

Lecture 18

18.1 What are Cities for? The Challenges Ahead

IUS Ch 10

The chief function of the **City** is to convert
power into **form**,
energy into **culture**,
dead matter into the **living symbols of art**,
biological reproduction into **social creativity**.

- Lewis Mumford, The city in history, 1962

Recurring Themes in Urban Science

IUS 10.1

Cost-Benefit Dynamics

dynamical, heterogeneous, noisy

individuals, households, governments

selects people into situations of
opportunity or disadvantage

volatility challenges
and the need for
clear horizons and growth

Connectivity

poverty as disconnection

barriers to connectivity = segregation, poverty traps, slums

Disconnected/segregated individuals penalized
but also the system as a whole
because of network effects

Information

structural

professions
businesses
neighborhoods

growth rates

choice
agency
education
migration

The patterns of our lives (life paths):
the shape of connectivity, cost-benefit
over time

Paying the high costs of connectivity in larger cities

is only worth it in light of greater social productivity

from deeper divisions of knowledge and labor
the new knowledge and possibilities this process creates

This presents as a state of interaction **density, diversity, heterogeneity, interdependence and complementarity**

which embeds more information per capita and creates fast change

Large cities have little to offer that is material, **information** is most of what they do

most ‘expensive’, most difficult to create, most enduring.

The Challenges Ahead

IUS 10.2

urban science must generalize to entirely new situations

Gigacities

The Challenge of Slums

Shrinking Cities

Sustainable Development

Gigacities

Largest Cities that ever existed in the next decades

Population projections of the 101 largest cities in the 21st century [\[edit\]](#)

Large [urban areas](#) are hubs of economic development and innovation, with larger cities underpinning [regional economies](#) and local and global [sustainability](#) initiatives. Currently, 757 million people reside in the 101 largest cities;^[22] these cities are home to 11% of the world's population.^[22] By the end of the century, the world population is projected to grow, with estimates ranging from 6.9 billion to 13.1 billion;^[22] the percentage of people residing in the 101 larger cities is estimated to be 15% to 23%.^[22]

The 101 cities with the largest population projections for the years 2025, 2050, 2075, and 2100 are listed below.^[22]

Rank	City	Projected Population (millions) 2025	City	Projected Population (millions) 2050	City	Projected Population (millions) 2075	City	Projected Population (millions) 2100
1	Tokyo	36.40	Mumbai	42.40	Mumbai	57.86	Lagos	76.60
2	Mumbai	26.39	Delhi	36.16	Lagos	55.26	Dar es Salaam	73.68
3	Delhi	22.50	Dhaka	35.19	Kinshasa	54.51	Mumbai	67.24
4	Dhaka	22.02	Kinshasa	35.00	Delhi	49.34	Kinshasa	63.05
5	Sao Paulo	21.43	Kolkata	33.04	Kolkata	45.09	Lilongwe	57.43
6	Mexico City	21.01	Lagos	32.63	Karachi	43.37	Delhi	57.33
7	New York	20.63	Tokyo	32.62	Dhaka	42.45	Blantyre City	56.78
8	Kolkata	20.56	Karachi	31.70	Dar es Salaam	37.49	Khartoum	56.59
9	Shanghai	19.41	New York	24.77	Cairo	33.00	Niamey	55.24
10	Karachi	19.10	Mexico City	24.33	Manila	32.75	Kolkata	52.40
11	Kinshasa	16.76	Cairo	24.04	Kabul	32.67	Kabul	59.27
12	Lagos	15.80	Manila	23.55	Khartoum	30.68	Karachi	49.06
13	Cairo	15.56	Sao Paulo	22.83	Nairobi	28.42	Nairobi	46.66
14	Manila	14.81	Shanghai	21.32	New York	27.19	N'Djamena	41.15
15	Beijing	14.55	Lahore	17.45	Tokyo	24.64	Cairo	40.54

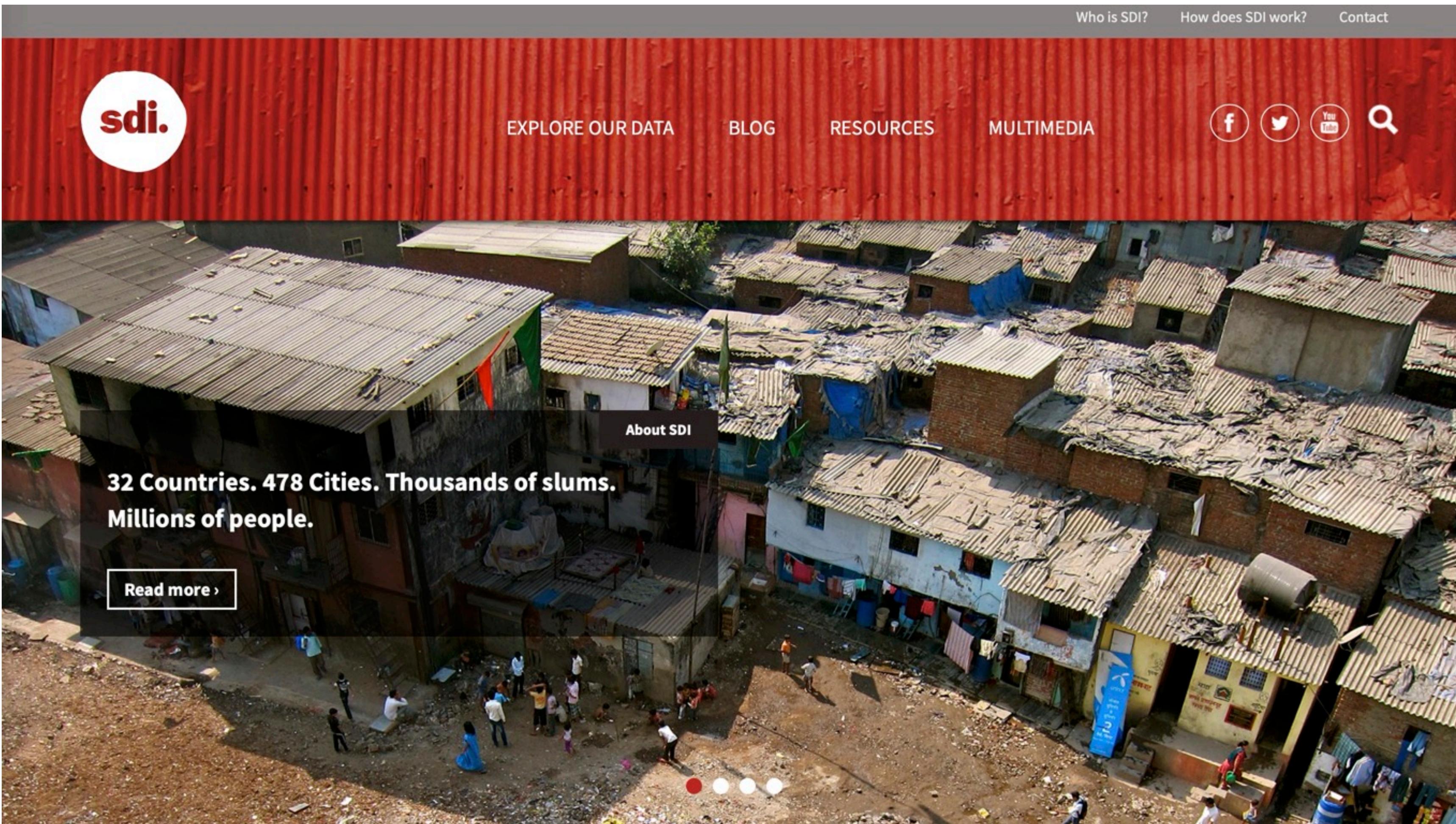
Hoornweg & Pope (2014).

