TUNGSRAM™

Innovation is our heritage
EST. 1896

Well-designed future for livable, citizen-centric cities in Egypt

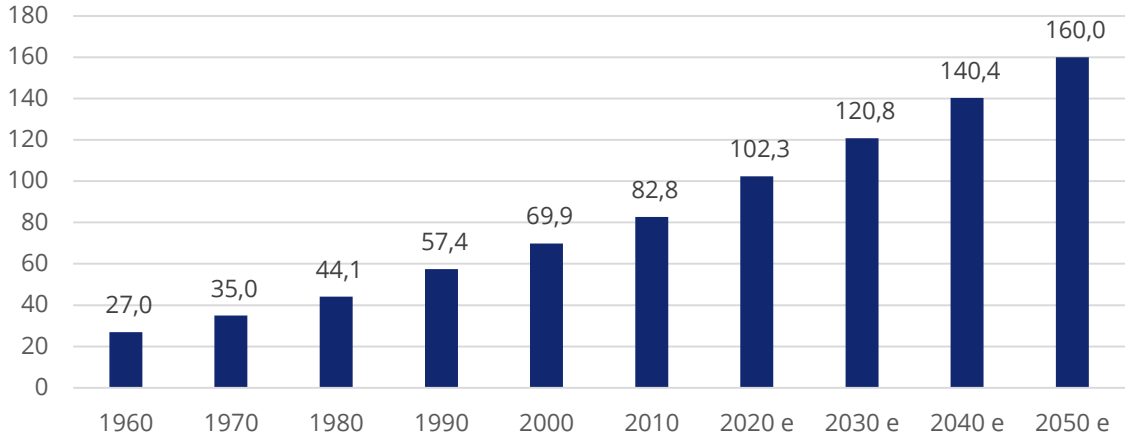
Joerg Bauer | 2019

Business Environment of Egypt

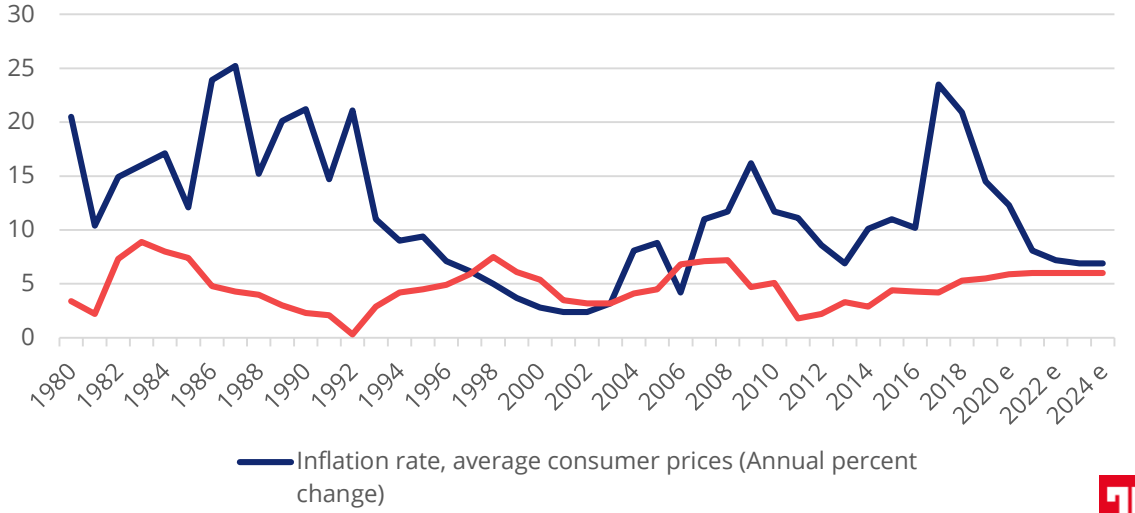
Quick snapshot

Official name	Arab Republic of Egypt
Government	Presidential republic
Capital	Cairo
Official language	Arabic
Territory	1 001 449 km^2
Agricultural land	37 330 km^2
Population	97,0 million (2018)
GDP	USD 242,8 billion
GDP per capita	USD 2 503
Currency	Egyptian pound (EGP)
Risk rating	‚B' STABIL (S&P)
Hungary's export ranking	51 (out of 209)

Population (million)



Inflation rate and real GDP growth



Business Environment of Egypt

Strengths / Opportunities

- Number of investments has increased thanks to political stabilization;
- Subsidies from the Gulf countries stabilize the budget;
- The IMF agreement reduces budget pressure;
- The extraction of gas reserves increases the government revenue.

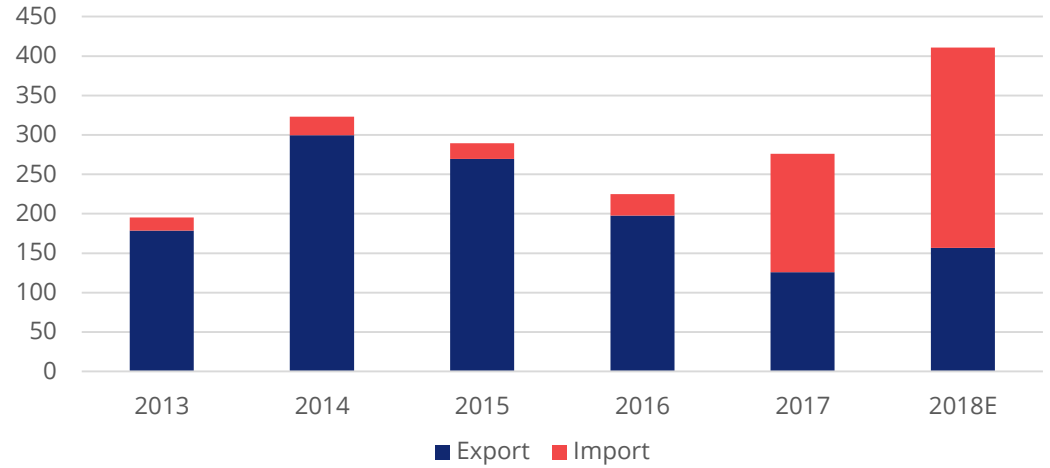
Weaknesses / Threats

- Extremely high security policy risks are threatening the most important industry, tourism (high risk of terrorist attacks);
- Extremely high levels of corruption can hinder direct capital investment;
- High government deficits;
- High domestic currency-denominated government debt;
- Continuous current account deficit;
- High systemic risks in the banking system.

Country risk factors

Politics and Security policy:
Business environment:
Economic growth:
Public finances:
Monetary and exchange policy:
Banking sector:
Payment experiences:

Hungary's export and import balance (in million USD)



Introduction

Innovation is our heritage

1896

Established as United Electric Ltd.

1909

Tungsram brand registered

1921

Lipót Aschner founded the world-famous research lab and makes the brand a world market factor

1931

Imre Bródy, a researcher at Tungsram develops Krypton lamps

1946

Zoltán Bay, the technology officer of the company founds radar astronomy by a world famous experiment

1989

GE purchases the majority of Tungsram shares, later 100%

2018

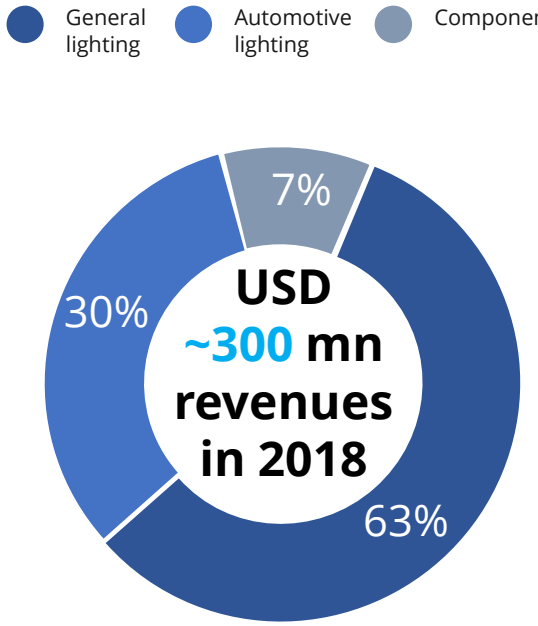
Tungsram Group is founded

Tungsram has a 120-year long track record and unique assets and capabilities

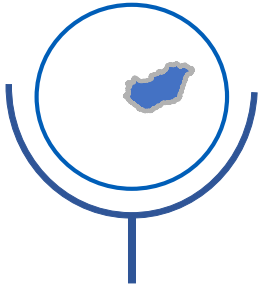
Over 120 years
of reliable operations

1896

World-class innovation heritage



4000+ employees in Hungary and globally



Established sales network in a **100+** countries:

