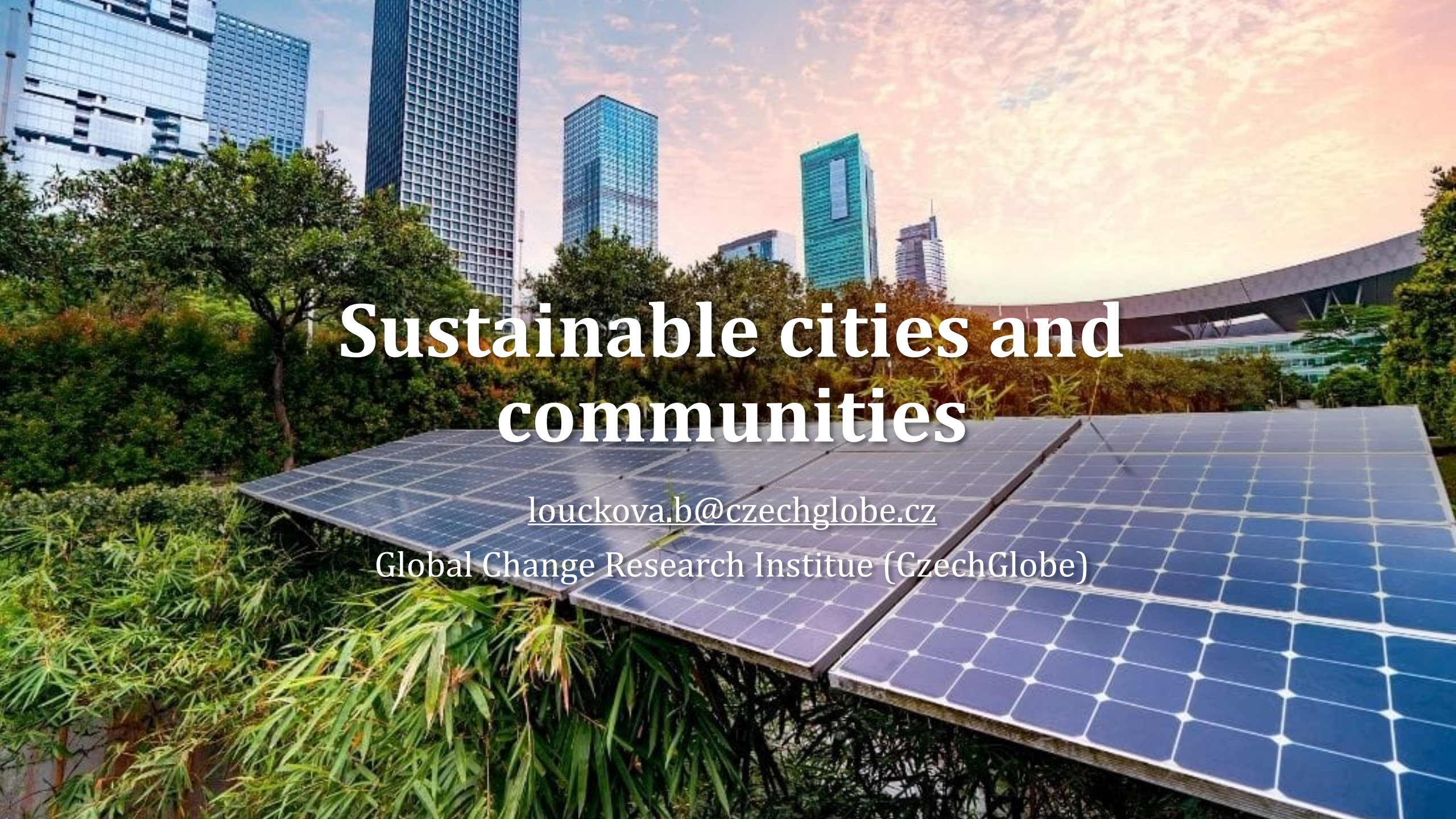

Sustainable cities and communities

