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BUILDING THE FUTURE

KEEPING UP WITH A GROWING URBAN POPULATION

EVERY DAY, AT LEAST 200,000 PEOPLE PACK THEIR BAGS AND MOVE TO THE BIG CITY. BY 2050 ALMOST 70% OF THE WORLD'S POPULATION WILL LIVE IN CITIES—THAT'S ABOUT 7 BILLION PEOPLE.

The shift to more urban living means cities will need more housing and infrastructure. That need presents both an opportunity and a challenge for architecture, engineering, and construction (AEC) professionals. They get to design, plan and build more, but they have to do it on a planet with already-stressed resources.

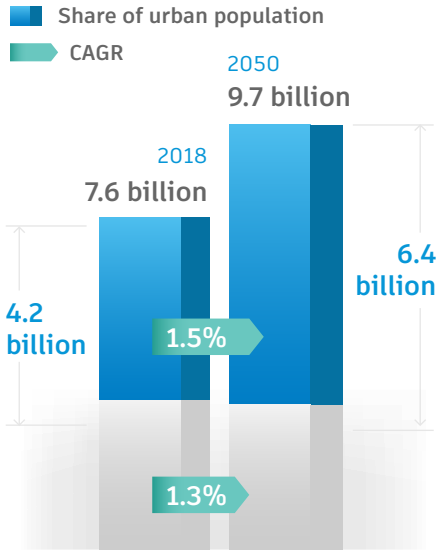
Urban Areas are Booming

...and so is the economy!

Mother Earth's population is growing like never before. By 2050, the United Nations predicts the number of people on our planet will grow from about 7.6 billion today to nearly 10 billion.

Those 10 billion people won't spread themselves evenly across our urban, suburban and rural areas. Urban areas, which now welcome about 55% of the global population, will contain 68% of us by 2050. Most of this increase will take place in Asia and Africa, primarily in India, China and Nigeria.

GROWTH OF POPULATION (2018 - 2050)



*Compound Annual Growth Rate

Sources: World Bank, Statista Calculation

Meanwhile, rural areas, which now account for about 3.4 billion people, are expected to decline to about 3.1 billion by 2050. It's interesting to note that India and China, two countries expected to experience high urban-area growth, also have the largest rural population, at 893 and 578 million, respectively.

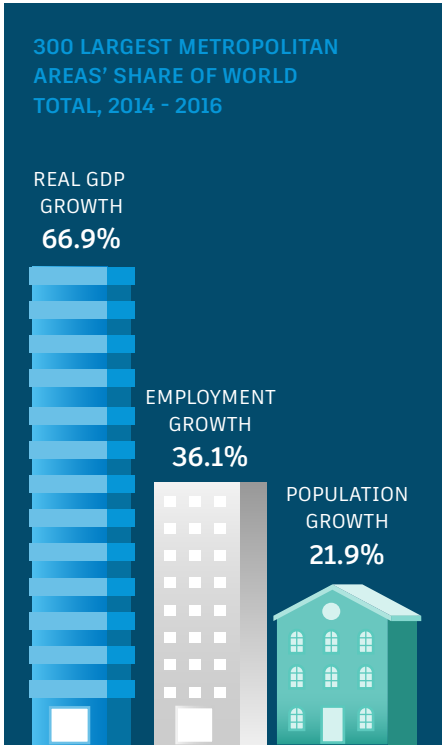
Rapid urban development will impact us on a local, regional, and global level. It will impact our schools, hospitals, energy systems, and employment opportunities. It will mean the need for more housing and improved public transit, roads and bridges.

