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Trends in China

Facts from the *Renewables in Cities 2021 Global Status Report*

Key Renewable Energy Takeaways in 2020 from China

- China is the greatest market in the world for solar PV¹, with many of these developments taking place in urban areas and helping to decarbonise energy use in buildings; however, further efforts are needed to increase the share of renewables across sectors, including heating and cooling, but also power – especially in light of the expansion of e-mobility².
- The electrification of all transport modes has been pioneered in Chinese cities; they are visibly committed to the national EV ambition, providing complementary municipal-level subsidies (in addition to national incentives) for battery electric and fuel cell electric vehicles.
- China is the second-largest producer of district heating (DH) in the world, and although these systems rely almost entirely on fossil fuels, some cities have been increasing solar thermal and geothermal heating capacity and use in their DH networks.

Brand new data shows

- Only 25 cities had renewable energy targets and/or policies from a global total of over 1,300 cities). This covers 321 million people, 38% of the urban population in China
- On a global scale, Chinese cities are lagging behind on setting net-zero³ targets: some notable exceptions exist: 6 cities were developing net-zero targets in 2020, and **Dalian** set a target to achieve net-zero by 2050. **Rizhao** has had a target for climate neutrality by 2050 since 2008.

Renewable Energy Developments in Chinese Cities

City renewable energy commitments and policies

- Most city-level targets and actions are in line with (and often part of the implementation of) national-level policy, including China's commitment to reach carbon neutrality by 2060.
- At least 5 Chinese cities had EV targets (**Beijing, Foshan, Hong Kong, Lhasa and Shenzhen**).

¹ China has dominated global investment in renewable energy capacity since 2012. However, investment fell in 2019, following a slowdown in the solar PV market after the central government suspended the feed-in tariff for solar PV in 2018.

² Although it is home to several EV capitals, China's electricity mix only relies on 28% renewables.

³ Net-zero" emissions can be achieved, for example, by using natural sinks, such as reforestation or adopting agricultural best practices, or through a technological solution, such as carbon capture and storage. Net-zero targets also are referred to commonly as "climate-neutral", "carbon-neutral" or "zero-emission" targets, although technically these are not the same. Carbon neutrality refers to net-zero emissions of only CO₂, whereas climate neutrality indicates a broader focus on net-zero emissions of all greenhouse gases. There is no agreed-upon definition, and implementation of these targets also varies broadly.

- **Foshan** and **Zhangjiakou** have specific targets for hydrogen use in transport or for fuel cell vehicles (such targets are still scarce at the city-level, and the few that exist are all in Asia).
- At least 9 Chinese cities provided subsidies for EVs to complement the incentives available at the national level under the New Energy Vehicles policy, including **Shanghai** and **Shenzhen**; and many other cities had implemented enabling policies to decarbonise transport.
- **Chinese frontrunners in banning fossil fuels: Handan, Taiyuan** and **Xingtai** had bans on the use of fossil fuels in buildings.
- Low emission zones (LEZs) have started to emerge in Chinese cities (**Beijing, Hong Kong, Shanghai** and **Suzhou**), although they had been a European trend until recently.
- Solar mandates also exist in Chinese cities: **Luanzhou** requires new residential buildings with less than 12 floors to install a solar water heating system for each household (if suitable); for taller buildings the systems must be installed up until the 12th floor.
- In 2020, **Beijing, Guangzhou, Shanghai** and **Xian** announced financial support policies for distributed solar PV through 2025, providing a subsidy per kWh produced.
 - During 2018-2020, **Jiaozuo** provided an equipment rebate of CNY 40 per m² of heating area to residents who shifted from using coal to biomass CHP or heat pumps.

