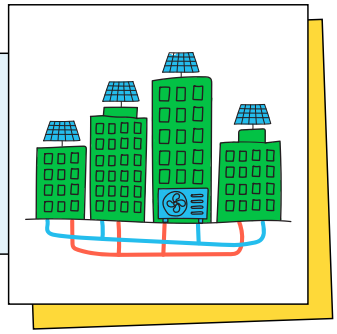
C40 NET ZERO CARBON BUILDINGS ACCELERATOR



How cities are maximising energy energy efficiency and eliminating fossil fuels in buildings

SIGNATORY CITIES

Cape Town, Copenhagen, Durban/Ethekwini, Heidelberg, Johannesburg, London, Los Angeles, Medellín, Melbourne, Montréal, New York City, Oslo, Paris, Portland, San Francisco, Seattle, Stockholm, Sydney, Tokyo, Toronto, Tshwane, Vancouver, Washington, D.C.

COMMITMENTS

1. **All new buildings are net zero carbon by 2030**
2. **All existing buildings are net zero carbon by 2050**
3. **All municipal buildings are net zero carbon by 2030**

SUMMARY

Buildings are one of the largest sources of greenhouse gas emissions, accounting for over half of total city emissions on average, and contributing over a third of global energy-related CO_2 emissions. Buildings are also a significant source of air pollution, producing more NOx emissions than vehicles in some cities, as well as the largest source of $PM_{2.5}$. The **27 global signatory cities** of the C40 Net Zero Carbon Buildings Accelerator are committed to implementing policies that will place all buildings on a pathway to net zero carbon.

By 2060, the world is projected to add 230 billion metres squared of new buildings, or an area equal to the entire current global building stock. It is therefore vital to introduce codes and regulations to ensure new buildings are energy efficient, use renewables, and do not depend on fossil fuels. Accelerator cities are developing long term decarbonisation roadmaps with mandatory building codes and regulations implemented at specific milestones. Best practice includes the use of performance based codes, prohibiting the use of fossil fuels in new buildings that are highly energy efficient. **Washington, D.C.** sent a clear market signal with the Clean Energy DC Building Code Amendment Act of 2022, which codified the goal of adopting a net-zero energy, all-electric standard by the end of 2026. This gives the industry plenty of time to change and adapt their practices and specifications.

Existing buildings, many of which were not constructed with effective energy codes, will continue to exist for many years to come and their energy performance must be improved. The City of **Toronto** is currently working on establishing Building Emissions Performance Standards to accomplish GHG reductions from existing buildings in the city. If adopted by council, these standards will require existing buildings, with years of advance notice, to be retrofitted to reduce GHG emissions.

Data analysis is the bedrock of policy development for existing buildings, and our signatory cities have continued benchmarking the energy consumption of many building typologies, enabling them to set effective codes. **Seattle** has seen remarkable success with wide ranging support mechanisms to make the energy reporting process friction free. The collection of data directly enables the implementation of mandatory energy performance standards for existing buildings, the highest impact action for this particular sector.

Cities are continually innovating with other mechanisms to make homes healthier, more comfortable, highly efficient and with lower emissions. **San Francisco** is leveraging the regional air quality board to implement a policy that effectively requires electrification at time of replacement for heating equipment in existing buildings, therefore removing harmful sources of

indoor air pollution that have been proven time and again to cause illness and death, with an exaggerated impact on women and children.

Cities are also going beyond the requirements of the Accelerator, by taking action to address operational and embodied emissions in the codes they are introducing, adopting a whole carbon approach. The City of **Stockholm** is currently considering what embodied emission limits they might apply, based on a metric of kgCO2e/m^2 of floor area, and **Medellín** is introducing policy to shift production systems towards a circular economy and low carbon supply chain for materials.

Cities continue to lead from the front by adopting the most ambitious and wide reaching policies for their own municipal buildings first, before applying these measures to other building owners. This approach enables them to grow supply chains, build up knowledge and expertise, and share information on implementation challenges. Through all these measures, residents benefit from having low carbon buildings that are healthy, comfy and resilient.

IMPACT

74% of C40 signatory cities have implemented policies or roadmaps to ensure all new buildings will be net zero carbon before 2030

61% of C40 signatory cities are implementing policies to deliver net zero carbon municipal buildings through retrofits and/or renewable energy requirements

78% of C40 signatory cities are implementing retrofit programmes for existing, privately-owned buildings, progressing the city towards the target for net zero carbon by 2050

TURNING COMMITMENT INTO ACTION

Commitment 1: Enact regulations and/or planning policy to ensure NEW buildings operate at net zero carbon by 2030

Melbourne has spent many years developing a new building code in close collaboration with the Victoria State government, which holds the power to enact mandatory building policy. The policy will require new developments to meet best-practice sustainability standards, nearly net zero carbon standards, and prioritise high levels of energy efficiency and electrification. There is the potential for the policy to be used in other jurisdictions, therefore multiplying its potential impact.