Urban population growth may also equate to economic growth. A 2017 review of historical data found high population growth in high-income urban economies may lead to greater income growth. However, high population growth in low-income countries may slow their development.[1]

Sub-Saharan Africa had negative growth in per capita GDP during the 1990s. Between 2000 and 2015, GDP shifted to a more positive rate of 2.29% and an overall economic growth rate for this period of almost 5%. Not coincidentally, the region experienced strong population growth—a 2.7% annual percentage growth—during this time.[2]

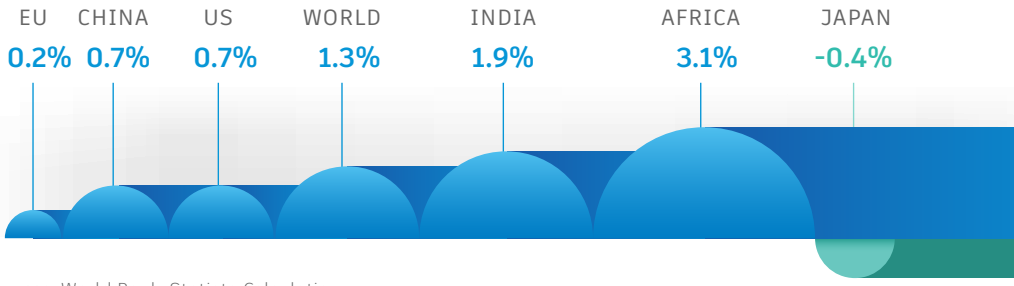
In countries with predicted population growth, studies indicate economic growth will follow. Both high-income and low-income countries will need to prepare by planning for more buildings and expanded infrastructure.

On the other hand, Japan is expected to experience a decline in population. One of the world's oldest societies, Japan has a rapidly ageing population and a shrinking workforce. Economists have indicated that its demographics are weakening Japan's GDP, illustrating how population decline can shrink economic growth.



Sources: Brookings, Oxford Economics

GROWTH OF URBAN POPULATION (2018 - 2050)



Sources: World Bank, Statista Calculation

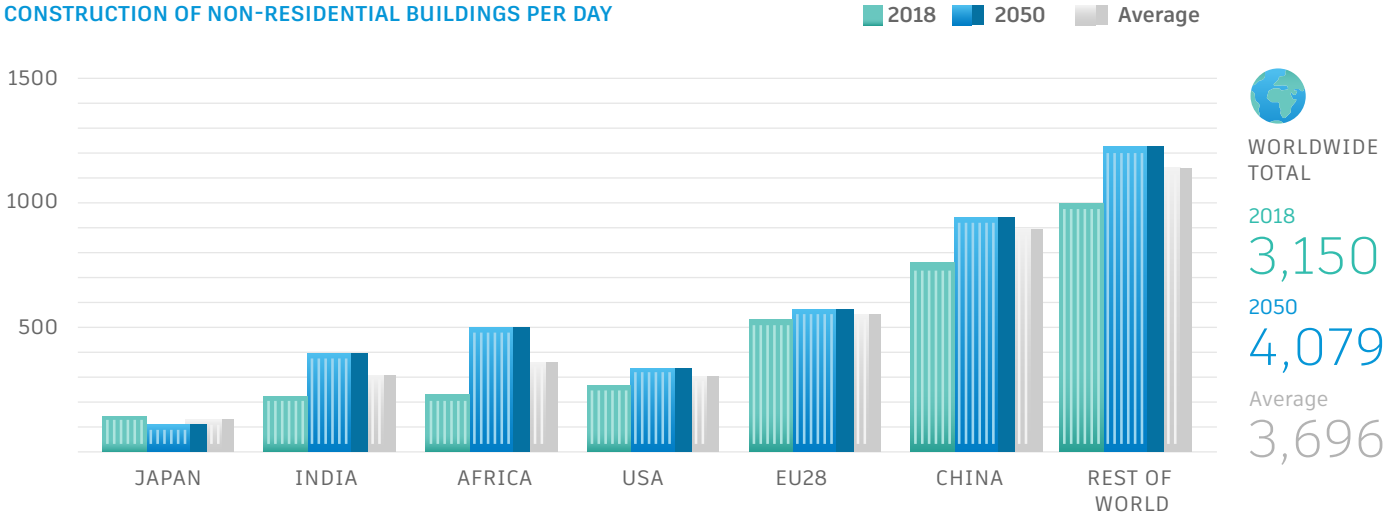
More People, More Business

Keeping up, building up with economic, and population growth

Although wealth disparity between rural and urban areas varies, the relative economic power of cities holds true everywhere. Both GDP and employment in urban areas far outpace the global average.