Population predictions of the 101 largest cities in the 21st century

Compute the properties of these cities: their innovation rates, their speed of walking, their infrastructure needs and design, their wealth: **They will be amazing !**

Fast Human Development in a Million Neighborhoods

The challenge of slums and accelerating the development of livable cities



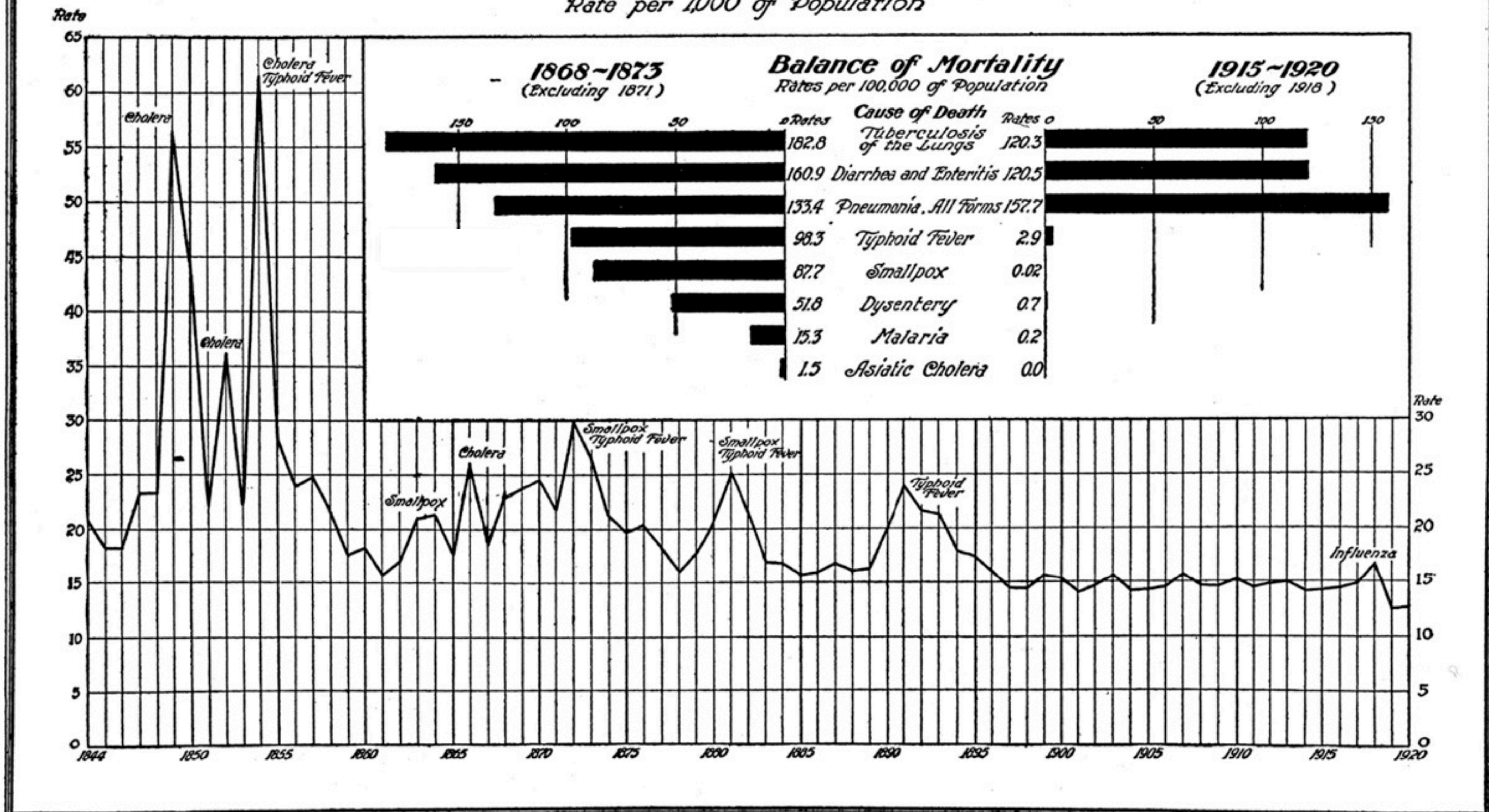
Can you create a million great neighborhoods supporting a decent life in one generation?

Mortality of Chicago, Ill.

All cities are developing cities

Crude Death Rate, 1844-1920

Rate per 1,000 of Population





Chicago, Near West Side, 1910



The 10 most beautiful streets of Spain

Toledo, Spain

Shrinking Cities

a critical challenge for the US and many other richer nations, including China

<https://www.theguardian.com/cities/gallery/2016/nov/02/global-population-decline-cities-mapped>