95+% export

5 plants for advanced lighting technologies and components

20+ Tungsram subsidiaries globally

Ceramics, metal, glass, plastic quality and tooling capabilities

Expanding Hungarian technology center, SMART everything

Traditional

LED

Indoor

LED Outdoor

LED Industrial

Automotive

Precision Indoor Farming

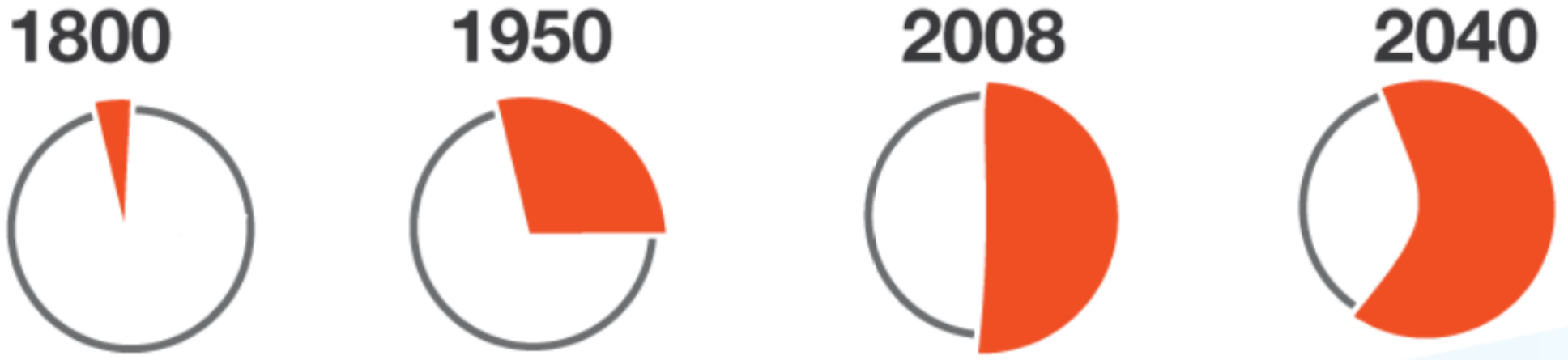
Battery manufacturing

Smart City Solution

Megatrends

THE WORLD IS NOW URBANIZED

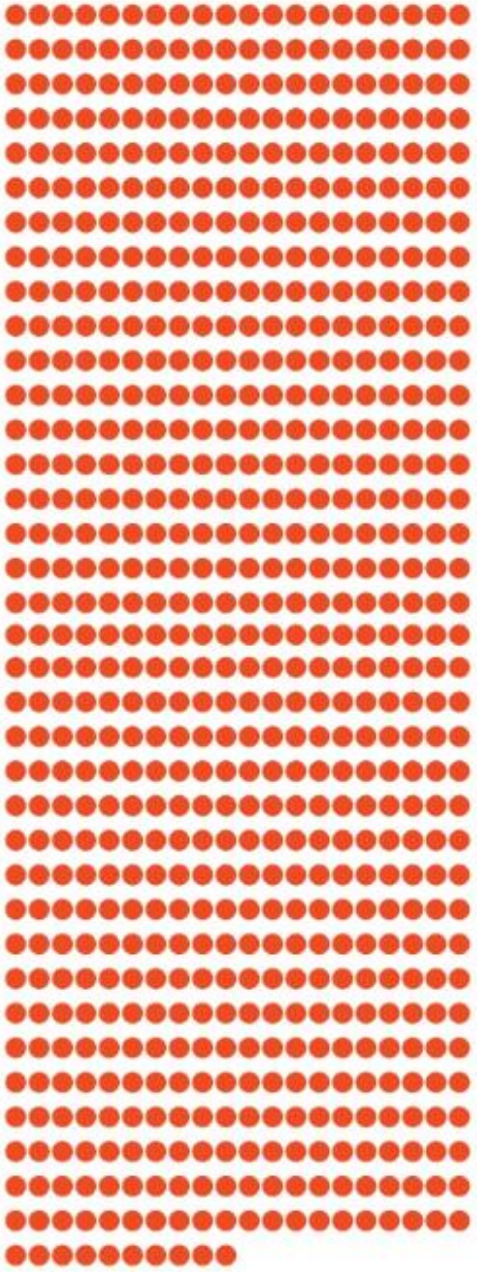
% of population living in cities

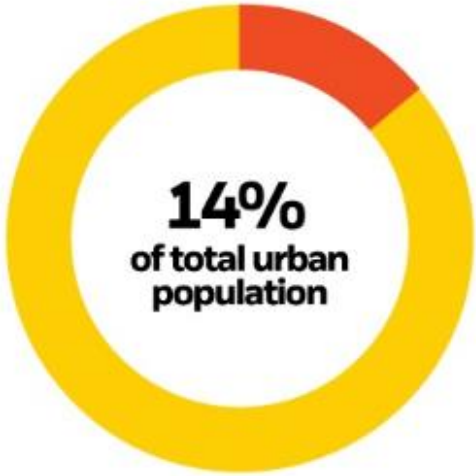


2030

41 megacities

730M people

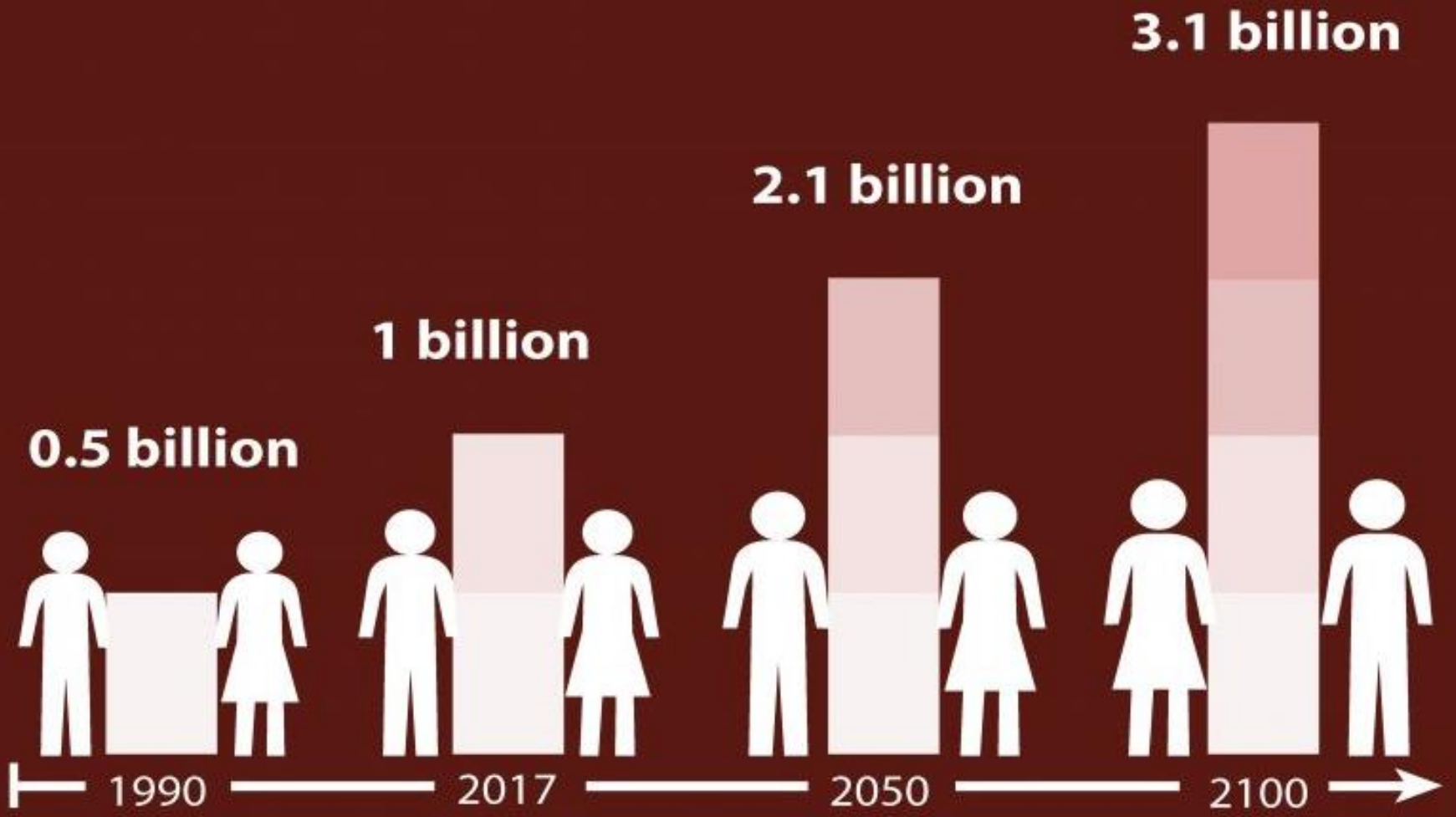




Source: UN World Urbanization Prospects,
The 2014 Revision (Jul 2014)

