

HOW CITIES ARE BUILDING THE FUTURE WE WANT:

city progress towards meeting
Net Zero Carbon Buildings
Declaration commitments



Introduction

In September 2018, C40 cities from around the world made an ambitious commitment to ensure all new buildings are net zero carbon by 2030, and all buildings by 2050.

Signatory cities describe in their own words* what they are doing now to act on this commitment and create the future we want.

Cape Town
Copenhagen
Durban
Johannesburg
London
Los Angeles
Medellín
Montréal
New York City
Paris
Portland

San Francisco
Seattle
Stockholm
Sydney
Tokyo
Toronto
Tshwane
Washington, D.C.

*Cities will publicly report on progress annually after signing the declaration. These cities have voluntarily reported in advance of the first 2020 reporting deadline.

Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration the City of Cape Town has begun the process of developing a Buildings Policy which will incorporate a requirement for all new buildings to be net zero carbon by 2030. This requirement will lower the energy use intensity of buildings to the maximum extent feasible and achieve net zero carbon building performance by 2030 through meeting the remaining energy requirements with renewable energy.

This is being progressed under the C40 South Africa Buildings Program (SABP) with a local delivery partner providing expert support and including a dedicated Technical Officer working with the city to lead the delivery of programme outputs and outcomes. The City, with technical assistance through the C40 SABP has developed a roadmap to NZC for new buildings by 2030 through modelling emission and energy use intensity reduction pathways and developing interim targets between now and 2030.

Under the declaration, the City of Cape Town has committed to ensuring its new and existing municipal buildings are NZC by 2030. Currently actions to reduce energy consumption and carbon emissions includes lighting retrofits, installation of rooftop photovoltaics (PV) and smart metering to improve energy management and measurement/reporting.

Interventions are also planned for the existing buildings sector, including legal instruments to promote resource efficiency and rooftop PV in homes, mechanisms to support access to finance (for the residential sector in particular) for the upfront capital costs and decarbonising the Cape Town electricity grid by enabling the purchase of large scale renewable energy from independent power producers (IPPs).

On track with delivery plan to meet declaration commitments? **Yes**



Copenhagen

Progress Summary

The national building energy codes set high requirements for new buildings, and therefore the city of Copenhagen focuses on existing building and decarbonising the electricity and heat supply with the publicly owned utilities. Copenhagen's ambitious CPH2025 Climate Plan will ensure that Copenhagen is supplied by 100% carbon neutral electricity and heat in 2025, which means the buildings will be net zero carbon users. Together with the city utilities, Copenhagen will invest in new wind turbines, heat pumps, biomass fueled combined heat and power plants and other technologies.

Copenhagen have succeeded in reducing the total electricity consumption in Copenhagen by 8% compared to 2010; heat consumption is still at the 2010-level. However, in the same period Copenhagen's population and number of buildings have increased leading to higher demand of energy. If instead the focus is on emissions in buildings, the CO₂ emissions have been reduced by 55% for electricity and 44% for heat. This is due to a transition in the energy grid with investments in the abovementioned technologies.

One of the most ambitious actions Copenhagen is taking is Energy Leap a network for the largest building owners in Copenhagen, targeting a 3% annual energy reduction in all buildings. The network members accounts for approximately 11% of the total building stock in Copenhagen, and seek to expand this to 20%.

In municipal buildings where the city has control it is progressive. With a goal of reducing energy consumption in municipal buildings with 40 % by 2025 compared to 2010 Copenhagen City Properties has measured a reduction of 17% in 2018 compared to 2010. Among many actions like upgrading BMS in smaller buildings and a large number of technical refurbishments a comprehensive energy surveillance system has been installed in all municipal buildings. This allows the municipality to monitor the electricity, heat and water consumption on an hourly basis and track progress of energy saving initiatives and provide strategic foundation for new business cases and refurbishment plans. A task force in the department tracks the overall development in consumption patterns and assists local technical staff when irregularities occurs to ensure as energy efficient operation as possible. The City leads the C40 Municipal Building Efficiency network.