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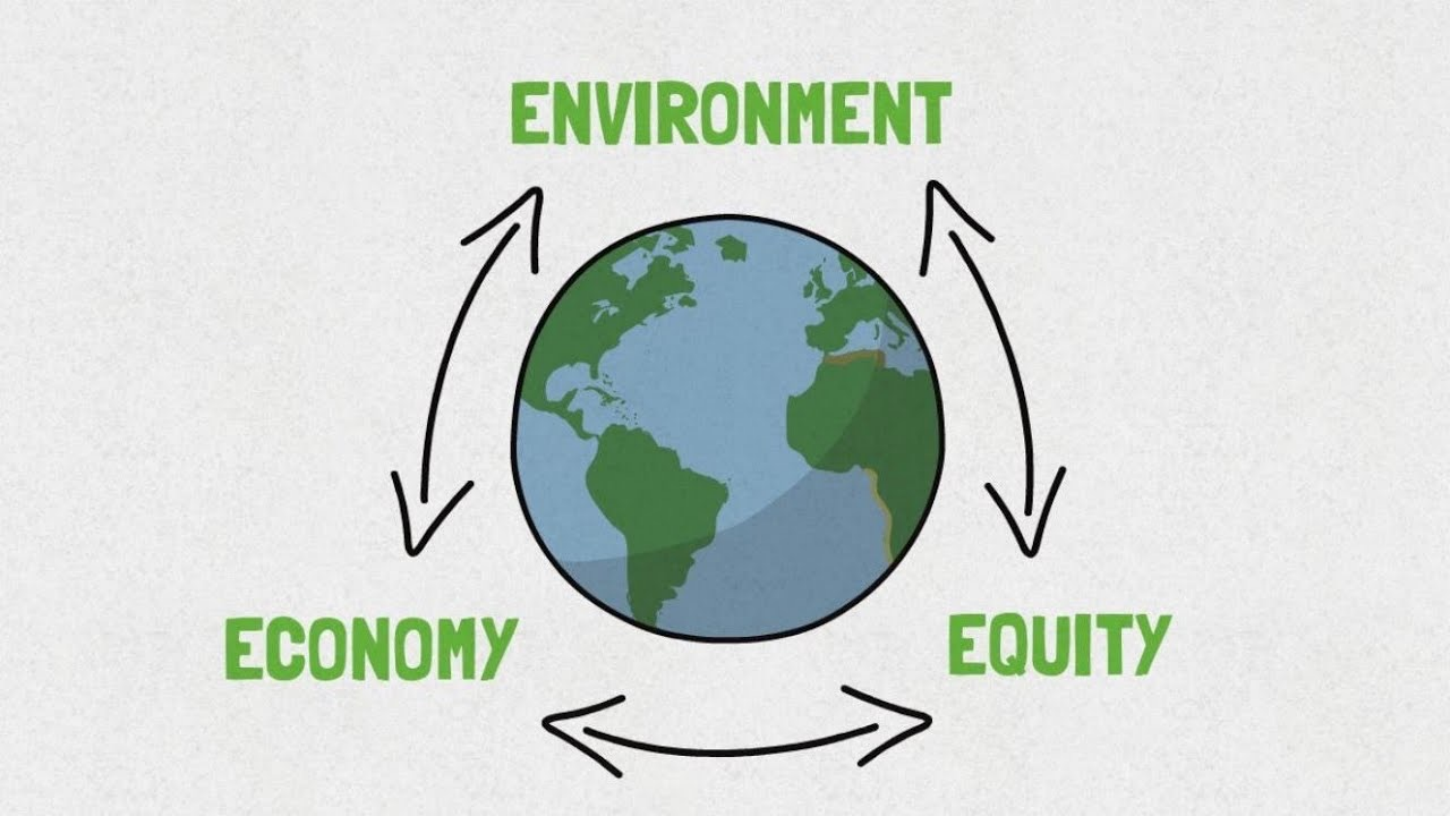
Outline