Vancouver introduced a requirement in 2025 for new buildings to be nearly zero carbon, with carbon intensity limits set at 3 kgCO2e/m^2 or less in larger residential buildings, and 1.5 kgCO2e/m^2 in smaller residential buildings. These limits effectively eliminate the use of fossil fuels for heating and hot water in new buildings in Vancouver.

Commitment 2: Enact regulations and/or planning policy to ensure ALL existing buildings operate at net zero carbon by 2050

Seattle has carried out extensive recording of energy consumption in its buildings to establish benchmarks. Compliance rates are very high – 89% of nonresidential buildings and 97% of multifamily buildings have reported their detailed energy and fuel consumption data. This has been achieved with robust outreach, third-party data support, and training. The city uses benchmarking data to drive policy development. It also enables them to track high and low performers, and identify building owners to target for retrofit programmes and rebates, such as those offered by the city utility, Seattle City Light.

Tokyo's first-of-its-kind cap and trade system imposes absolute carbon reduction obligations on large existing buildings, and it has been in operation since 2010. Since then it has achieved a 31% carbon emissions reduction compared to the baseline due to progress in energy efficiency measures and the use of low-carbon electricity and heat, in spite of extreme heat in summer and an increase in the number of users as a result of restored economic activities. From 2025 the system will be strengthened again, this time setting minimum carbon reduction thresholds of 50% for office buildings and 48% for factories. These measures only cover the large buildings, but Tokyo has also raised requirements for smaller buildings through the Global Warming Countermeasures Reporting System (effective in April 2025), which requires small and medium-sized businesses to report their CO_2 emissions. New targets of 35% reduction have been set for energy conservation and 50% for renewable energy consumption. All of these efforts support the aim of halving carbon emissions by 2030.

Commitment 3: Own, occupy and develop only assets (municipal buildings) that are net zero carbon in operation by 2030

Cape Town has been implementing energy efficiency retrofits across its portfolio, reaching a total of 188 buildings as of May 2025. This includes works to replace inefficient split-unit air conditioning systems and upgrading lighting. The city is a leading South African municipality on Energy Performance Certificates, with 72 of their buildings certified, and there is ongoing work to renew certificates and make more buildings compliant. This process has raised awareness around driving greater energy efficiency across departments. Cape Town has an active programme that supports rooftop solar deployment and implementation, offering initial sizing and cost, and creating a procurement vehicle for building operators to access service providers. To date, the city has generated 4,217 MWh from a total installed capacity of 2,636 kWp. This financial year 120 smart electricity meters with automated outputs have been installed, with a total of 1,519 smart electricity meters installed up to May 2025 in 1,073 municipal facilities (71.6% of the 1,499 facilities listed for metering).

Sydney's new Environmental Strategy 2025–30, proposes ambitious targets: an 85% emissions reduction (2006 baseline), 30% total energy reduction (2023 baseline), and complete elimination of fossil gas. The City of Sydney has already achieved a 76% reduction against its 2006 baseline (100% with carbon credits) through ongoing electrification, refrigerant reduction, and renewable electricity use, publicly reporting its progress annually via Climate Active.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INSPIRATION

Vancouver and **New York** have inspired **Montréal** with their regulations on energy and GHG disclosure and rating systems for buildings. In part, this influenced Montréal's new regulation regarding GHG emissions limits in new buildings including the prohibition of emitting appliances such as those fuelled by oil or gas in new residential, commercial and institutional buildings. Also, new regulations on the disclosure and rating of GHG from large buildings, with a view to introducing a GHG rating for buildings. With these new regulations, the goal of zero-emission new buildings by 2030 is already assured. The city is now monitoring new building permit applications and assisting with their implementation. In addition, the City of Montréal is continuing its work on the energy efficiency of new buildings.

Washington, D.C. has greatly benefitted from continued learning and coordination with other jurisdictions pursuing and implementing similar policies. While the District was the first in the nation to pass a Building Energy Performance Standard, we have been closely tracking **New York City, Boston** and others as their programmes are being rolled out. On the Net-Zero Energy codes front, the city has been closely following New York State, Massachusetts, Washington State and others in their development and implementation of innovative stretch codes. C40 has been a key partner in facilitating those peer connections to enable shared learning.

COLLABORATION

Copenhagen aims to reduce energy use by 20% in 2035 compared to 2019 through the Energispring (or Energy Leap) Programme, and will track this using overall city consumption data. The public-private partnership includes 40 of the city's largest building owners covering around 40% of the total floor area in Copenhagen, and members agree to a target of reducing heat consumption 3% yearly in participating buildings.

The public-private partnership engages private building owners in energy efficiency activities through competition and the sharing of solutions. Despite being voluntary, this has shown significant energy savings across a large portion of the city.

Medellín is carrying out joint technical assistance and training activities with CAMACOL, the Colombian Chamber of Construction, and the World Bank's IFC, which have provided training on incentives for sustainable construction to municipal officials. Similarly, activities have been carried out with the city's academic sectors and some independent builders' groups. Some indirect actions have been developed with ICLEI.