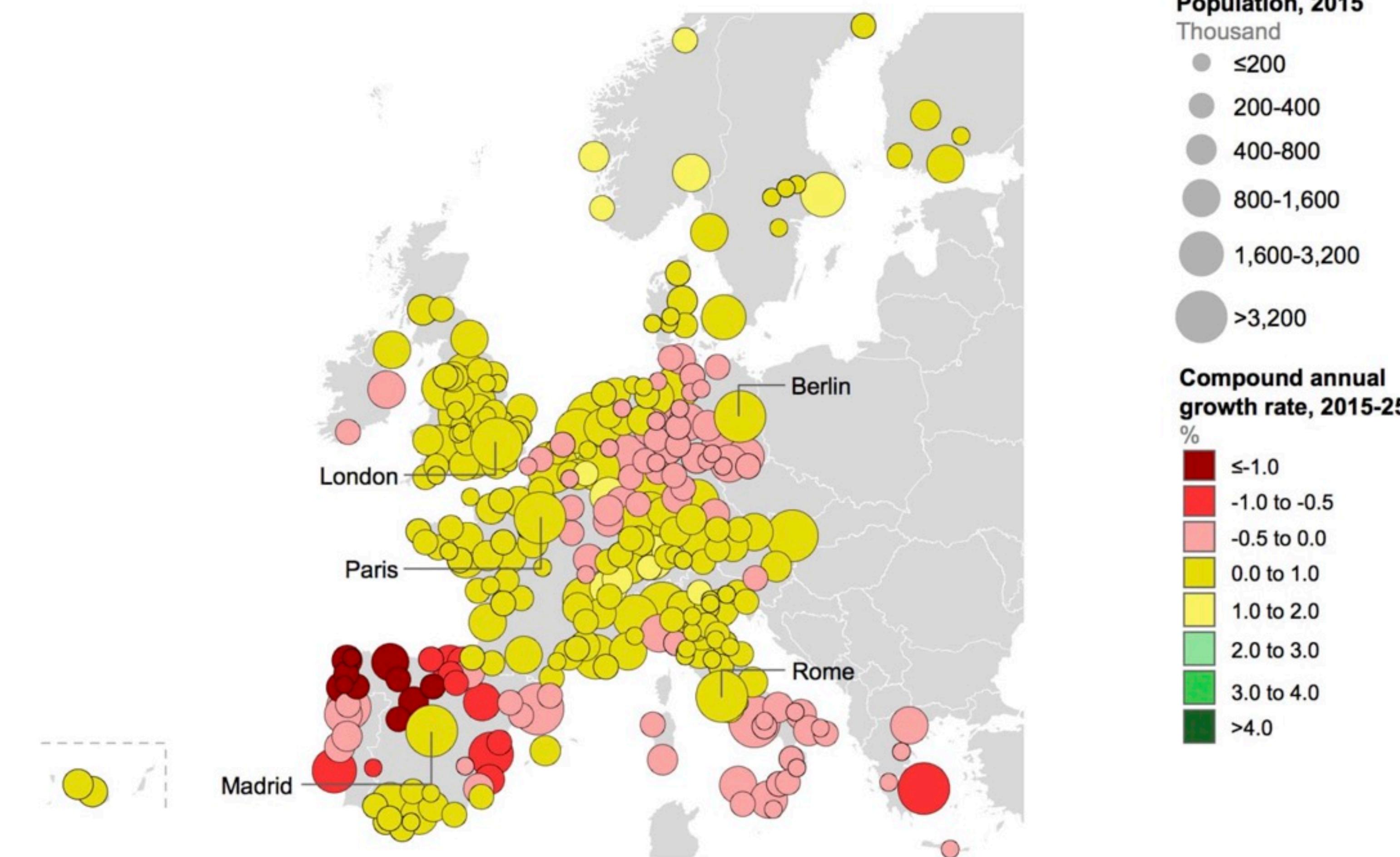
Shrinking cities: the rise and fall of global urban populations - mapped

The world is experiencing rapid urbanisation, but not every city is growing. Population is likely to decline in 17% of large cities in developed regions and 8% of cities across the world from 2015 to 2025, according to a [McKinsey report](#)

infrastructure is hard to shrink and creates enormous deficits: can you imagine how to improve this situation?

