

The Arcadis Sustainable Cities Index 2022

Prosperity
beyond profit



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Foreword

In our 5th edition of the *Arcadis Sustainable Cities Index*, we examine urban sustainability through the lens of prosperity. In order to be truly sustainable, cities must look beyond economic development to the health of their natural environment and the quality of life of the people that live there. Without a thriving urban landscape that puts the planet first while providing inclusive opportunities for its citizens, no city can position itself for long-term success, and its prosperity cannot, therefore, be sustained.

Since our last SCI, published in 2018, the pressure on cities has grown exponentially and our relationship with them has changed. Cities were on the front line of the COVID-19 pandemic, with hubs around the world suffering enormous social and financial fallout as businesses were forced to close, public services were pushed to their limits and unemployment rose. The sense of urgency around climate change has also spiked dramatically over the past several years.

Though the pandemic may have temporarily stunted growth for many cities, it has presented the opportunity for a 'Great Reset', towards greener, healthier, more inclusive centers. Sustainability is not a luxury; on the contrary, it's something we cannot afford to lose focus on. For all the suffering it caused, one positive thing the pandemic taught us is that radical change is not as far out of reach as we think. 'Building back better' is not only about economic recovery; it is about meeting the evolving needs of citizens in a way that accelerates our progress towards net zero.

The Arcadis Sustainable Cities Index 2022 questions how we currently understand the meaning of prosperity within cities. Prosperity is commonly identified with economic productivity, but now we can see that, to secure true prosperity, cities must pursue sustainability.

Cities must take a holistic approach, developing a sustainability plan that invests equally in the three pillars of Planet, People and Profit. Often, cities have a laser focus on attracting businesses, investors, and skills to feed the profit pillar. There should be as much fanfare when it comes to creating affordable housing, building net-zero infrastructure and transport, and reducing air pollution.

Cities are not only the places where most change is needed, but where the most change is **possible**.

This year's Index will focus on the theme of *Prosperity beyond profit*, exploring how a city can unlock benefits for its environment and create inclusive opportunities for its people, businesses, and future generations.



John Batten,
Global Cities Director



Executive summary

The Arcadis Sustainable Cities Index ranks 100 global cities on three pillars of sustainability: Planet (environmental), People (social), and Profit (economic).



SCI Overall Top 5 Ranking

- 1 Oslo
- 2 Stockholm
- 3 Tokyo
- 4 Copenhagen
- 5 Berlin

The Norwegian city of **Oslo** tops the Index overall, ranking first in Planet, 17th in People and 39th in Profit.

The top five spots of the overall Index are occupied by a cluster of **northern European** capitals plus Tokyo, which comes in at number three and is the only Asian city in the top 20.

There are no US cities in the overall top five and only two – west coast cities Seattle and San Francisco – reach the top 10 (although US cities dominate the Profit pillar, they do not perform well for Planet or People).



Planet Pillar Top 5 Ranking

- 1 Oslo
- 2 Paris
- 3 Stockholm
- 4 Copenhagen
- 5 Berlin

Europe – and Scandinavia in particular – dominates the Planet pillar, with three key Scandinavian capitals featuring in the top five. These cities' governance, innovation, human capital and climate action efforts boost their environmental scores.

Tokyo is the only non-European city to feature in the top ten, while Bogota is the only developing city to feature in the top 40.



People Pillar Top 5 Ranking

- 1 Glasgow
- 2 Zurich
- 3 Copenhagen
- 4 Seoul
- 5 Singapore

Europe tops the chart here, with a cluster of high-performing cities that offer healthy, safe, well-connected environments and relatively low-income inequality.

Several east Asian cities – **Seoul, Singapore and Tokyo** – also feature in the top 10, propelled to top positions by their strong, affordable amenities, excellent education and low-income inequality.



Profit Pillar Top 5 Ranking

- 1 Seattle
- 2 Atlanta
- 3 Boston
- 4 San Francisco
- 5 Pittsburgh

The US monopolizes the top of the profit pillar: 19 of the top 20 cities are US-based (Tokyo completes the top 20).

US cities are leading the way in areas such as connectivity, ease of doing business, green finance, economic development and job quality.

However, as the top three cities will demonstrate later in this report, profitability doesn't always translate into prosperity.

Prosperity beyond profit:

The Arcadis Sustainable Cities Index 2022 offers a new vision of prosperity, one that puts the planet and its people at its center, understanding profit not as a measure of success, but as a way of unlocking greater sustainability, for the planet and its inhabitants.

Cities ranking highly in the SCI 2022 tend to have a shared focus on Planet, People and Profit, in that order of priority. It's no co-incidence that the pillar most likely to align to overall success in the SCI is Planet (despite each pillar being equally weighted).

To secure future prosperity, cities that are performing well economically, but poorly when it comes to planet and people need to make smart, targeted investments in social policy and environmental strategy.

Profit can – and should – be a catalyst for social and environmental wellbeing. Cities that cannot fall back on economic strength will inevitably find themselves limited in their efforts to better the lives of their citizens or invest in transition.

It is these cities, often in emerging markets, that require focused attention – not least because their sustainable development often represents long-term investment opportunities – to help them strive towards the goals that all cities share. Particularly when it comes to the climate; one city's failure is every city's failure.



The Arcadis Sustainable Cities Index 2022





The evolution of urban sustainability

Our understanding of urban sustainability is evolving. Although the natural environment is still at the core, over time it has developed beyond this planet-centric focus to include social notions of equality and opportunity. This can be seen in the inclusion of a community-based target for COP26: ‘building defences, warning systems and resilient infrastructure and agriculture to avoid loss of homes, livelihoods and even lives’. To build a healthy and equal city, a thriving economy is essential.

The Arcadis Sustainable Cities Index 2022 builds on a legacy index first published in 2015. This year’s report examines 100 cities from 47 countries and incorporates new indicators to provide a holistic measure of urban sustainability. Each city is ranked across three sub-indices: Planet, People and Profit. To achieve true sustainability, cities must strike a balance between these three components.

At Arcadis, everything we do is driven by our passion for improving quality of life – and this is the reason we are focused on cities. Currently, more than half of the global population lives in a city and, by 2050, [it’s estimated](#) that this will increase to two-thirds. These urban hubs are the places where we can have the biggest impact.

Cities are also fueling some of our greatest challenges, in particular the climate crisis. [UN Habitat estimates](#) that while cities only account for less than 2% of the Earth’s surface, they consume 78% of the world’s energy and produce more than 60% of greenhouse gas emissions. Our cities are also incredibly vulnerable to climate change. Mumbai, New York, Lagos, Tokyo, Shanghai, Jakarta, Miami and many other metropolises are coastal cities, threatened by rising sea levels and extreme storms.

Crucially, our cities are the places where people come together, pool resources, and find innovative solutions to humanity’s problems. At Arcadis, we are fixated on cities because they are simultaneously one of our greatest vulnerabilities and one of our greatest strengths.

At Arcadis, everything we do is driven by our passion for improving quality of life – and this is the reason we are focused on cities. Currently, more than half of the global population lives in a city and, by 2050, it’s estimated that this will increase to two-thirds. These urban hubs are the places where we can have the biggest impact.

A new vision of prosperity

This year's SCI sets out a new vision of prosperity: one centered not in individual profit, but in the planet we all share. While no city can guarantee good outcomes for every citizen, prosperous cities are environments in which the majority of residents are able to enjoy a high quality of life, and where that standard of living comes without the heavy burden of environmental degradation or high costs of living.

The United Nations defines a 'prosperous' city as "one that is productive, provides adequate infrastructure, has a good quality of life, offers equity and social inclusion, and is practicing environmental sustainability". These core aspects align with the three pillars – Planet, People & Profit – of the SCI; a prosperous city is one that pursues sustainability.



The three pillars of sustainability

The *Arcadis Sustainable Cities Index* is a broad measure of sustainability, encompassing measures of the environmental, social and economic health of cities.



Planet Pillar



People Pillar



Profit Pillar



Captures environmental factors like energy usage and emissions

Indicators include:

- Immediate needs of citizens (air pollution, green spaces, waste management).
- Long-term impacts (public policy, energy consumption and greenhouse gas emissions).
- Investment in low-carbon infrastructure (renewable energy, sustainable transport).

Measures social performance including quality of life

Indicators include:

- Personal well-being (health, education, crime).
- Working life (income inequality and work-life balance).
- Urban living (reliability of public transport infrastructure, broadband, Wi-Fi availability).

Assesses business environment and economic performance

Indicators include:

- Affordability
- Commercial transport infrastructure.
- Economic performance (ease of doing business, economic development, employment).
- Business infrastructure (access to reliable electricity, connectivity).



Overall results

The Norwegian city of Oslo tops the SCI overall, ranking first in Planet, 17th in People and 39th in Profit. The most sustainable city in the overall index is also the number one city when it comes to supporting its natural environment.

The top five spots of the overall Index are occupied by a cluster of northern European capitals plus Tokyo, which comes in at number three and is the only Asian city in the overall top 25. Tokyo ranks in the top ten for both People and Planet, coming in seventh for both. Again, we are seeing a city performing well both in terms of the sustainability of its natural and social environment and its people, performing well in the overall SCI.

