

Quantifying the Impact of the Inflation Reduction Act on City Climate Actions and Goals: Methodology for Cities

JUNE 2023

In August 2022, President Biden signed the largest piece of climate legislation in history, the Inflation Reduction Act (IRA). The legislation invests \$369 billion to support a national transition to clean energy and a greener economy, with a focus on environmental justice communities. The scale of this funding represents an unprecedented response to the urgency of the climate crisis, and will enable and augment cities' climate ambition and actions.

In October 2022, C40 Cities and Climate Mayors published [Climate Action and the Inflation Reduction Act: A Guide for Local Government Leaders](#) to help mayors and their staff understand the opportunities within the IRA to advance climate goals. Additionally, several organizations have developed models to estimate the carbon emissions impact of IRA nationally. To date, emissions models and municipal guidance documents have not yet been paired to give cities a deeper understanding of the potential impacts of the IRA to accelerate and support their own climate goals and carbon trajectories.

This report, developed by C40 Cities, Bloomberg Associates, and Slipstream, provides guidance on how cities can evaluate the quantitative impacts of key provisions from the IRA under the assumption that the city, its partners, residents, and businesses apply for and leverage the funding. This report builds on the methodology developed in partnership with the City of Chicago to create an Addendum to their Climate Action Plan (CAP), [Impacts of the Inflation Reduction Act on Chicago's 2022 Climate Action Plan](#).

The project team thanks the City of Chicago for their contribution to the development and application of this methodology and for sharing their experiences as examples for this document.

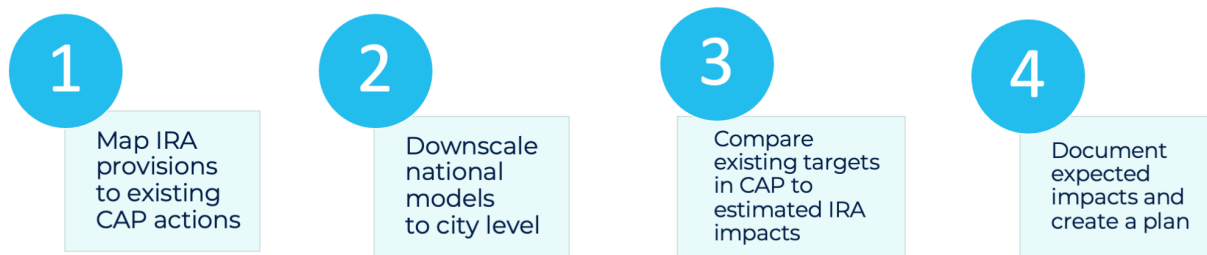
With this report, cities will have the tools to:

1. Understand the potential impact and applicability of key IRA programs to existing CAP actions and goals, and which to prioritize to meet those goals.
2. Identify ways the IRA can accelerate or increase the impact of climate, health, and equity actions.
3. Guide outreach and engagement activities to catalyze resident/private sector uptake of IRA funding.
4. Identify priority areas to include in updated climate action plans (CAPs), or in regional planning efforts.

5. Estimate potential impact to use in funding decisions and prioritization of grant applications.

Below, we provide an overview of a four step method used in partnership with the City of Chicago to estimate the impacts of the IRA on its CAP and carbon trajectory. Based on the key funding streams from the IRA and the largest sectors of GHG emissions, this methodology focuses on three primary sectors: buildings, renewable energy, and transportation.

