

RENEWABLES IN CITIES 2021 GLOBAL STATUS REPORT

SUMMARY FOR POLICY MAKERS

CITY



GLOBAL GOALS, LOCAL ACTION: RENEWABLE ENERGY IN CITIES



Cities are key

to accelerating the transition to renewables across all energy end-use sectors.

City governments around the world are taking action to accelerate the global uptake of renewable energy, both in municipal operations as well as city-wide. They have installed, purchased or contracted for renewable energy to meet the demand of their own buildings and vehicle

fleets; adopted renewable energy targets and implemented policies to incentivise local renewable energy generation and consumption; supported urban community energy projects; and facilitated co-operation among stakeholders.

Traditionally, national governments have been the main entities tasked with governing energy supply and driving the transition to a renewables-based energy system. However, city governments are uniquely positioned to take action to move away from fossil fuel-based energy systems towards renewables, while curbing energy use and related greenhouse gas emissions. Decarbonising heating and cooling and transport, which together represent more than 80% of final energy demand, requires local solutions (→ see Figure 1). Thus, cities – including their governments, inhabitants, and commercial and industrial actors – are essential to building a renewables-based economy, and their active participation is critical in helping to define and implement the energy agenda.

■ **Focusing on high-impact areas:** Cities are critical to the energy transition because they account for around three-quarters of global final energy consumption (and for a similar share of global energy-related carbon dioxide (CO₂) emissions), and they are home to more than 55% of the global population, a share that continues to grow.

■ **Accelerating renewables in all sectors:** Municipal action is essential in the power sector, but it is also needed in other end-use sectors that so far have lagged in the energy transition, despite representing the bulk of global energy use. Buildings, concentrated in and around urban centres, account for 33% of total final energy consumption, and urban transport is responsible for 13%ⁱ.

■ **Encouraging the uptake of renewables city-wide:** City governments have the ability not only to shift municipal operations to renewable energy, but also to encourage the

broader uptake of renewables among a wide range of urban actors, including by establishing ambitious targets and comprehensive policies, raising awareness and facilitating stakeholder dialogue.

■ **Playing multiple roles in shaping the urban energy transition:** Among the roles that city governments play are as target setters, regulators and policy makers, but also as facilitators and advocates for renewables, considering their proximity to citizens. City governments and other urban players also have strengthened their purchasing power to source renewables and have increasingly become producers of renewable energy.

The *Renewables in Cities 2021 Global Status Report* maps efforts by various city actors, most notably municipal governments, to accelerate the global uptake of renewable energy, examining in particular urban policy landscapes, market and infrastructure developments, investment trends and opportunities for citizen participation.