Ageing Population

Projected global population aged 60 years or over



Source: United Nations Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2017 Revision*
Produced by: United Nations Department of Public Information

SUSTAINABLE DEVELOPMENT GOALS

Scarcity of resources

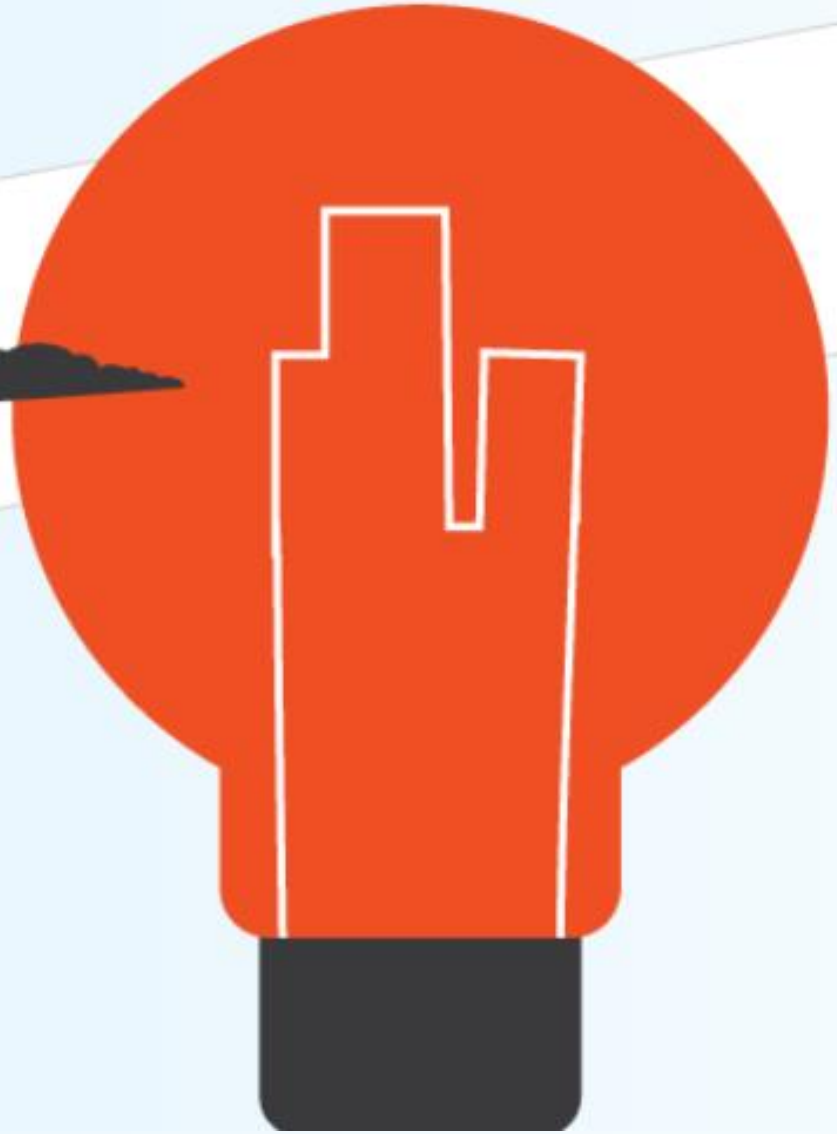
In the developing world, as much as
80% of future economic growth will occur in cities