Figure 1. Four Step Method: Quantifying the Impact of the IRA on City Emissions



1. Map IRA provisions to existing CAP actions and determine which provisions can drive reductions beyond CAP actions

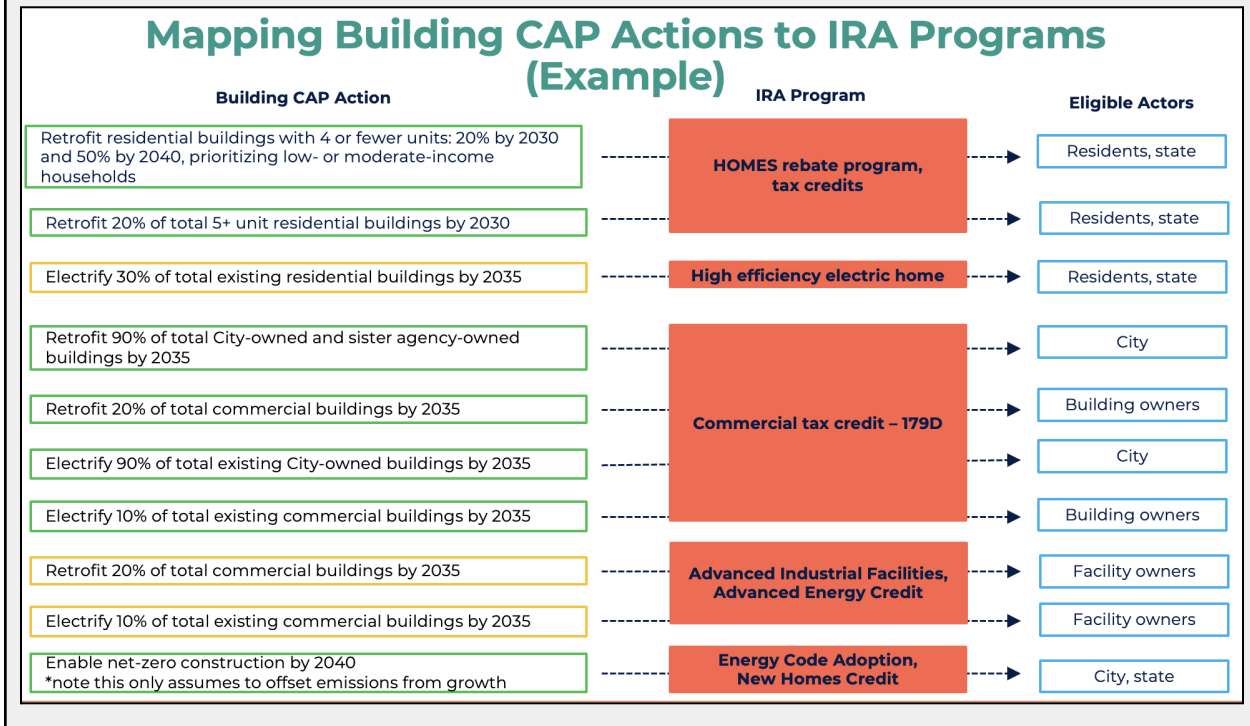
A first step is to map the IRA provisions that are relevant to a city’s existing CAP actions. Through this exercise, cities can prioritize provisions by potential impact and funding potential and also identify eligible actors for the different provisions. This will allow cities to understand where the municipality itself is directly eligible for IRA support, and where the city’s role is to facilitate access to funding for partners, businesses, and residents. City staff should also consider if there are any provisions in the IRA that could impact emissions currently not covered by goals in existing CAPs.

The [*Climate Action and the Inflation Reduction Act: A Guide for Local Government Leaders*](#) developed by C40 and Climate Mayors provides an overview of IRA’s key provisions that can support city climate action. With this guide, cities can identify the relevant provisions and how to partner with other organizations and governmental entities. The relevant provisions can then be compared to both the actions in existing CAPs and emissions sources identified in city greenhouse gas inventories. Figure 2 illustrates the mapping of IRA provisions to Chicago’s CAP actions.

EXAMPLE: MAPPING IRA TO CAP ACTIONS

Chicago reviewed each action in the CAP to identify whether the IRA impacted the goal, which provisions were most relevant, and which actors were eligible for the funding. This allowed the City to understand which provisions to review in more depth to understand potential impact.

Figure 2. Mapping Building CAP Actions to the IRA: Chicago Case Study



2. Downscale national models' estimates to the city level to understand potential IRA impact on City goal

The next step is to estimate the amount of funding that will apply to any given municipality. Several organizations have created economic and greenhouse gas emissions models that estimate the impact of IRA nationally or by state. In this section, we discuss how to take the outputs of national models to estimate expected impact for cities through downscaling approaches.