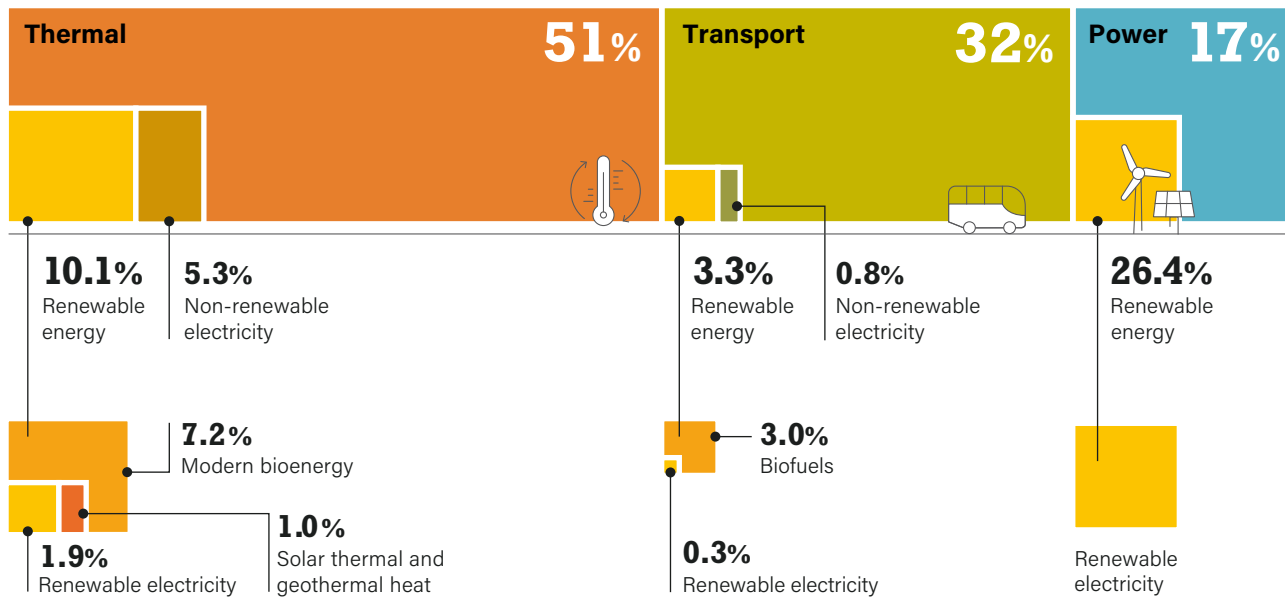
Municipal governments deploy and use renewable energy for various reasons, which differ according to the local and regional context (→ see *Regional Trends* section). Common **drivers** for renewable energy uptake include reducing local air pollution, advancing local economic development, lowering operational costs, improving energy access (and alleviating energy poverty), promoting a stable and secure energy supply, mitigating and adapting to climate change, and improving the health and well-being of citizens (as evidenced by responses to the COVID-19 pandemic).

In 2020, the unfolding of the **COVID-19 pandemic** and the government-initiated lockdowns to slow the spread of infections had major impacts on both cities and the drivers for renewables. Economic activity fell sharply in the early months of the pandemic, reducing energy demand globally and severely affecting energy use in cities, notably in the transport sector. These developments resulted in a shift in government (especially municipal) priorities, as efforts to ensure public health and well-being were pushed up the policy agenda. Images of blue skies and clearer air helped to increase societal pressure towards reduced **pollution** and a green recovery, also creating momentum for the development of renewables. Although COVID-19 recovery plans were still being prepared as of early 2021, initial municipal proposals emphasised both the environmental and the socio-economic benefits associated with renewables – in line with similar plans proposed at the national and supra-national levels – as well as the need to strengthen energy system resilience.

i According to the United Nations, the term “city” can connote a political or civic entity, a geographic unit, a formalised economy or an infrastructure bundle. In some instances, local communities, neighbourhood associations, urban businesses and industries may be subsumed under the term “city”. Throughout the report, both “municipal government” and “city government” refer to city-level decision-making bodies and government authorities (the mayor’s office, city council, etc.). “Local government” is a more generic term that can refer to different sub-national levels of public administration, including also counties, villages and other intermediate levels of government. In addition to municipal governments, key “urban actors” include individual citizens, groups of citizens and private enterprises, as well as various civil society groups that are active within the city.

ii Based on the fact that urban transport accounts for 40% of the energy used in the transport sector.

Figure 1. Renewable Share of Total Final Energy Consumption, by Final Energy Use, 2017



Note: Data should not be compared with previous years because of revisions due to improved or adjusted methodology.

Source: Based on IEA data.

URBAN POLICY LANDSCAPE

In 2020, municipal governments around the world demonstrated leadership in advancing the energy and climate agendas, with some local governments pushing for higher ambition and more rapid change than at the national level. City governments have used different types of targets, policies and actions to demonstrate their ambition. In 2020, more than 1 billion people – around a quarter of the global urban population – lived in a city with a renewable energy target and/or policy (for a total of over 1,300 cities), and around 260 cities set new targets or passed new policies in 2020. Improved reporting on municipal energy and climate targets indicates that several cities adopted higher targets or set earlier target years. In addition to these actions directly related to renewable energy, other measures indirectly support the shift to renewables – such as reducing CO₂ emissions, including through net-zero goals and the electrification of public transport.