ENVIRONMENTAL IMPACT

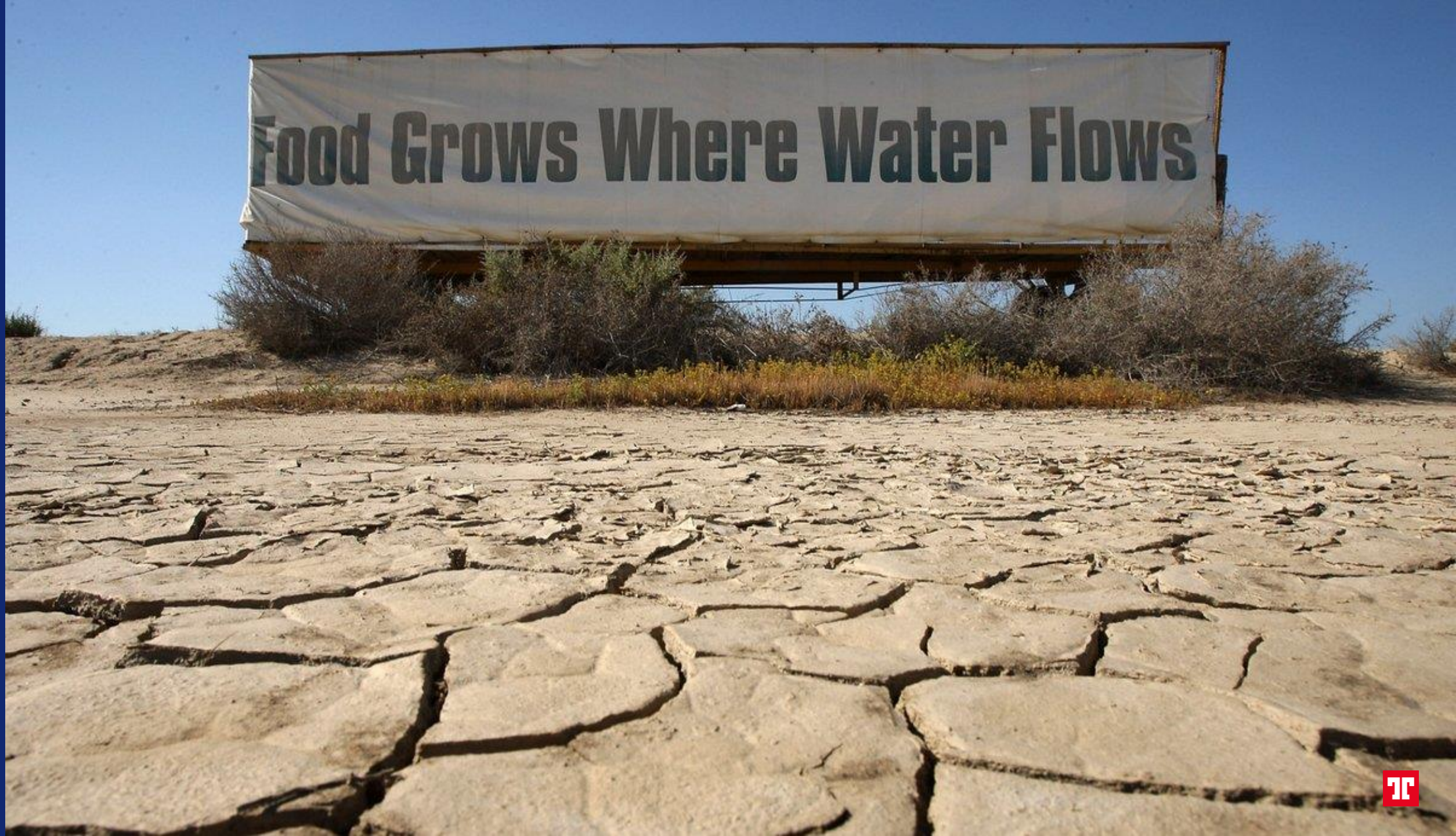
Cities use

60%-80%

of the world's annual energy needs

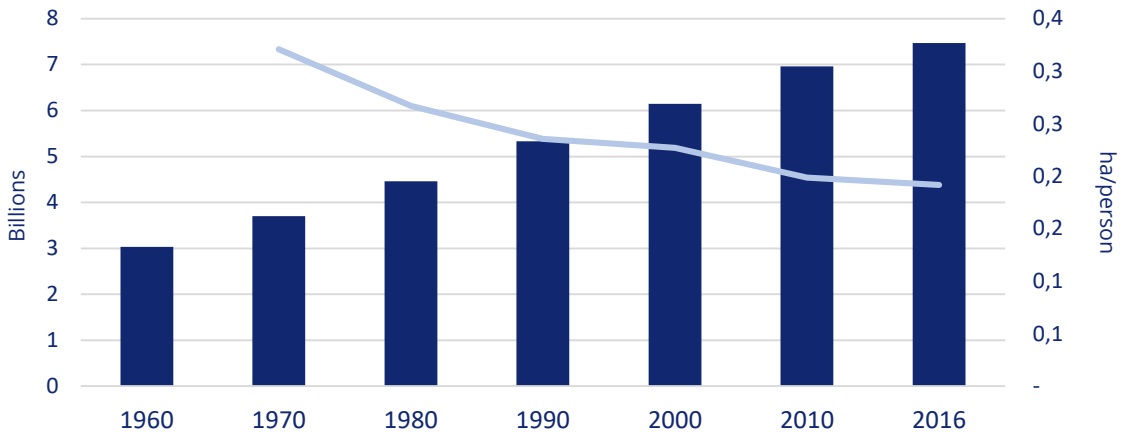


Lighting alone represents 19% of the world's total electricity consumption

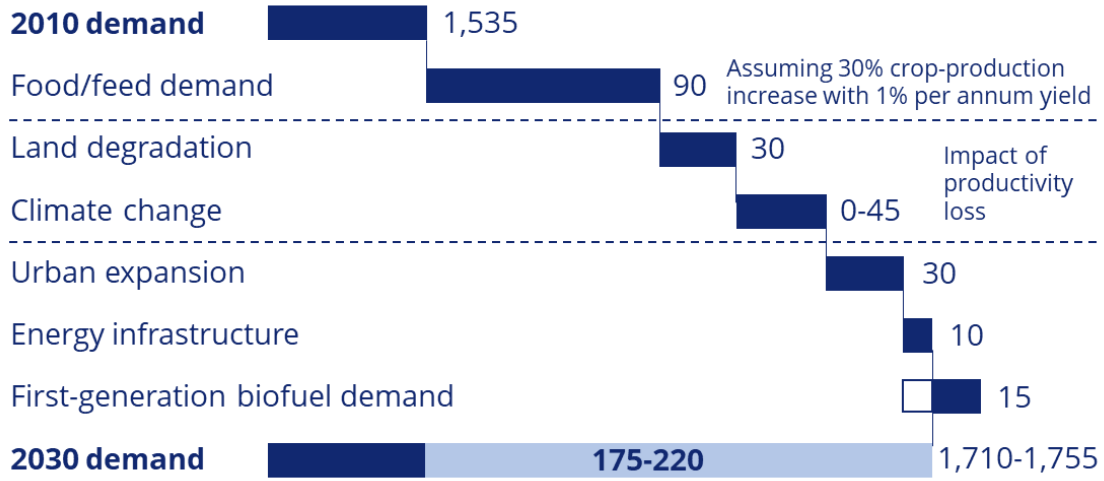

Food Grows Where Water Flows

Agricultural needs of humanity

World population vs. Arable land (hectares per person)



Base-case cropland demand by 2030
Million hectares



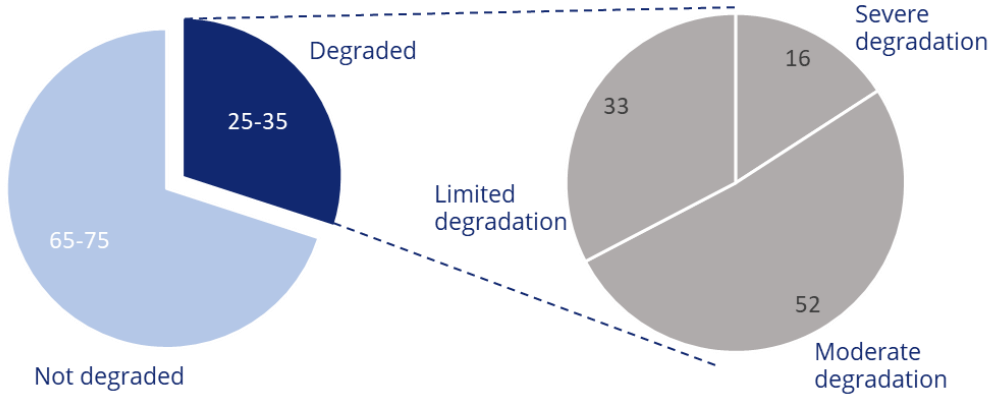
Degradation of land under cultivation
Million hectares, percent

Land under cultivation

100% = 1,5B ha

Degraded land under cultivation

100% = 375M-525M ha



Key facts

- Globally, 5 million to 10 million hectares of arable land are lost each year
- Degradation drivers include
  - Misuse of fertilizers, irrigation and machinery
  - Climate change (e.g., erosion, desertification)

To meet 2030 food, feed, and fuel demand,
175 million to 220 million hectares
of additional cropland (arable land & permanent crops) would be required.

Source: McKinsey, Our Insights, 2012

Food waste during production and distribution

PRODUCTION

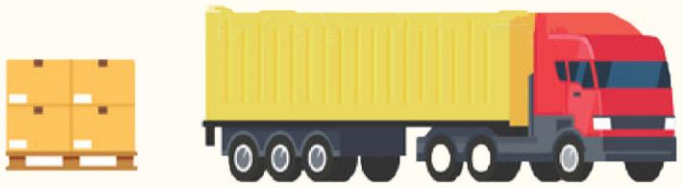
Starting from food waste on the farm, around 10% of food waste occurs, before it gets distributed.

According to a report in 2014 by Value Chain Management International, $31 billion worth of food ends up in landfills or composters each year in Canada.

10%

PACKAGING + DISTRIBUTION

21%



Food manufacturing and processing is responsible for as much as one-fifth of the food wasted across Canada.

What is the solution?

Let there be light!

Light is everywhere

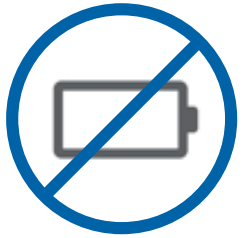
Light and sensors are the backbone of smart