The blue call-out box 'National Models' provides an overview of the major models that quantify IRA's impact on nationwide emissions and on sector-specific adoption of retrofits, electric vehicles, and renewable energy. These models forecast the changing greenhouse gas composition of the electric grid and the adoption rates of

energy reduction, electrification, and transportation technologies based on expected investment costs and economic growth. The models typically provide a range of expected impact to acknowledge uncertainty of the assumed inputs and results.

The models estimate a reduction in nationwide emissions of between 32% and 43% compared to 2005 levels. The greatest estimated emissions reductions are from the power sector through investments in renewable energy. The reductions are dependent on assumptions around uptake of tax credits by individual consumers and businesses. Cities can support uptake by encouraging and guiding their residents and businesses to seek out and use these tax credits.

The simplest approach to understand city-level funding or emissions impact is to downscale the models through application of the proportions of the number of homes, businesses, or overall consumption in a city. A more complex downscaling analysis would account for city-specific characteristics, such as resident demographics and relevant state policies, and would likely result in a more fine-tuned estimate of impact. For example, the percentage of households that are low-income will impact the amount of funding that flows through the home rebate programs as only low to moderate-income homes are eligible. For cities that want to use more complex downscaling, we recommend starting with the methodology described in this report and adjusting scaling factors where needed to better represent city-specific characteristics.

National Models

Overall IRA Impact

[Rhodium Group: A Turning Point for US Climate Progress³](#)

[Energy Innovation: Updated Inflation Reduction Act Modeling Using The Energy Policy Simulator](#)

[REPEAT: Preliminary Report- The Climate and Energy Impacts of the Inflation Reduction Act of 2022⁴](#)

[RMI: The Economic Tides Just Turned for States](#)

Buildings

[ACEEE: Clean Infrastructure: Efficiency Investments for Jobs, Climate, and Consumers](#)

[RMI: The Inflation Reduction Act Could Transform the US Buildings Sector](#)

Vehicles

[ICCT and Energy Innovation: Analyzing the Impact of the Inflation Reduction Act on Electric Vehicle Uptake in the United States](#)

Total Funding

[Congressional Budget Office: Estimated Budgetary Effects of H.R. 5376, the Inflation Reduction Act of 2022](#)

There may be instances where utility, state, or city climate actions assume greater participation or faster decarbonization pathway than assumed in the national IRA models. In such cases, IRA funding can be assumed to provide added support to achieve them rather than resulting in additional greenhouse gas reductions beyond the city CAP goal.

This section outlines the simple approach described above to model the impacts of three primary areas of the IRA funding that are often found in city climate action plans: renewable energy, buildings, and transportation.

Renewable Energy

The IRA supports decarbonizing the electrical grid through production incentives for wind, solar, and hydrogen systems as well as incentives for manufacturing of clean energy technologies. There are several incentives and grant programs that target rooftop and community-based renewable energy.

Citywide electricity consumption. The [national models](#) project that the IRA infusion of funding will result in the electricity grid reaching between 60% and 85% renewable energy by 2030. Cities should review current utility commitments, state policy goals, and city CAP goals for renewable energy, and compare those renewable targets and timelines to the IRA's impact by 2030. If the existing goals have a significantly longer timeline, or represent a lower percentage of renewable energy, cities can look to incorporate the assumption of lower grid emissions across sectors within the city's inventory and on planned actions – especially as buildings and transportation begin to electrify.