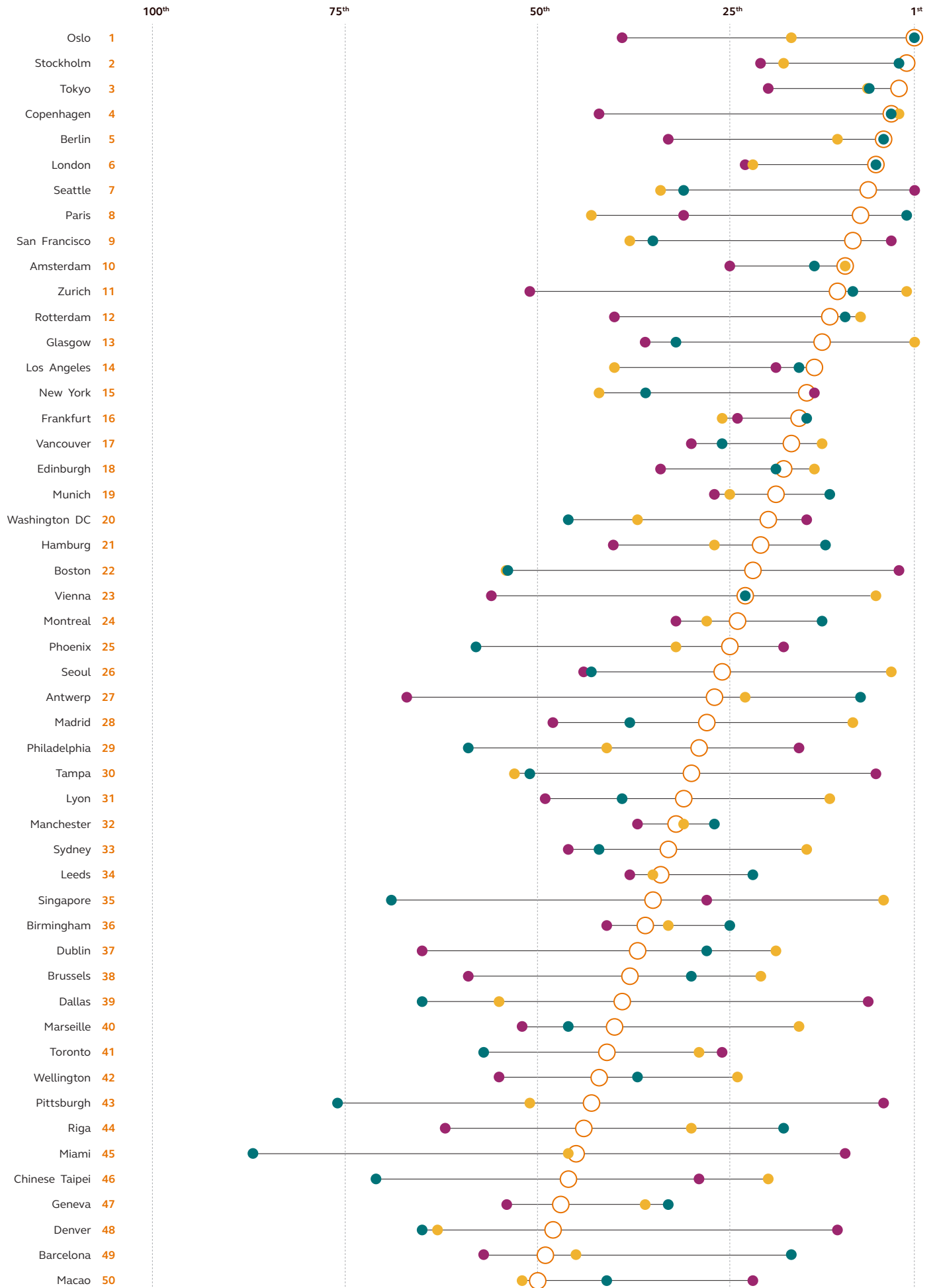
Of the 25 Asian cities included, only four others rank in the top half: Seoul (26), Singapore (35), Chinese Taipei (46) and Macao (50).

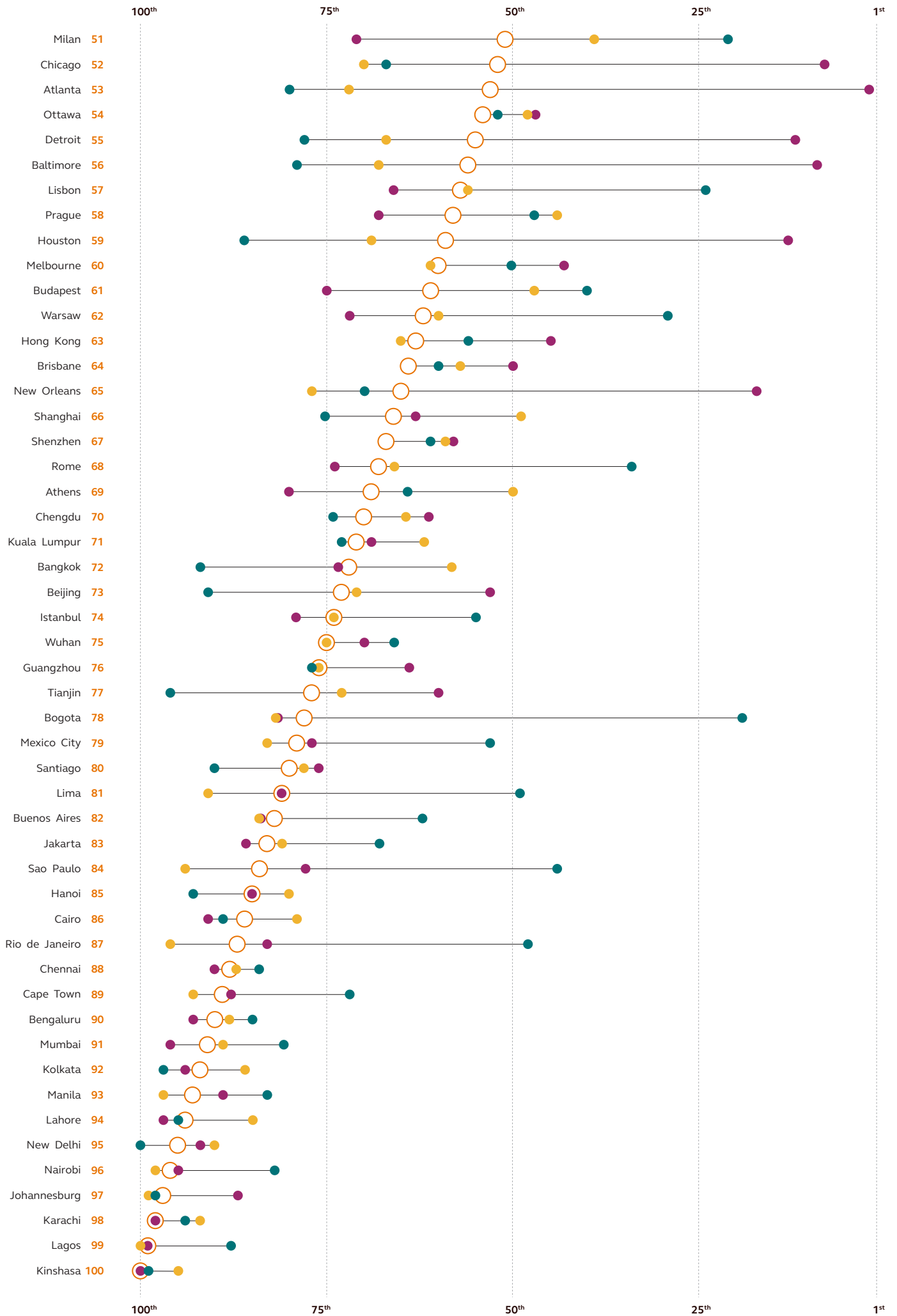
US cities are undoubtedly the strongest performers in the Profit pillar when it comes to profitability in its truest sense, yet many of these cities do not perform well under a Planet or People centric lens, leaving US cities out of the SCI overall top five and seeing only two – west coast cities Seattle and San Francisco – reaching the top 10.

Many economically strong cities neglect environmental and social factors. For cities to thrive today and into the future, a focus on prosperity beyond profit is needed. An economy can't thrive without its people and people cannot thrive without a hospitable natural environment in which to live and work.

Overall Ranking

Overall Planet People Profit



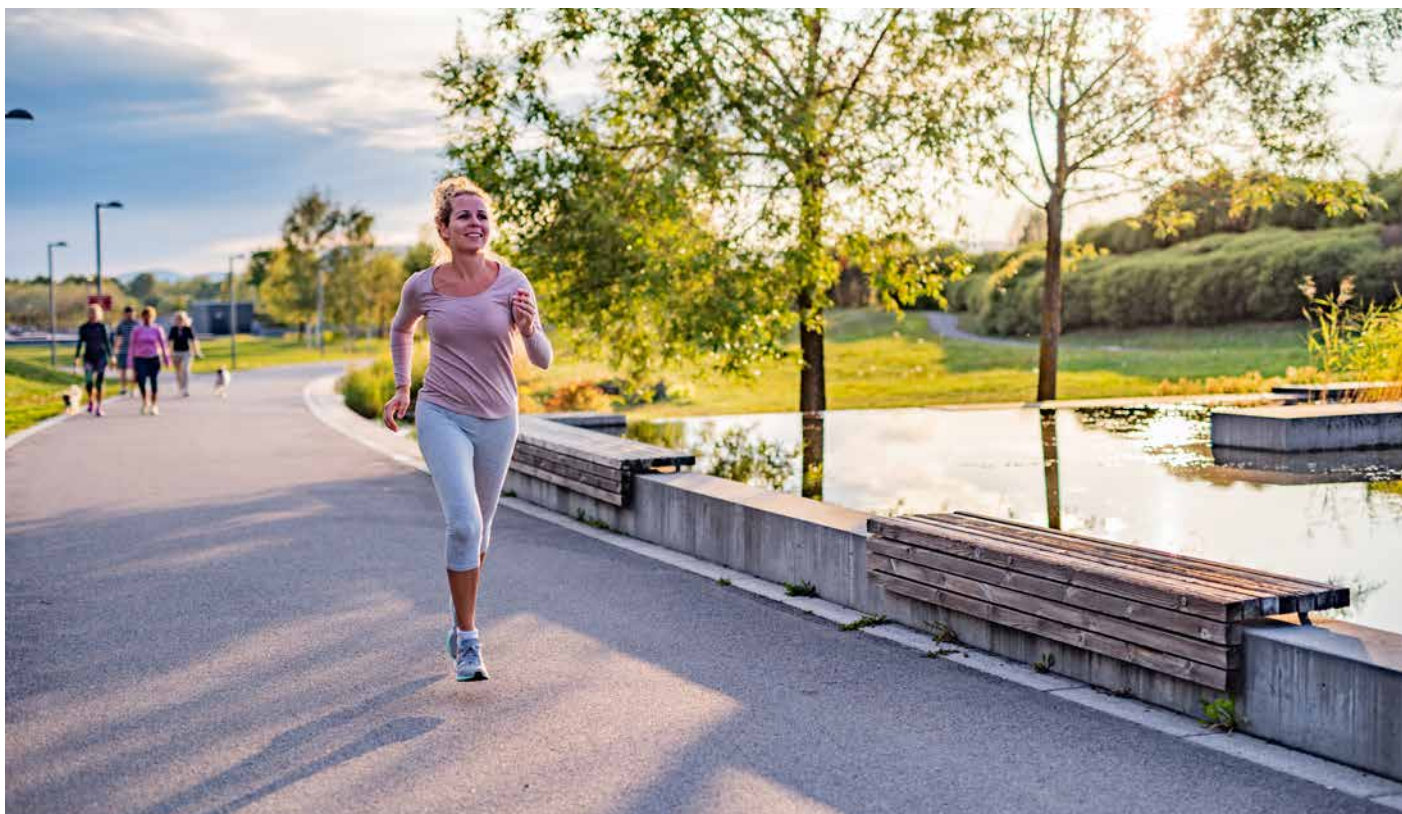




Planet Pillar

The Planet pillar in the *Arcadis Sustainable Cities Index 2022* is not only the first, but the most important. Environmental sustainability is the fragile foundation on which people's lives and companies' profits are built; without first protecting the environment, the prosperity of communities, businesses, or entire markets cannot hope to be sustained.

When looking at cities' interaction with the planet, we examine not only the big picture – global climate change – but also locally, how a city embraces nature and cares for its immediate environment. Around climate change, we measure greenhouse gas emissions, sustainable transport, renewable energy usage, and efficiency. With more of a local focus, we also measure green spaces, air pollution, water usage, and waste management. Finally, we consider a city's exposure to climate-related threats and the policies it has implemented to help ensure it plays a positive role in the future prosperity of the planet.