They will
ALWAYS
be necessary
& are already in place

They're
off the floor,
away from harm

Greater line of light
causes
less interference

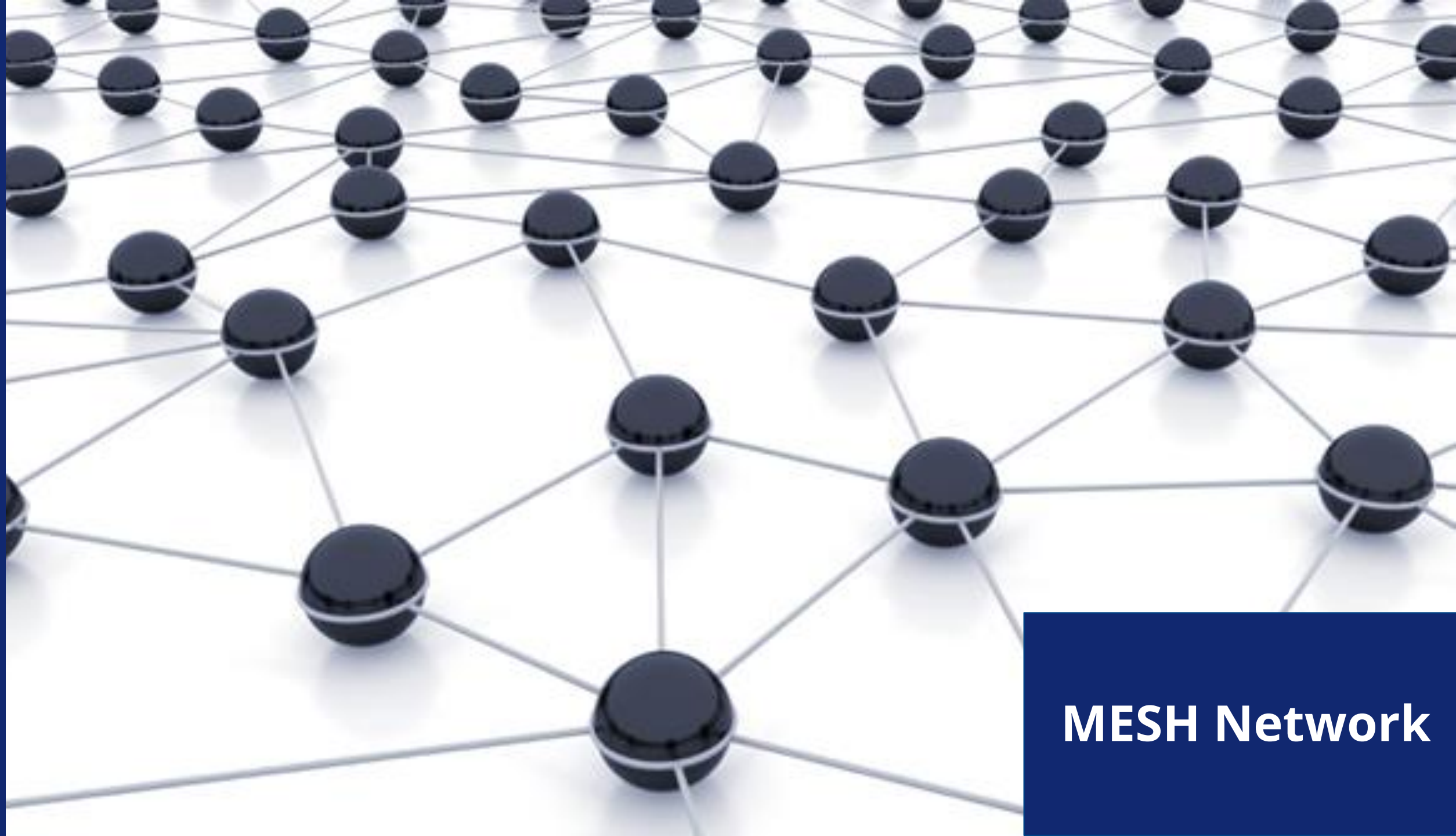
No additional clutter on the ceiling or walls



No battery
maintenance
required

LOWER
complexity & costs
than stand-alone systems

Easiest path
to retrofit existing
properties



MESH Network

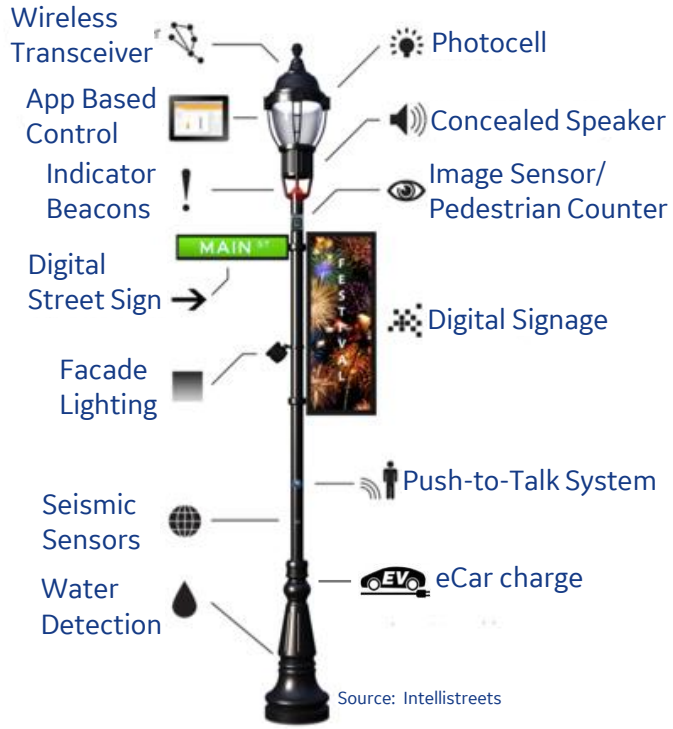
Outdoor capabilities

- Traffic counting
- Atmospheric dust
- City noises
- Ambient light
- Temperature
- Air pressure
- Speed estimation
- Carbon monoxide
- Vibrations
- UV-B radiation
- Humidity
- GPS position
- Panic button

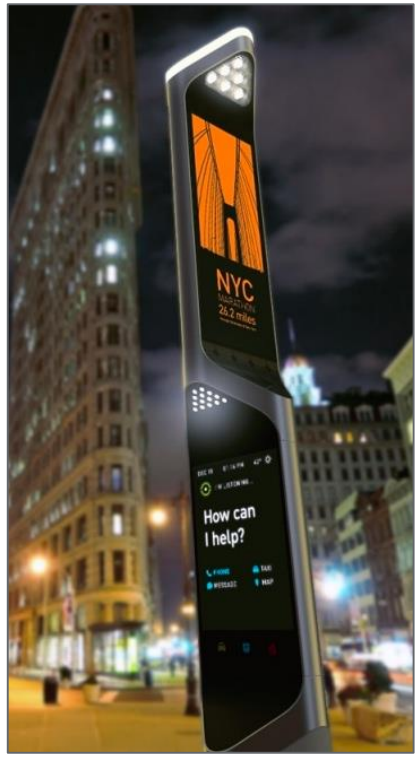
Lighting – The most valuable real estate in the city

Connectivity

Intelligent Lamp post

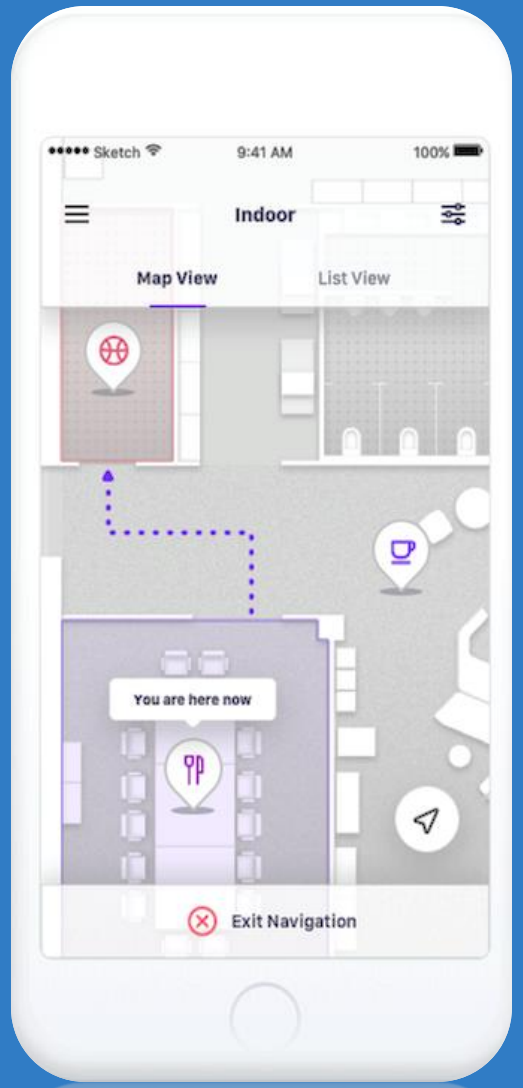


NYC Beacon Project



Open, modular, connected & future safe as smart-ready

Indoor capabilities



RETAIL
Shopping list with route planning
Finding other users
Emergency information
Promotions
Welcome messages
Call shop assistant
Games (e.G.: Treasure hunt)
Product information

OFFICE
Occupancy monitoring
Office usage analytics
Meeting room & workspace booking
Find colleagues
Emergency information
Report damage or accident

MUSEUMS
Welcome message
Tour guidance
Find friends
Electronic ticket
Augmented reality
Marketing interface
Visitor analytics
Emergency information

INDUSTRIAL
Asset, vehicle, people tracking
Process optimization
Location based task lists
Machinery documentation
Incident report
Find people
Emergency information

Plant as a service

Production example:
Lettuce

Vertical farms

6 300+
heads/m²/year

Greenhouse

420
heads/m²/year

Open field

20
heads/m²/year

EU's biggest R&D institute

Tailored customer solutions

Wing-to-wing solutions

Financing solutions

Real-time AI support

Turn-key solution

Various levels of smartness

Non smart

- Lighting only
- Not upgradeable for further energy saving
- No connection for SMART functions