EQUITY AND INCLUSION

Vancouver is rolling out the Multi-Family Resilient Upgrade Program, which provides capital incentives and concierge support to retrofit social housing, market rentals, and condominiums – helping reduce GHG emissions and increase resilience to overheating. The programme builds on earlier city-led pilots such as the Rental Apartment Retrofit Accelerator and the Non-Profit Resilient Retrofit Grant, which showed strong demand for decarbonisation retrofits and identified key barriers and opportunities for scaling. This initiative supports Vancouver's Climate Emergency Action Plan, which commits to halving building emissions by 2030 while creating healthier and more climate-resilient homes for all.

Medellín established the District Circular Economy Policy in 2025. The policy fundamentally changes production and consumption systems helping to develop circular construction practices and the redirection of materials away from landfill. It sets the stage for the city to introduce governance and strategies needed to make changes in supply chains and to analyse their impact across social, economic and environmental measures. The policy will initiate cross-sectoral partnerships with a focus on generating equitable green jobs, with a preference for employing those from low-income communities.

CHALLENGES

The kinds of policies required to meet the aims of this Accelerator require a substantial amount of data collection, analysis, modelling, and stakeholder engagement. Once they are in the implementation phase they require skilled enforcement teams to ensure the huge diversity of buildings in a given city are compliant. Developing the capacity to deliver this is a huge challenge.

Each individual building faces its own unique set of retrofit challenges leading to low building retrofit rates, including issues such as low electrical capacity, deferred maintenance issues, and disruption to homes and businesses to complete retrofit works, and crucially there are often severe finance gaps that prevent projects from being bankable.

Many cities have to rely on policy levers outside their control, particularly those held by other levels of government, in order to shift the market. These barriers make it difficult to drive large-scale, coordinated action across the built environment.

HOW CITIES ARE STEPPING UP THEIR ACTION

The case for zero emission and resilient buildings has only grown stronger over time, and signatory cities are showing just how many benefits there are for residents in the transition to fossil free, high efficiency buildings. Heating, cooling and cooking are emotive topics, and choice remains an important discussion. However, cities are learning better ways to communicate these issues, and are better equipped to make the case for the benefits of electrification and decarbonisation. In a forward thinking move, the City of **Portland** has drafted a building code including carbon performance standards that would incrementally reduce building emissions every five years from 2030 to 2050.

Signatory cities are playing a key role in decarbonising heat in buildings. In **Heidelberg** there are plans to shut down fossil fuel plants in the district energy system before 2030, and in **Montréal** actions are underway to electrify boilers in their downtown district energy system. In **Medellín**, further biogas production is being planned in wastewater plants and landfill sites, which will reduce future reliance on fossil fuels in buildings.

Signatory cities have further developed thinking around neighbourhood strategies and improving community amenities, housing quality and comfort levels, all while driving down emissions and improving health, while crucially avoiding displacement of communities. **Washington, D.C.** is redeveloping the historic Barry Farm neighbourhood, with a commitment to achieve Passive House certification, and there are plans to install one of the largest district geothermal installations in the US.

Signatories continue to lead from the front by accelerating the decarbonisation of municipal buildings, and in **Tshwane** the administration is setting up an Energy Task Team, which is working on scaling up solar systems in city owned buildings, as as delivering energy efficiency and cost savings.

As signatory cities continue their groundbreaking approaches, they are limited in their ability to scale these solutions through lack of finance. New, long term, low payback investment options are needed, accounting for increased climate resilience and acknowledging all the co-benefits that are achieved. Upgrading existing buildings remains the greatest challenge for policy makers and financiers, given the complex and disruptive nature of building retrofit projects. Cities look to the future by helping aggregate demand for new technologies, driving down costs through public procurement, and securing and blending finance to make the transition as smooth as possible.

FUTURE ACTION

Montréal has 35 municipal building decarbonisation projects that are underway and due for completion in 2026. Within its total portfolio of 538 centrally managed buildings, the city has gone from having 281 to 306 buildings with carbon-neutral status in the period between 2021 and 2025. This has been possible through the removal of fossil fuels which can be replaced with locally available clean electricity, though there remains further opportunities for improved controls and higher energy efficiency. The City of Montréal is also working on a decarbonisation plan for municipal buildings that are not managed by the city.

Oslo will continue to decarbonise the district heating system which provides heat to the majority of the buildings in the city, with 75% of Oslo's total energy use taking place in buildings. The district heating system in Oslo utilises surplus energy from waste management facilities, sewage and data centres, in addition to bioenergy and electric boilers. Liquefied natural gas and fossil gas now only account for 1.6% of input energy to the system and the use of fossil fuels is being phased out of the district heating system. A carbon capture facility is being installed to capture residual emissions from one of the heat sources on the heat network, scheduled to begin operation in 2029.