A green light for European prosperity

Environmental sustainability is a firmly established strength among European cities – Scandinavia in particular – who are leading the way in this most fundamental measure of future prosperity. Three key Scandinavian capitals – Oslo (1) Stockholm (3) and Copenhagen (4) all feature in the top five for this pillar.

It is no coincidence that these same cities all rank in the top five of the overall SCI, having built their prosperity on the firm bedrock of sound environmental governance, innovation, human capital and climate action.

When it comes to the planet, there can be no clearer dividing line than that of the Atlantic Ocean. For all their economic might, many US cities - from Chicago and Detroit, in the Midwest, to Atlanta, Miami and New Orleans, in the South - have room for improvement in addressing environmental issues. A clear example is Miami which, despite securing a place just inside the top half of the overall SCI rankings, comes in at 87 on the Planet pillar.

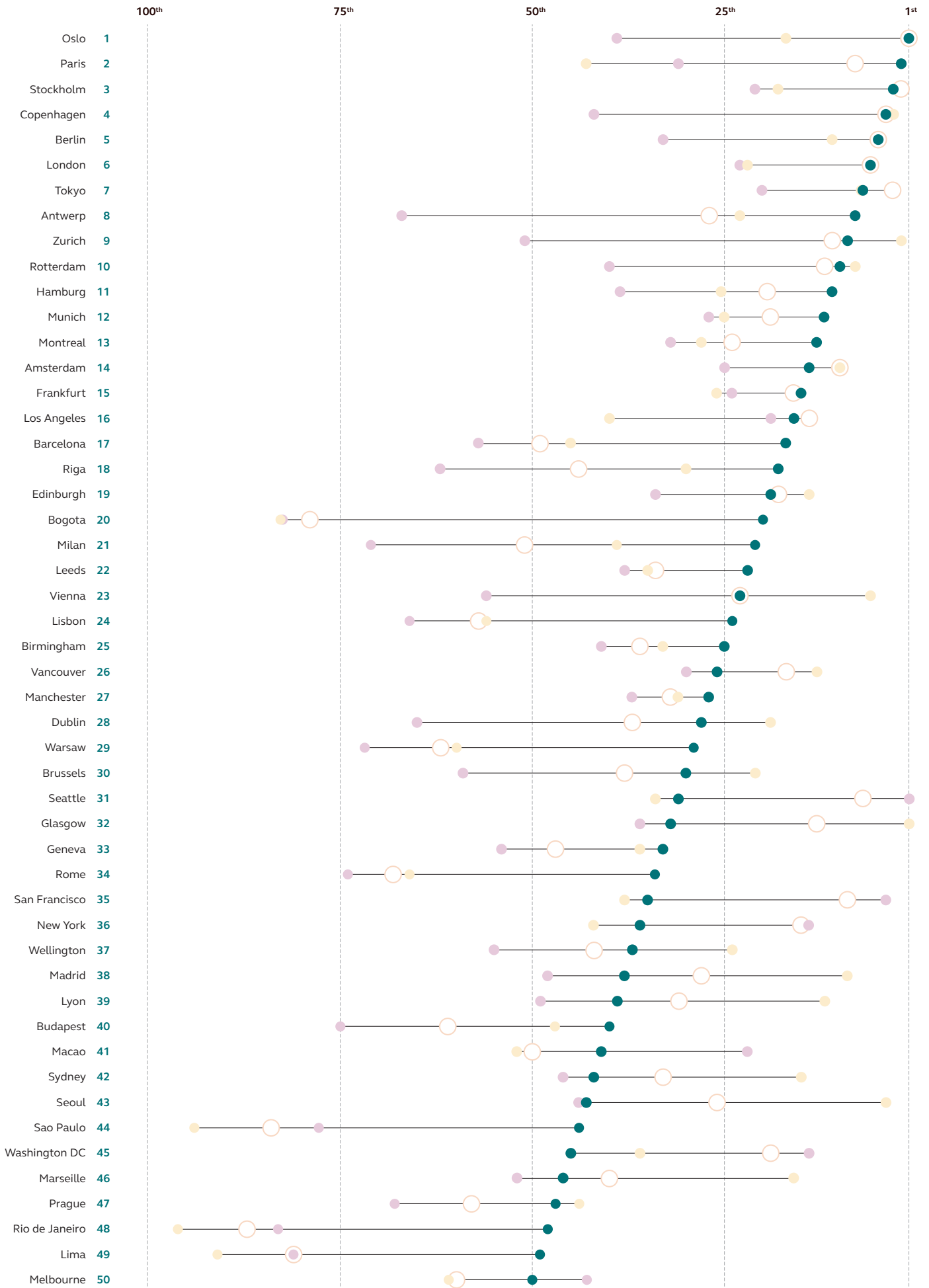


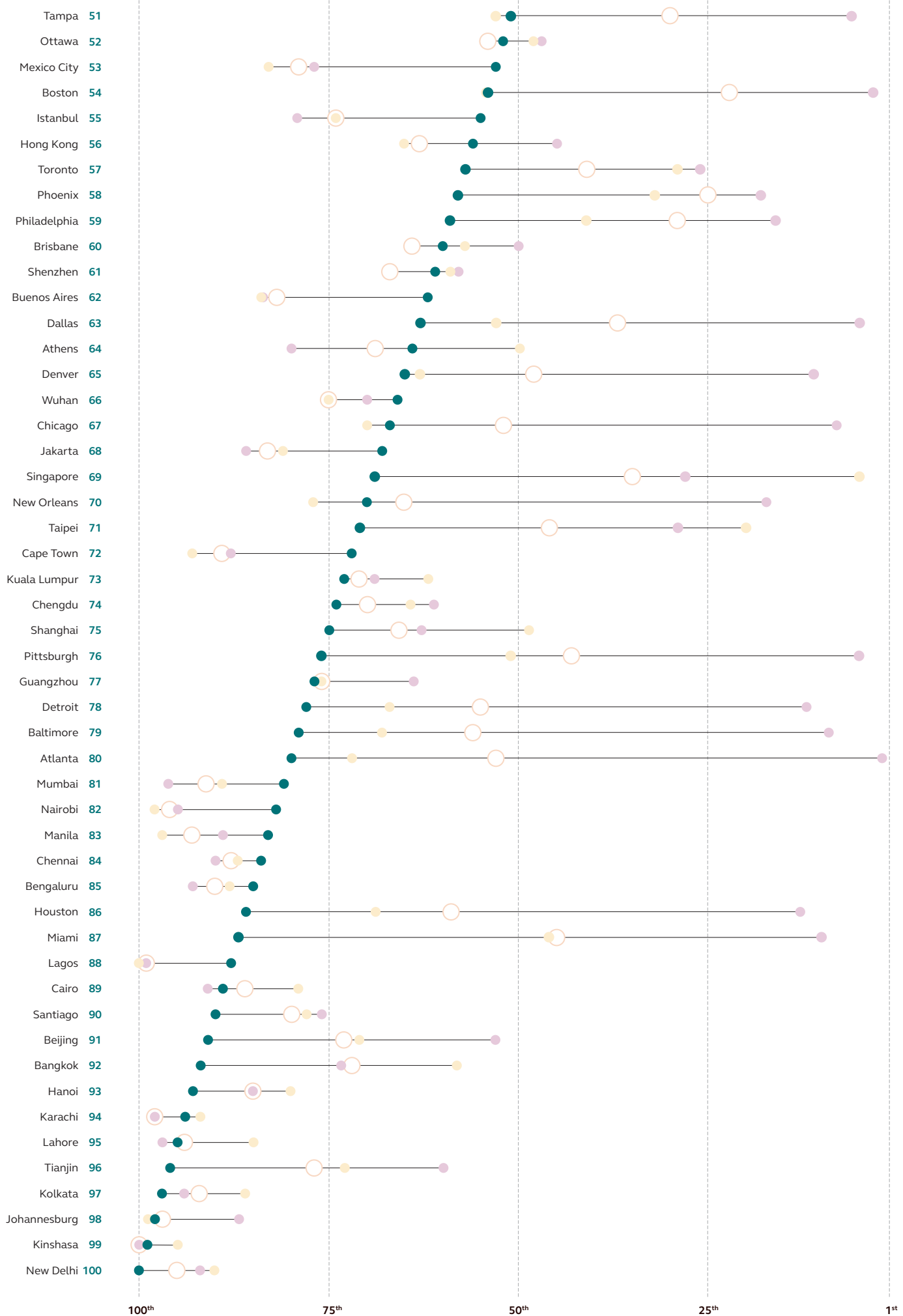
Elsewhere the Planet pillar offers a greater mix of strengths and weaknesses. The only non-European city to feature in the top ten is Tokyo (7). However, Tokyo ranks low for the sustainability of its transport. In Colombia, Bogota is a city that is struggling for prosperity in terms of People and Profit, but is a beacon of light in its environmental performance. It is the only developing city to feature in the top 40 of the Planet index, ranking an exceptional 20th. The bottom 10 cities for this pillar can all be found in Africa and South and East Asia.

In Colombia, Bogota is a city that is struggling for prosperity in terms of People and Profit, but is a beacon of light in its environmental performance. It is the only developing city to feature in the top 40 of the Planet index, ranking an exceptional 20th.

The Planet pillar assesses the quality of the natural environment in a city.

Overall Planet People Profit







Planet Pillar

City Index Highlights

Oslo

Norway

1

SCI OVERALL RANK: **1**

Strengths: Sustainable transport, green spaces, air pollution, energy use.

Opportunities: Greenhouse gas emissions.

Berlin

Germany

5

SCI OVERALL RANK: **5**

Strengths: Green spaces, environmental exposure.

Opportunities: Greenhouse gas emissions.

Bogota

Colombia

20

SCI OVERALL RANK: **78**

Strengths: Greenhouse gas emissions, energy usage, green spaces.

Opportunities: Air pollution, bicycle infrastructure, waste management.



Berlin



Seattle

Birmingham

UK

25

SCI OVERALL RANK: **36**

Strengths: Environmental exposure, air pollution.

Opportunities: Greenhouse gas emissions, sustainable transport, energy.



New Delhi

Seattle

USA

31

SCI OVERALL RANK: **7**

Strengths: Air pollution, environmental exposure.

Opportunities: Energy usage, bicycle infrastructure, greenhouse gas emissions.

Sydney

Australia

42

SCI OVERALL RANK: **33**

Strengths: Air pollution.

Opportunities: Environmental exposure, bicycle infrastructure.

Miami

USA

87

SCI OVERALL RANK: **45**

Strengths: Air pollution.

Opportunities: Energy usage, environmental exposure, greenhouse gas emissions, public environmental policy, sustainable transport.

New Delhi

India

100

SCI OVERALL RANK: **95**

Strengths: Greenhouse gas emissions, environmental exposure.

Opportunities: Air pollution, bicycle infrastructure, waste management.



People Pillar

Citizens are the lifeblood of a city, and the more these metropolises can support the energy, creativity and innovation of their people, the more they will prosper. To unlock the full potential of its citizens, a city must be inclusive and safe, while also nurturing skills and providing opportunities to the full breadth of its population.