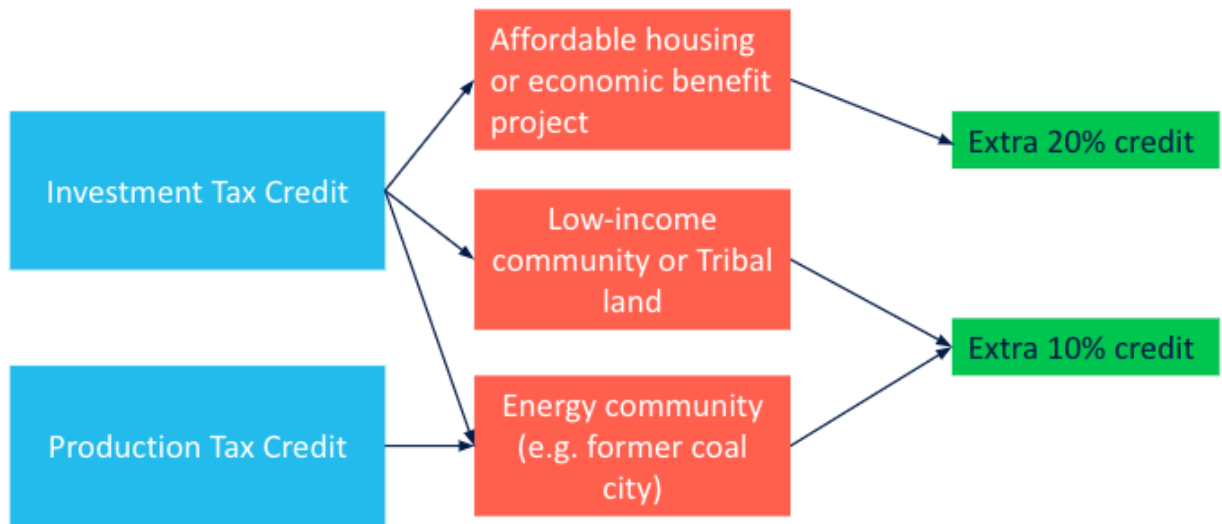
EXAMPLE: ASSESSING HOW IRA WILL AFFECT CAP GOALS

The City of Chicago had an existing goal for 100% renewable electricity communitywide by 2035 and the state of Illinois had a goal of 100% renewable electricity by 2040. With both goals in-place, the City determined that IRA funding could help meet its existing goals rather than accelerate impact.

City operations consumption. The Clean Electricity Investment Tax Credit (ITC) and Production Tax Credit (PTC) provide a tax credit equal to up to 30% for investment in renewable energy projects. The IRA creates a mechanism for non-tax-paying entities, such as municipalities, to receive the financial benefit of the tax credit through direct payment. Cities can evaluate the impact of a 30% reduction in upfront costs on the amount of renewable energy they can afford to install on city-owned buildings.

Community-based solar and renewable energy. The IRA prioritizes renewable energy adoption in low-income communities through several provisions. As shown in Figure 3, the PTC and ITC increases by 10% if the installation is located in an energy community.¹ The ITC increases by 10% if the installation is in a low-income community or Tribal nation, and by 20% if the installation is part of an affordable housing project. Annually, up to 1.8 gigawatts (GW) are eligible through these tax bonus credits.

Figure 3. Additional community-based solar and renewable energy PTC and ITC credits in the IRA



The Greenhouse Gas Reduction Fund (GGRF) provides additional funding for the installation of renewable energy in low-income and disadvantaged communities. Up to an additional 7 GW could be facilitated through the [\\$7 billion set aside in the GGRF](#) for renewable installations, should a city or its partners receive the competitive funding available through the program.

One approach to estimating the impact for an individual city is to multiply the expected national GW (1.8 GW annual through bonus credits and 7 GW through GGRF) by the proportion of city electricity consumption to [national electricity consumption](#) (4 trillion kWh).² Cities can then compare this estimate to their goals

¹ An energy community includes areas with former coal plants or that meet fossil fuel employment of 0.17%. The qualifying areas in the US are mapped here: <https://arcgis.netl.doe.gov/portal/apps/experiencebuilder/experience/?id=a2ce47d4721a477a8701bd0e08495e1d>

² The EIA summarize total national electricity consumption: <https://www.eia.gov/energyexplained/electricity/use-of-electricity.php>

for community-based renewables, and prioritize ITC and PTC applications early in a year to realize the benefits of the funding on equity-focused goals.