Scaling up renewables in buildings and transport

- Urban consumers have installed on-site renewable energy generation in Chinese cities:
 - **Hong Kong** Disneyland installed a 1.8 MW system after local utilities introduced a feed-in tariff scheme to help achieve Hong Kong's green goals.
 - The chemical company Solvay installed a biomass boiler at its facility in **Zhangjiagang** in 2019 to switch from natural gas to renewables.
 - Six large solar thermal systems were completed in other cities to provide hot water for schools (in **Hangzhou** and **Zhejiang**), an office building (in **Shanghai**) and several large blocks of flats (in **Hangzhou, Linyi, Nanchang** and **Zaozhuang**).
- **Finding solutions to land scarcity:** To reduce project costs by shifting away from renewable power plants located far from load centres, several Chinese cities, incl. **Beijing, Guangzhou, Shanghai** and **Shenzhen** implemented small-scale wind pilot projects closer to city boundaries.
- **District heating relies on fossil fuels, but first signs of scaling up renewables are emerging:** China is the second-largest producer of district heating worldwide but this relies on less than 1% renewables (significantly less than the global average of 8%). However, the use of solar thermal and geothermal heat for DH systems increased in 2019:
 - Solar DH systems were commissioned in **Shenzhen, Zhongba** and **Saga**.
 - China's largest geothermal heating system came online in **Fengxi New City**.
 - In 2018, China's largest DHC network using river water and a water-source heat pump started running in public buildings in the **Chongqing Jiangbeizui CBD**.
- **China dominates the global e-mobility market**, accounting for 98% of the world's electric buses (505,000) and for the majority of electrified cars, light commercial vehicles, two-/three-wheelers and trucks, as well as EV charging stations:

- Globally, the leading cities for passenger EV sales in 2019 were all in China (**Shenzhen** with 81,427 units sold, **Beijing** with 80,567 and **Guangzhou** with 72,270).
- In 2020, **Shanghai** completed a pilot programme that will allow utilities to co-ordinate EV charging with the availability of renewables.
- **Interest in biofuels in urban transport remains:** in **Hong Kong**, the restaurant group Maxim's partnered with Shell to launch a pilot programme to fuel 100 delivery trucks with biodiesel produced from used cooking oil; **Shanghai** started a programme to run 2,000 city buses on B5 fuel (which is sold at nearly 250 stations in the city).
- **Green hydrogen is garnering interest in China⁴**, incl. in **Zhangjiakou** – a renewable hydrogen demonstration zone: In 2019, 174 fuel cell electric buses started circulating in the city, and in 2020, the city announced a target to have more than 2,000 fuel cell vehicles and 16 hydrogen refuelling stations in operation by 2022.
 - **Guangzhou** and **Kunshan** adopted local development plans in 2020 for the production and use of renewable hydrogen in urban fleets.

Financing renewables in cities

- Projects in Chinese cities are mostly driven by policies and targets set by the central government; City governments often act as co-ordinators, linking financing with technological expertise through public-private partnerships:
 - The municipal government of **Shanghai** partnered with Shanghai Electric in 2007 to expand offshore wind power capacity near the city. Since then, other cities in **Shandong** and **Guangdong provinces** have partnered with Shanghai Electric to build offshore wind power projects.
 - The **Nanjing** municipal government joined with two private investors to build a large-scale heat pump project sourced by river water.
- During 2016-2019, USD 17.5 billion in green bonds had been issued at the local level in China:
 - In 2019, the state-owned Hebei Renewables Construction and Investment Company completed the **Zhangjiakou** Guyuan wind power hydrogen generation project, with an investment of CNY 2 billion.
 - In 2020, Datang Henan Power Generation Co., Ltd issued a USD 144 million green bond to finance 14 offshore wind power projects.

China's Energy Profile:

<https://www.iea.org/countries/china>

Regional Trends - Asia

- In Asia, growing concerns about air pollution and smog have driven public demand for renewable energy technologies and electric vehicles to improve public health.

⁴ China was developing an ambitious roadmap to support the deployment of hydrogen vehicles in more than 20 cities, backed with several policy measures including financial subsidies.

- At least 78 municipal governments in Asia had adopted renewable energy targets and/or policies, most of which were in buildings and transport.
- Local governments have been instrumental in pushing some nations to commit to carbon neutrality and/or net-zero targets.
- Green hydrogen for transport also is garnering interest across Asia, with several cities having ongoing or planned pilot projects.

Questions? Please contact press@ren21.net or +33 1 44 37 50 99.

All report materials, figures, case studies and the full data pack can be downloaded here:
<http://ren21.net/rec2021press>