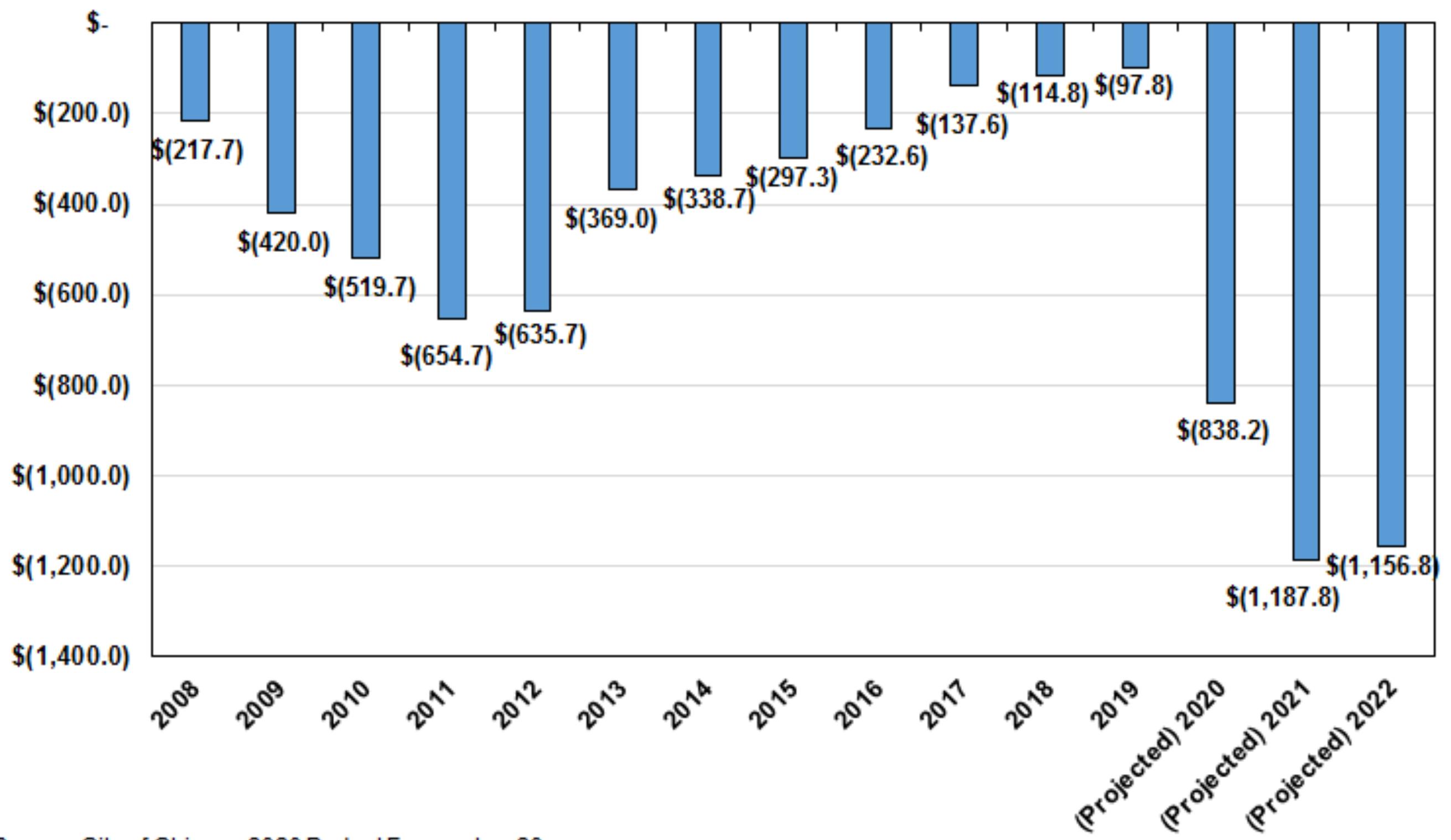
Shrinking Cities

The challenge of slums and accelerating the development of livable cities



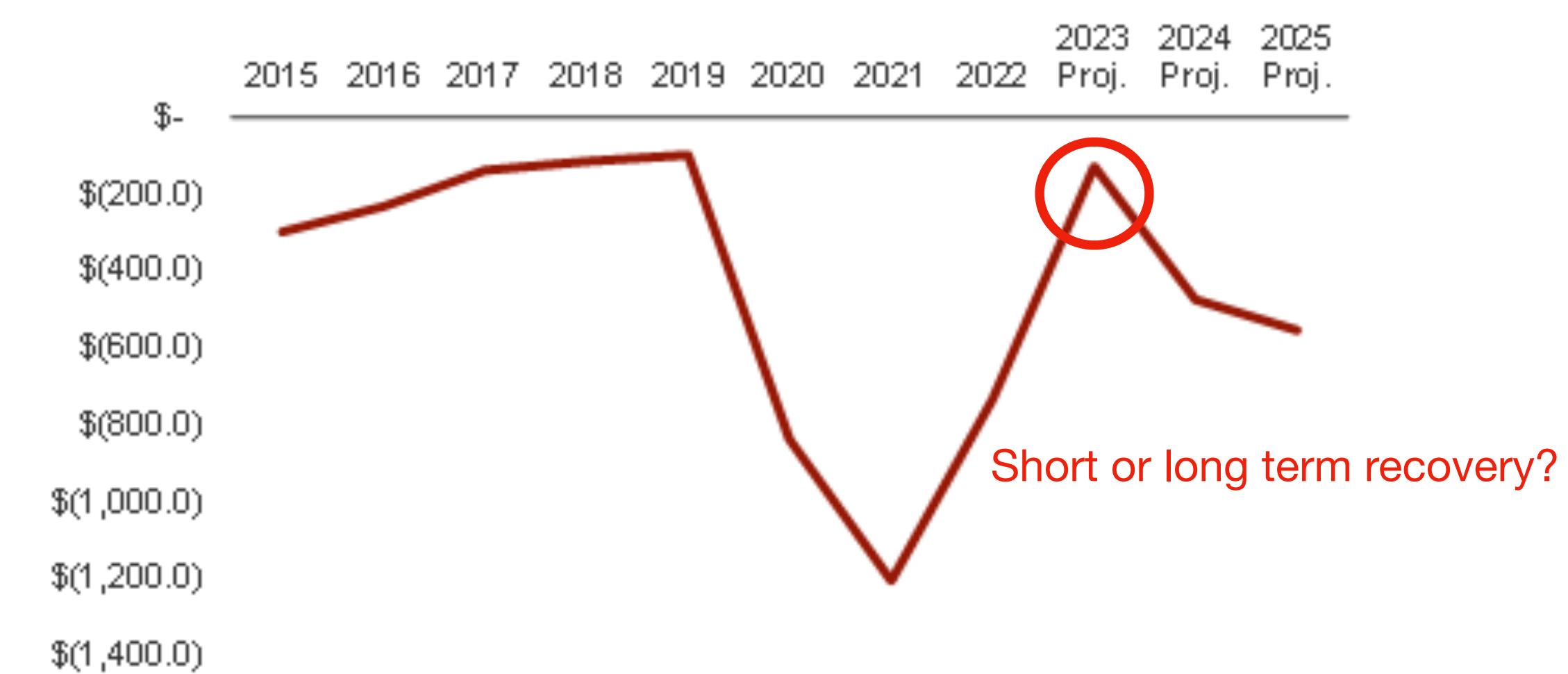
infrastructure is hard to shrink and creates enormous stranded costs (and deficits): can you imagine how to improve this situation?

**City of Chicago Corporate Fund Deficit
FY2008-FY2022
(in \$ millions)**



Source: City of Chicago 2020 Budget Forecast, p. 20.