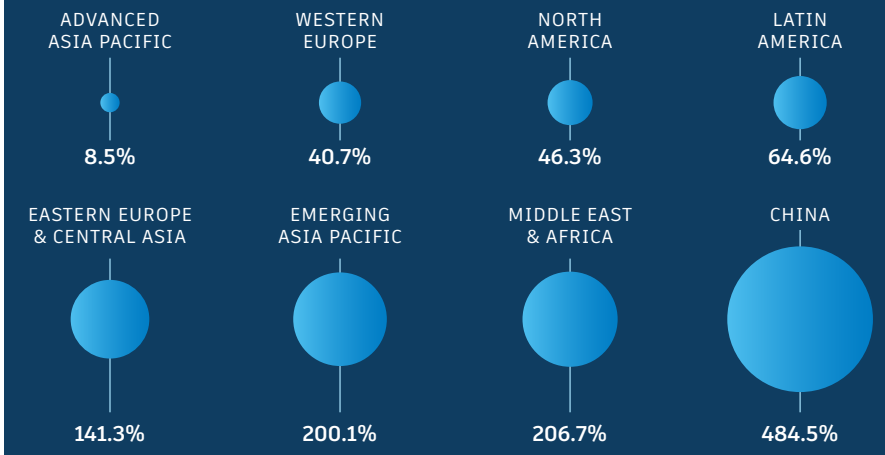
As urban centers develop, they will need more buildings for businesses and services. Globally, urban areas will need to construct more than 3,600 non-residential buildings daily, on average, to keep up with demand. By 2050, almost a quarter of this construction will take place in China.

CONSTRUCTION OF NON-RESIDENTIAL BUILDINGS PER DAY



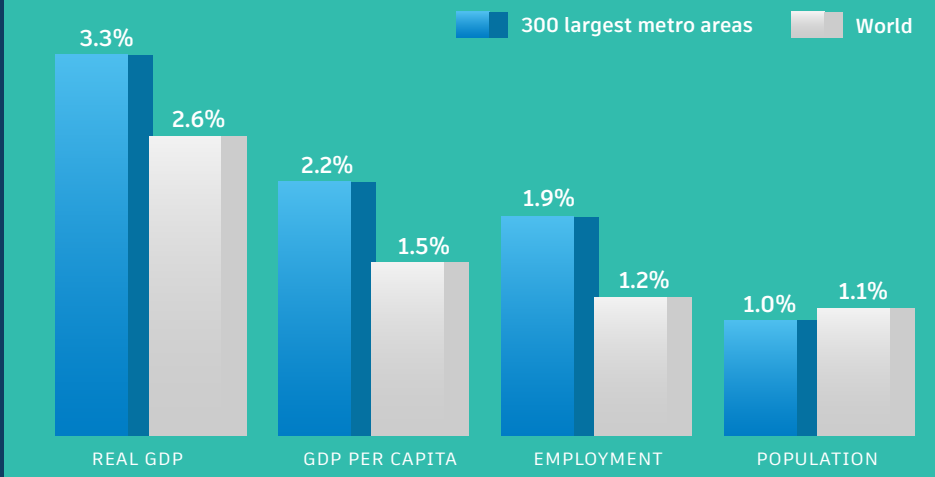
Sources: World Bank, Statista Calculation

% DIFFERENCE BETWEEN GDP PER CAPITA IN 300 LARGEST METRO AREAS AND THE REST OF THEIR RESPECTIVE REGION, 2016



Sources: Brookings, Oxford Economics

COMPOUND ANNUAL GROWTH RATE, 2014-2016



Sources: Brookings, Oxford Economics

A Roof Over Every Head

More people, more houses

The move to urban areas over the next few decades will impact how people live as well as the number of homes needed. Population growth, combined with an increase in two-person households, means we'll need more than two billion new homes by the end of the century.[3]

Wealth and income, historical and cultural factors, and personal preference all influence city-dwellers' lifestyles. Yet, despite the economic prosperity that generally exists in urban areas, population density is still a major factor that affects one's personal space. When it comes to housing, urban areas have long been and will long continue to be, defined by multifamily housing.