On track with delivery plan to meet declaration commitments? No

It will become a challenge to reach our targets related to energy reductions in the building sector due to Copenhagen's growth in the building stock and population since 2010. However, it needs to be stated in general the building stock in Copenhagen is pretty energy efficient, and we expect to be fully supplied by renewable energy by 2025.

Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration the eThekweni Municipality (Durban) has undertaken the first steps in developing a buildings bylaw with the aim of ensuring that all new buildings are net zero carbon by 2030. It will address mandatory requirements to reduce the energy use intensity of buildings with interim targets between now and reaching net zero carbon in 2030. To further support this bylaw and to stimulate the uptake of new Net Zero Carbon buildings, the City of Durban is in the process of publishing green building incentives.

This progress is being made in collaboration with C40 under the C40 South Africa Buildings Program with a local delivery partner providing expert support and including a dedicated Technical Officer working with the city to lead the delivery of programme outputs and outcomes. The city attended the New Building Efficiency Network Workshop in Beijing where Net Zero Carbon road mapping was central theme of the knowledge exchanges.

On track with delivery plan to meet declaration commitments? **Yes**



Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration the City of Johannesburg has undertaken the first steps in developing a buildings bylaw with the aim of ensuring that all new buildings are net zero carbon by 2030. It will address mandatory requirements to reduce the energy use intensity of buildings with interim targets between now and reaching NZC in 2030.

This is being progressed in collaboration with C40 under the C40 South Africa Buildings Program (SABP) with a local delivery partner

providing expert support and including a dedicated Technical Officer working with the city to lead the delivery of programme outputs and outcomes. The city, with technical assistance through the C40 SABP has been developing a roadmap to NZC for new buildings by 2030 through modelling emission reduction and energy use intensity reduction pathways and developing interim targets between now and 2030.

On track with delivery plan to meet declaration commitments?

Yes



Progress Summary

London was one of the first major world cities to put together a detailed climate action plan, in the form of the London Environment Strategy, compatible with the aims of the Paris Agreement. The Mayor further developed the 1.5C Compatible Plan which sets the framework for our activities in committing to the Net Zero Carbon Buildings Declaration.

New buildings

London has been successfully implementing its zero carbon target for new homes through the London Plan since 1 October 2016. The new London Plan will extend the zero carbon target to all major development, including non-residential.

To meet our zero carbon target, developments must achieve a minimum on-site carbon reduction beyond national building regulations by reducing energy demand, being supplied by clean energy and maximising opportunities for renewable technologies on-site. Any shortfall in achieving the target is paid into the relevant borough's carbon offset fund which is ring-fenced for carbon saving projects in the borough. It is estimated that approximately £48m has been collected or secured since the zero carbon target for homes was introduced, with the support of the GLA to all London boroughs.

Evidence suggests that the residential elements of developments required to meet the zero-carbon homes are achieving higher on-site

carbons savings compared to those applications not required to meet the zero carbon target.

Existing buildings

The Mayor's £34m Energy for Londoners programmes (e.g. RE:NEW and RE:FIT) aim to make London's homes warm, healthy and affordable, its workplaces more energy efficient, and to supply the capital with more local clean energy. In addition, the Mayor's £500m Energy Efficiency Fund, which was launched in July 2018, provides long term, low interest loans to public bodies and small to medium enterprises for energy efficiency and renewable energy projects. The Mayor has no direct powers to encourage building retrofit (except for major refurbishments requiring planning consent) but he continues to advocate to national government for supportive action.

On track with delivery plan to meet declaration commitments? **Yes**



Progress Summary

Los Angeles is committed to upholding the California Energy Code that will require all new low rise and single family residential buildings to install solar PV and operate at Zero Net Energy from 2020. The intention is to ensure that all new buildings achieve the same or better by 2030. On April 29th the Mayor released the updated Sustainable City pLAN for Los Angeles calling it Los Angeles' Green New Deal. In this it is required that all new buildings will be Net Zero Carbon by 2030 and that all new municipal buildings and major renovations must be completely

electrified from now, and that every building in LA must be completed decarbonized by 2050. Energy use in buildings is to be reduced by 22% by 2025, 34% by 2035 and 44% by 2050. The City of LA will also be investigating policies that will promote the electrification of building services in new and existing buildings.