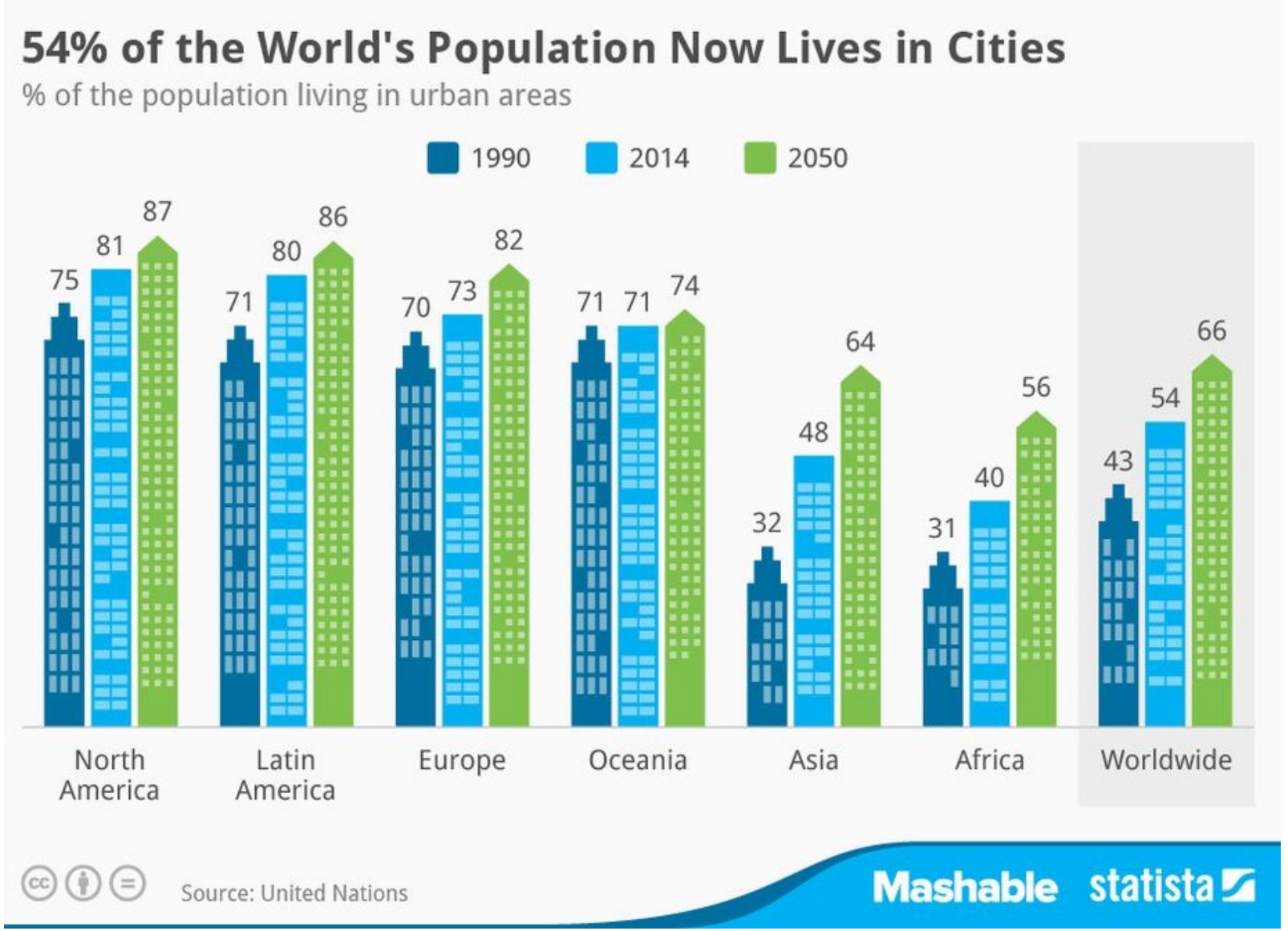
- What is sustainability?
- Sustainable cities: 5 key features
- Sustainable vs. Smart cities
- Benefits and Challenges of Sustainable & Smart cities
- Examples of Sustainable & Smart cities
- Conclusion

What is sustainability?