Between 2018 and 2050, multifamily housing will comprise more than half the daily average residential buildings constructed per day– close to 10,000 per day. Like commercial buildings, about 25% of this construction will take place in China.

AVERAGE MULTIFAMILY HOUSING CONSTRUCTED DAILY (2018-2050)

Excluding single family homes. Sources: World Bank, Statista Calculation

Infrastructure Makes Urban Growth Possible

Connecting metropolitan areas within and between

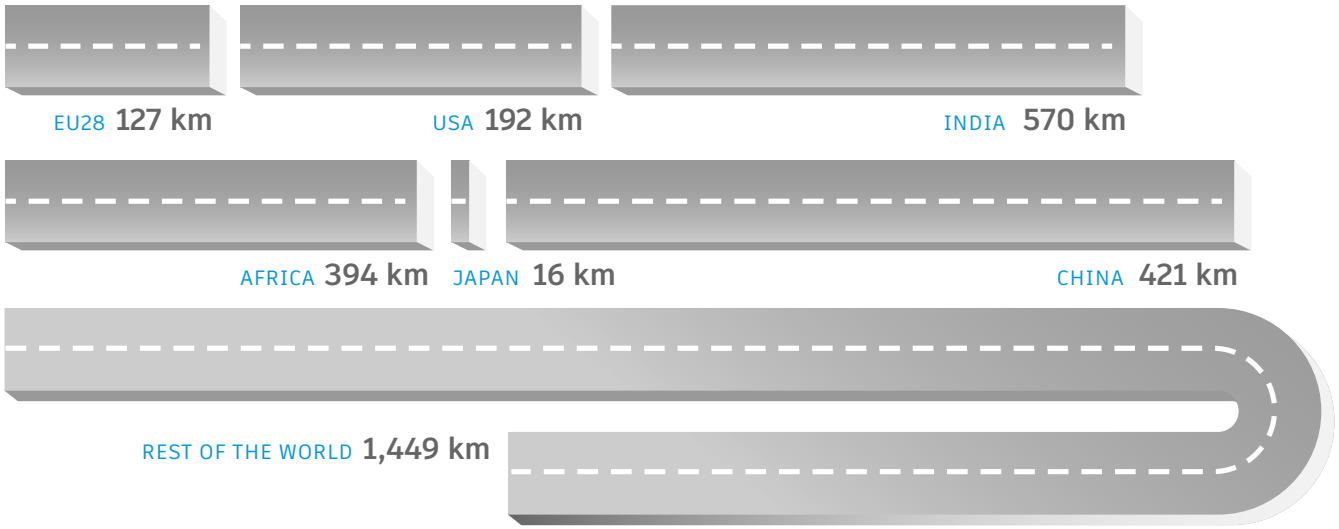
The migration to urban areas necessitates supporting infrastructure. Our world's communities will need a combination of smart city planning as well as investments in road and public transportation networks.

Annually we need to construct more than 240,000 km of urban roads and more than 915,000 km of road in rural areas. Combined, that is enough road to wrap around the globe over 28 times. China and India alone must build more than 69,000 km of urban roads and more than 290,000 km of road in rural areas.