**On track with delivery
plan to meet declaration
commitments?**

Yes



Progress Summary

As a signatory to the Net Zero Carbon Buildings Declaration, the city of Medellín has already taken several measures in existing buildings to reduce greenhouse gas emissions between 45% to 50% by 2030, and 100% by 2050. For new buildings, the goal is to be net zero carbon by the year 2030. The climate action plan is under development and will be based on the guidelines of the Net Zero Carbon guide. The measures we have assumed are based on reduction of water and energy consumption and on the reduction and recycling of solid waste. The official buildings of the Municipal Administration of Medellín are powered by hydroelectric energy. In November 2018 the Sustainable Mayor's Office Program was included in the Development Plan, under the Agreement No. 003 of 2016, which executes different actions and activities to assess,

monitor and reduce the consumption of energy, water and generation of solid waste in official buildings. The Guide for the reduction of net carbon emissions for official buildings in the city is currently under construction. It includes strategies, actions, goals, activity scheduling, monitoring, and indicators. Parallel to the Guide, we will execute plans to increase awareness of zero carbon strategies and increase the compliance capacity of stakeholders in the residential, commercial and service sectors, as well as in the local industry.

On track with delivery plan to meet declaration commitments?

Partially

There have been some changes in strategy as result of the roadmap currently being established



Progress Summary

Ville de Montréal has participated in the development of the first Energy Transition, Innovation and Efficiency Master Plan conducted by the Quebec government. The Ville de Montréal has held two public consultations on the subject to reduce the consumption of fossil fuels and boost the use of renewable energy. One on designing buildings in a perspective of sustainable development on the territory of Ville de Montréal and a second, on reducing dependence on fossil fuels in Montréal. This is building towards to the specific targets that will be developed as part of the 2020-2030 plan for Net Zero Carbon buildings.

Besides, on May 6th 2019, as a first step towards fulfilling its Net Zero Carbon buildings declaration commitments, Ville de Montréal has announced its intention to table by 2020, a draft by-law aiming to ban oil heating systems in all new buildings on the territory of the urban agglomeration of Montréal.

The ban and mandatory removal of heating oil will be undertaken gradually as of 2025, and until 2030, in industrial, institutional and commercial sectors, and will end with the residential sector. In order for these measures to be equitable, they will be adapted for low-income families. Moreover, community-based stakeholders such as the industry, business-owners and citizens will be consulted, in order to achieve a gradual transition towards carbon neutrality.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



Progress Summary

NYC passed Local Law 32 of 2018 to require that all new buildings and substantial renovations be built to a stretch energy code achieving at minimum a 20% improvement over the base code in 2019, with further uplift in 2022, and that large new buildings adopt very low energy design targets similar to Passive House standards with absolute predicted performance targets in 2025. Beginning in 2019, all new buildings will be required by local law to install solar or green roofs or both on all available roof spaces furthering NYC's progress to achieving net zero carbon new buildings by 2030. NYC's public buildings are now required by Local Law 31 of 2016 to be designed to achieve 50% improvement in energy performance over a 2016 baseline.

In April 2019, City Council passed the Local Law 97 of 2019 Act that requires large existing buildings to cut emissions by at least 40% by 2030, and at least 80% by 2050. Non-compliant building owners will be met with fines per tonne of CO2 emissions over the cap.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



Progress Summary

Over a 12-year period, the City of Paris has managed to reverse the trend and progressively reduce the environmental impact of buildings in Paris: between 2008 and 2020, 55,000 social housing units and 300 schools will have been renovated and more than 50,000 dwellings in jointly owned properties will have been helped to complete their renovation formalities. As 80% of the building stock was built before the introduction of the first thermal regulations in 1974, and less than 1% of new floor area is constructed each year, renovating buildings in a sustainable manner remains a key issue in the efforts to attain carbon neutrality in Paris. The renovation of 1 million dwellings between 2020 and 2050 is a massive challenge that requires a faster rate of execution while further improving the quality.