**City of Chicago Initial Corporate Fund Deficit
Projections: FY2015-FY2025 (\$ in millions)**

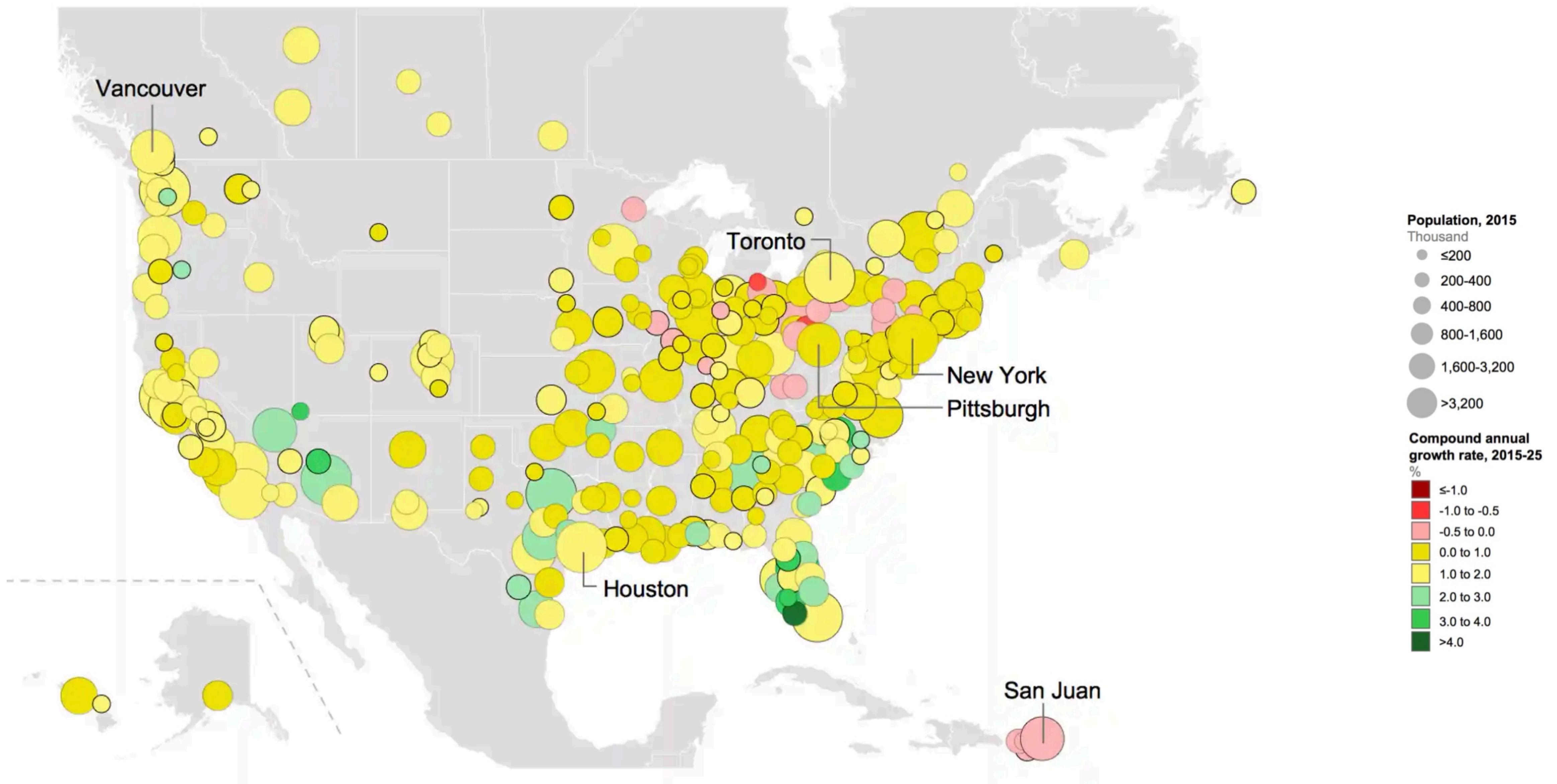


Short or long term recovery?

Source: City of Chicago Budget Forecasts: FY 2015-FY2023.

<https://www.civicfed.org/civic-federation/blog/city-chicago-projected-budget-deficit-increases-8382-million>

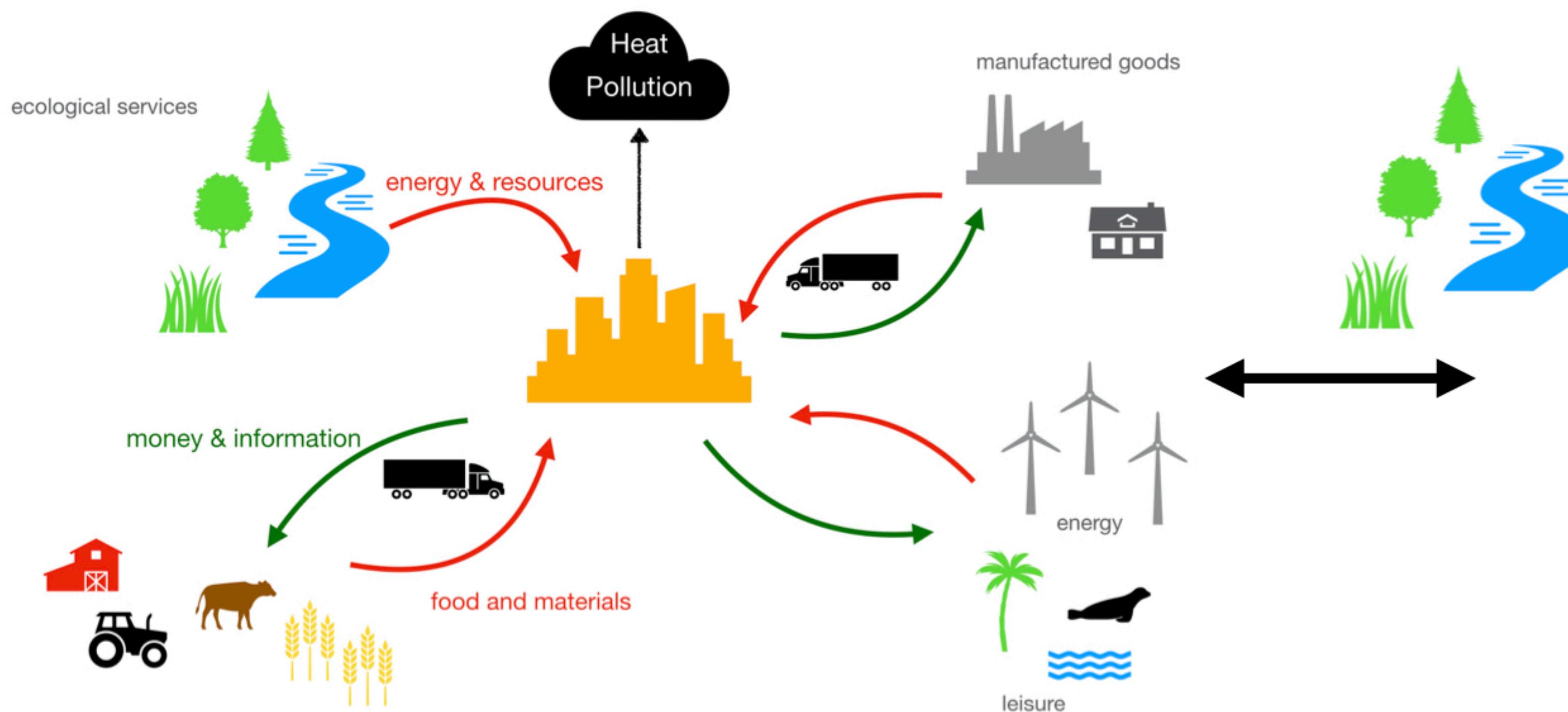
<https://www.civicfed.org/civic-federation/blog/fy2023-chicago-budget-forecast-signals-short-term-recovery>