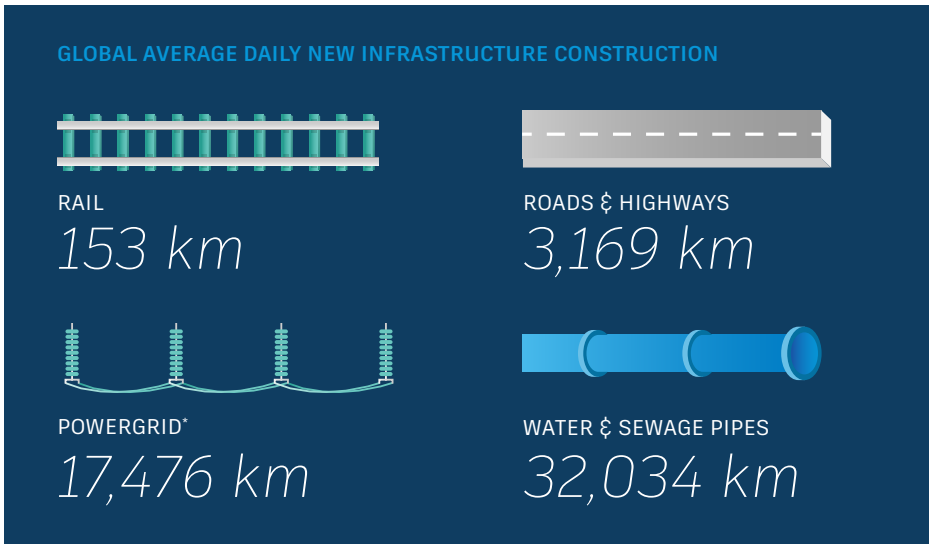
Other support systems in need of development include:

- About 60 international airports each year to account for increasing air travel demand.
- New and/or expanded power and water networks to accommodate an increase in buildings and related infrastructure.
- New and/or expanded fresh water and sewage systems. This is especially important in developing countries with limited infrastructure.
- New urban and rural rail infrastructure needed to support transportation in and around cities.

GLOBAL AVERAGE DAILY NEW ROAD & HIGHWAYS CONSTRUCTION



GLOBAL AVERAGE DAILY NEW INFRASTRUCTURE CONSTRUCTION



The trend toward renewable energy will likely play a big role in electrical power supply. Expect to see increased construction of long-distance energy transmission and solar and wind installations between now and 2050.

Annually, experts predict urban communities will deploy on average more than 3 million km of powergrids* and lay more than 7 million km of pipes between now and 2050.

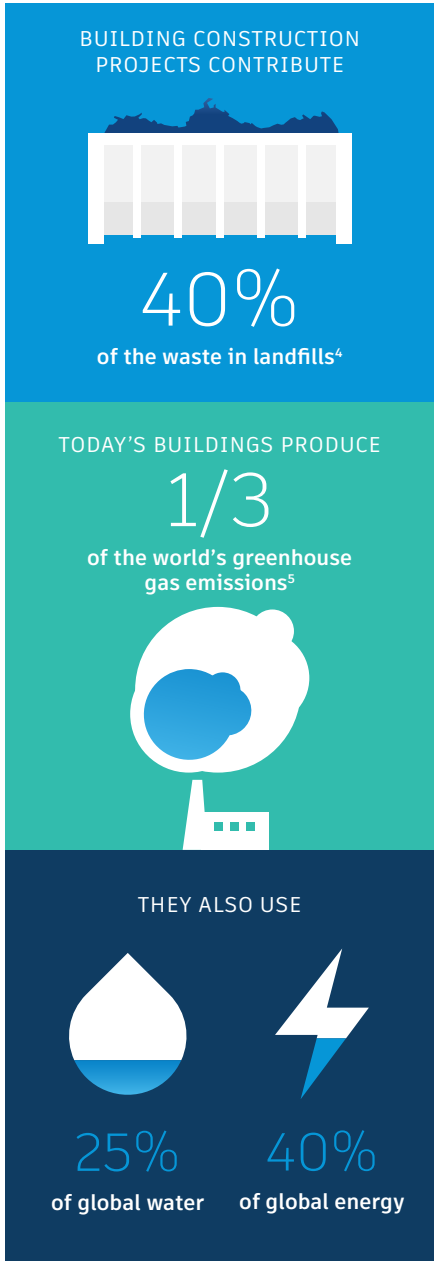
* Including high voltage transmission lines and distribution lines

With Every Opportunity Comes Responsibility

The AEC industry faces its share of obstacles. Globalization is forcing firms to compete in more and new markets. Clients want high-quality buildings and infrastructure delivered on tighter deadlines and budgets. Regulation standards become more rigorous by the year. How do we overcome these challenges and take care of our growing global population?