As of 2018, any new construction in Paris will have to target a regulatory consumption of 50 kWh/m²/yr (primary energy), the Energy 3 and Carbon 1 requirements levels of the

Energy Positive Building and Carbon Reduction reference standard (référentiel Bâtiment à Énergie Positive & Réduction Carbone) (E + C-) and the best performance standards through energy labelling, aiming for energy neutrality. These performance objectives were incorporated into the social housing funding circular in 2018.

The City of Paris is working towards the development of a blueprint for energy performance of public buildings (Schéma Directeur de Performance Énergétique des Bâtiments Publics) in order to optimise the management of its assets, for implementation in 2020.

From 2020 the New Urban Planning document will be setting objectives for the public and private stakeholders in terms of energy performance, production of renewable energy, carbon neutrality and adaptation to climate change.

On track with delivery plan to meet declaration commitments? **Yes**



Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration, the City of Portland Bureau of Planning and Sustainability (BPS) is currently establishing a net zero carbon roadmap as part of the Zero Cities Project. The Zero Cities Roadmap is a three-year project funded by the Urban Sustainability Directors Network (USDN) to develop strategies to achieve a zero carbon building sector. The project centres on racial equity through community collaboration and technical analysis of potential carbon reduction policies.

To address its own facilities, Portland BPS is collaborating across multiple bureaus to chart a course toward net-zero carbon buildings by 2030.

The proposed energy efficiency goal is a 50 percent reduction in energy use. BPS plans to bring an Energy Action Plan for City Buildings before City Council by the end of 2019, which will address strategies and actions across the three main pillars of building decarbonization: energy efficiency, renewable energy and building electrification. The Energy Action Plan for City Buildings will include a funding strategy and budget requests.

**On track with delivery
plan to meet declaration
commitments?**

Yes



San Francisco

Progress Summary

As a signatory of the Net Zero Carbon (NZC) Buildings declaration, the City of San Francisco has undertaken the first stages to develop a roadmap for NZC new buildings by 2030 and all buildings by 2050. Over the past year, the city has been collaborating with the Carbon Neutral Cities Alliance and the Urban Sustainability Directors Network on developing a NZC roadmap, including performing technical data-driven studies, and deploying best practices for community engagement and for considering equity. Significant progress is being made on new buildings: through the triennial California energy code update process (which goes into effect January 1, 2020), San Francisco is currently proposing an all-electric favouring reach code that will be the first step toward requiring new construction to be all-electric before 2030. Analyses completed show that all-electric buildings are cost-effective for most building types; however, a few barriers remain to requiring all-electric for all buildings, including: lack of an all-electric baseline prototype for certain building types; compliance

software compatibility; and practitioner familiarity. We will continue to work with stakeholders to clear these barriers to meet our 2030 commitment. For existing buildings, our data-driven efforts to date have considered all local building typologies and analysing the rates of “city-owner” interactions as potential policy intervention points. The findings will underpin a new stakeholder-driven policy development process slated for the latter half of 2019 and 2020 which will identify new policies and programs that are tailored to the specific constraints and opportunities of our highly varied building stock and ownership structures. Initiatives will be crafted to illuminate the co-benefits of electrification in the context of anticipated changes in local and global climate, while also advancing other key priorities such as redressing historical racial inequities and ensuring that job and economic opportunities from electrification are accessible to all San Franciscans.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration the city of Seattle continues to implement Seattle's 2013 Climate Action Plan and the 2018 Seattle Climate Strategy which are the city's foundational roadmaps for meeting Seattle's carbon neutral goal in the building and transportation sectors by 2050. Development of an equity-focused roadmap specific to existing residential buildings is underway in collaboration with USDN and CNCA. In addition, the city researched net zero carbon code roadmaps for new construction from several global cities and presented these at the New Building Efficiency Network Workshop in Beijing where Net Zero road- mapping was a central theme.

On track with delivery plan to meet declaration commitments?

Yes

Seattle is on track with our action milestones, however these alone will not get us to our net-zero carbon target in the building sector and further work is needed to develop actions for existing residential buildings, existing small commercial buildings (those not otherwise covered by the proposed performance standard), and on eliminating fossil fuel in new construction.