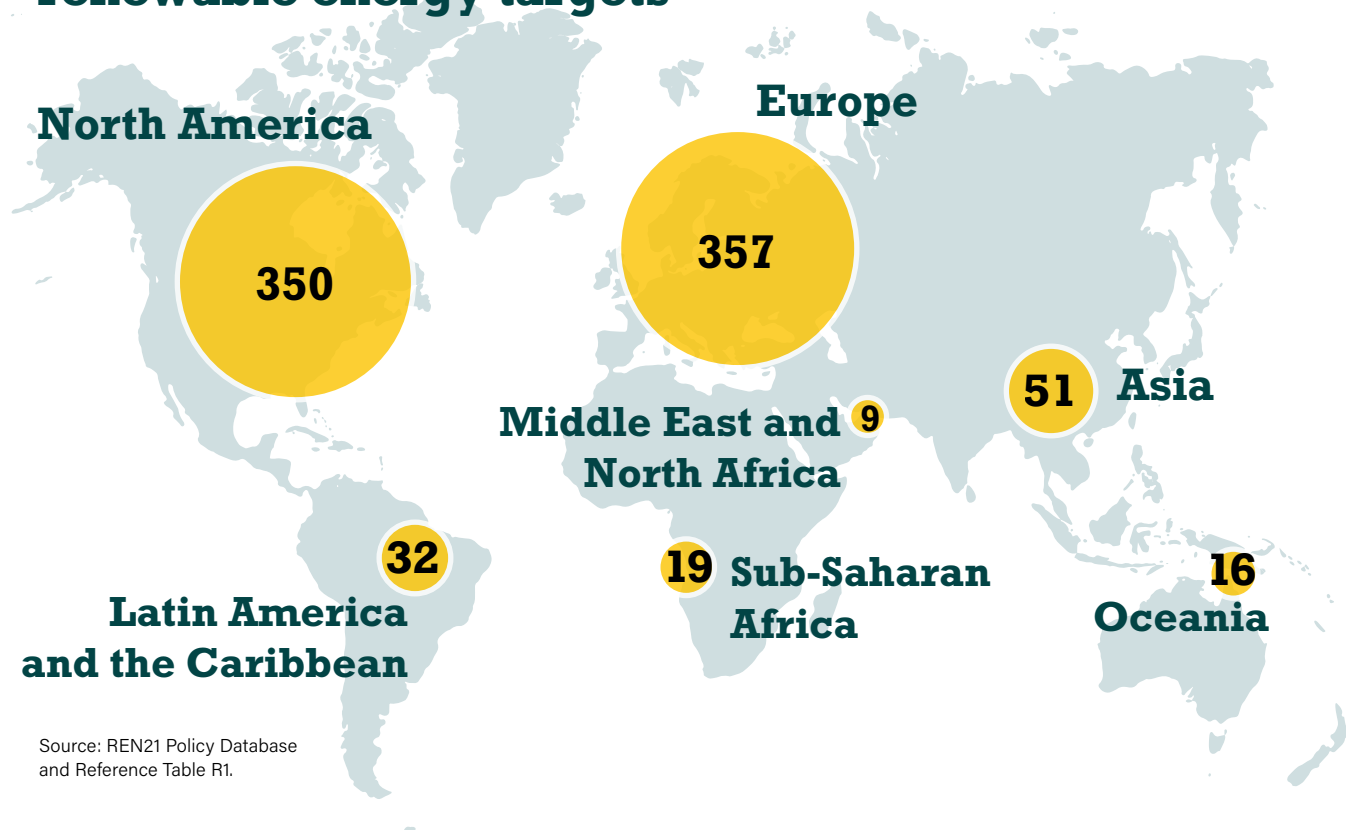
More than
1 billion people
– 25% of the global urban population – live in a city with a renewable energy target and/or policy.