EXAMPLE: COMMUNITY-BASED SOLAR AND RENEWABLE ENERGY PROJECTS

The City of Chicago has two community-based goals for renewables in its 2022 CAP:

- Install 5 megawatts (MW) of co-owned community solar projects by 2025
- Increase Chicago-based community renewables to 20 MW by 2025

To evaluate how the IRA might impact these goals, the City estimated the total estimated capacity of renewable energy available through the ITC and PTC bonus tax credits. Total City of Chicago electricity consumption represents roughly 0.6% of national consumption, which amounts to roughly 10 MW of the annual 1.8 GW available through bonus tax credits. Through the GGRF, the city could install an additional 4 MW annually. By 2030, this could result in nearly 115 MW of community-based solar in low-income neighborhoods, which is 90 MW more than currently included in its two CAP goals.

Buildings

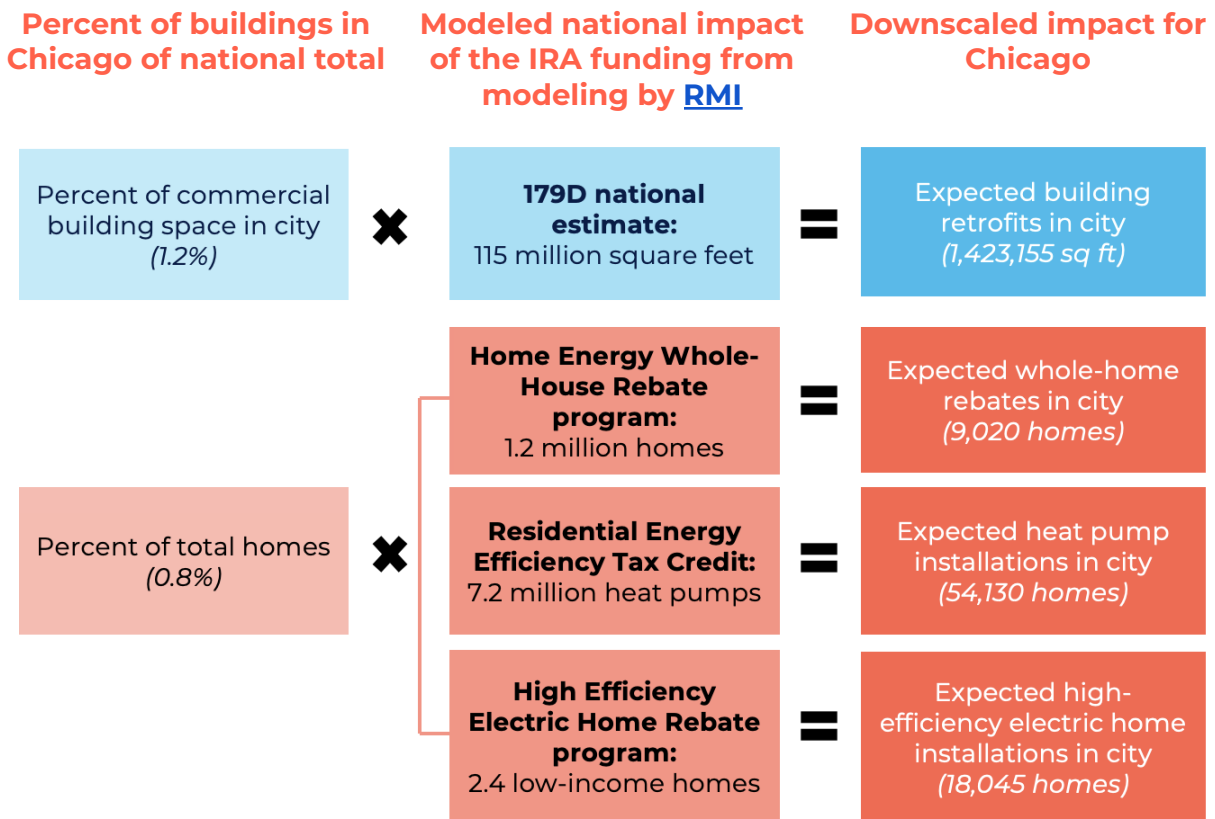
The IRA supports energy retrofits and electrification for public, residential, and commercial buildings. The funding comes primarily through tax credits and rebates to businesses, residents, and community-based organizations to decarbonize their buildings and add renewable energy onsite. The legislation prioritizes funding for low-income neighborhoods and households primarily through direct rebate programs.

