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How cities can shift from gas to renewables in buildings

[Clean Energy](#)[Spotlight On: The Renewable Energy Transition](#)Author(s): **C40 Cities Climate Leadership Group, C40 Knowledge Hub**

Once touted as a ‘bridge fuel’ from oil and coal to renewables, natural gas has emerged as one of the most significant drivers of climate change.^{1, 2} When burned for energy, natural gas still produces half the carbon dioxide (CO₂) of coal, while the potent greenhouse gas (GHG), methane, is often leaked during its production.³ The damage to human health caused by pollution from burning gas is significant, but largely unknown to the public.

Urban consumption is driving burgeoning demand for natural gas. By 2024, demand is forecast to be 7% higher than in 2019.⁴ Heating and cooling in buildings is a major source of that demand, particularly in higher-income nations. Buildings account for 28% of gas demand, on average, in Organisation for Economic Co-operation and Development (OECD) countries, as high as 37% in its European nations, and 24% in China.⁵ Natural gas in buildings is also typically the segment of gas usage that cities can most easily influence.

Cities around the world are exploring pioneering policies to transition from natural gas to renewable energy in buildings. Here are key ways that cities can encourage this shift.

Curb demand for natural gas in new and existing buildings

Even if your city lacks control over the energy system, direct and indirect regulatory tools can help to reduce the amount of natural gas used in its buildings. These approaches may involve taking legal action to enact pioneering policies and working with or in opposition to national and/or regional governments. In

the United States, for example, local governments are having to fight against “preemptive” laws in state legislatures which stop utilities being subject to further regulation by municipalities.⁶



English

City-led efforts to reduce or ban natural gas use are still relatively new, but the following approaches are finding success today:

- **Ban natural gas and incentivise electricity in new buildings.** New all-electric homes and neighbourhoods avoid the costs of gas mains and services, as well as reducing costs for homeowners.⁷ These policies have gained traction in the last few years, led by several cities across California. In 2020, San Francisco joined more than 30 cities that have banned the use of natural gas in new builds, helping to put pressure on the state to update its Building Energy Efficiency Standards. This will incentivise builders to choose electric over natural gas-fired heating for new residential and small commercial buildings from 2023.⁸
- **Introduce building performance standards.** These are, in effect, a cap that city governments can place on energy usage, prompting building energy-efficiency upgrades. They indirectly reduce the use of natural gas in new and existing buildings due to the fuel’s inefficiency. The Institute for Market Transformation (IMT) has created a Model Ordinance for Building Performance Standards as a resource to help cities compile their own standards, which can be modified to reflect local circumstances and priorities.⁹ For guidance on building standards more broadly, read How to set energy efficiency requirements for new buildings and How to set energy efficiency requirements for existing buildings. Also visit the Building Energy Efficiency Policy Explorer for more examples of policies around the world.

Washington DC's Building Energy Performance Standards (BEPS) are minimum energy performance thresholds by property type. Buildings must meet a benchmarked performance and reporting requirement or comply within an established timeline, as part of the city's Sustainable DC plan to halve GHG emissions and energy consumption by 2032.¹⁰

- **Introduce emissions performance standards.** These can lead to a larger reduction in natural gas in the building stock than restrictions on overall energy use, by directly restricting emissions from fossil fuels like gas. Cities have been exploring updates to building codes, with an explicit focus on air quality.¹¹ Vancouver's Zero Emission Buildings Plan includes increasingly strict emission limits on new buildings, with a view to achieving zero emissions in all new buildings by 2030. This effectively acts as a natural gas ban.¹²
- **Capitalise on land-use regulations.** These offer a way to reduce natural gas use for cities that lack the powers to introduce building regulations. This new approach is being taken in Brookline,

Massachusetts, which is engaged in a legal fight to add an expiry date to special buildings supplied with fossil fuels, or a perpetual licence if buildings are all-electric.¹³



Be sure to set zero-emission targets as well

Ideally, aim for 100% clean electricity by 2035, at the latest, on the way to 100% clean energy by 2050.

Consider establishing a goal for when to turn off natural gas in your city's buildings. Such targets establish a clear and visible direction of travel, send important signals to the energy market, and can help to encourage stakeholders to participate and collaborate in the transition.

Replace natural gas appliances when they die out

Between now and 2050 – the latest target year for net-zero emissions – the energy supply for most buildings and their appliances will change only once or twice. The point of replacement is, therefore, a critical opportunity to switch appliances to renewable alternatives and to ensure that emissions from natural gas are not locked in for years.