By the end of 2020:

- Governments in more than 830 cities in 72 countries had adopted a **renewable energy target** in at least one sector, for a combined total of around 1,100 targets (→ see Figure 2). Of these, over 610 cities had set 100% renewable energy targets (many for 100% renewable electricity), for either municipal operations or city-wide use. Geographically, renewable energy targets have increased in all regions of the world, although most targets are in North America and Europe, followed by Asia. Despite this momentum on target-setting, data challenges remain related to tracking progress and identifying the scope of application.
- Similar to national-level trends, most renewable energy target-setting in cities has focused on the **electricity** sector, including some targets to switch to renewable electricity consumption in buildings. However, targets for renewables-based **heating and cooling** in buildings (mainly in Europe and the United States) and for decarbonising **transport** are growing slowly. In addition, at least 67 cities had **e-mobility targets** in place in 2020 (up from 54 in 2019), which provide an opportunity to increase the share of renewables in transport.
- More than 10,500 cities globally, covering 974 million people, had passed **CO₂ emission reduction targets**, and around 800 cities had committed to net-zero emissions (a sharp increase from the 100 net-zero targets set by the end of 2019). Such targets create opportunities to deploy energy efficiency and accelerate the supply and use of renewable energy.

Figure 2. Renewable Energy Targets in Cities, 2020

834 cities worldwide have renewable energy targets



To achieve their energy and climate targets, municipal governments have procured renewables for their own operations and scaled up renewable energy generation on public buildings and for municipal fleets. Many city governments first have increased the share of renewables in their own operations in order to help build local capacity, demonstrate the business case and raise awareness of the opportunities presented by renewables. Importantly, city governments also have expanded their policy portfolios to support the uptake of renewables city-wide. While most urban renewable energy targets address the power sector (similar to national-level developments), momentum has grown for policies that go beyond power and are expanding to heating and cooling and the transport sector or an integrated policy approach.

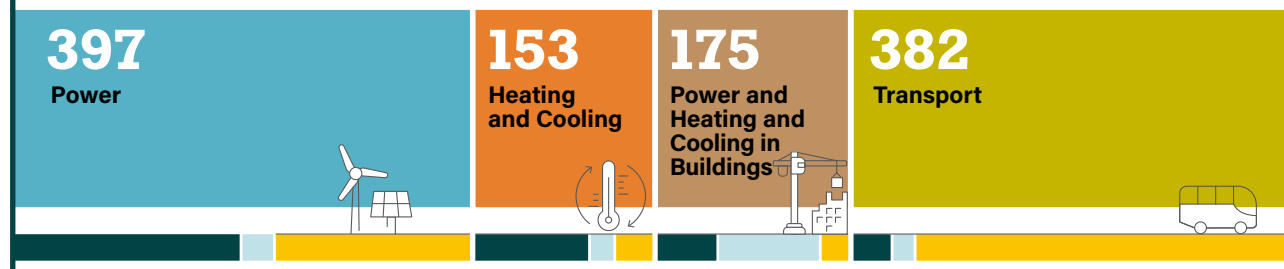
■ By the end of 2020, around 800 municipal governments had in place regulatory policies, fiscal and financial incentives as well as indirect support policies to enable the uptake of renewables in buildings and transport city-wide – for a combined total of over 1,100 policies (→ see Figure 3).

■ In the **buildings** sector, the number of codes and mandates requiring *new* buildings to use renewables for electricity and/or heating (usually solar PV or solar thermal) has risen. The use of renewable energy in *existing* buildings is often encouraged via financial and fiscal incentives. As of 2020, a total of 53 cities spanning 10 countries had issued or planned bans or restrictions on the use of natural gas, oil or coal in buildings for space and water heating.