The AEC industry must fundamentally rethink how it designs, constructs, and operates the built environment. Innovative firms around the world are doing this already by adopting new technologies that improve efficiency and productivity like building information modeling, prefabrication and modular construction, generative design, and robotics. It's happening now and will continue to happen as the industry races to meet the demand for new buildings and infrastructure.

But we must also consider our planet. Climate change and depleting natural resources are today's pressing industry challenges.



How can the industry help our grow our cities and communities with the least environmental impact?

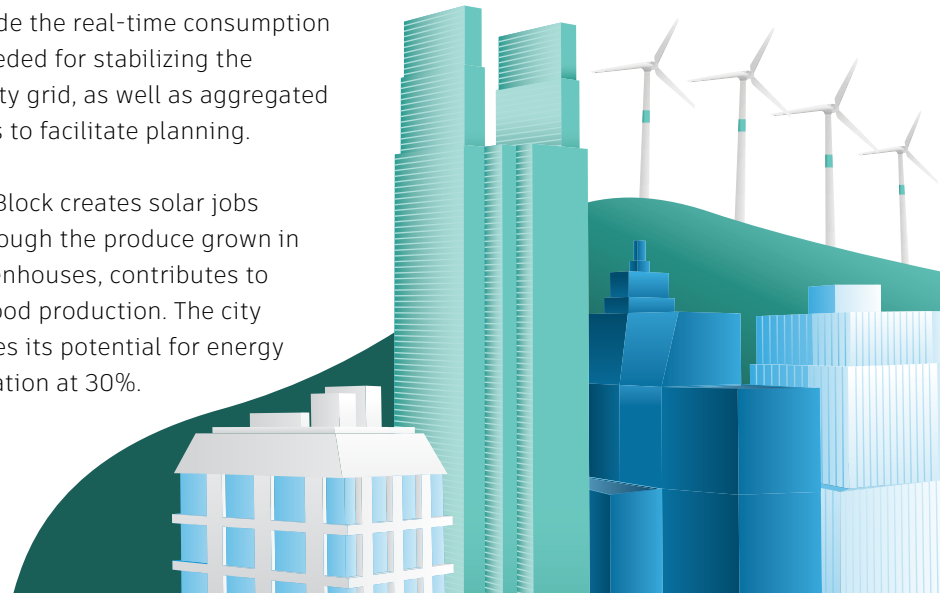
The World Green Building Trends 2018 report from Dodge Data & Analytics shows an increased global demand for green projects over the past decade. That trend will continue, the report states, especially as architecture firms aim to hit goals around carbon neutrality like Architecture Institute of America's AIA 2030 Commitment.[6]

A great example of a city taking responsibility is Copenhagen. To reduce greenhouse gasses and create an avenue for urban jobs and food production, Copenhagen launched Energy Block, which positions solar collectors on rooftop greenhouses. Energy Block relies on smart meters to provide the real-time consumption data needed for stabilizing the electricity grid, as well as aggregated patterns to facilitate planning.

Energy Block creates solar jobs and, through the produce grown in the greenhouses, contributes to urban food production. The city estimates its potential for energy optimization at 30%.