When looking at these urban hubs through a people-centric lens, we consider the fundamental levels of crime, education, healthcare, and transport alongside key employment factors, such as income equality, and work-life balance. Connectivity is increasingly linked to the status of a modern metropolis, leading us to include the cost of broadband and Wi-Fi availability as important indicators of a sustainable and prospering city.





Shared prosperity: where East meets West

Europe is the clear leader, with 15 of the top 20 cities located in Western Europe. Cities such as Berlin, Amsterdam, Zurich, Rotterdam, and Glasgow all offer their citizens relatively healthy, safe, and well-connected environments, in which income inequality is typically low and job quality is high.

East Asian cities provide the only real competition for Europe in this pillar. Seoul, Singapore, and Tokyo all feature in the top ten people-centric cities, buoyed up by strong, reliable amenities – from transport and healthcare to broadband – excellent education, and low-income inequality. However, like their European peers, they are less affordable cities to live in.

SOLUTION SPOTLIGHT

The affordability conundrum: Too successful for its own good?

A city is not truly sustainable if some of its citizens are being priced out. As the cost-of-living rises, essential workers – such as in the emergency services or education – could find that their salaries are not keeping pace. This potential for an exacerbated divide in wealth can lead to greater income inequality, unemployment and homelessness. Similarly, a city may have a strong economy, but if the work-life balance is poor, resignations and relocations could increase. A case in point is Atlanta, which ranks first for economic development but 72nd in the overall people pillar.

Focusing on the key metric of affordability, we see many of the most people-centric cities, such as Zurich, San Francisco and New York, struggle, whereas cities across South and East Asia, South America and North Africa perform well. Buenos Aires, Kolkata, Kuala Lumpur, Bogota, Santiago, Chengdu and Cairo are all among the most affordable cities in the world, but all are let down by various other measures – from education and income equality to infrastructure.

“Technology is one of the most impactful and cost-effective additions to our toolkit in the fight against climate change, rising cost pressures and creating healthier environments for people. This is increasingly true for the places where we work, live, learn and play. Intelligent building technology can be part of the solution – translating into improved energy savings, real estate savings and enhanced people experience.”

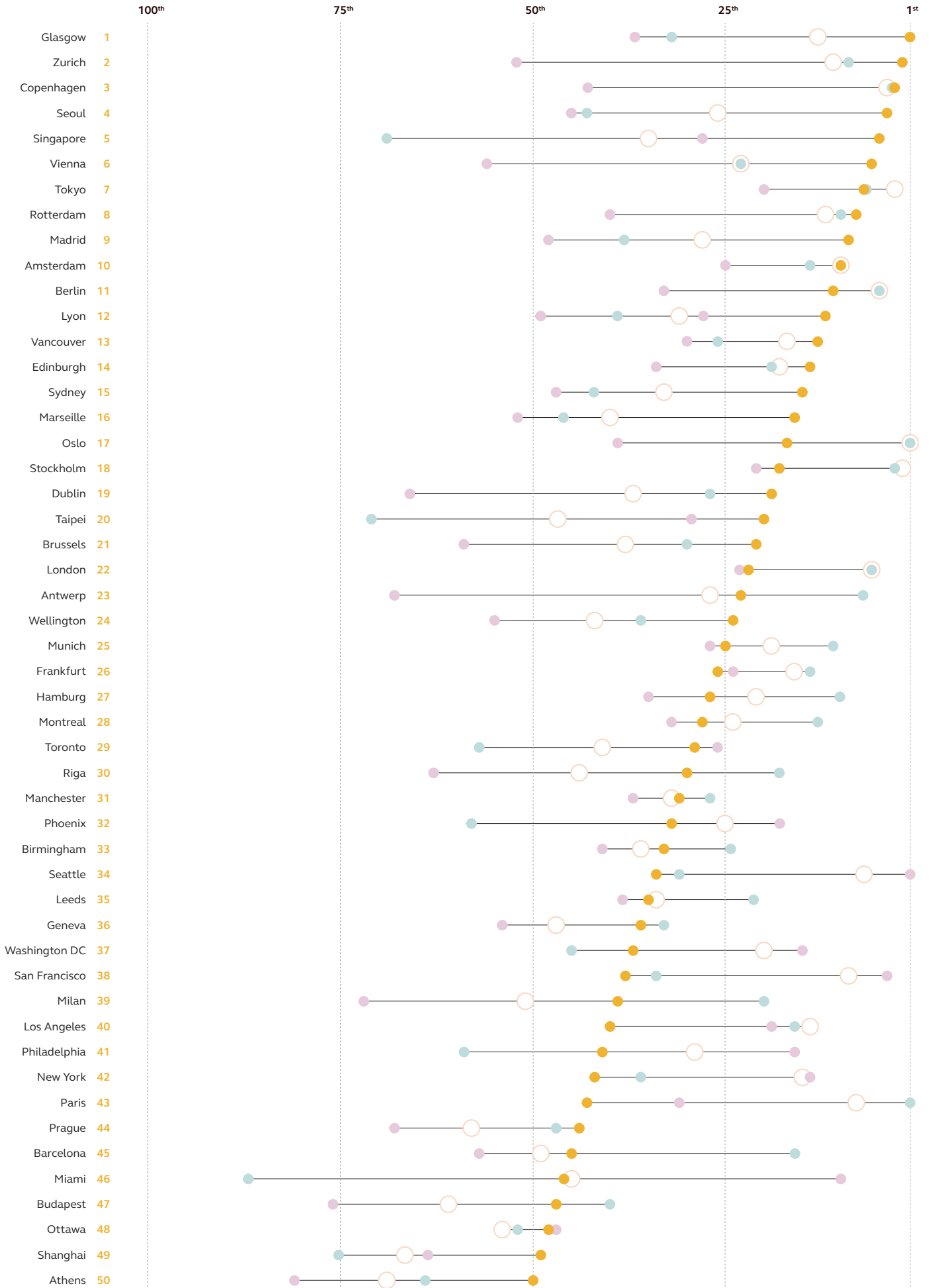
Sandeep Kapoor
Head of Intelligent Buildings,
Arcadis

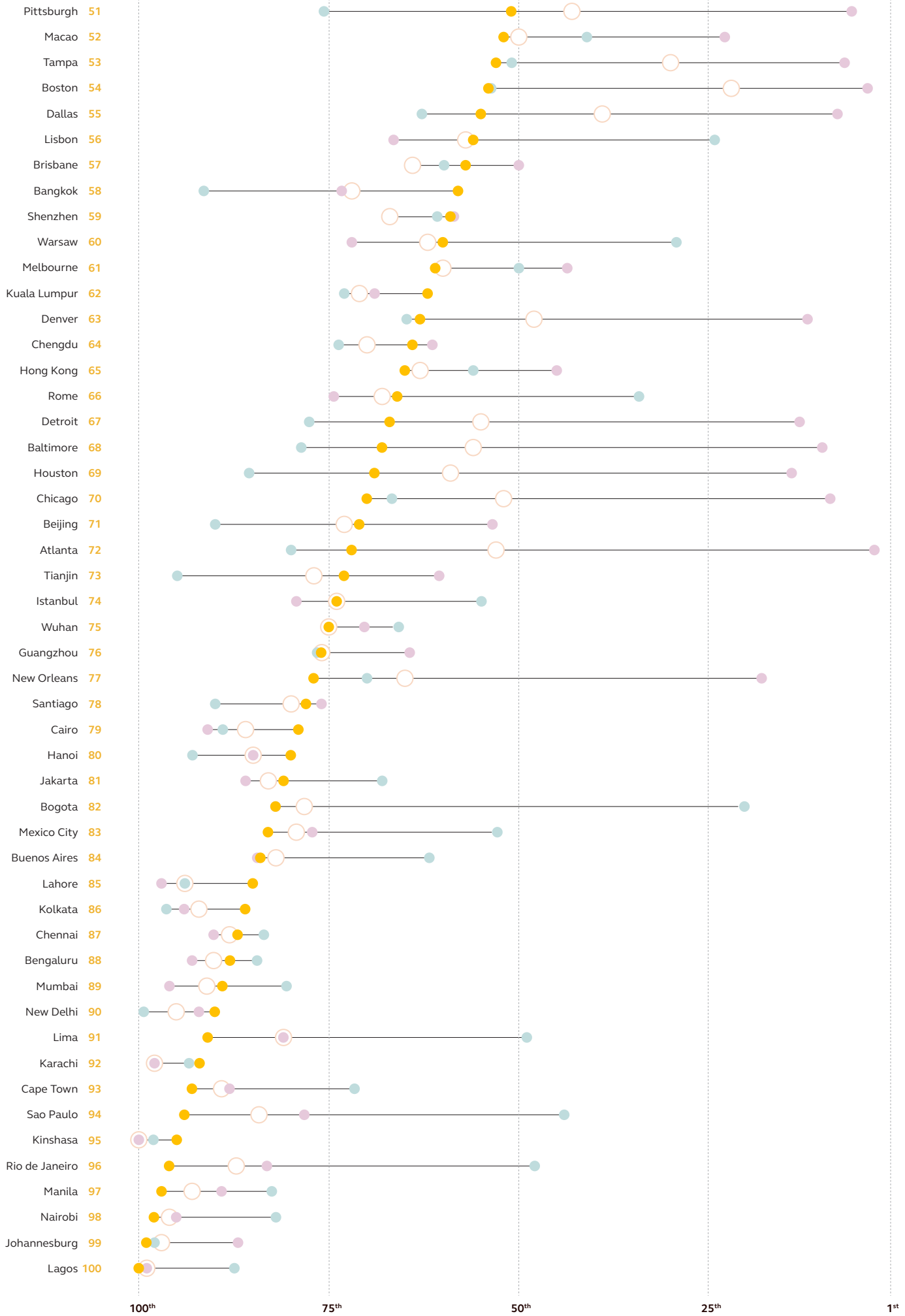


People Ranking

The People pillar measures the quality of social infrastructure in a city.

Overall Planet People Profit







People Pillar

City Index Highlights

Glasgow

UK

1

SCI OVERALL RANK: **13**

Strengths: Transport, broadband, crime, education, health, work-life balance.

Opportunities: Connectivity.

Zurich

Switzerland

2

SCI OVERALL RANK: **11**

Strengths: Transport, broadband, crime, education, health.

Opportunities: Work-life balance.

Seoul

South Korea

4

SCI OVERALL RANK: **26**

Strengths: Broadband, crime, education, health, income equality.

Opportunities: Work-life balance.



Seoul

London

UK

22

SCI OVERALL RANK: **6**

Strengths: Transport, health, Wi-Fi, work-life balance.

Opportunities: Crime.

Manchester

UK

31

SCI OVERALL RANK: **32**

Strengths: Health, work-life balance, broadband.

Opportunities: Crime, income equality.

San Francisco

USA

38

SCI OVERALL RANK: **9**

Strengths: Transport, education.

Opportunities: Work-life balance, income inequality.