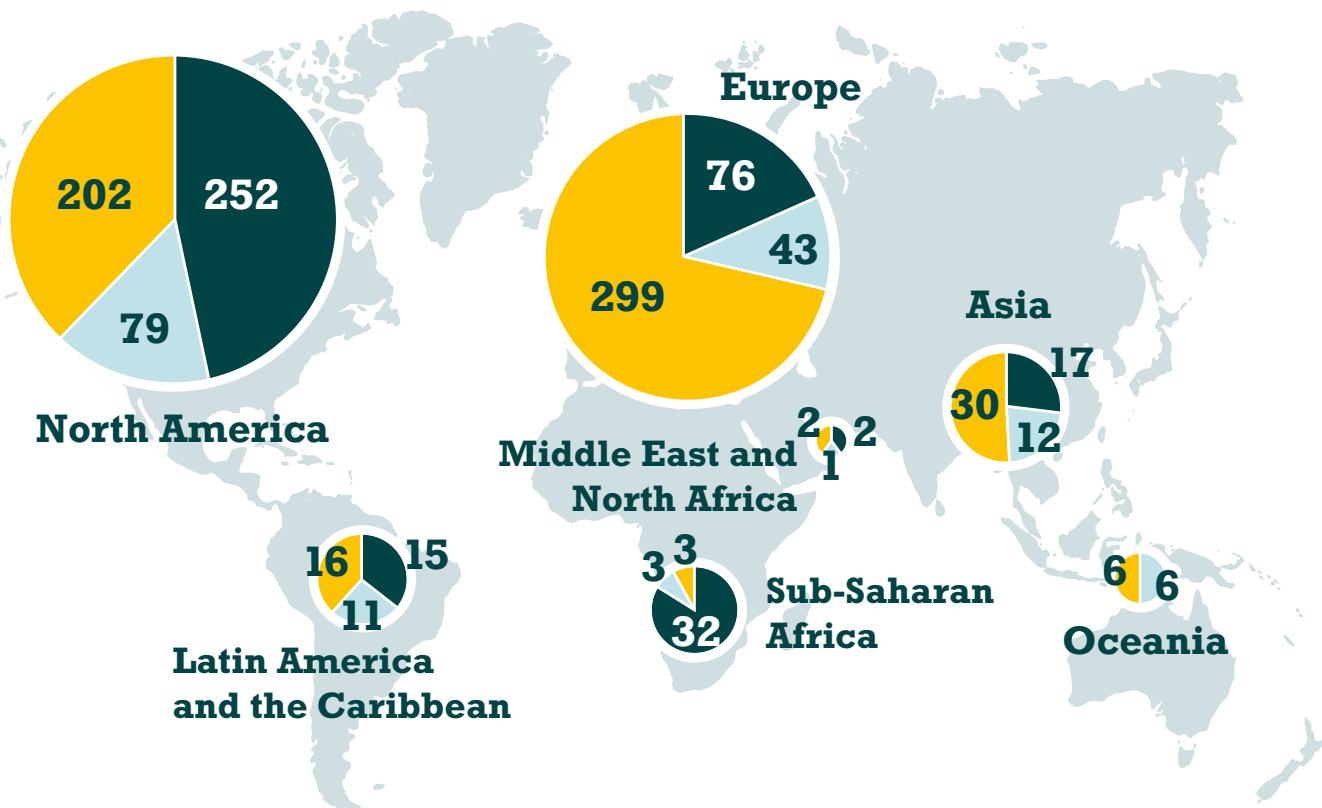
■ While liquid biofuels and biomethane are still part of some cities' **transport** decarbonisation plans, municipal policies supporting electrification (notably public procurement policies and financial subsidies) are expanding to all transport modes. However, only a few cities have taken e-mobility as an opportunity to increase the share of renewables in the transport sector, and most electric vehicle (EV) policies do not make an explicit link to renewable electricity. The growing numbers of low-emission zones and city-level bans or restrictions on certain fossil fuels/vehicles – in place or planned in 249 and 14 cities, respectively – also have implications for the use of renewable electricity and other fuels (including renewable hydrogen) in urban transport.