0

Smart ready

- Standardized connections for future extension
- Preset lighting levels for additional energy saving

1

1st level

- CMS
- Connected lighting remote control system

2

2nd level

Smart sensor box:

- Traffic counting
- Speed assumption
- Environmental sensing: air pollution, CO2 concentration, noise, UV– B,
- Temperature, humidity
- Asset management

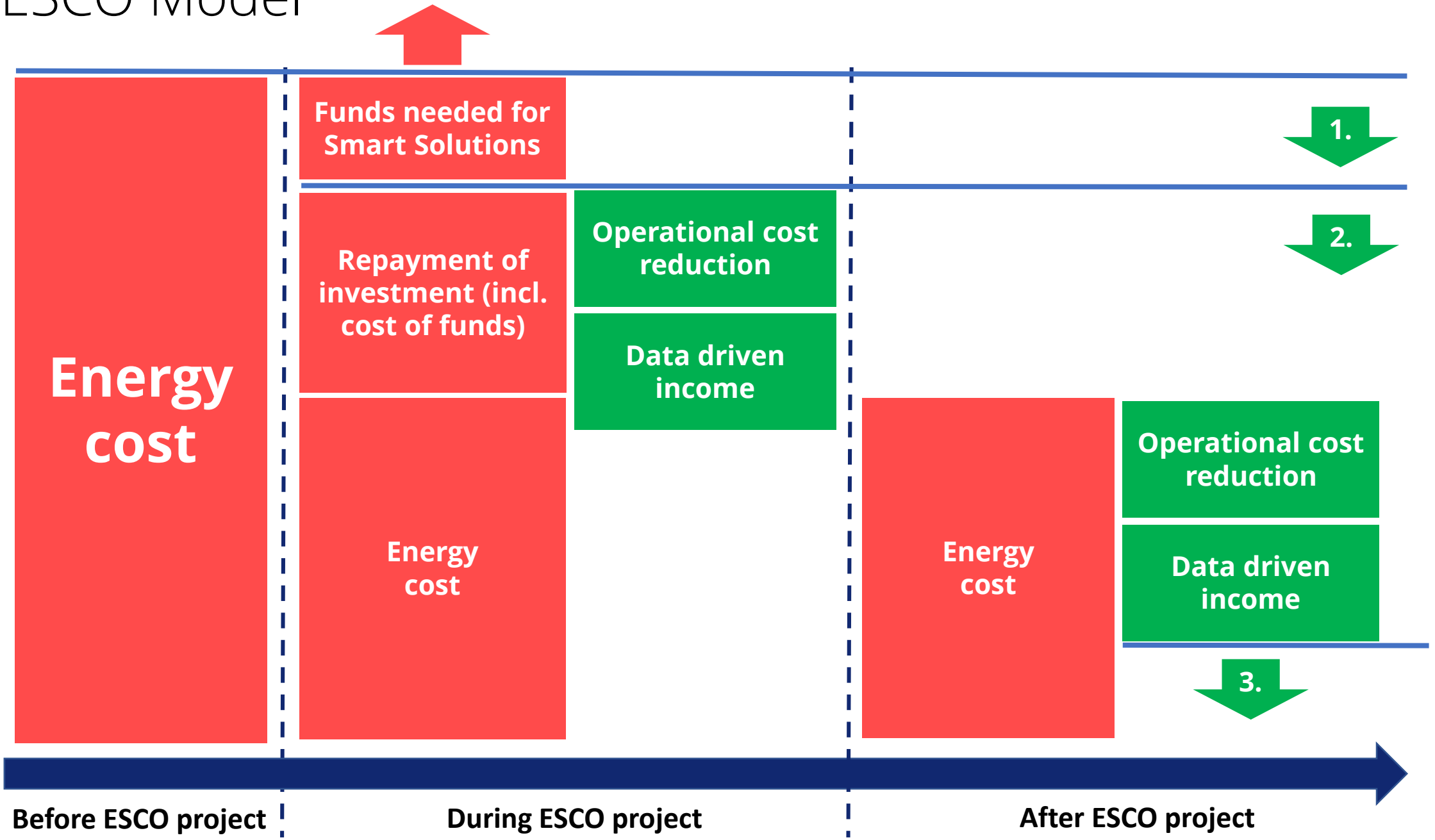
3

Smart City

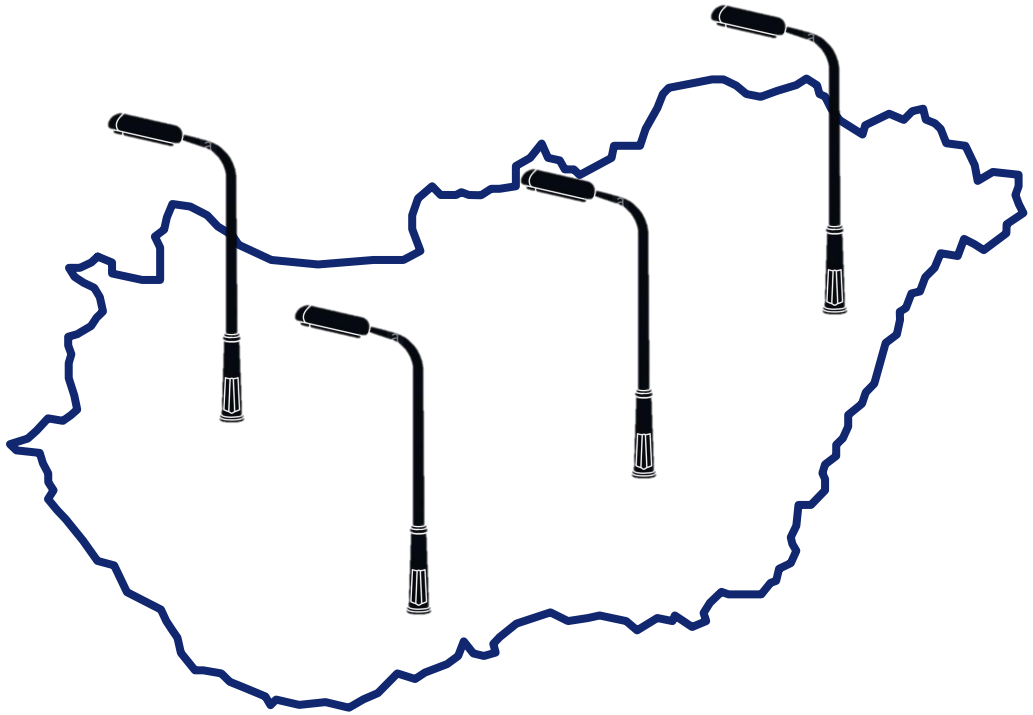
- Smart lighting
- Smart sensor box
- Wifi, 5G
- Traffic monitoring & management
- public transport
- camera system for traffic, parking & safety
- Smart buildings
- Smart platform & analytics
- Digital signage

4

ESCO Model


Energy cost
Funds needed for Smart Solutions
Repayment of investment (incl. cost of funds)
Energy cost
Operational cost reduction
Data driven income
1.
2.
Energy cost
Operational cost reduction
Data driven income
3.
Before ESCO project
During ESCO project
After ESCO project