San Francisco

Melbourne

Australia

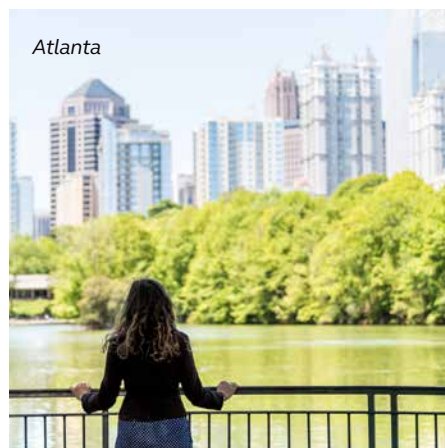
61

SCI OVERALL RANK: **60**

Strengths: Health, income equality.

Opportunities: Affordability, transport, Wi-Fi.

Atlanta



Atlanta

USA

72

SCI OVERALL RANK: **53**

Strengths: Transport, education.

Opportunities: Income equality, work-life balance, crime.



Profit Pillar

Not so long ago, prosperity was a synonym for profit, often used to reflect the economic vibrancy of a city or market. That definition has now evolved, but that does not mean that profit has lost its role in the prosperity of a city. Without strong, sustainable businesses and an abundance of jobs linked to a net-zero aligned future economy, the prosperity of a city may be only fleeting.

Within Profit the SCI measures a number of purely economic measures, including ease of doing business, GDP per capita, the stock market value of companies headquartered in that city and the number of publicly listed companies. The pillar does however consider how many of these more economic measurements impact a city's profitability at more of an individual level, including through employment, job quality, access to transport, electricity and affordable housing as well as connectivity. From an environmental perspective the SCI also measures green finance.



A star-spangled ranking

The US dominates the top of the Profit pillar, with 19 of the top 20 cities found in the America. Despite their strong performance on the Profit pillar, many of these cities - Atlanta, Baltimore, Chicago, Detroit, Houston, and New Orleans - rank in the bottom half of the overall SCI. The US dominance in the Profit pillar provides a clear contrast to the performance of American cities in the People and - in particular - Planet pillars, suggesting that US cities have traditionally been configured for the pursuit of profit.

The key question is whether a profit-first approach can continue to deliver results in an era of climate change and social progress, and if not, then to what extent is the profitability of US cities at risk? Those that fall far below global standards when it comes to the health of their natural environment risk becoming less desirable as the global competition for talent intensifies. A high quality of urban life, which includes green spaces and promotes wellbeing, will be crucial in attracting and retaining top talent, as well as the innovative companies employing them.

Tokyo is the highest-ranking non-US city, complementing its strengths elsewhere and its overall position in the SCI. As we continue down the rankings, we start to see major European cities, like Stockholm (21), London (23), Frankfurt (24) and Amsterdam (25), emerging. We also see a variety of Asian cities performing well, from Macao (22) and Singapore (28) to Chinese Taipei (29).

A common weakness among some of the cities that rank highest for economic development and ease of doing business is work-life balance, demonstrating how business strength and sustainable employment are not always aligned. This will be a key issue for cities to address if they want to achieve and maintain prosperity, especially in a “new world of work”.



SOLUTION SPOTLIGHT

Hybrid working

The rise of hybrid working following the pandemic brings contradiction for cities. They would ideally like a full return to the office - due to the revenue this brings through small businesses and all the infrastructure surrounding office buildings - but they are aware that this will not happen in the near future. Hybrid working also contributes to a sustainable city, for example cutting emissions through decreased commuting and business travel and reduced business carbon footprint.

Flexible working has become a lifestyle. Before the pandemic, less than 5% of the businesses in NY city used a hybrid working environment; this has now risen to over 60%. Though this may level out, it is unlikely to go away. As a result, a city that really accommodates hybrid working will be a more sustainable city.

“As employees’ priorities and expectations of work evolve, businesses are having to rethink how they use their physical workspaces. The key will be designing offices that are more than just a space to work, optimizing areas for employees to collaborate, learn and build connections. And when they’re not in use, can these buildings serve a wider purpose for the community? For example, could building owners open up fitness and wellbeing facilities that can be enjoyed outside of business hours? It isn’t just a case of navigating this new way of working, but creating spaces that adapt to our changing needs and bringing life back into our cities.”

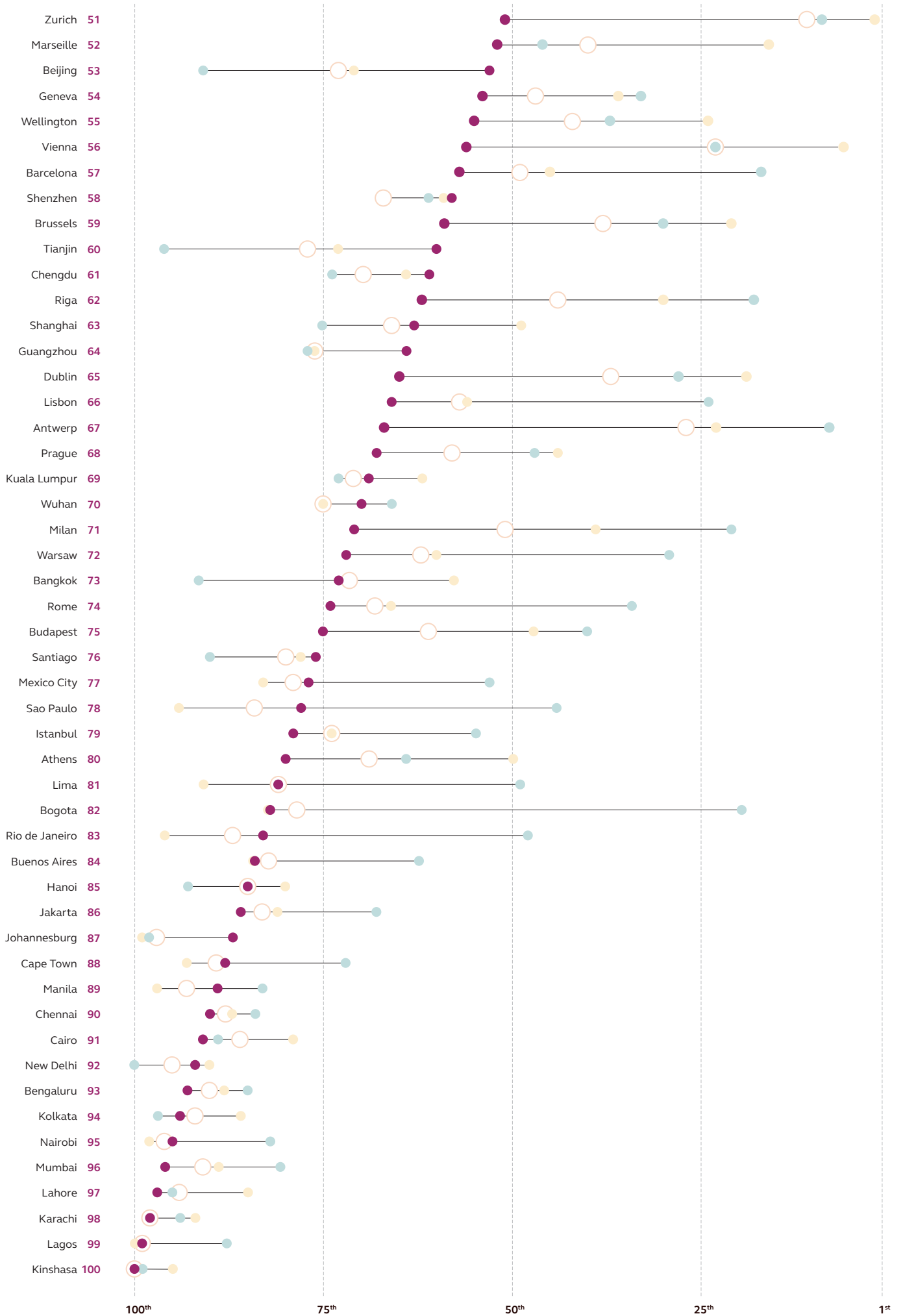
Mark Cowlard
Global President, Places, Arcadis

Profit Ranking

The Profit pillar measures the quality of the economy in a city.

Overall Planet People Profit







Profit Pillar
City Index
Highlights



Tokyo

Seattle

USA

1

SCI OVERALL RANK: 7

Strengths: Ease of doing business, economic development, green finance, transport infrastructure, employment, job quality.

Opportunities: Affordability.

Atlanta

USA

2

SCI OVERALL RANK: 53

Strengths: Ease of doing business, economic development, employment, green finance.

Opportunities: Affordability, income inequality.

Tokyo

Japan

20

SCI OVERALL RANK: 3

Strengths: Transport, connectivity, green finance.

Opportunities: Employment, affordability.



Amsterdam

Amsterdam

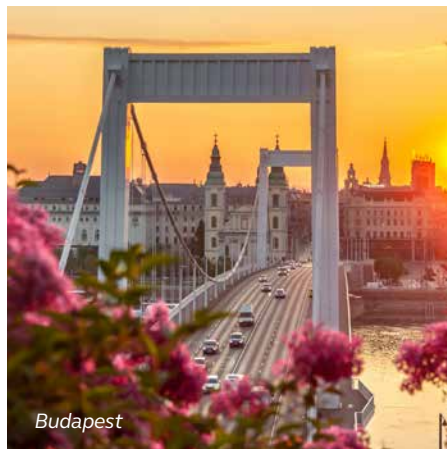
Netherlands

25

SCI OVERALL RANK: 10

Strengths: Connectivity, job quality, transport infrastructure.

Opportunities: Affordability, ease of doing business.



Budapest

Rotterdam

Netherlands

40

SCI OVERALL RANK: 12

Strengths: Connectivity, transport infrastructure.

Opportunities: Economic development, affordability, ease of doing business.

Vienna

Austria

56

SCI OVERALL RANK: 23

Strengths: Affordability, connectivity.

Opportunities: Economic development, employment, green finance, job quality.

Budapest

Hungary

75

SCI OVERALL RANK: 61

Strengths: Affordability.

Opportunities: Economic development, employment, green finance, job quality, transport infrastructure.

Kinshasa

DRC

100

SCI OVERALL RANK: 100

Strengths: Connectivity, employment.