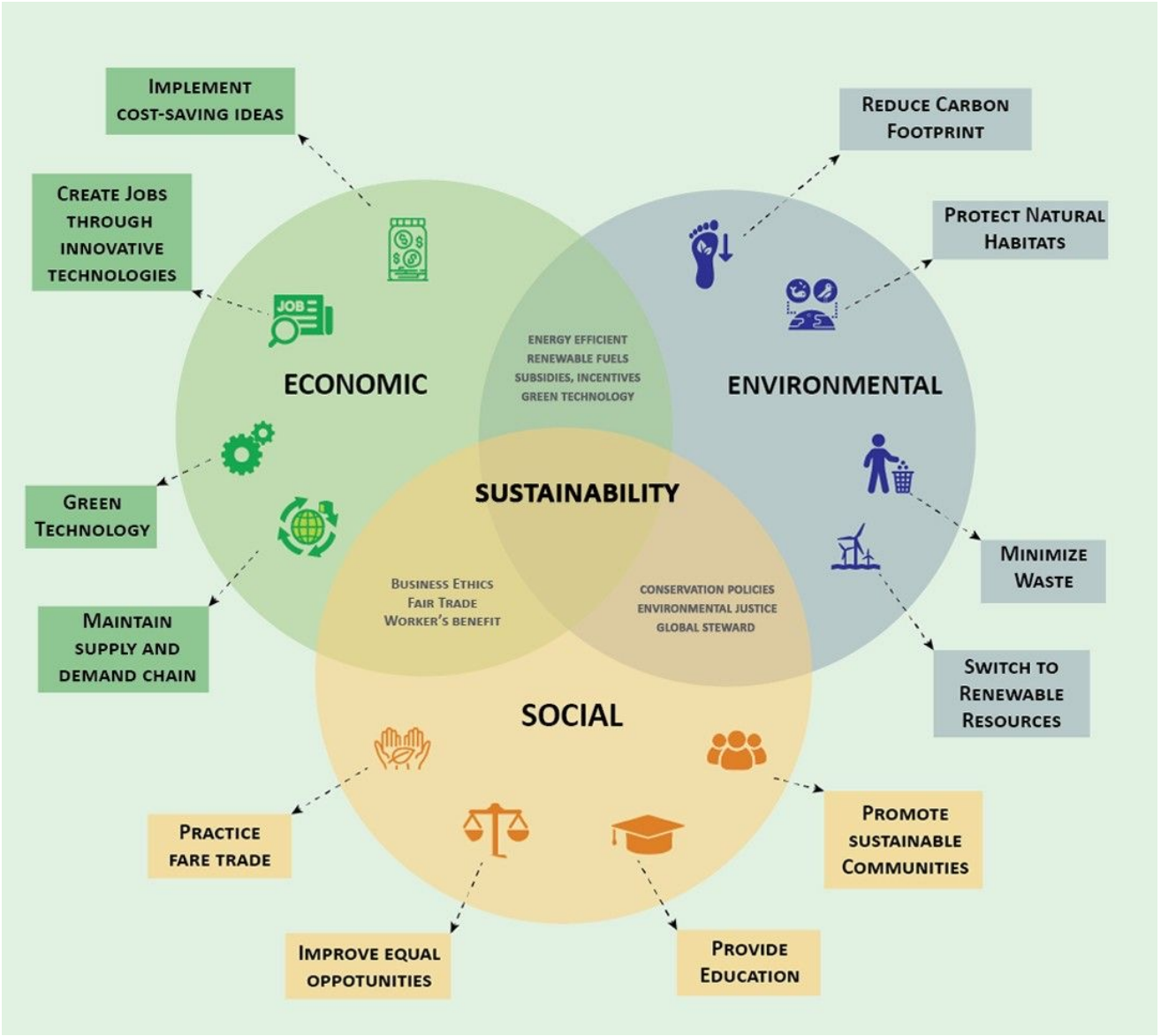
Sustainability is the balance between the **environment, equity, and economy**



