

Bigger, purer, and newer smart renewable cities across the world



As urbanization and use of renewables continue to rise, the smart renewable city (SRC) concept is increasingly taking hold. In its seminal report [Renewables \(em\)power smart cities](#), Deloitte developed an SRC framework to identify and classify cities globally that are deploying solar and/or wind power in connection with their smart city plans. To qualify as an SRC per the Deloitte model, a city must have a publicly available city plan that presents a vision integrating renewables and smart city initiatives. In addition, it must have already deployed solar and/or wind power (at least 1% of its city energy mix) and have a plan to deploy more. The share of fast-growing wind and solar generation was selected to categorize the cities because these two sources are closest to reaching price and performance parity with conventional ones, and they have become the preferred energy sources for most consumers. Over the past year, Deloitte's original list of SRCs has grown by over 40% to include 13 additional cities.

The updated table below presents three types of SRCs. First, the Biggest SRCs comprise all the cities that qualify as SRCs and have more than a million residents. Growth in the number of cities has primarily occurred in this category, with 10 very geographically diverse entrants: Barcelona, Berlin, Buenos Aires, eThekweni, Istanbul, Santiago, Santiago de Cali, Tainan, Taoyuan, and Zaragoza. This increase may be attributable to growing decarbonization pressures most acutely experienced in the big population centers that are intent on meeting citizen preferences and contributing towards meeting the emissions targets set by governments, businesses, and financiers. The list of the Purest SRCs picks up where the Biggest SRCs leave off: It includes all cities, regardless of size, where solar and/or wind account for more than 51% of the current energy mix, up from 42% in our original list. The upward revision is due to Adelaide raising the bar by achieving a majority renewables grid over the past year. Finally, the Newest SRCs are greenfield smart city projects entirely powered with renewables—a category that now includes four SRCs.

These developments show that smart cities across the world are rapidly seizing the opportunity to become SRCs, recognizing that solar and wind can power both their grids and people-centered goals around economic competitiveness, sustainability, and quality of life. Amid [accelerating energy industry convergence](#), utilities will likely continue to play a key role in the successful deployment of SRC initiatives as the building and transportation sectors renewably electrify and prosumer citizens engage with their electric providers and cities in new ways.

Selected smart renewable cities committed to growing solar PV and wind share of electricity mix, 2020

City	Country	Population (millions)	Current wind and solar share of electricity mix	Current renewables* share of electricity mix	Renewable/carbon target
Biggest					
Berlin	Germany	3.6	1%	3%	Carbon-neutral by 2050 25% solar electricity by 2050
Tokyo	Japan	14	1%	9%	30% renewable energy by 2030 Carbon-neutral by 2050
Taoyuan	Taiwan	2.2	3%	5%	850 MW cumulative installed renewable power capacity by 2021
Chicago, IL	United States	2.7	3%	5%	100% renewable energy for municipal buildings by 2025
Singapore	Singapore	5.6	4%	4%	50% emissions reduction from 2030 peak by 2050
Buenos Aires	Argentina	3.1	4%	32%	20% renewable energy by the city's largest public sector users by 2025
Istanbul	Turkey	15.5	4%	32%	33% emissions reduction by 2030 from 2015 baseline
eThekweni	South Africa	3.9	5%	5%	40% renewable electricity by 2030 and 100% by 2050 40% emissions reduction by 2030 from 2015 baseline and 80% by 2050
Calgary	Canada	1.3	5%	10%	80% emissions reduction by 2050 from 2005 baseline
Santiago de Cali	Colombia	2.5	5%	100%	National: 1.5 GW of renewable power capacity by 2022 and 4 GW by 2030 (excluding large hydro)
Tainan	Taiwan	1.9	5%	7%	20% renewables share and 20 GW installed solar PV by 2025
Manchester	United Kingdom	2.8	6%	13%	Carbon-neutral by 2038
Seoul	South Korea	10.3	7%	8%	Carbon-neutral by 2050
Barcelona	Spain	1.6	7%	18%	45% emissions reduction by 2030 from 2005 baseline Carbon-neutral by 2050 National: 100% renewable electricity by 2050
Paris	France	2.3	7%	21%	100% renewable energy by 2050
Zaragoza	Spain	7	8%	14%	50% renewable energy by 2030
Santiago	Chile	7.3	9%	51%	100% renewable electricity by 2040
Nelson Mandela Bay	South Africa	1.2	10%	10%	National: 35.6% solar and wind by 2030
Bangalore	India	11	10%	25%	Regional: 6 GW by 2021 National: 227 GW wind and solar by 2022
Toronto	Canada	2.9	13%	37%	75% renewable energy by 2050
Hamburg	Germany	1.8	15%	30%	100% renewable electricity by 2035 55% emissions reduction by 2030 from 1990 baseline year and 100% by 2050
Jaipur	India	3	20%	45%	National: 227 GW wind and solar by 2022
London	United Kingdom	8.9	21%	23%	1 GW solar by 2030 and 2 GW solar by 2050 Carbon-neutral by 2050
Los Angeles, CA	United States	4	21%	34%	100% renewable energy by 2045 Carbon-neutral by 2050
Birmingham	United Kingdom	1.1	21%	33%	60% emissions reduction by 2027 from 1990 baseline National: Carbon-neutral by 2050
Madrid	Spain	3.2	24%	41%	National: 100% renewable electricity by 2050
San Diego, CA	United States	1.4	33%	35%	100% renewable electricity by 2035
Adelaide	Australia	1.3	51%	51%	Regional: South Australia – 100% renewable electricity by 2030
Purest					
Gladsaxe	Denmark	0.07	52%	77%	100% renewable energy by 2035
Denton, TX	United States	0.1	83%	83.8%	100% renewable electricity by 2020
Örebro	Sweden	0.2	100%	100%	Carbon-neutral by 2050
Diu	India	0.05	100% during day	100% during day	Carbon-neutral by 2029
Georgetown, TX	United States	0.07	100%	100%	100% local renewables generation
Newest					
Peña Station Next	United States	0.05	100% microgrid	N/A	Carbon-neutral
Xiongan	China	Multimillion target	N/A	N/A	100% renewable energy
Neom	Saudi Arabia	Multimillion target	N/A	N/A	100% renewable electricity
Hyllie	Sweden	0.7	N/A	N/A	100% renewable or recycled energy by 2030

Note: * Includes solar, wind, biomass, geothermal, and hydropower. Listed are city targets for renewables, unless otherwise noted.

Source: Deloitte analysis; for the list of cities with more than a million people, see United Nations, "The world's cities in 2018"; for the share of wind and solar, see [Carbon Disclosure Project](#) data.

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