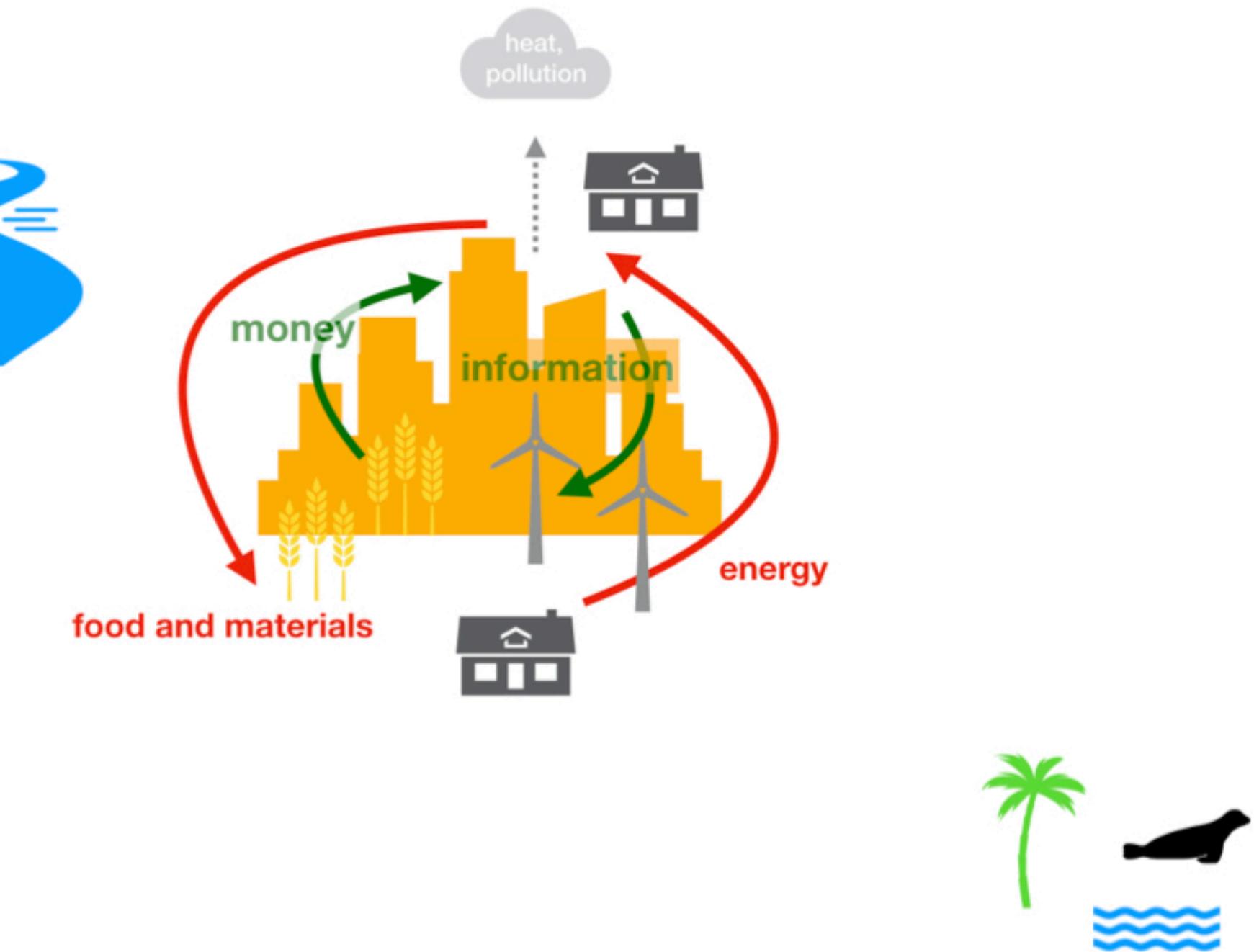
Decarbonization and Sustainability

Changing Humans relationship with Nature and the Planet

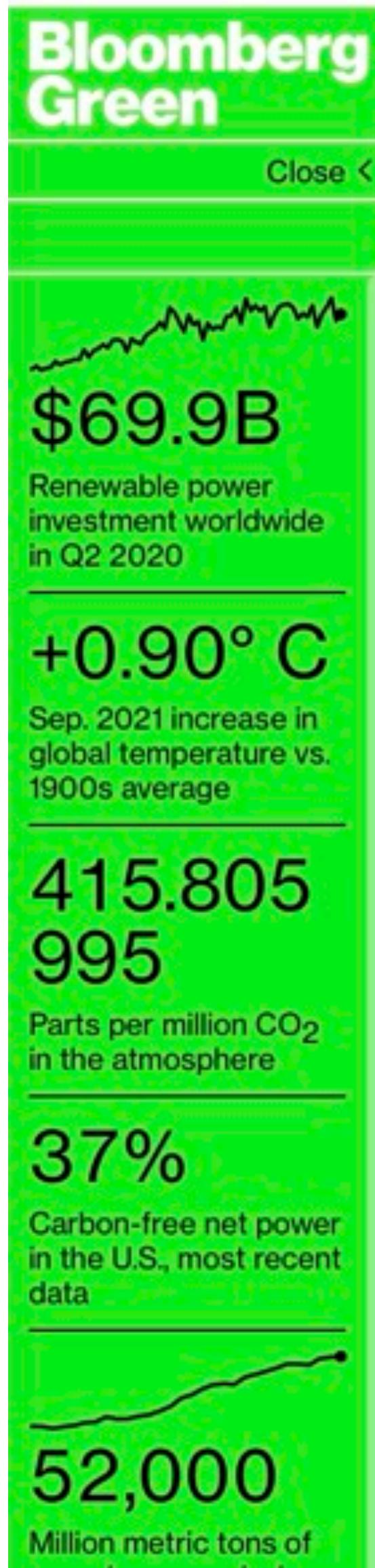
Distributed Regional System



“Circular” Economy



will change the structure of cities and urban systems: **can you predict how?**



Warm Futures

Kim Stanley Robinson on Cities as a Climate Survival Mechanism

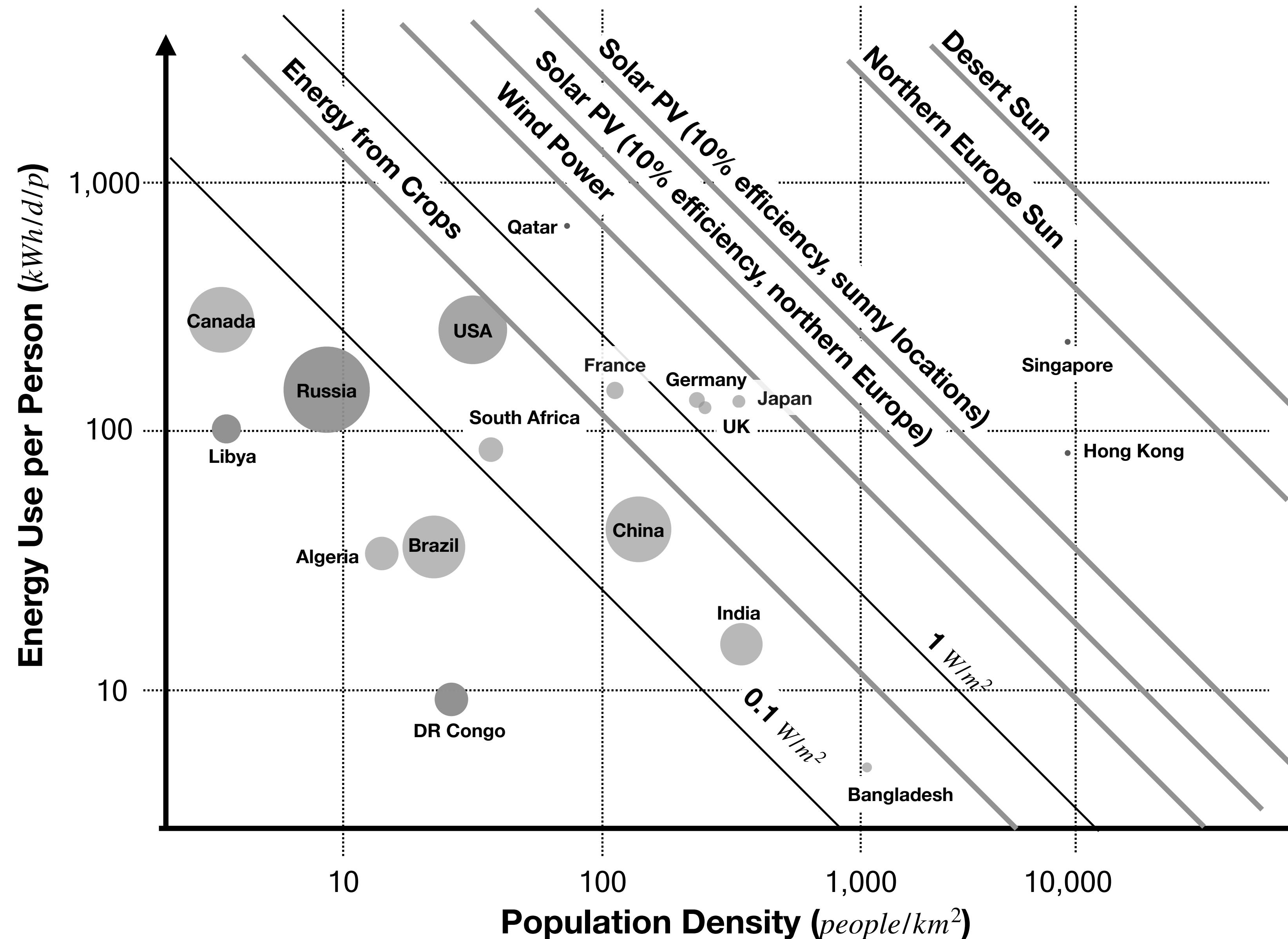
A future with far more cities, and cities that are asked to do far more.

By [Kim Stanley Robinson](#) +Follow

April 17, 2021, 5:00 AM CDT



Illustration: Viktor Hachmang for Bloomberg Green



1 NO
POVERTY



2 ZERO