Rapid Urbanization



Key Pillars of Sustainable Urban Development



Sustainable cities

- = **eco-cities**, **green cities**
- consideration of social, economic, and environmental impact
- a high quality of life while reducing their ecological footprint
- a balance between growth and environmental impact

5 key characteristics of Sustainable Cities:

Energy Efficiency

Efficient and Sustainable Transport system

Waste Management and Water Conservation

Sustainable (green) architecture

Green Spaces

1. Energy efficiency

Freiburg, Germany

2. Efficient Transportation

Oslo, Norway

Asterdam Netherlands

3. Waste Management and Water Conservation

Rotterdam, Netherlands

4. Sustainable (green) architecture

Bosco verticale house in Milano, Italy

5. Green spaces

Urban gardening in Atlanta, Georgia

Sustainable cities and smart cities

Sustainable cities:

- minimizing environmental impact while maximizing the quality of life
- Key features:
  - Reducing carbon emissions and waste
  - Conserving natural resources
  - Ensuring social equity

Smart cities:

- enhancing the efficiency and services of the city through digital technology and ICT
- Key features:
  - Integration of IoT device
  - Data and analytics
  - Enhanced public services

Sustainable Cities and Smart Cities

Integration & Overlap

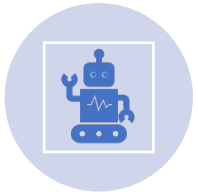
- **Smart cities focus on technological and operational efficiency,** while **sustainable cities emphasize environmental health**, yet both aim to enhance urban living.
- Smart technologies can be employed to achieve sustainability goals (e.g. smart grids for energy management)
- Many modern urban planning strategies combines **both smart and sustainable principles**

Benefits of Sustainable & Smart cities

Reduction in dependency on non-renewable energy sources
Mitigation climate change impacts
Promotion of healthy lifestyle
Enhancement of the overall quality of life for their residents
Environmental preservation
Improved Services and Innovation
Safety and Connectivity
Equitable access to resources and amenities

Challenges of Sustainable Cities

Financial limitations



Technological challenges (integrating different technologies)

Governance challenges (cooperation across sectors)

Social and cultural barriers (skepticism, resistance from stakeholders, digital divide)