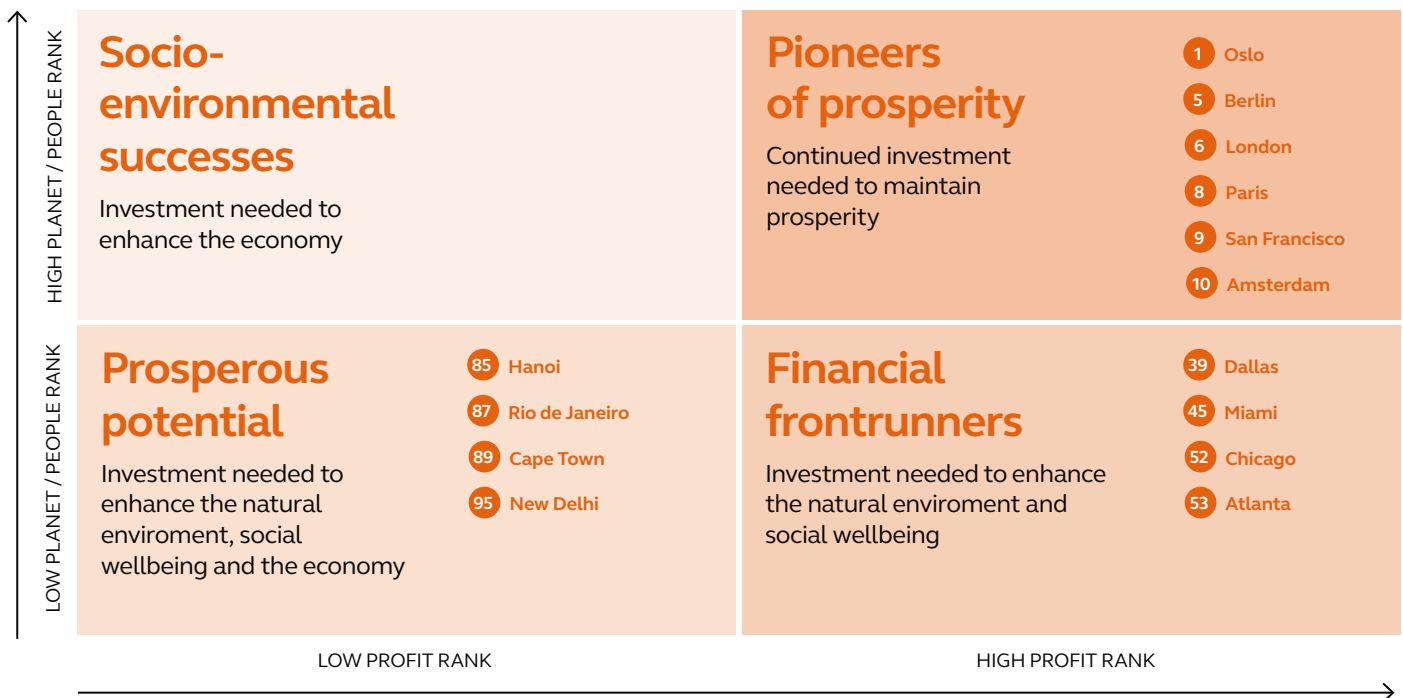
Opportunities: Affordability, ease of doing business, economic development, green finance, job quality, transport.

Prosperity beyond profit



The Arcadis Sustainable Cities Index 2022

Quadrants based on 2022 SCI outcome



Profitability unlocks prosperity

Cities that rank high in the profit pillar, and on the overall SCI, have proven themselves not only business powerhouses, but places where much of that economic strength runs through the fabric of their communities, without leaving the environment to pay the price.

Profit does not equal prosperity, but it does help. The vast majority (80%) of the cities in the top half of the profit pillar are also in the top half of the SCI. Being financially solvent enables cities to better look after their citizens and to devote more energy to tackling the systematic challenges of climate change. But that isn't where the story ends.

Looking at the top 20 cities in the SCI, only two are in the Profit pillar top ten (Seattle and San Francisco). While profit is undoubtedly a necessary part of sustainable prosperity, it is certainly no guarantee. In fact, the data shows that putting the planet and people first is a more reliable road to prosperity than putting profit first, as long as there is some profit to finance the necessary progress. Of the 20 cities at the top of the SCI, seven rank in the top ten for Planet and three rank in the top ten for People.

Invest in people and planet to secure prosperity

Some highly profitable cities are setting themselves up for long-term sustainable success by working to translate profits into prosperity, including some of the biggest cities in the world like Tokyo and Los Angeles. Others – like Atlanta – are enjoying high levels of profitability now, without ensuring that this is sustainable or truly shared by their citizens. Cities that fall either side of that line are not divided by geography, market or even size – the only clear distinction is which aspects of prosperity they have attached the greatest value to.

Other cities – those who struggle with social or environmental sustainability but also lack profit – are in an altogether different situation: unsustainable, but without the means to enact genuine change. These cities' sustainability challenges will be felt well beyond their city walls, with global implications. It is down to more profitable cities and markets to play their part in helping facilitate universal progress; not just financially, but also through the important lessons, approaches and frameworks each city has developed on its own journey towards prosperity.

“An interesting connection between many of the cities that fall towards the bottom of the Index is their proximity to the equator. It's a geographical influence that undoubtedly brings many challenges, but when it comes to renewable energy, it also offers an abundance of valuable natural resources. Put simply, many of the world's less sustainable cities are also its sunniest, and with the right support and investment these cities have an opportunity to leapfrog developed cities with a long-established systemic dependence on fossil energy and make rapid gains.”

Carolien Gehrels

Global Director, Energy Transition, Arcadis

Translating Profit into Prosperity

Overall  Profit 

Who does it well?

+ High performing - Low performing

Seattle



+

Ranks highest on quality of transport infrastructure, education, Wi-Fi availability, air pollution, public climate policy, employment, green finance, job quality and transport infrastructure.

San Francisco



+

Ranks highest on education, transport, air pollution, electricity and economic development.

Los Angeles



+

Ranks highest on transport, education, Wi-Fi, public policy, connectivity, ease of doing business, green finance, job quality.

Tokyo



+

Ranks highest on greenhouse gas emissions, connectivity, green finance, transport, crime, education, health, work-life balance.

Stockholm



+

Ranks highest on Wi-Fi, income inequality, work-life balance, air pollution, sustainable transport, ease of doing business, green finance.

Atlanta



-

Ranks lowest in income inequality, work-life balance, public policy, energy, greenhouse gas emissions and environmental exposure.

Chicago



-

Ranks lowest in crime, health, work-life balance, energy and greenhouse gas emissions.

Baltimore



-

Ranks lowest in crime, income inequality, work-life balance, energy, environmental exposure, greenhouse gas emissions and transport.

New Orleans



-

Ranks lowest in crime, income inequality, energy, environmental exposure, Wi-Fi, greenhouse gas emissions, transport and connectivity.





Conclusion: Sustainability = Prosperity

Sustainability is the key to urban prosperity. Profit alone is not enough, and the truly prosperous cities are those that are performing well across all three pillars of the Index. Cities are only truly sustainable if they are built on planet-friendly foundations; if local authorities support the vibrancy of their communities; and if economic value is only recognized when it is shared. Prosperity and sustainability can no longer exist in silo.

Cities at the top can't relax

The cities at the top of the SCI are doing it the right way, but that does not mean they can rest on their laurels. These cities must consider how they will maintain their prosperity in the face of the four megatrends of urbanization, climate change, digitization and changing societal expectations.

A key issue is that of affordability and making sure that citizens are not being priced out of these desirable urban metropolises.

Profit can lead to prosperity

The cities that are performing well on profit but rank poorly in the overall index need to commit to making robust investments in social policy and carbon transition in order to secure prosperity for their citizens. These need to be smart, targeted investments, and with a challenge as big and complex as achieving sustainability, it can be difficult to know where to start.

The first order of business must be the natural environment. The three pillars are all interconnected, and it starts with the planet; there is no economy without society, and there is no society without a hospitable planet. Priority number one has to be reducing energy usage, cutting emissions and increasing the capture and storage of the emissions that are produced.

Cities at the bottom of the index need to be our real focus.

The cities performing poorly in any one pillar need urgent, targeted remediation efforts. However, cities at the bottom of the Index that are performing poorly across all three pillars need collective effort aimed at increasing economic opportunities while simultaneously driving sustainability. Without the means to invest in people and planet, cities cannot start down the path to prosperity.

Though there are no simple solutions, residents of the index-topping cities must recognize that, in an increasingly globalized world, we cannot leave anyone behind. Not only is this about our responsibility towards those in less prosperous parts of the world, but in recognition of our deep-rooted global connectivity.



The path forward: Priorities for net-zero cities

Net zero is considered the benchmark standard for decarbonization: achieving a balance between the emissions produced and those removed from the atmosphere. At Arcadis, we help our clients to build and operate assets in harmony with nature and society. We believe that, in the pursuit of decarbonization, cities should be focusing their energy on five key areas:





SOLUTION SPOTLIGHT

Decarbonizing urban energy systems

The two key focuses for building secure and sustainable urban energy systems are:

- **Decentralizing sources** – generating energy locally to boost autonomy, reduce transmission losses and lower carbon emissions.
- **Maximizing efficiency** – remaining conscious of energy consumption, making sure that citizens and businesses are prioritizing its use.

In order to meet these goals, cities need to have a clear vision for the future and take decisive action. Public engagement is important, but the biggest progress will come from national and city governments setting official targets and putting the strategy in place to meet them.

Energy transition

Making the shift to renewable energy sources is the key to combating climate change, while also improving quality of life. Cities all over the world need to realize the urgency of the energy transition; we must dramatically cut our energy usage in order to bend the curve back towards a 1.5 degree world.

We are seeing rapid development in the technologies that enable energy production from renewable sources such as solar, wind and thermal, and there are also new solutions emerging, such as synthetic fuels from biomass. But harnessing energy from renewable sources is only the first step; storage and distribution need equal attention to enable sustainable transition.

The move from macro to microgrids – small, localized grids that produce, distribute and consume electricity – will be central to helping cities meet clean energy targets. Microgrid technology enables the integration of renewable energy solutions into the electricity grid. Not only does this boost energy efficiency and reduce greenhouse gas emissions but increases grid reliability and city resilience.

“The future of urban energy systems is circular, renewable, and synthetic. But the road to this future looks different for cities around the world – for those close to the equator there are opportunities to produce green hydrogen using solar energy sources, whereas those with colder climates may have opportunities in offshore wind, for example. At Arcadis, we’re helping our clients overcome their unique obstacles and accelerate their energy transition.”

Carolien Gehrels
Global Director, Energy Transition,
Arcadis



Net zero energy buildings

Whether they are new homes, shops, workplaces, factories, schools or hospitals, buildings impact the quality of people's lives. The built environment is also one of the biggest barriers to achieving global sustainability. Therefore, it is crucial that city spaces are designed and managed in ways that are energy efficient and allow communities to thrive.

SOLUTION SPOTLIGHT

Nurturing sustainable communities

Every new building should be designed and constructed in line with net-zero objectives, complying with Leadership in Energy and Environmental Design (LEED) gold and platinum standards. But retrofitting existing building stock is equally, if not even more, important.

Creating intelligent buildings will be a key factor in making our buildings more sustainable. As more systems become automated and digitized, everything from how we switch on a light and control room temperature to how we manage building access and security is evolving, and fast. A normal building will have these as separate elements, but an intelligent building connects them all, not only improving energy efficiency but providing valuable data on how people use and benefit from the buildings they utilize.

“Green solutions come with a number of benefits for cities. For example, we’re working with the city of Paris to transform 100 hectares of asphalt, planting 170,000 new trees by 2026. Not only will this help ‘cool’ the city, but also create more enjoyable places for its citizens. Green roofs and buildings too, like the award-winning Wonderwoods project in Utrecht, have great benefits that go well beyond restoring biodiversity and creating healthier, happier spaces for people and the planet.”