HUNGER



3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



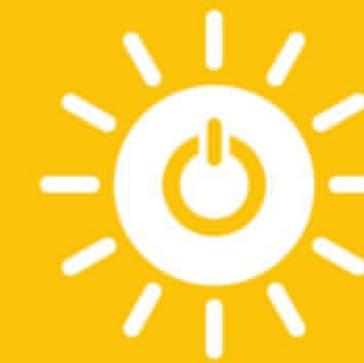
5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



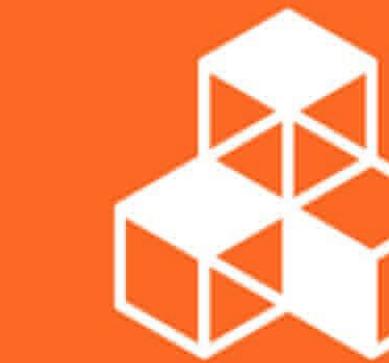
7 AFFORDABLE AND
CLEAN ENERGY



8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



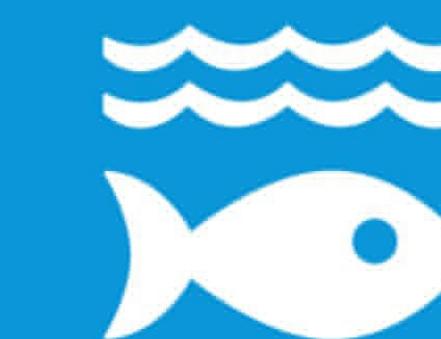
THE GLOBAL GOALS

For Sustainable Development

13 CLIMATE
ACTION



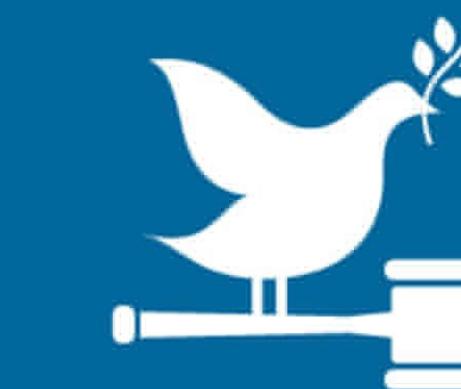
14 LIFE BELOW
WATER



15 LIFE
ON LAND

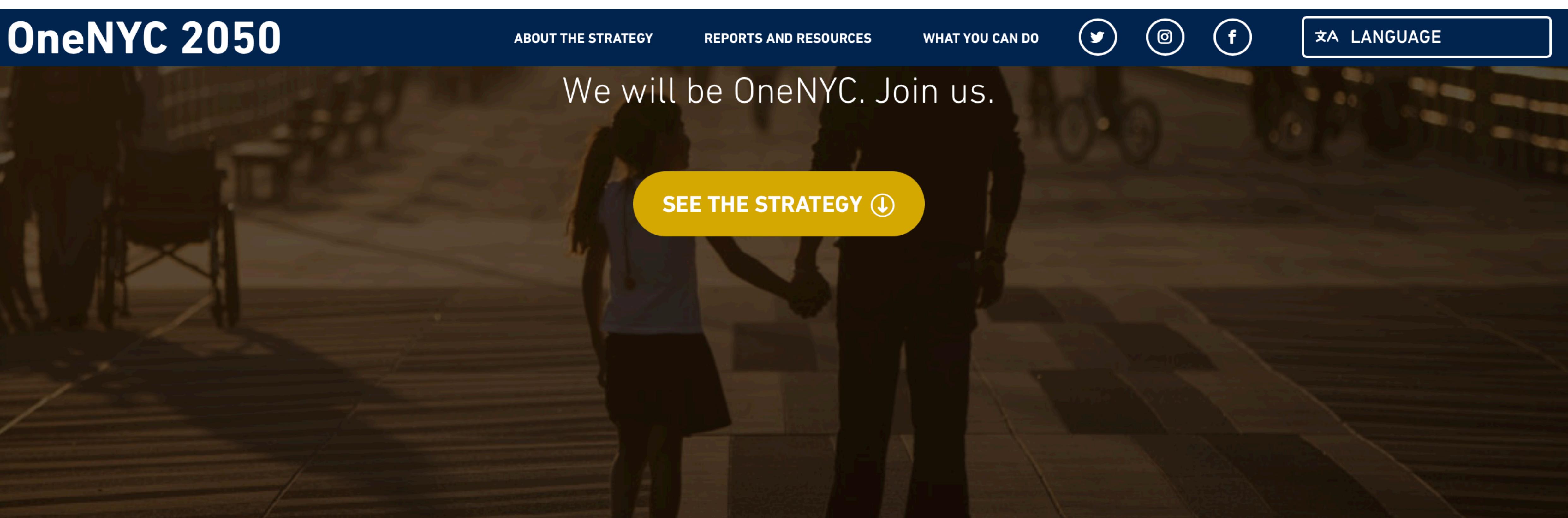


16 PEACE AND JUSTICE
STRONG INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS





We will be OneNYC. Join us.