Residential and commercial building retrofits. Residential funding flows through rebate programs run by state offices: the Home Energy Performance-Based Whole-House Rebate program and High Efficiency Electric Home Rebate program, and through the Energy Efficiency Home Improvement tax credit. For commercial and high-rise multifamily properties, the funding flows primarily through the Commercial Buildings Energy Efficiency Tax Credit 179D, a tax credit that building owners can take advantage of when reducing building energy use by a minimum of 25% compared to baseline energy consumption.

Figure 4 illustrates the approach to downscale the impacts estimated in the [national models](#) to an individual city, applying the proportion of total commercial building square feet or proportion of total homes to the national totals. Cities can find the

number of homes per municipality in the [US Census data](#) and the commercial square feet estimates can be found in the [City and County Commercial Building inventory](#).

Figure 4. Calculating the IRA impact on residential and commercial building retrofits for Chicago



We recommend that cities compare these impacts to the number of buildings currently reached by utility and other programs, and the number of buildings targeted in existing city or state goals. Cities should also compare the timelines for those programs to the timeline for expected impacts from IRA (typically by 2032). This will help cities to determine if the IRA will be additive to or supportive of existing adoption assumptions in the CAP, and what impact on greenhouse gas reduction levels and timelines may be.

Transportation

Business and residential electric vehicle adoption. The IRA provides tax credits for new commercial vehicle purchases and new or previously-owned passenger vehicle purchases. These tax credits are expected to increase sales of electric vehicles within

the decade, which will ultimately increase the number of EVs on the road in the future. International Council on Clean Transportation (ICCT) and Energy Innovation [have modeled](#) the impact of the IRA on total sales of light-duty and heavy-duty vehicles through 2035. ICCT and Energy Innovation project that EV sales will reach as high as 63% by 2035 for light-duty vehicles and 56% by 2035 for heavy-duty vehicles.

Figure 5. Percentage EV share of total national light duty vehicles

Source: [ICCT and Energy Innovation White paper Analyzing the Impact of the IRA on Electric Vehicle Uptake in the US, January 2023](#)

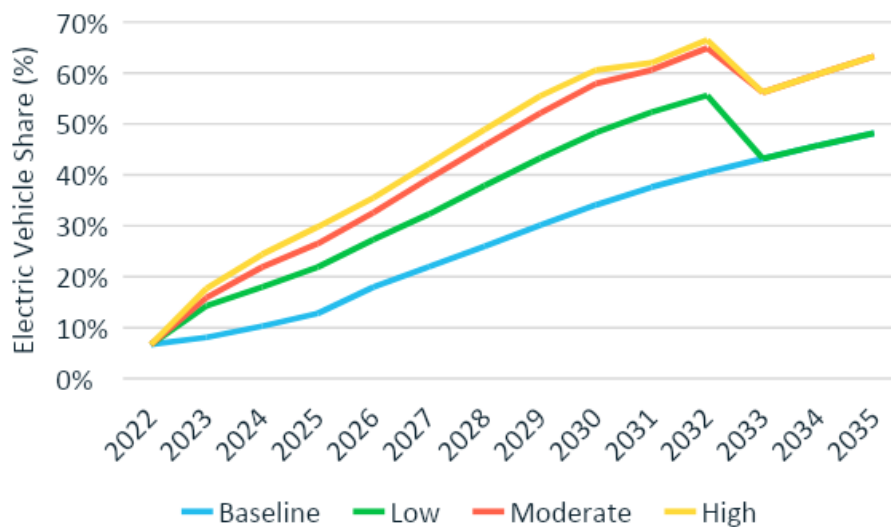


Figure 6 illustrates how to quantify the impact of the IRA tax credits on the number of miles or vehicles on the road that are electric across a city. To do this calculation, first, convert percent sales to percent stock (or number of vehicles on the road) by multiplying the percent sales by the annual percent turnover for new vehicles. The percent sales data is available by year in the ICCT and Energy Innovation report referenced above, and current percent EV stock is usually available through vehicle registration data at the city. Combining that with city-specific data on miles driven or total number of vehicles provides total citywide EV vehicles or miles.