Marjolijn Versteegden
Global Solution Director for Net Zero Facilities and Sustainable Communities, Arcadis



SOLUTION SPOTLIGHT

Accelerating the shift to electric travel

The future of travel is undoubtedly electric. Pressure to put the brakes on greenhouse emissions and ban new petrol and diesel cars means an acceleration in the uptake of electric vehicles. But there are certain hurdles which must be overcome to achieve widespread adoption.

One of the biggest challenges is the availability and affordability of the vehicles themselves. Electric Vehicles (EVs) are still more expensive than ICE vehicles, but the total cost of ownership is coming down. And for customers that avoid buying new cars, the used-EV market is growing all the time.

Another key barrier is charging and range anxiety, meaning that a focus on installing public charging infrastructure will be central to catalyzing EV adoption. Most early EV-adopters were those who had their own off-street parking and were able to install personal charge points. This is less feasible within cities, so it will be important for residents living in flats or houses without dedicated parking to know that these facilities are accessible to them. The number of rapid charging points is growing at speed in some markets, and we are looking towards a future where wireless charging or battery swapping will make this process even more convenient.

Sustainable urban transport

The development of connected and sustainable transport systems is central to creating thriving cities – optimizing the mobility of people and goods at the lowest cost to the environment. This means integrating existing infrastructure with new technologies to create efficient, people-centric mobility ecosystems.

The move from internal combustion engine (ICE) to zero-emission vehicles will be central to cutting greenhouse gases. But mobility is changing and, as new technologies emerge, we will see a big shift from automobiles to other forms of transport. These will include mass modes, such as intelligent rail and urban transit solutions; micromobility options, such as electric bikes, e-cargo bikes, drones and scooters; and other active modes of transport.

As can be seen in the rise of platforms such as Uber and Citymapper, we are moving towards a model that's more aligned with the mobility-as-a-service concept. This will have a crucial role to play in the smart cities of the future, helping to reduce emissions and make travel easier for all citizens.

“With technologies continuously evolving, it can be challenging for cities to make the right call when it comes to infrastructure investment. In order to avoid installing technologies that may soon become redundant, cities must be forward-thinking and agile in their decision-making, whilst working closely with the market leaders but also innovators.”

Simon Swan

Senior Director, Global Zero Emission Vehicle Solutions, Arcadis



SOLUTION SPOTLIGHT

Building intelligent water and waste systems

Preserving the quality, quantity and reliability of our water and waste resources brings a host of challenges. One solution, however, is to build intelligence directly into a city's utility network. The use of artificial intelligence (AI) and predictive analytics, for example, can play a critical role when it comes to optimizing the distribution, collection and treatment of water and waste. It is an approach that Icon Water, a public utility company serving the Australian Capital Territory and surrounding regions, recently used to bring the performance of their sewer network up to the same standard as other Australian cities. The use of planning analytics and predictive modelling was critical in supporting investment and maintenance decisions. And in New York City, predictive analytics has been used to develop a new Commercial Waste Zones system for the management of commercial waste, estimated to reduce the vehicle miles travelled from related truck traffic by approximately 50%, and giving the Department of Sanitation greater transparency and data insights into this industry.

Fundamentally, intelligent water and waste systems are all about creating value. From a digitally enabled workforce that is focused on understanding and applying digital insights, through to digital planning and intelligent operations, intelligent water tools like AI and machine learning are all centred on enabling better decision making and supporting more affordable, sustainable and resilient operations. When it comes to resource conservation and recycling, having access to information and data is key – and this is where new and innovative digital technologies typically come into play.

“Intelligent water systems and smart waste management are all key elements of the circular economy, which is itself part of a wider shift towards a more sustainable economic model. Restorative and regenerative by design, the circular economy relies on innovation to redefine products and services to design waste out and minimize negative impacts. Using resources efficiently, reducing waste, recycling, and prioritizing the use of circular materials are all critical not only when it comes to reducing embodied carbon, but also in building broader economic, natural, and social capital for our cities and their communities.”

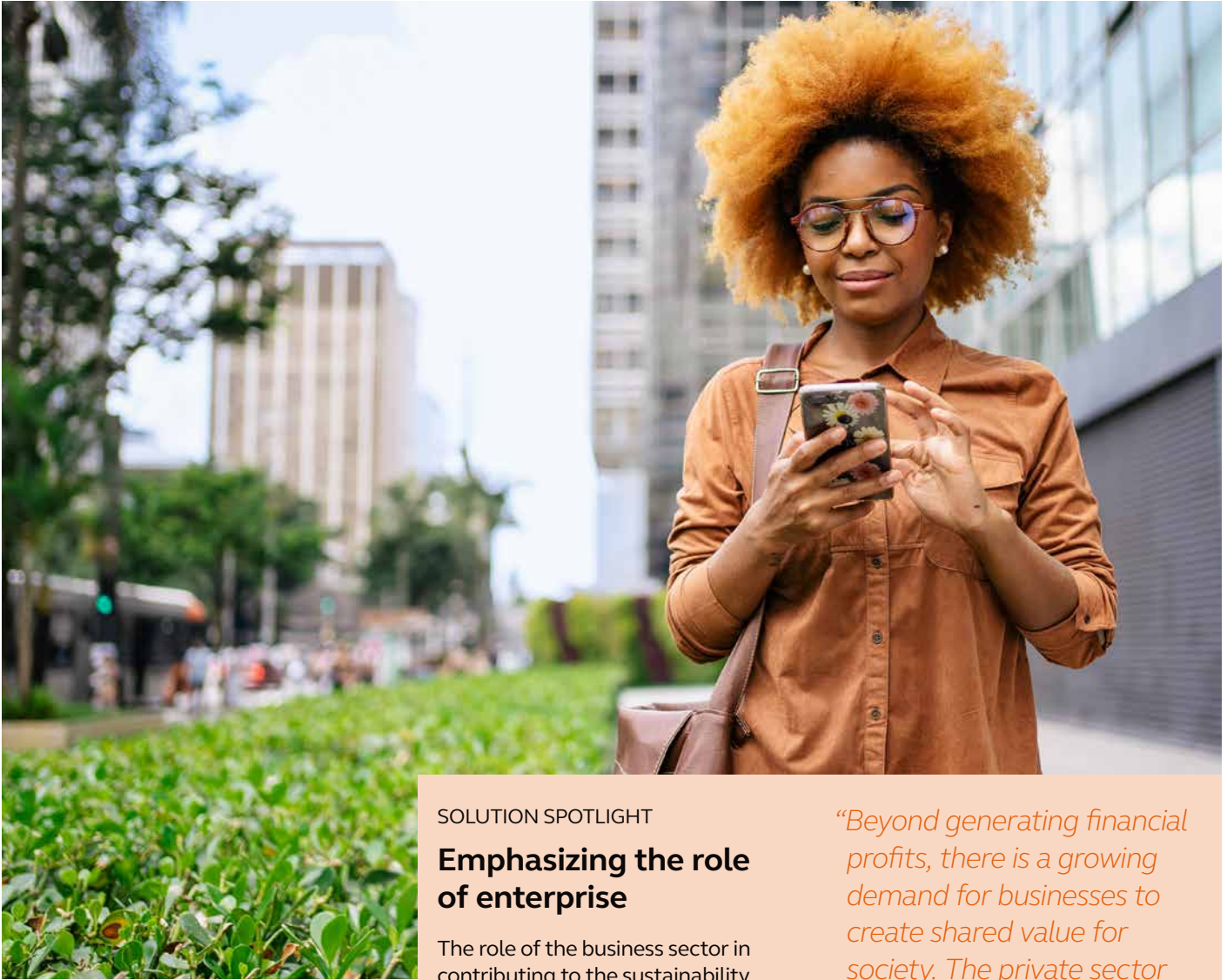
Jane Wu

Senior Management Consultant
and Waste Management Specialist,
Arcadis

Smart resource management

Most of our world's natural resources are finite, from the land on which we live to the water on which life depends. Managing these resources in a sustainable way is therefore critical when it comes to driving global economic growth and supporting a balanced ecosystem.

Over the next three decades, global demand for fresh water will increase by an expected 50 to 70 percent. The affordability crisis looms large, even as issues around long-term resilience – including the ability of our water systems to withstand acute shocks and chronic stresses, such as sudden climate events or aging assets – continue to take their toll. As global populations increase, so does the strain on our resource systems and the amount of waste produced, leading to greater amounts of garbage sent to landfill or ending up in our oceans.



Corporate ESG commitments

A focus on corporate environmental, social and governance (ESG) commitments can accelerate value creation for many organizations. But a strong ESG proposition is not just about increasing operating profits, it can also be key to delivering much wider transformational change.

SOLUTION SPOTLIGHT

Emphasizing the role of enterprise

The role of the business sector in contributing to the sustainability performance of our cities can be seen in the case of the Cidade Center Norte in São Paulo. This iconic multi-purpose complex hosts up to 70 million guests a year and plays an integral role in the economy of the city's north zone, which comprises around 3 million people. However, to attract more businesses to the complex and contribute to the wider sustainable development of the city, it needed to focus on its ESG agenda and embed sustainability at the heart of its strategy.

Initiatives are therefore focused on promoting access to quality consumption and resource efficiency for store owners, human rights promotion for suppliers, transparency for partners, organic food for hotel guests, waste management for exhibitors, social investment for the community, safety for visitors, and wellbeing for employees.

“Beyond generating financial profits, there is a growing demand for businesses to create shared value for society. The private sector has a critical role to play in helping solve some of the world’s most pressing challenges, like climate change, urbanization, socio-economic inequality, resource scarcity, and environmental degradation. The corporate social responsibility (CSR) movement coupled with ESG commitments are about ensuring businesses have a longer-lasting, positive impact on communities and the cities in which they operate.”

John Batten
Global Cities Director, Arcadis

What sustainability data should cities start collecting?

In developing this report, it became clear that while many cities face similar challenges, source data and reporting structures vary greatly around the world. The metrics and indicators we have selected therefore had to be qualified on the basis of the information being available across all cities, the source credibility, and more.

One issue we encountered is that, in some cases, metrics were available only at a country – rather than city – level. For example, the metric “Female labor force participation” is only currently available at a country level, so different cities within one country will score the same, even though they may be spread over a vast geographic area – albeit one that is likely to share very similar policies and societal influences on female educational attainment.

There were also various topics – for example, detailed public policy data on a wide range of forward-looking sustainability factors, or climate-aligned retrofitting of buildings – that we deemed highly relevant, but the underlying data did not exist, or was available only for a small subset of cities in the SCI.

This should be seen as a call-to-action for cities around the world who can directly influence the collection and publication of this data in the future. Some of the most important areas where we believe cities and other organizations should begin collecting and collating data include the extent to which science-based targets have been adopted to support decarbonization plans, or the robustness of climate disclosures. This will do much when it comes to further enhancing our collective understanding of the sustainability performances of cities.