Figure 3. Renewable Energy Policies in Cities, by Type and Region, 2020

1,107 policies are in place in 799 cities worldwide



Regulatory policies Fiscal/financial policies Enabling policies



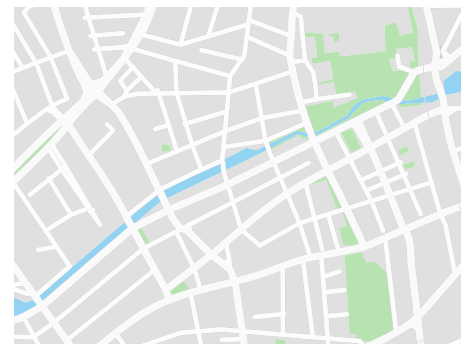
Source: REN21 Policy Database and Reference Table R5.

Note: Some city governments have more than one renewable energy policy. Policies in buildings indicates that policies apply in the building sector and can include both power and/or heating and cooling elements.

In addition, several city governments have shaped their urban energy systems to better accommodate rising shares of renewables in the energy mix. During 2019 and 2020, several cities took steps to address challenges to local and regional electricity **distribution infrastructure**, for example by: upgrading existing assets or deploying battery storage capacity; expanding district energy networks or commissioning new systems that rely (at least in part) on renewable thermal energy (supported by technologies such as heat pumps and energy storage systems); and installing EV charging stations, including some that deliver 100% renewable electricity.

The regulatory and financial power of municipal governments is decisive in the ability of cities to

advance renewables.



INVESTMENT AND CITIZEN PARTICIPATION FOR LEVERAGING RENEWABLES CITY-WIDE

Cities represent more than 80% of global gross domestic product and can contribute significantly to global investment in renewables, including through municipal bonds and development finance as well as via public-private partnerships and power purchase agreements. However, cities often have limited funds at their disposal or depend on national governments to provide a significant amount of finance. During 2019 and 2020, municipal governments continued to struggle to finance and invest in renewable energy projects due in part to their inability to mobilise their own fiscal revenue collection and borrow money. The exact share of investment in renewable energy projects by municipal governments (or other urban actors) in cities during this period is unknown due to a lack of data, which prevents a fuller depiction of the role of cities in driving renewable energy investment.

Municipal governments are responsible for only part of the financing that occurs within a city. Businesses, households, communities and other urban actors also play a role, often encouraged by policies. In Europe and the United States, as well as elsewhere, more and more citizens have chosen to purchase energy from providers offering renewable electricity or heat, to increase self-consumption of renewables and to join together to create **community energy** projects in cities. City governments also have used **participatory governance** to include citizens in urban planning, budgeting and policy development.

Against the backdrop of rising global climate movements, citizens have been exerting pressure on their city (and national) governments to adopt stricter local climate and energy policies. Partly in response to this, by the end of 2020 a record 1,852 municipal governments in 29 countries had declared **climate emergencies** (up from around 1,400 in 2019), and 231 municipal governments had submitted a climate action plan alongside their declaration, some of which are used to support renewable energy deployment.

MULTI-LEVEL COLLABORATION

City governments cannot transition to a renewables-based energy system in isolation; multi-level governance is key to ensure that municipal efforts to scale up renewables are closely connected to the policies, regulations and incentives adopted at higher levels of government. The degree of regulatory and financial power that a national government grants to a city government is decisive in that city's ability to advance the deployment and use of renewables. Local renewable energy production, target-setting and policy making are all influenced by state/provincial, national and regional regulatory and policy frameworks. Other factors greatly affecting cities' ability to scale up renewables include market rules set by state and/or national governments (as well as the political dynamics that shape these instruments) and economic dependence on fossil fuels.

Where city governments are not able to directly install, purchase and/or procure renewables due to location-specific variables – such as a lack of institutional or financial capacities – they are pursuing alternative avenues, for example partnering with stakeholders (including utilities and other cities) to engage with national- or state-level legislators and regulators to remove barriers. Many city governments are pursuing community aggregation or the municipalisation of utilities to facilitate direct control of renewable energy supply.

