives and needs. This can be achieved by setting up participatory governance mechanisms.

- Analyse the job creation potential of existing and planned public infrastructure projects and collaborate with workforce development organisations to match job seekers and necessary skills to the new green jobs.



**Create job transition pathways and improve the capacity of women, youth, migrants, and people with disabilities to work in green industries.**



**Promote climate action-related jobs that show clear benefits for people and the environment.**

Consider where job opportunities are promoted and who has access to them. Include **public campaigns** that show the clear benefits that climate action has for all (good jobs, clean air, public transport, clean energy, health impacts). This is critical to gain citizens' support towards these projects and to increase the understanding that green jobs are good for people, not only for the planet.

- For example, Phoenix was the first city in the US to make the American Forests' Tree Equity Pledge, committing to achieve tree equity and a standard of shade coverage in every neighborhood by 2030.



**Introduce policy/regulatory changes to incentivise the public and private sector to support equitable access to jobs.**

Set contract standards for public procurement to hire locally wherever possible and work with companies using sustainable practices, providing decent pay and working conditions, and offering employment pathways to disadvantaged groups. Consider introduction of tax incentives for businesses adopting greener and fair practices and supporting reskilling of workers and gender, race and youth equitable access to jobs. Ensure ample workforce development opportunities are available, including training, upskilling and reskilling programmes. Opportunities should be targeted at workers transitioning away from carbon intensive industries and workers who have low education levels, or other barriers to access jobs, to ensure they can increase their earning potential and have better stability of work.

**Analyze the skills gap and prepare the workforce for future demand.**

The city could create a forum between local authorities, local skills partners and communities to quantify the skills that will be in demand for the new occupations, and co-develop skills training and apprenticeships. For example, what will be the



demand for energy efficiency related occupations, and what's the existing workforce in these occupations? Can training programs be developed to fill the skill gaps identified?



**Ensure ample workforce development opportunities are available, including training, upskilling and reskilling programs.**

Opportunities should be targeted at workers transitioning away from carbon intensive industries and workers who have low education levels, or other barriers to access jobs, to ensure they can increase their earning potential and have better stability of work. The city should ensure equitable access to training among gender, race and other demographic groups to empower vulnerable groups.



**Protect workers in extractive industries in transitioning to green jobs by implementing social protection measures in addition to re-skilling.**

Provide job security through training opportunities and create a pipeline with green job employers for workers to transition into new roles.

# Acknowledgements

## Authors

### **Cambridge Econometrics**

Boglárka Molnár, Dóra Fazekas, Cornelia-Madalina Suta; Ann Furbush

### **Vivid Economics**

Jake Wellman, Inés Pozas Franco, Leire Sarasola

### **C40 Cities**

Julia Moreno Rosino, Siwe Ntombela, Honorine van den Broek d'Obrenan, Korrin Davis

Christina Lumsden

## Contributors

We are grateful to the city officials from the city of Phoenix (Willa Altman-Kaough, Matthew Potzler, Nancy Allen) for their valuable inputs and contributions to this research.

### **Photography**

Getty Images

### **Design**

Tom Hampson, reforma.london



[C40.org](https://www.c40.org)