[SEE THE STRATEGY](#)

OneNYC 2050 is a strategy to secure our city's future against the challenges of today and tomorrow. With bold actions to confront our climate crisis, achieve equity, and strengthen our democracy, we are building a strong and fair city. Join us.

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<https://sdgs.un.org/sites/default/files/2020-09/International-Affairs-VLR-2019.pdf>



VOLUME 1 OF 9 ONENYC 2050

With bold actions to confront our climate crisis, achieve equity, and strengthen our democracy, we are building a strong and fair city. Join us.

VOLUME 2 OF 9 A VIBRANT DEMOCRACY

New York City will involve every New Yorker in the civic and democratic life of the city, welcoming immigrants, advancing justice, and leading on the global stage.

VOLUME 3 OF 9 AN INCLUSIVE ECONOMY

New York City will grow and diversify its economy so that it creates opportunity for all, safeguards the American dream, and addresses the racial wealth gap.

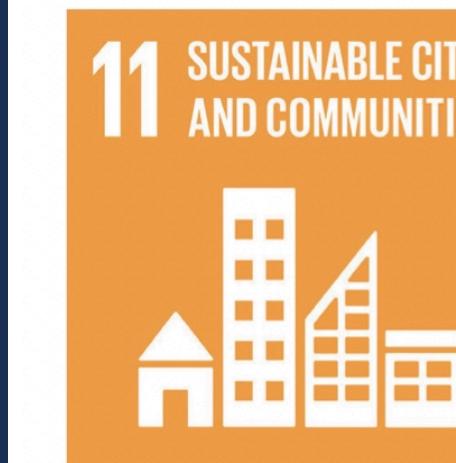
<https://onenyc.cityofnewyork.us/>

Sample Indicators for OneNYC

NYC tracks more than 1,000 indicators through a monitoring system it has been developing since the 1970s, which is maintained by the NYC Mayor's Office of Operations and published in the form of the Mayor's Management Report (MMR). A massive data infrastructure sits beneath the top-line indicators, and in many cases also aligns more directly with the SDG indicators. For each SDG, the NYC Mayor's Office for Operations has included top-line OneNYC indicators, and then a sampling of specific indicators, a description, and the source to demonstrate how the City monitors both operational performance and progress toward its goals. The complete set of OneNYC and MMR indicators can be found online.^{21 22}

pioneered climate action plans
voluntary local reviews (UN Agenda 2030)

<http://onenyc.cityofnewyork.us>



11 SUSTAINABLE CITIES
AND COMMUNITIES



Housing



Thriving
Neighborhoods



Culture



Transportation



Infrastructure



Healthy
Neighborhoods,
Active Living



Vision Zero



Zero Waste



Air Quality



Parks & Natural
Resources



Neighborhoods



Infrastructure

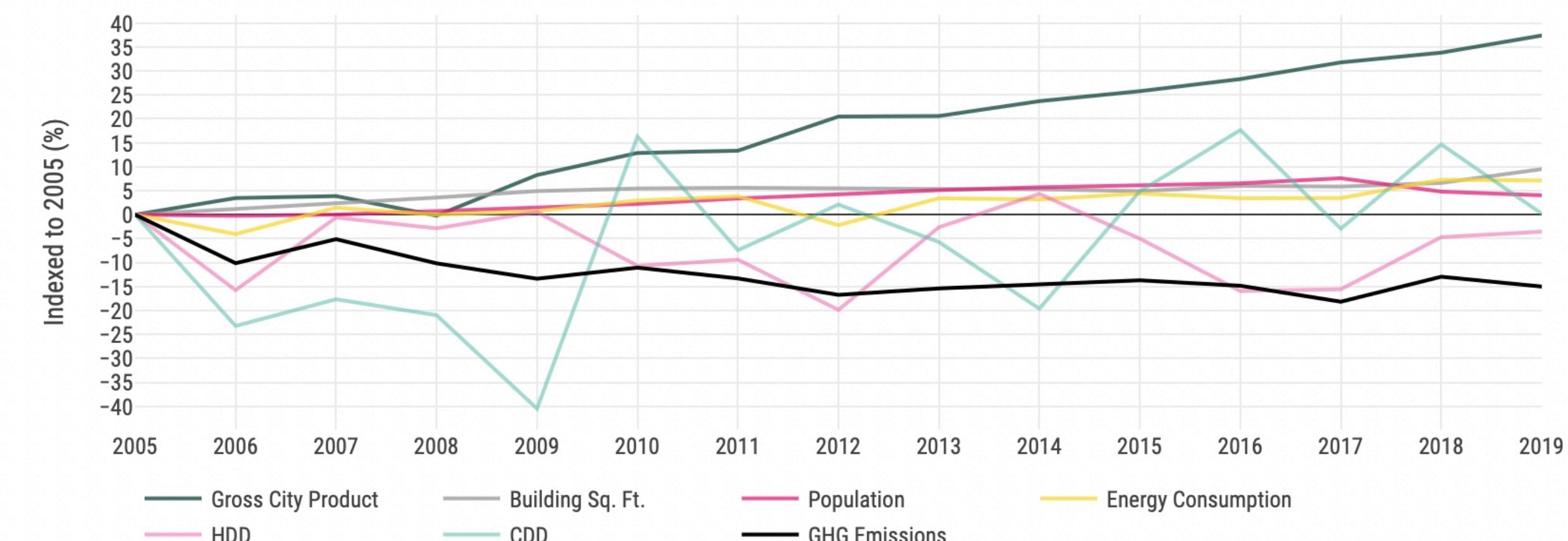
Holistic, Complex Systems approach to Goals and Policy

Energy, GHG Emissions, and Economic Indicators i

This chart plots NYC's GHG emissions and the trends in factors that can drive emissions, including energy consumption, population, heating degree days, cooling degree days, and building area. This chart also shows the city's Gross City Product, which has risen as emissions have decreased since 2005.

Localizing Sustainable Development in Cities

ENERGY, GHG EMISSIONS, AND ECONOMIC INDICATORS TRENDS



New kind of policy

riding on urban processes revealed by science, with 20-30 year objectives and quantified metrics