Over 1,850 municipal governments have declared climate emergencies, partly as a result of growing citizen pressure for

**climate
action.**

CITY





Oak View, California, United States



Bacoor, Philippines

REGIONAL TRENDS

This year's *Renewables in Cities Global Status Report* contains a Feature chapter focused on cities in **Sub-Saharan Africa**. Due to rapid population growth and urbanisation, as well as rising energy demand, cities across this region increasingly recognise the many potential benefits of renewable energy use, including as a means to increase energy access and fight energy poverty. Key barriers and opportunities for advancing renewables in urban settings of Sub-Saharan Africa fall into four categories:

- **Policy and regulation:** Although city authorities often have limited regulatory powers and weak policy mandates, they are well placed to co-ordinate efforts to encourage local renewable energy deployment, which require collaboration across various stakeholders, including national policy makers.
- **Access to financial markets:** Most local governments in Africa depend on national government grants as their main source of revenue, which is spent largely on operations instead of capital investments. Nonetheless, cities across the region have demonstrated progressive leadership on renewables through piloting various demonstration projects.
- **Data needs:** Scarcity of city-level data in Africa is a major barrier for private investment in grid expansion plans and energy projects. This places local governments, which generally are closer to the population, in a unique position to provide investors with such information or to engage with relevant entities, including electric utilities, to facilitate data collection.
- **Internal capacity:** To build internal capacity and knowledge and support renewable energy implementation, municipalities in Sub-Saharan Africa have formed partnerships with external organisations, established or joined city networks, and developed public-private partnership platforms to facilitate private sector engagement.

In **Europe**, cities have been global leaders on urban energy and climate issues, often driven by the push for greater climate action as well as a desire to improve the health of city residents. Partly as a result, European cities spearheaded the climate emergency movement. In addition, European cities have been the most numerous participants in city networks and have dominated local climate action. In line with the European Green Deal, cities also have committed to net-zero goals and developed more holistic strategies and integrated solutions to decarbonise urban activities, including scaling up renewables on municipal buildings, using waste and wastewater as inputs to produce renewables, integrating solar and geothermal district heating, and shifting to renewables-based municipal vehicle fleets.

North America has remained a leading region for city-level renewable energy action, driven by local ambition to decarbonise and diversify the energy supply while increasing economic competitiveness and deploying resilience. During 2019 and 2020, several cities achieved or made significant progress towards their 100% renewable energy goals. Key trends in the region included procurement of renewables for municipal operations, galvanised support for distributed renewable energy generation projects, diverse community solar models, and robust incentives or mandates for energy efficiency upgrades and building electrification. Although North American cities continued to struggle to transition to renewables-based heating, cooling and transport, an increasing share of municipal governments partnered with legislative or regulatory bodies at higher levels of governance, as well as community stakeholders and/or the private sector, to remove legal, technical and financial barriers restricting renewable energy deployment and use across all end-use sectors.

In **Asia**, growing concerns about air pollution and smog have driven public demand for renewable energy technologies and electric vehicles to improve public health. Although national governments have tended to dominate city-level actions to promote renewables, municipal-level commitment has been growing: for example, local governments have been instrumental in pushing the national governments in Japan and the Republic of Korea to commit to carbon neutrality and/or adopt net-zero targets. Cities in Asia also increasingly have sought to develop and strengthen public-private partnerships and to take advantage of digitalisation and use smart technology to attract more foreign direct investment in renewables.

In **Latin America and the Caribbean**, concerns about traffic and congestion, inadequate infrastructure, air pollution and the effects of climate change have accelerated investment in renewables and the electrification of public transit. By the end of 2020, several municipal governments had renewable energy targets, and cities in the region were among the frontrunners in setting net-zero targets. Many cities already have high shares of renewable electricity in their energy mixes due to the large contribution of hydropower to national and regional grids, emerging national-level regulations for integrating distributed power generation, the growing penetration of wind and solar power (incentivised by national policies) and the emergence of renewable energy auctions. Similarly, many urban transport systems in the region also benefit from high shares of renewables due to existing national-level biofuel blending mandates.