Long-term sustainability

Examples of Sustainable / Smart Cities

Singapore

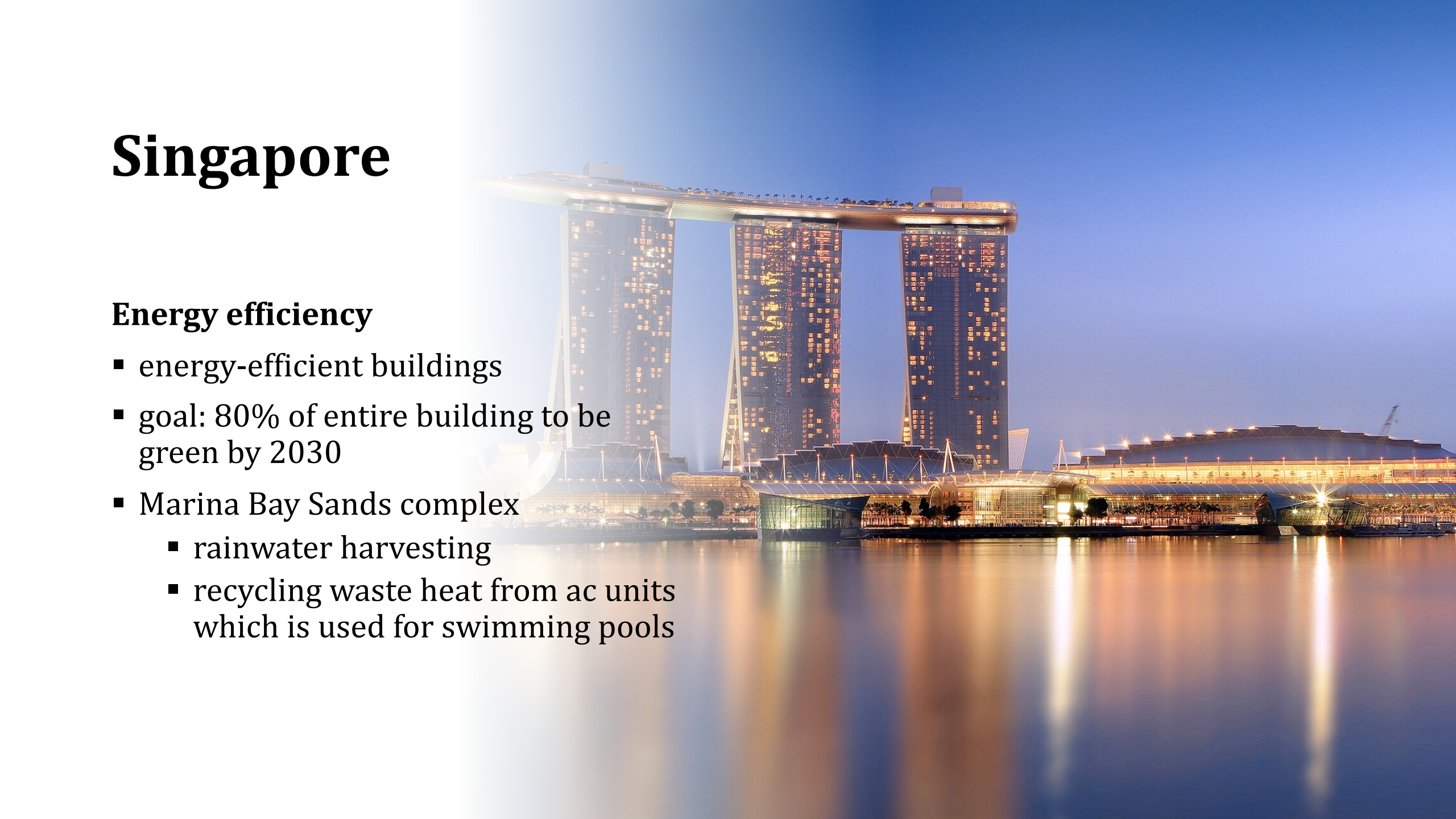
- population: 6 mil.
- one of the most advanced cities in the world regarding technologies
- leading smart city
- high living standards, excellent public infrastructure,
- advanced transportation system, waste management, energy system

Singapore

Transportation

- Mass Rapid Transit system (MRT)
  - over 3 mil passenger every day
  - reliable and efficient
  - automatic train control, real-time passenger information
- pilot program for self-driving cabs

Singapore



Energy efficiency

- energy-efficient buildings
- goal: 80% of entire building to be green by 2030
- Marina Bay Sands complex
  - rainwater harvesting
  - recycling waste heat from ac units which is used for swimming pools

Singapore

Waste management

- Waste-to-Energy Incineration Plants
- Tuas South Incineration Plant
  - generating electricity by incinerating waste
  - 90% of city's waste
  - electricity to power 60 000 homes

Stockholm, Sweden

- population: 1 mil.
- **goal**: the world‘s smartest city in 2040
- emphasis on sustainable urban planning, connectivity, accessible data, smart platforms, innovations

Copenhagen, Denmark

- Population: 600.000
- 60% of solar and wind energy
- over 500 km of bicycle paths
- Copenhill: a waste-to-energy plant and recreational facility in one
- Environmental policies
  - cycling infrastructure
  - clean public transportation
  - green roofs, parks

Vancouver, Canada

- Population: 600.000
- Green Initiatives (green building standards, green transportation)
- Digital governance
- Smart utilities
- Greenest City Action Plan

Rotterdam, Netherlands

=> 5 ground-braking examples of innovative (and nature-based) solutions in urban planning

"Water resilience is in Rotterdam's DNA.

