

Sustainable disruption: 12 decarbonising technologies for cities

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A new research programme by Economist Impact, supported by Osborne Clarke, identifies technologies that can help cities achieve their carbon-emission targets while also creating jobs, lowering energy costs for residents, and improving overall quality of life. From a long list of 26 technologies across three sectors, the research highlights twelve. Critical gaps in public and private funding across all sectors prevent implementation at a large scale, but also create exciting opportunities for businesses looking to invest in new, sustainable technologies.

Methodology: The long list of technologies was identified following a literature review and in consultation with an external advisory board. The four technologies *highlighted* at the top of each sector were selected based on their scoring for **one indicator**¹ among the following categories: **impact**, **ease of scalability**, and **level of investment**, as well as the interesting (and perhaps neglected) stories they may tell. The featured technologies do not necessarily have the greatest (positive) impact on CO₂ emissions – and for some of the featured technologies, this impact is hotly debated.

Osborne Clarke View



Governments and city authorities need to pull out all the stops to provide favourable regulatory and tax frameworks – and, where possible, financial support – for businesses who are willing to implement or invest in these important technologies.

Omar Al-Nuaimi, Osborne Clarke's International CEO



Overall scorecard: Impact, scalability and investment

Technology and Thematic area	Impact	Scalability	Investment
Buildings & Construction			
Building automation systems (BAS)	Medium	Medium	Low
Digital twins	Medium	Medium	Medium
High-efficiency heat pumps	High	Very high	Medium
Low-carbon cement & concrete alternatives	High	Very high	Low
Cool roofs	High	High	Low
Dynamic glass	High	Very high	Medium
Environmentally friendly insulation	Medium	Very high	Low
Green roofs	Medium	High	Medium
High-performance glass	High	High	Low
City Infrastructure			
District heating & cooling systems (DHC)	High	Medium	Medium
Smart grids & smart meters	High	High	High
Unified communications (VOIP)	Medium	High	High
Waste robotics	High	Very high	Low
Battery energy storage	Medium	High	High
Distributed energy storage	High	Medium	Very high
Distributed solar power	High	High	High
Subway advanced control system	High	Low	Low
Thermal energy storage	High	High	Medium
Transportation			
Autonomous vehicles (AV)	Medium	Medium	High
Hydrogen transport vehicles	Medium	Medium	Medium
Mobility as a Service (MaaS)	Medium	High	Medium
Vehicle-to-grid technologies (V2G)	High	Medium	Low
Battery operation enhancements	Medium	Medium	Medium
Electric vehicles (EV)	Medium	Medium	Very high
Electric vehicle charging ports	Medium	High	High
Smart charging	High	High	Medium

¹ Our three scoring categories, impact, scalability, and investment, each have 3-4 underlying indicators making up their score for that category. The highlighted technologies each have at least one indicator which scores as high or very high among at least one category. For more details the workbook with the full research can be found at <https://impact.economist.com/sustainability>.

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Scorecard: City-level investment

The scorecard below shows the availability of government support at the national, regional or city level for each of the technologies listed. This includes subsidies, tax incentives, policies, projects and grants or funding bodies. Cities are ordered according to funding availability.

Technology & Thematic area	Barcelona	Seoul	Paris	New York	London	San Francisco	Delhi	Berlin	Singapore	Florence
Buildings & Construction										
Building automation systems (BAS)	Yes	Yes	Some	No	No	No	No	No	Yes	Some
Digital twins	Yes	Some	Some	No	Some	No	No	No	Some	No
High-efficiency heat pumps	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Some	Yes
Low-carbon cement & concrete alternatives	No	Some	Yes	Some	Yes	Some	Some	No	No	No
Cool roofs	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No
Dynamic glass	Yes	No	Yes	Yes	Yes	Yes	Some	No	No	No
Environmentally friendly insulation	Yes	Some	Yes	Some	Yes	Some	No	No	No	Some
Green roofs	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
High-performance glass	Yes	Yes	Yes	No	Yes	No	No	Yes	No	Yes
City Infrastructure										
District heating & cooling systems (DHC)	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No
Smart grids & smart meters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unified communications (VOIP)	No	Yes	No	Some	No	Some	No	Yes	Yes	No
Waste robotics	Some	No	No	No	No	No	No	No	Yes	No
Battery energy storage	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Some	Yes
Distributed energy storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Distributed solar power	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Subway advanced control system	Yes	No	No	No	No	No	No	No	Yes	No
Thermal energy storage	Yes	Yes	Yes	Yes	No	Yes	Some	Yes	No	Yes
Transportation										
Autonomous vehicles (AV)	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Some
Hydrogen transport vehicles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Some
Mobility as a Service (MaaS)	No	No	No	Yes	Yes	Yes	Some	No	No	No
Vehicle-to-grid technologies (V2G)	No	No	No	No	Yes	No	No	Yes	No	Yes
Battery operation enhancements	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Electric vehicles (EV)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electric vehicle charging ports	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Smart charging	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



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