Despite facing varying challenges,

**cities
worldwide**

have been pursuing efforts towards a renewables-based energy system.

In **Oceania**, renewable energy deployment varies widely. Many of the Pacific island nations have turned to renewables to decrease their dependence on fossil fuel imports, reduce energy costs, and increase energy security and resilience; most of these efforts are dominated by national and/or sub-

national governments. In Australia and New Zealand, momentum is growing for renewable energy in cities, also facilitated by rising concerns about climate change and energy insecurity.

Across the **Middle East and North Africa**, concerns about air pollution and health have risen, and energy security challenges remain. Generally, municipal-led renewable energy developments have progressed slowly, due to lack of financial and human resources and to strong centralisation of the energy system. Although some exceptions exist, city governments in the region tend to have comparatively little political autonomy, and thus national rather than municipal governments have largely driven efforts to deploy renewables. Some renewable energy projects in cities have been funded by national governments, whereas in less affluent regions investment has been supported by foreign development aid as well as rising involvement from the private sector and civil society.



Dubai, United Arab Emirates

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RENEWABLE ENERGY POLICY NETWORK FOR THE 21st CENTURY



REN21 is the only **global renewable energy community** of actors from science, governments, NGOs and industry. We provide up-to-date and peer-reviewed facts, figures and analysis of global developments in technology, policies and markets. Our goal: enable decision makers to make the shift to renewable energy happen – now.



The most successful organisms, such as an octopus, have a **decentralised intelligence** and “sensing” function. This increases responsiveness to a changing environment. REN21 incarnates this approach.



Our more than **2,000 community members** guide our co-operative work. They reflect the vast array of backgrounds and perspectives in society. As REN21's eyes and ears, they collect information and share intelligence, by sending input and feedback. REN21 takes all this information to better understand the current thinking around renewables and change norms. We also use this information to connect and grow the energy debate with non-energy players.



Our annual publications, the *Renewables in Cities Global Status Report* and the *Renewables Global Status Report*, are probably the world's most comprehensive crowd-sourced reports on renewables. It is a truly collaborative process of co-authoring, data collection and peer reviewing.

ABOUT REC 2021

REN21's *Renewables in Cities Global Status Report (REC)* series provides an overview of the status, trends and developments of renewable energy in cities, using the most up-to-date information and data available. The REC's neutral, fact-based approach documents in detail the annual developments in policies, markets, investments and citizen action, with a particular focus on renewables in public, residential and commercial buildings as well as public and private urban transport. The REC complements REN21's *Renewables Global Status Report*, which covers renewable energy market, industry and policy trends. Jointly, these reports contribute to making renewable energy visible in the global debate, drawing decision makers' attention to renewables and continuously providing better data and tracking to inform energy decisions worldwide.

REC 2021 is the result of a collaborative effort, building on REN21's unique data and reporting culture, with more than 330 data contributors and peer reviewers and over 30 individual interviews from around the world. The report is endorsed by an Advisory Committee of more than 20 organisations, including major renewable energy players and city networks. In this collaborative process, data are collected on hundreds of cities, ranging from mega-cities to small and medium-sized cities and towns. Collectively, this report aims to inform decision makers and to create an active exchange of views and information around urban renewable energy.

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Y COOPERACIÓN

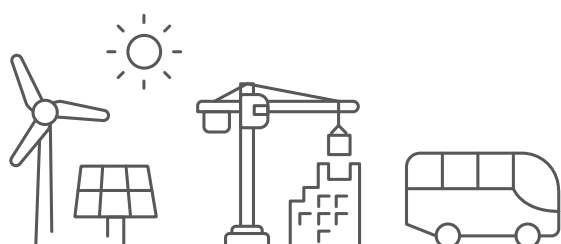


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For further details and access to
the full report and references, visit
www.ren21.net/cities



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See Endnotes and Methodological Notes
in the full REC for further details on the
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