Energy saving on LED outdoor – funding for E-mobility



274 800 MWh
Yearly energy consumption of HU

109 920 MWh
Yearly energy saving with LED outdoor lighting

~ 55 000
Electric cars to be charged yearly from the saving

4 396 800
Charging cycles covered by energy saving

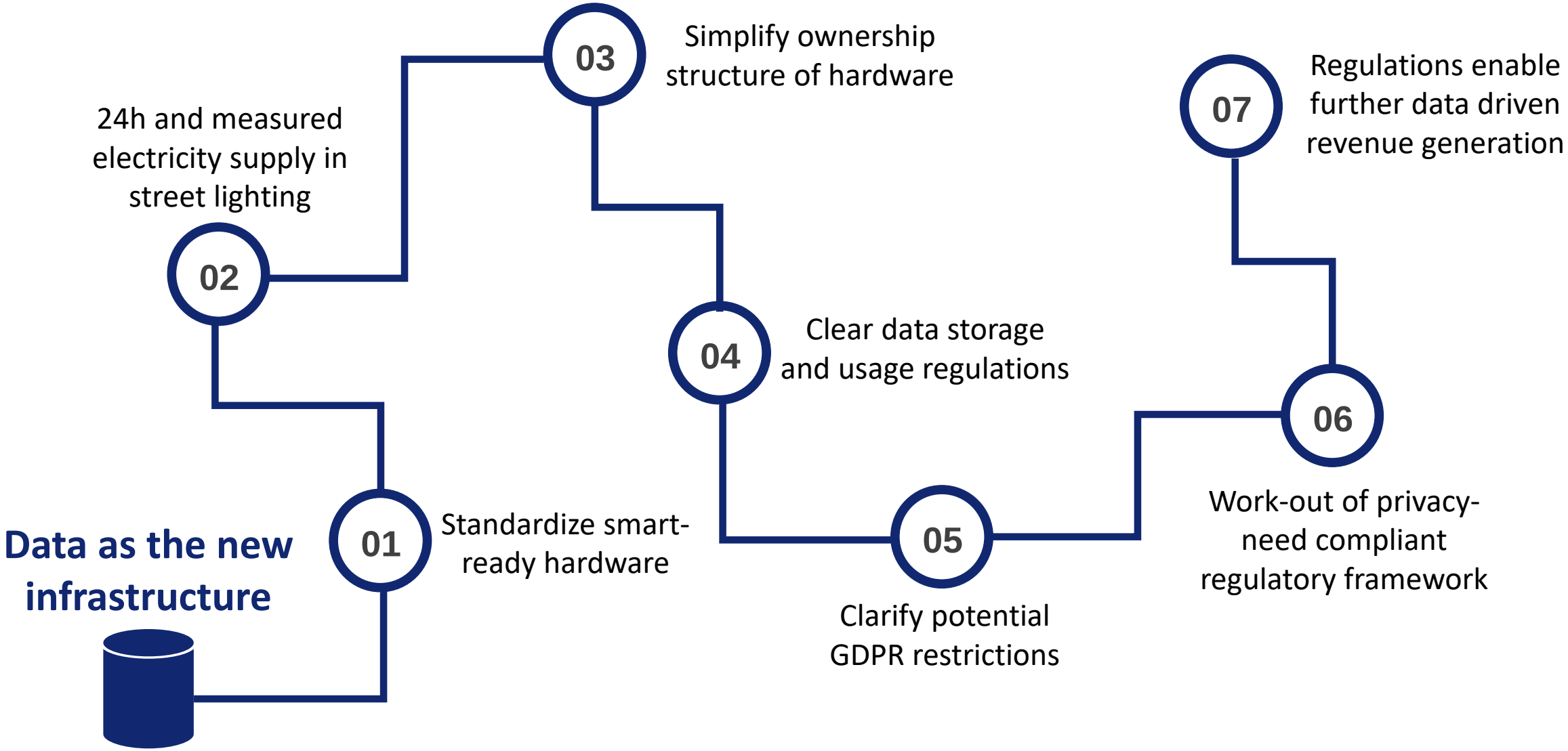
3 641 823
Passenger cars

4 731
Fully electric cars

~1 100 million
kms covered by the energy saving

Further capacity
by relamping of public buildings

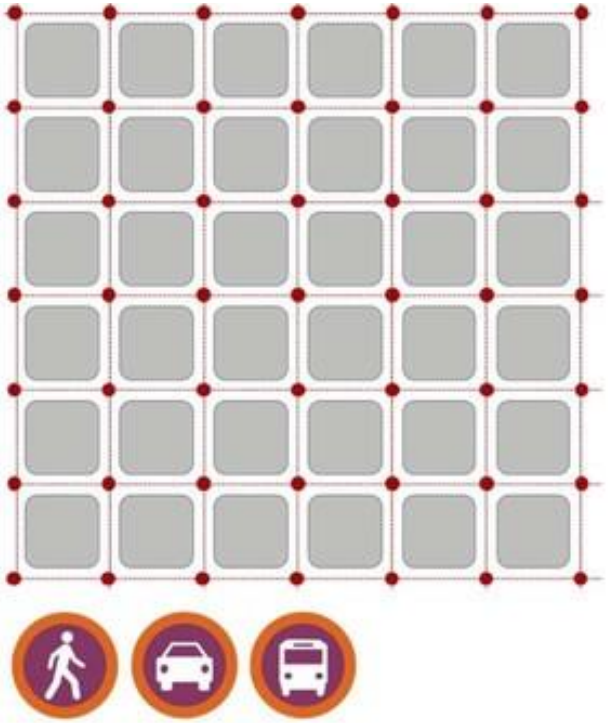
Data privacy – Call for action



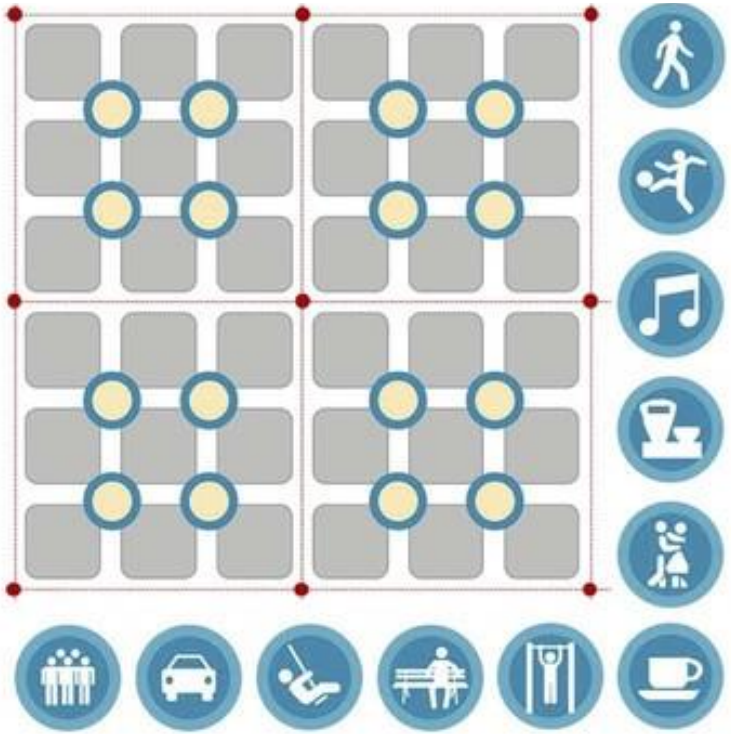
Vision: City Superblocks

Case study of Barcelona

Currently

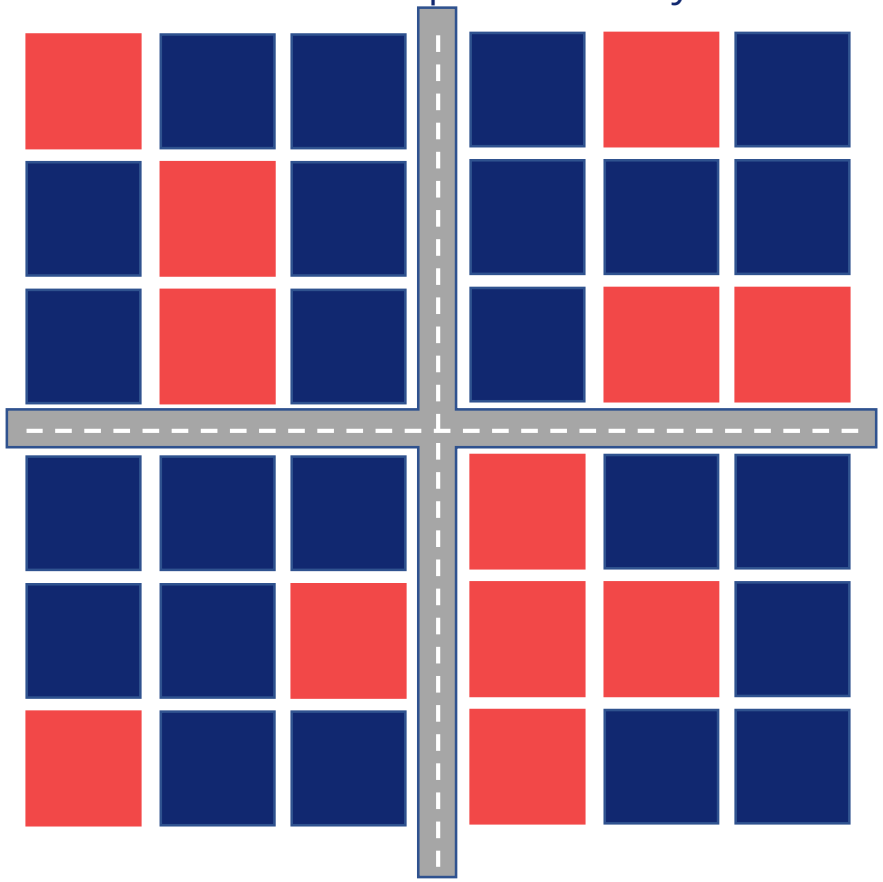


Superblocks



Tungsram Superblocks (Walking distances)