Stockholm

Progress Summary

Since 2012 new buildings built on city owned land (approx. 60% of Stockholm geographical area) should be constructed to reach Passive House standard (55 kWh/m²), for tertiary buildings extra energy use can be added, e.g. schools with special demands for ventilation. For comparison the national standard is 80 kWh/m² so this is a challenge for the builders. Stockholm and a few other Swedish cities have acted as test beds showing that higher degree of energy efficiency than national standards is possible to achieve. In 2021 new national energy standards for new buildings will be implemented in Sweden in the area of 60 kWh/m².

Studies made by the City of Stockholm and Swedish Environmental Research Institute (IVL) have shown that in a 50 year perspective, CO₂ emissions from the production of building material and the construction process of the building is of the same magnitude as the operation of the building. Based on this knowledge the City of Stockholm and IVL have developed a tool for calculating the CO₂ impact for building materials and the production process of new buildings. The City's three residential building companies are now implementing the process of climate declarations of building material/building process

for their new constructions. A target value of maximal CO₂ emission for new buildings is expected to be developed by 2023.

There are two technologies in use for heating new buildings in Stockholm, ground source heat pumps and district heating. Whether or not buildings will operate at net zero carbon is hence a function of the heat and electricity production supplying the buildings.

The last remaining coal fired plant in the district heating system is expected to be shut down in 2023. Remaining fossil fuel in the system after 2023 is from fossil based plastics in the waste incineration plant. Better sorting systems for plastics before incineration are under construction and the energy company and City are studying the possibility to introduce BECCS (Bio Energy Carbon Capture and Storage). If BECCS can be introduced, net zero carbon production can be realized or even a climate positive heat production.

Approx. 1000 – 1300 buildings with oil burners remain within the geographical Stockholm. The city has set a target to phase out all oil burners in Stockholm to 2025.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration, the City of Sydney has undertaken the first stages of roadmap (referred to as Net Zero Planning Pathways) development for NZC new buildings by 2030 and all buildings by 2050.

To inform the planning pathway the city is holding a series of forums to identify issues and opportunities for planning to transition to net zero energy developments.

The City has also engaged a consultant to develop performance standard pathways to high performing net-zero energy buildings in Greater Sydney planning controls.

The City also advocates for improved energy efficiency and renewable energy provisions in the building codes and works with the New South Wales Government and the Green Building Council of Australia to set pathways to net zero for NABERS and Green Star rating tools.

The City also advocates for wider coverage and lower thresholds for mandatory disclosure of energy performance of existing buildings.

On track with delivery plan to meet declaration commitments?

Yes



Progress Summary

Aiming for a Zero Emission Tokyo, a sustainable city with no CO₂ emissions, Tokyo Metropolitan Government (TMG) will help citizens and businesses in Tokyo change their behaviours, and encourage and accelerate the development of green technologies. In order to achieve these goals, TMG will strengthen existing programs such as the Tokyo Green Building Program, Tokyo Cap-and-Trade Program, and Tokyo Carbon Reduction Reporting Program. We will also implement programs based on the “Zero Emission Tokyo” strategy which is going to be released in December

2019. TMG is also accelerating international cooperation and knowledge sharing to realize the commitments by participating in related C40 network workshops (e.g. the New Building Efficiency Network Workshop in Beijing in April 2019, and the Clean Energy Network Workshop in Tel Aviv in June 2019).

**On track with delivery
plan to meet declaration
commitments?**

Yes



Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration the City of Toronto has established the regulatory and policy roadmap for NZC new buildings by 2030. In December 2017, City Council approved the Toronto Green Standard Version 3 which includes a phased in four-tiered framework for achieving near-zero emissions in all new buildings by 2030.

With respect to existing buildings, the City in partnership with the Province of Ontario established a mandatory energy and water use and reporting regulation for buildings 50,000 square feet and larger. Implementation is phased in over 3 years and the buildings over 250,000 square feet were the first to report in 2018 on their 2017 data. The regulation will be completely phased in by the end of 2020.

Toronto has in place a number of programs whereby we provide both technical and financial assistance (primarily low cost loans) for building retrofits.