Figure 6. IRA Impact on Electric Vehicle Adoption based on the ICCT and Energy Innovation Report



EXAMPLE: CHICAGO EV CALCULATIONS

The City of Chicago 2022 CAP did not include a goal on passenger electric vehicle adoption, which provided an opportunity to quantify the impact of the IRA outside of the CAP. City of Chicago residents will also have access to additional EV incentives through the State of Illinois and the electric utility, both required by the IL Climate and Equitable Jobs Act. With both policies impacting adoption, the City used the ICCT and Energy Innovations’ high estimates on annual percent EV sales for passenger vehicles. For heavy-duty vehicles, the City used the moderate estimates.

Using the equation above, the City calculated the total number of miles by vehicle type that would be EV miles each year. Assuming 100% renewable electricity (based on the Chicago 2022 CAP goal), EV vehicles were assumed to emit zero emissions. Table 1 illustrates the carbon reduction by year.

Table 1. EV Carbon Emissions Reduction for City of Chicago

Year	Greenhouse Gas Reduction (metric tons)		
	2030	2035	2040
Passenger Sedan	428,292	812,440	1,272,967
Passenger Truck	76,081	144,320	226,127
Light Commercial Truck	20,207	38,332	60,060
Heavy-duty Vehicle	639	1,700	2,862
Short-haul Vehicles	52,422	110,784	174,009
Total Reduction (Cumulative)	577,641	1,107,574	1,736,025

City fleets and buses. The IRA can support cities to electrify their own fleets through direct pay of the tax credits for vehicle purchases mentioned above, and the Clean Heavy-Duty Vehicles program, which provides competitive grants for replacement of large vehicles such as trash trucks. With this change in the upfront

cost for equipment, cities can determine if the lower costs can accelerate goals for electrification of city-owned vehicles and transit buses. Cities should look at current municipal fleet electrification goals and timelines to identify if the IRA funding can support acceleration of EV adoption within the fleets.

Electric vehicle charging. Table 2 summarizes EV charging infrastructure funding from the IRA tax credits and Infrastructure Investment and Jobs Act (IIJA) funding through competitive and formula grants. Though EV chargers will not directly reduce emissions, they will encourage broader adoption of electric vehicles.

A significant portion of this funding is allocated directly to low-income neighborhoods. This will be particularly important for communities where free or low-cost charging infrastructure is most needed to support equitable EV uptake. Overall, this will help remove some of the barriers to EV adoption that exist despite the vehicle tax credits.

Table 2. National IRA EV Charging Infrastructure Funding

Grant	Funding	Eligibility
IRA Alternative Fuel Vehicle Refueling Property Credit	30% tax credit	Consumers, businesses, cities (low-income area)
IIJA Charging and Fueling Infrastructure Grants (Community Charging)	\$1.25 billion	State, cities, local governments (low-income prioritized)
IIJA Charging and Fueling Infrastructure Grants (Corridor Charging)	\$1.25 billion	State, local governments
IIJA National Electric Vehicle Infrastructure	\$5 billion	States

3. Compare existing targets in your Climate Action Plan to estimated impacts from national models.

The downscaled analysis of the potential impact of the IRA can then be compared in relation to existing city goals and action plans to determine if the IRA supports existing carbon reduction goals, provides reduction in new areas not included in the CAP, or can accelerate carbon reductions for actions in the CAP. Cities should convene relevant Mayor’s Office/departmental stakeholders to weigh in on whether IRA provisions may 1) enable an acceleration of CAP targets, 2) will primarily support

existing CAP strategies/targets, or 3) will support sectors and actions not currently in the CAP.