To help ensure that natural gas appliances are replaced, cities can:

- Install infrastructure for electricity ahead of time, such as wiring and access to a clean electricity supply, to make it as smooth as possible for businesses and residents to switch from natural gas when the time comes.
- Use regulatory powers to enforce or encourage a switch from natural gas at major milestones in a building's lifecycle, such as the point-of-sale or -lease, a change in use, or when undertaking maintenance work or renovations. See How to set energy efficiency standards for existing buildings for more on legislation to bring existing buildings up to standard.
- Connect electrical appliance upgrades to related policies, such as those targeting health, energy poverty or skills development. The Philadelphia Energy Authority's Built to Last programme, for example, is a pilot project to help homeowners in high-poverty neighbourhoods access housing repair services.¹⁴ It combines low-income home repair programmes with electrification and solar power installation, leading to home restorations that include a transition away from gas to clean energy.¹⁵

Create a roadmap to assess your city's best clean alternatives to natural gas

The feasibility of renewable energy sources should be assessed as part of a renewable energy strategy. Read



English

(for cooling and heating)

[How to create a roadmap for your city's renewable energy transition](#) for advice on how to do this. Technologies that can replace natural gas include air-source and ground-source heat pumps (for cooling and heating), solar thermal hot water systems and waste heat recovery. These technologies can power district heating and cooling networks to maximise efficiency. See [How to decarbonise your city's heating and cooling systems](#) for more on how these can be employed.

Identify funding and address equity concerns

Clean, efficient energy systems typically deliver lower energy bills. However, the upfront costs associated with switching from natural gas to electricity in buildings are a barrier, particularly for lower-income groups. Cities must engage meaningfully with stakeholders to create a plan that protects vulnerable populations, while achieving an energy transition in buildings as quickly as possible. [How to embed equity and inclusivity in climate action planning](#) outlines resources and tips on ensuring policies are equitable and inclusive.

Funding sources and tools that can support the transition away from natural gas include [municipal green bonds](#), utility user taxes (UUTs), franchise fees and appliance rebates. [Six effective ways for cities to invest in climate action](#) introduces options to raise resources and secure investment.

Incorporating equity concerns into New York City's buildings mandate

In New York City, [regulations require](#) existing large buildings to meet strict GHG emission limits from 2024 and these will become increasingly stringent over time.¹⁶ The law gave rise to concerns that the costs could be passed on from building owners to the residents of affordable housing through rent rises. After a thorough stakeholder engagement process, a separate pathway was created for affordable housing owners and renters to abide by the law, including low-cost energy-saving measures, less stringent emission cuts and financing tools for renewable energy projects.¹⁷

Win local support for the transition from natural gas

Opposition to this shift often highlights the perceived costs, difficulties and cultural impacts involved in transitioning to new forms of energy. To build local support for alternatives, cities need to address misconceptions and build a positive narrative around the transition. Working with trusted community messengers, from celebrities and cultural leaders to doctors and public health authorities, can help to achieve this.

Cities should promote four main benefits of abandoning natural gas:



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1. **Climate:** Do not be afraid of making the environmental case for switching to renewable energy.
Natural gas is a significant contributor to climate change. If cities fail to act, the impacts of the climate crisis will be far more severe and prolonged than the challenges involved in achieving an energy transition.
2. **Health:** Gas stoves generate indoor air pollution that can be harmful to human health – especially children, who are more susceptible to air-pollution-related illnesses than adults.¹⁸ Children living in a home with gas cooking have a 42% higher risk of asthma symptoms and a 24% higher risk of being diagnosed with asthma.¹⁹ Meanwhile, a study examining COVID-19 mortality data in the United States found that long-term exposure to elevated nitrogen dioxide – which is between 50% and 400% higher in homes with gas than electric stoves –²⁰ was correlated with a higher risk of death from the pandemic.²¹ In California, indoor natural gas often violates air-pollution standards for safe *outdoor* air.²² Read *Why clean air is vital for your city's health and prosperity* for more on the air-pollution challenges facing cities.
3. **Resilience:** Transitioning from natural gas to new technologies can help boost cities' resilience and ability to adapt to the changing climate. For example, heat pumps can provide critical cooling services for cities in climates that are unaccustomed to heatwaves.²³ Repairing old and inefficient homes and buildings will be vital to preparing cities for increasingly regular hot weather events.

Natural gas and other fossil fuels are also subject to volatile prices. Renewable energy prices are more stable. As demonstrated by the rapid increase in gas prices in 2021, fossil fuel prices can be affected by many economic and geopolitical factors, while the cost of solar and wind is locked in during installation.²⁴ Price swings create huge costs for energy companies, governments and consumers.

4. **Jobs:** There are hundreds of millions of gas appliances around the world that will need to be replaced in the transition to electricity. This means creating jobs for new panels, wiring, HVAC installation, maintenance and other tasks.

For guidance on how to promote a transition to renewables more generally, read *How to win support for local clean energy*.