Working with the information provided through the regulation, uptake of our building energy efficiency programs and other sources we initiated in 2019 the development of a roadmap for deep energy retrofits of existing buildings. A regulatory, policy and program roadmap that will put Toronto on the path to seeing deep energy retrofits in all buildings by 2050 will be presented to Council in 2020. This roadmap will complement our existing private-public partnership to establish local low carbon thermal district energy systems and the development, to start in 2020, of a Community-wide Renewable Energy Strategy.

The combination of existing programs with the ongoing research and strategy development mean that by the end of 2020 Toronto will have in place a clear regulatory, policy and program roadmap for seeing all existing buildings being moved towards a net zero emission goal.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



Tshwane

Progress Summary

Since the declaration was signed the City of Tshwane has completed a number key actions, working across departments in the city including Built Environment and Enforcement: Building Control, Group Property, Energy and Electricity) as well as external partners including C40 under the C40 South Africa Buildings Program, Building Efficiency Accelerator (BEA), Sustainable Energy Africa, Green Building Council of South, Council for Scientific Industrial Research and ICLEI Africa.

(a) Updating the Green House Gas Emissions Inventory which has given us new insights with respect to the contribution of building energy which is 25% of the city's emissions.

(b) A City-wide study has been commissioned starting in June 2019 to ascertain the level of compliance with national mandatory technical standard regulation called SANS 10400 – XA-Energy. The findings will assist in updating the City of Tshwane Green Building Bylaw and Policy with the aim of ensuring that all new buildings are net zero carbon by 2030 with interim targets between now and 2030.

(c) The City will conduct a study to ascertain why the city stakeholders like home-owners could not immediately buy into the implementation of the 2012 Green Building Bylaw.

(d) Linking and creating learning platforms between Climate Action Planning and New Building Programmes so that activities of

both C40 programmes feed into each other.

(e) For New Buildings the Green Buildings “Hub” has been established which is a committee which will guide the NZC Roadmap and is made up of City Internal Departments.

(f) For Existing Buildings, the Green Building Advisory Committee has also been established. It is made up of few internal departments and Built Environment external members like ICLEI Local Government for Sustainability, Green Building Council of South Africa, and Council for Scientific and Industrial Research (CSIR), Aurecon among key others.

(g) The City is also making headway towards the development of the embedded generation policy and user application system for renewable energy.

On track with delivery plan to meet declaration commitments? No

For services that need to be procured externally or for the city to enter into agreements with other external organizations, there is a need for budget allocations, procurement and contracting process which needs to be undertaken. These processes have delayed the building audit studies, Green Building Bylaw Review, external stakeholder engagement, the commencement of SANS 10400 XA study and identification of city owned buildings to be refurbished and retrofitted.

Washington, D.C.

Progress Summary

As a signatory of the Net Zero Carbon Buildings declaration, Washington, D.C. has undertaken the first stages of roadmap development for NZC new buildings by 2030 and all buildings by 2050.

The Clean Energy Omnibus Amendment Act of 2018 became law in March 2019 and includes a building energy performance standard (BEPS) to target the least efficient buildings for improvement. Beginning in 2021, larger buildings will demonstrate that they exceed the local median ENERGYSTAR score for their building type or will be required to follow either a performance or prescriptive pathway to improve their energy performance. Smaller buildings will be phased in over time. The Green Bank, launched in 2019, will address financial and funding needs of energy efficient retrofits. The city recently awarded a grant to seed a high-performance building innovation and training hub to assist the building industry comply with green building requirements.

For new construction, Washington, D.C. has developed a new energy code (currently under review)

with a voluntary Net Zero Energy compliance pathway called Appendix Z. This outcome-based compliance path restricts all fossil fuel combustion on site and includes a range of energy efficiency requirements. This standard will be tested and reviewed ahead of its potential adoption into mandatory code in 2026. The development phase for 2022 net zero energy code for residential development will begin soon. To encourage and support pilot projects during this period, the city awarded several net-zero energy building design assistance grants in 2019.

To support the efforts in achieving this commitment, the city attended the New Building Efficiency Network Workshop in Beijing where developing a roadmap to net zero carbon was a central theme. The District is currently developing its strategy to achieve carbon neutrality by 2050 which will inform the roadmaps for both existing and new buildings.

**On track with delivery
plan to meet declaration
commitments?** **Yes**



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CITIES