Considering the following questions should help to understand these impacts:

1. How do existing CAP timelines compare to the 2032 timeline for IRA funding? How does the funding present the opportunity to accelerate existing timelines to reduce emissions more quickly?
2. How does the additional IRA funding impact existing targets for adoption (e.g., MW of installed solar)? Can the funding increase those targets? Can the impact on reducing the cost of measures support adoption of mandatory policies such as building performance standards?
3. If the funding does not help accelerate goals or increase impact, how can the city leverage the IRA funding to meet its current goals? What steps does the city need to take to ensure the funding flows to the city to realize those impacts?
4. How does the funding impact sectors not previously covered by goals or planned city actions? How can the city help realize those impacts?
5. Which sectors and actions should the city prioritize in light of the federal funding and expected impacts?
6. How can the funding help improve equity of distribution across climate goals?

Example: Determining IRA implications for Chicago's CAP

In January 2023, the City of Chicago gathered staff members from various departments for a workshop to review the potential impact of the IRA. The staff members reviewed downscaled national model impacts and considered the questions listed above for most strategies in their CAP. From this workshop, the City of Chicago was able to identify which strategies could be potentially accelerated by the IRA, which strategies would benefit substantially from the funding, and which sectors the IRA would impact that were not covered by the existing CAP.

The City of Chicago identified several potential opportunities. A select few are highlighted below:

- **Leverage funding to meet existing goals:** IRA funding will be vital to meet existing residential retrofit goals and to achieve the existing goal of hitting 100% renewable electricity by 2040. The city identified the importance of working with residents to educate them on tax credit and rebate opportunities, and with the state and utilities to access funding for renewable electricity.
- **Accelerate actions:** The City of Chicago identified that an updated building

policy commitment combined with IRA commercial tax credits could accelerate the carbon reduction for commercial buildings in the city.

- **Outside actions:** The City of Chicago identified that the IRA would accelerate private EV adoption, which was previously not covered by the existing CAP. This impact was a 4% reduction on total carbon emission by 2040 of total carbon emissions.

4. Document expected impacts and create a plan

For any items identified as having a quantitative impact on existing carbon goals, we recommend updating the city CAP or publishing a secondary document like the City of Chicago’s [CAP Addendum](#) to reflect potential accelerations or emissions reductions.

If minimal quantitative impacts are found, this would be an indication that the city’s existing climate action plan is more ambitious than the downscaled national model and maximizing the use of the funding will be vital to support those ambitions. Doing so will require city departments, businesses, community organizations, institutions, and residents to take advantage of the funding available to them. This uptake across partners can be supported by the leadership and convening power of cities. The companion guide to this report, [Climate action and the Inflation Reduction Act: A guide for local government leaders](#) by C40 and Climate Mayors provides significant detail on how cities can leverage the IRA funding to achieve impact locally.

Equipped with the analysis of where and how far the IRA can support their climate actions, cities can create a plan to maximize the use of IRA for these as well as their affordability, equity, and economic development goals.

Put analysis findings into action:

1. **Use the quantitative estimates to inform planning.** The estimate of potential impact by sector can inform climate action planning by identifying top sectors to focus efforts. This can be especially useful in the near term as cities work through the proposal process and eventual planning under the EPA's Climate Pollution Reduction Grant.
2. **Prioritize education strategies and partnerships that maximize potential impacts on city emissions to ensure businesses and residents know about the availability of tax credits and rebates.** A substantial amount of funding for building retrofits, EV adoption, and onsite renewables flows through tax credits that need to be accessed by individuals and building owners. Through the quantification exercise, cities can identify areas where marketing and education will have the largest impact on emissions.
3. **Use the analysis to prioritize municipal retrofits, upgrades and purchasing.** Through the IRA, tax credits are now available for municipalities through direct pay. This analysis should help identify which provisions can help accelerate city-specific goals.
4. **Develop a plan for how the funding can be directed toward supporting low income residents.** Significant funding is directed at or increased for installations or retrofits in low-income households and neighborhoods. With this analysis, cities can identify which provisions will have the largest impact on those neighborhoods and develop plans for ensuring funding can be accessed.
5. **Identify priority areas to partner with state agencies and community organizations.** Several provisions flow through the state or community-based organizations, which makes it important for cities to form partnerships and encourage grant applications by partners to ensure funding flows to the city. This analysis can identify which of those provisions have the potential to have the largest impact on the city, and help cities prioritize partnerships for those grants.

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