Advocate for an end to natural gas globally

Transitioning away from natural gas – or leapfrogging this fossil fuel on the path to renewables – requires governments and finance institutions to stop putting money into it. Renewable-based alternatives are either already cheaper than natural gas or expected to be cheaper within a few years.²⁵



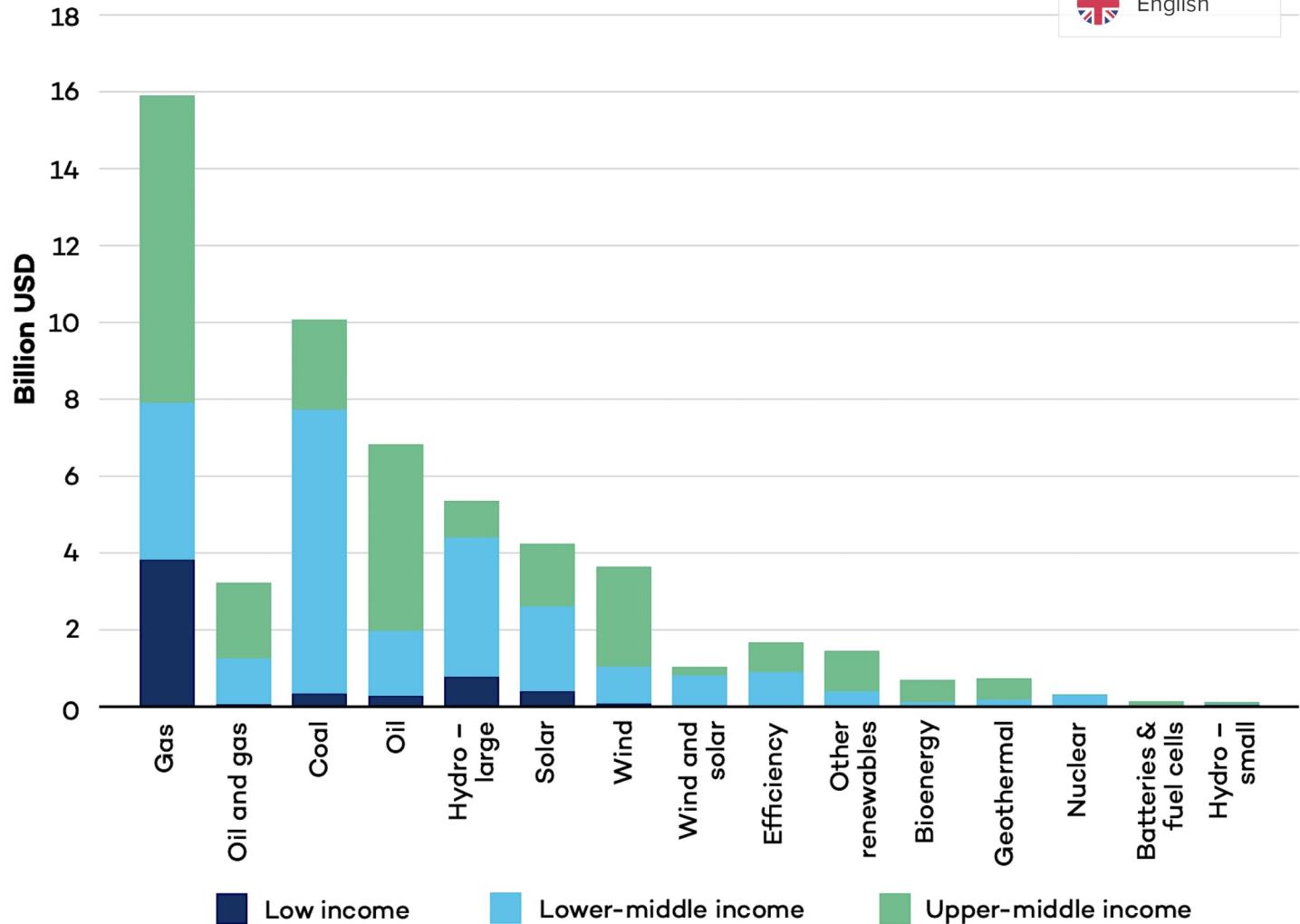
Chicago's Building Decarbonization Working Group

In 2021, Chicago created a working group to develop a plan to address the 70% of GHG emissions that come from the city's buildings due to natural gas and other fossil fuels. Committed to 100% of buildings citywide using renewable energy by 2035, the group brings together a broad coalition, with political buy-in from climate activists, public officials and private businesses, among others.²⁸

This means that broad political coalitions need to be forged to stand up to vested interests, particularly the fossil fuels lobby. In the United States, for example, natural gas in buildings is a key political battleground for the gas industry, which earns 90% of its revenue from supplying residential and commercial buildings.²⁶ In Europe, fossil-fuel companies have been pushing for the European Union to support natural gas.²⁷

In the Global South, where natural gas is used more for heavy industry and power than in buildings, international public finance puts four times as much funding into gas than wind or solar, as illustrated by the image below.

International public finance for energy in low- and middle-income countries (annual average 2017–19)²⁹



Sources: Oil Change International, n.d.; World Bank, 2021.

As major consumers of energy, cities must continue to advocate for a rapid shift to renewables.

Partner with city networks and campaigns to maximise the success of efforts to influence national governments, the private sector and financial institutions. Read [How to advance your city's climate action through city diplomacy](#) for advice on how to do this.



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