Finding consistent metrics for evaluating urban challenges could be instrumental in helping cities address their most pressing sustainability challenges. Some areas of measurement that we would like to see cities considering in future include the following:

- The percentage of top tier green-certified buildings in a city
- Retrofit potential and the ability to transform existing assets to be net-zero ready
- The robustness of pollution prevention and cleanup regulations, including permit requirements, legislation, emerging contaminants, and clean-up monitoring
- Measures for droughts or dry periods
- Urban heat island reduction plans
- The extent to which heating and cooling is provided through a shared neighborhood-wide system
- The percentage of sustainability-focused startups
- Penetration and uptake of Mobility as a Service initiatives
- The price of a basket of staple goods (as an alternative and more neutral metric to the price of a basket of consumer goods, which carries an inherent developed world bias).

“As a leader in the built environment, Arcadis is constantly integrating sustainability innovations into the work it does with cities around the world. Our sustainability ambition is to accelerate the transition to a net zero world, while improving quality of life for all. Time is running out. The UN, IPCC, and others have laid out the concrete actions and highlighted the rapid pace of change necessary so that cities can become solutions to – not sources of – the climate crisis.”

Alexis Haass
Global Sustainability Officer,
Arcadis



Methodology

The Arcadis Sustainable Cities Index (SCI) 2022 builds on a legacy index first published in 2015. Now comprising 100 global cities, the 2022 report incorporates a range of new indicators and cities, and measures activity across three “pillars”, ranking each city based on the results. The three pillars are Planet, People and Profit. The combined city-level sustainability scores for each pillar reveals the relative cumulative performance of the selected 100 global cities.

Our approach to the selection process of the indicators and pillars that underpin the SCI research was guided by the notion that cities are only truly sustainable when they have natural environments that are healthy and thriving; when local authorities support the quality of life of their communities; and when shared economic and social value is a priority.

The three pillars within the index are made up of indicators that provide data on specific themes. Some indicators comprise two or more individual metrics where they cumulatively provide the best perspective on the theme of that indicator, others feature one key metric that alone reflects the theme. Each metric, indicator and pillar within the index is equally weighted.

Some of the metrics within the index are available at the city level and some are only available at the country level. Each pillar has been constructed to ensure that at least half of the metrics are available at the city level to ensure sufficient differentiation for cities within a given country.

Some metrics are a combination of both city and country-level data. In these instances, city-level data was prioritized subject to availability. If unavailable, country-level data was used.

Each metric is based on a score which varies according to how that data is collected. To allow for direct and fair comparison of those scores across the entire data set each metric has been standardized to a score of between 0 and 1. Each city is then assigned a performance score relative to their position between the best and worst cities in that particular metric.

As with almost any index of this size, it is necessary to impute additional data for cities within the SCI where the primary data sources cannot provide up-to-date information. In some cases, the index will infer city data from national data.

Although this data was collected during the time of COVID-19 (Feb-April 2022) the index and results were not influenced or impacted by the global pandemic.

Disclaimer

This report is based on market perceptions and research carried out by Arcadis, a design and consultancy organization for natural and built assets. This document is intended for informative purposes only and should not be construed or otherwise relied upon as investment or financial advice (whether regulated by any financial regulatory body or otherwise) or information upon which key commercial or corporate decisions should be taken.

The index represents a snapshot in time and is for illustrative purposes only. While every effort has been made to ensure the accuracy of the index, Arcadis is not liable for any loss or damages associated with the use of the index for decision-making purposes.

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This document should not be relied upon as a substitute for the exercise of independent judgment.

Overall index rankings

	Overall SCI	Planet	People	Profit
1.	Oslo	Oslo	Glasgow	Seattle
2.	Stockholm	Paris	Zurich	Atlanta
3.	Tokyo	Stockholm	Copenhagen	Boston
4.	Copenhagen	Copenhagen	Seoul	San Francisco
5.	Berlin	Berlin	Singapore	Pittsburgh
6.	London	London	Vienna	Tampa
7.	Seattle	Tokyo	Tokyo	Dallas
8.	Paris	Antwerp	Rotterdam	Chicago
9.	San Francisco	Zurich	Madrid	Baltimore
10.	Amsterdam	Rotterdam	Amsterdam	Miami
11.	Zurich	Hamburg	Berlin	Denver
12.	Rotterdam	Munich	Lyon	Detroit
13.	Glasgow	Montreal	Vancouver	Houston
14.	Los Angeles	Amsterdam	Edinburgh	New York
15.	New York	Frankfurt	Sydney	Washington DC
16.	Frankfurt	Los Angeles	Marseille	Philadelphia
17.	Vancouver	Barcelona	Oslo	New Orleans
18.	Edinburgh	Riga	Stockholm	Phoenix
19.	Munich	Edinburgh	Dublin	Los Angeles
20.	Washington DC	Bogota	Taipei	Tokyo
21.	Hamburg	Milan	Brussels	Stockholm
22.	Boston	Leeds	London	Macao
23.	Vienna	Vienna	Antwerp	London
24.	Montreal	Lisbon	Wellington	Frankfurt
25.	Phoenix	Birmingham	Munich	Amsterdam
26.	Seoul	Vancouver	Frankfurt	Toronto
27.	Antwerp	Manchester	Hamburg	Munich
28.	Madrid	Dublin	Montreal	Singapore
29.	Philadelphia	Warsaw	Toronto	Taipei
30.	Tampa	Brussels	Riga	Vancouver
31.	Lyon	Seattle	Manchester	Paris
32.	Manchester	Glasgow	Phoenix	Montreal
33.	Sydney	Geneva	Birmingham	Berlin
34.	Leeds	Rome	Seattle	Edinburgh
35.	Singapore	San Francisco	Leeds	Hamburg

36.	Birmingham	New York	Geneva	Glasgow
37.	Dublin	Wellington	Washington DC	Manchester
38.	Brussels	Madrid	San Francisco	Leeds
39.	Dallas	Lyon	Milan	Oslo
40.	Marseille	Budapest	Los Angeles	Rotterdam
41.	Toronto	Macao	Philadelphia	Birmingham
42.	Wellington	Sydney	New York	Copenhagen
43.	Pittsburgh	Seoul	Paris	Melbourne
44.	Riga	Sao Paulo	Prague	Seoul
45.	Miami	Washington DC	Barcelona	Hong Kong
46.	Taipei	Marseille	Miami	Sydney
47.	Geneva	Prague	Budapest	Ottawa
48.	Denver	Rio de Janeiro	Ottawa	Madrid
49.	Barcelona	Lima	Shanghai	Lyon
50.	Macao	Melbourne	Athens	Brisbane
51.	Milan	Tampa	Pittsburgh	Zurich
52.	Chicago	Ottawa	Macao	Marseille
53.	Atlanta	Mexico City	Tampa	Beijing
54.	Ottawa	Boston	Boston	Geneva
55.	Detroit	Istanbul	Dallas	Wellington
56.	Baltimore	Hong Kong	Lisbon	Vienna
57.	Lisbon	Toronto	Brisbane	Barcelona
58.	Prague	Phoenix	Bangkok	Shenzhen
59.	Houston	Philadelphia	Shenzhen	Brussels
60.	Melbourne	Brisbane	Warsaw	Tianjin
61.	Budapest	Shenzhen	Melbourne	Chengdu
62.	Warsaw	Buenos Aires	Kuala Lumpur	Riga
63.	Hong Kong	Dallas	Denver	Shanghai
64.	Brisbane	Athens	Chengdu	Guangzhou
65.	New Orleans	Denver	Hong Kong	Dublin
66.	Shanghai	Wuhan	Rome	Lisbon
67.	Shenzhen	Chicago	Detroit	Antwerp
68.	Rome	Jakarta	Baltimore	Prague
69.	Athens	Singapore	Houston	Kuala Lumpur
70.	Chengdu	New Orleans	Chicago	Wuhan
71.	Kuala Lumpur	Taipei	Beijing	Milan
72.	Bangkok	Cape Town	Atlanta	Warsaw
73.	Beijing	Kuala Lumpur	Tianjin	Bangkok
74.	Istanbul	Chengdu	Istanbul	Rome
75.	Wuhan	Shanghai	Wuhan	Budapest

76.	Guangzhou	Pittsburgh	Guangzhou	Santiago
77.	Tianjin	Guangzhou	New Orleans	Mexico City
78.	Bogota	Detroit	Santiago	Sao Paulo
79.	Mexico City	Baltimore	Cairo	Istanbul
80.	Santiago	Atlanta	Hanoi	Athens
81.	Lima	Mumbai	Jakarta	Lima
82.	Buenos Aires	Nairobi	Bogota	Bogota
83.	Jakarta	Manila	Mexico City	Rio de Janeiro
84.	Sao Paulo	Chennai	Buenos Aires	Buenos Aires
85.	Hanoi	Bengaluru	Lahore	Hanoi
86.	Cairo	Houston	Kolkata	Jakarta
87.	Rio de Janeiro	Miami	Chennai	Johannesburg
88.	Chennai	Lagos	Bengaluru	Cape Town
89.	Cape Town	Cairo	Mumbai	Manila
90.	Bengaluru	Santiago	New Delhi	Chennai
91.	Mumbai	Beijing	Lima	Cairo
92.	Kolkata	Bangkok	Karachi	New Delhi
93.	Manila	Hanoi	Cape Town	Bengaluru
94.	Lahore	Karachi	Sao Paulo	Kolkata
95.	New Delhi	Lahore	Kinshasa	Nairobi
96.	Nairobi	Tianjin	Rio de Janeiro	Mumbai
97.	Johannesburg	Kolkata	Manila	Lahore
98.	Karachi	Johannesburg	Nairobi	Karachi
99.	Lagos	Kinshasa	Johannesburg	Lagos
100.	Kinshasa	New Delhi	Lagos	Kinshasa

Indicator details

Planet pillar

- Air pollution
- Bicycle infrastructure
- Energy consumption and renewable energy share
- Environmental exposure
- Green spaces
- Greenhouse gas emissions
- Public policy
- Sustainable transport incentives
- Waste management.

People pillar

- Quality of public transport infrastructure
- Cost of broadband
- Crime (homicide and theft rates)
- Education (educational attainment and PISA mean scores for math, reading and science)
- Health (life expectancy and physicians per 1,000)
- Income inequality
- Wi-Fi availability and work-life balance.

Profit pillar

- Access to reliable electricity
- Affordability
- Connectivity
- Ease of doing business
- Economic development
- Employment
- Green finance
- Job quality and commercial transport infrastructure.

About Arcadis

At Arcadis, our purpose is improving quality of life. We do this by creating livable places where people and communities can thrive. We enhance mobility, so that we can sustainably move in and between our cities. We work to protect citizens, cities, the environment, and natural resources for future generations. Arcadis is the world's leading company delivering sustainable design, engineering, and consultancy services. We are more than 29,000 architects, data analysts, designers, engineers, project planners, water management and sustainability experts driven by our passion for improving quality of life.

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