Public transportation only



WASTE & RECYCLING
- Waste Avoidance
- Recycling & Collection
- Circular set up

MOBILITY & TRAFFIC MANAGEMENT
- Individual
- Bicycle & similar
- Public
- Deliveries
- Parking

FOOD
- Maximum local, Indoor Farming
- Aquafarms and similar
- Avoid waste, food for the needy
- Bio Waste collection

COMMERCE
- Shops, Market
- Offices
- Restaurants, hotels

RECREATION
- Sports
- Rehabilitation
- Green areas, parks

EDUCATION
- Schools
- Kindergarten
- Vocational

AIR & ENVIRONMENT
- Monitoring
- Noise reduction
- No pollution
- Clean environment

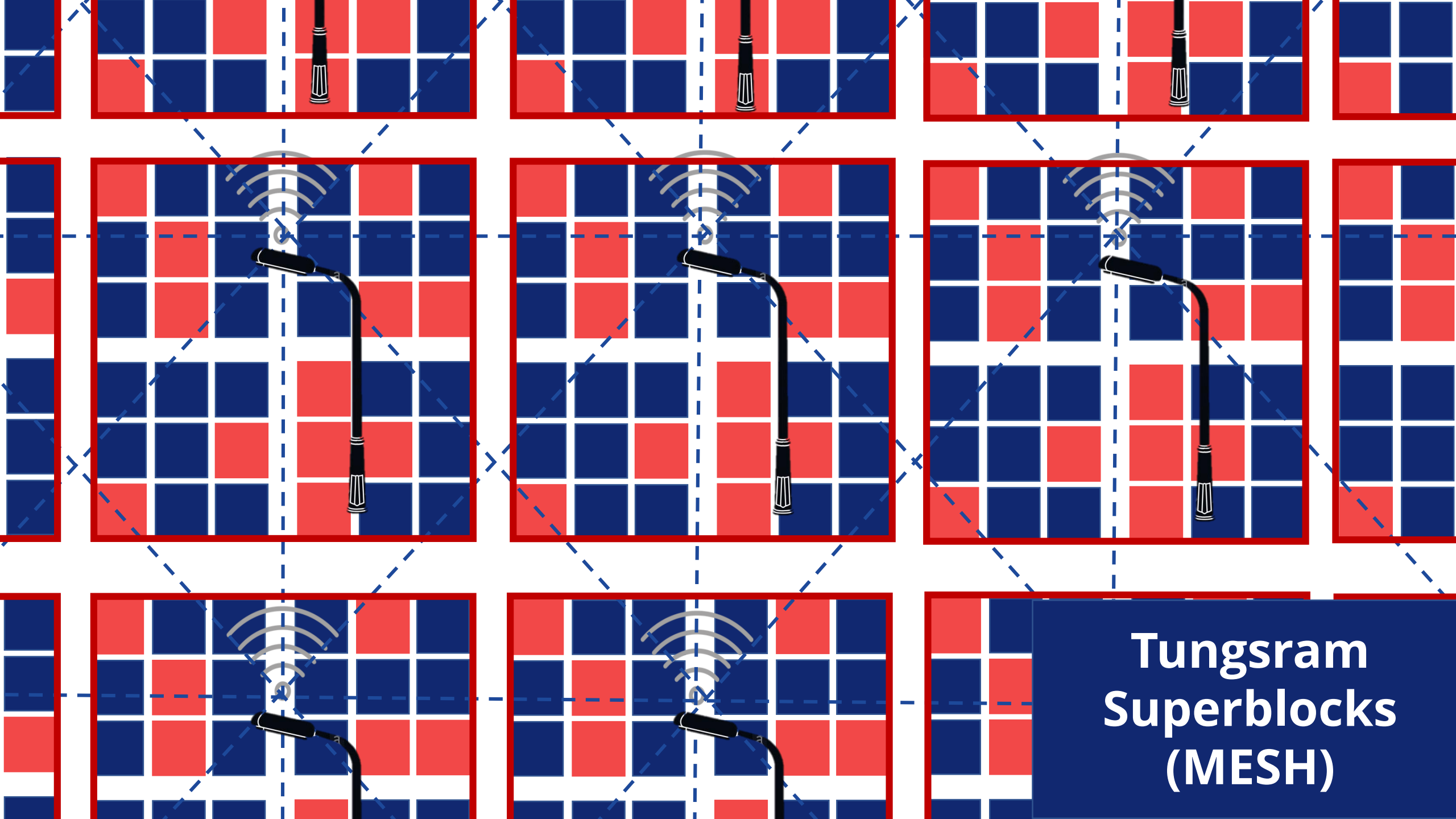
SUPPORT FOR DISABILITY
- Multi Generation environment
- Suitable for disabled
- Full service homes (modular)
- Goal: self-determined life

ENERGY & WATER
- Renewables, like solar
- Combined power
- GRID
- Clean, Waste, Rain, Grey Water
- Chargers
- District heating & cooling

HEALTH
- Primary Care
- Ambulatory
- Screenings

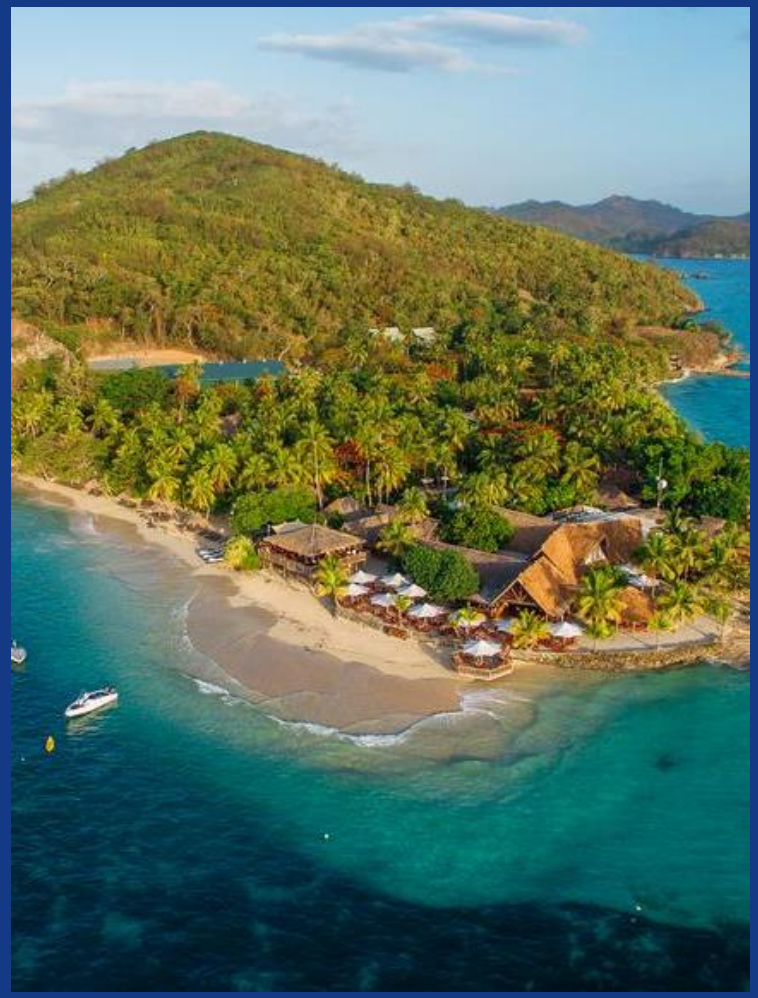
Local
Hungary
Tungsram

Stages of energy efficiency: Person > Flat > Building > T-Block > City > Region


Tungsram
Superblocks
(MESH)

Potential use cases for T-Blocks

Megacity



Island

Off-grid town

Thank you for your attention!

Contact us

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