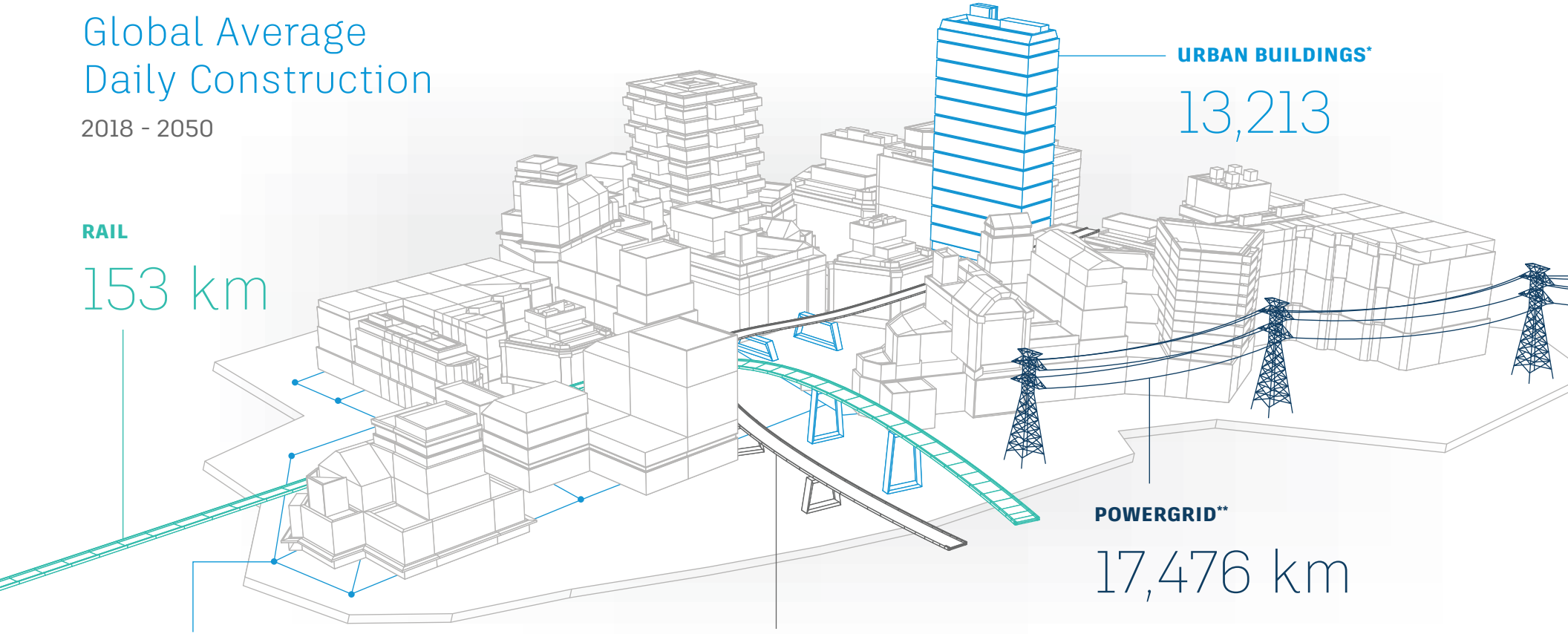
As the Copenhagen example shows, creating more sustainable cities is possible and doesn't need a radical new approach. In fact, it's estimated that 30 to 80% of building energy consumption can be reduced using proven and available technology.[7]

AEC professionals must continue to rethink how they design and build—now, through 2050 and beyond. It will take a concerted effort that includes smart city planning, advanced technology and a commitment to do things sustainably to accommodate our growing, increasingly urban population while preserving precious resources. The companies that take action stand to benefit in multiple ways from the changes taking place on our planet.



Global Average Daily Construction

2018 - 2050



URBAN BUILDINGS*

13,213

RAIL

153 km

POWERGRID**

17,476 km

WATER & SEWAGE PIPES

32,034 km

ROADS & HIGHWAYS

3,169 km

Please note that rail, water & sewage pipes, roads & highways and powergrid values are inclusive of both urban and rural data.

* Commercial and residential, excl single family homes

** Including high voltage transmission lines and distribution lines

Source: Statista Calculation

References

1, 2 Wesley F., E. (2017). The Role of Population in Economic Growth. SAGE Open. https://doi.org/10.1177/2158244017736094

3 https://theconversation.com/the-world-needs-to-build-more-than-two-billion-new-homes-over-the-next-80-years-91794

4 https://sustainablebrands.com/read/waste-not/planetreuse-redirecting-building-waste-from-landfill-to-leed-projects

5 https://aip.scitation.org/doi/abs/10.1063/1.3220701?journalCode=rse&

6 http://images.marketing.construction.com/Web/DDA/%7Bf8b87329-bf5b-4f99-b09b-915be728b796%7D_World_Green_Building_Trends_2018_SMR_FINAL_11-24.pdf

7 https://www.euenergycentre.org/images/unep%20info%20sheet%20-%20ee%20buildings.pdf

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