For centuries, Rotterdam, a delta city with water coming from all directions, has adapted to and learned ***to live with*** *water"*

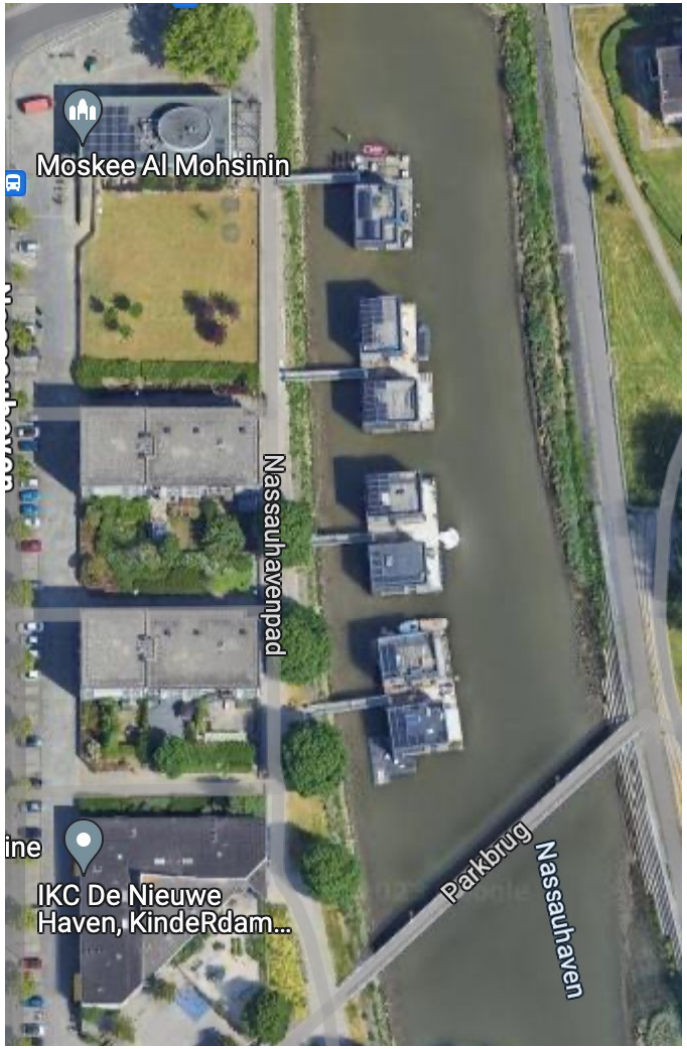
(Chief Resilience Officer of the Rotterdam Municipality)

1. Floating office of the Global Center on Adaptation (2021)

= climate-resilient and self-sufficient building designed to rise with growing water levels

2. Nassauhaven Floating Homes (2020)

= first floating street in Rotterdam (18 sustainable houses)



3. Benthemplein Water Square (2013)

= the world's first large-scale water square

= public space and storm water storage **combined in one space**

= 2000 cubic meters of rainwater

3. Benthemplein Water Square (2013)

3. Benthemplein Water Square (2013)

4. Westersingel Urban Floodplain

= a popular walking boulevard designed to become a floodplain during extreme rainfalls

5. The Dakpark (2014)

= a huge park planted on top of a shopping center

5. The Dakpark (2014)

Green gentrification

= an example: Hofbogenpark (to be open in 2024)

*"We still do not have enough information about green gentrification and its effects on the city - **mainly because of lack of research.**"*

(Inclusivity advisor of Rotterdam Municipality)

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Office for **Urbanism** and **Landscape Architecture**.

https://www.urbanisten.nl

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https://www.urbanisten.nl/work/rotterdam-adaptation-strategy

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INTENSIFYING **PARTNERSHIPS**

FOR URBANISATION AND CLIMATE CHANGE MITIGATION

THROUGH **SMARTER SUSTAINABLE CITIES**

Conclusion

- Sustainable/smart cities are important in addressing environmental challenges and enhancing quality of life for residents
- They offer a vast array of benefits - improved efficiency, energy conservation, reduced carbon footprint, better resource management
- The role of technology and innovation is crucial to create sustainable urban environments as well as the collaboration between government, businesses, and citizens
- Adopting sustainable practices, promoting green initiatives, and investing in smart city solutions can lead to a better future in cities

Thank you!