



*High performance. Delivered.*

## **Intelligent and sustainable cities**

Infrastructures for Eco-cities conference – Shenzhen, November 2010



# Cities are the most suitable platform to start the movement towards a more sustainable future!



## *Importance of cities*

- *Constant migration*
- *Wealth creation*
- *Global competition*
- *Major problems*

More than 50% of the world's population already lives in cities, by 2030 it will be more than 60%, and in 2050 more than 70% of people will live in 'endless cities'

The top 25 cities account for more than half the world's wealth and if the five largest cities in the United States were a single country, it would be the fourth largest economy

Cities compete with each other not only for resources and investments (public and private), but they increasingly compete to attract certain type of residents and visitors

Nearly 70% of CO2 emissions are created in and by cities and their residents demand huge amount of resources and produce huge amounts of waste

## Increasing population pressure, sometimes reinforced by changing climate patterns, is presenting cities with a number of challenges!



### Challenges

- *Security of resources*

How to ensure the secure and sustainable supply of resources for its residents (whether it is energy, water, or food) despite the continuously growing demand?
- *Social inclusivity*

How to provide the first class public services (e.g. healthcare and education), ensure public safety, and provide access to culture, to keep a city attractive to current and potential residents?
- *Mobility*

How to handle increasing demand for transport, facilitate access to public transportation, improve mobility, reduce the time spent in transport, and improve the quality of a journey?
- *Environmental quality*

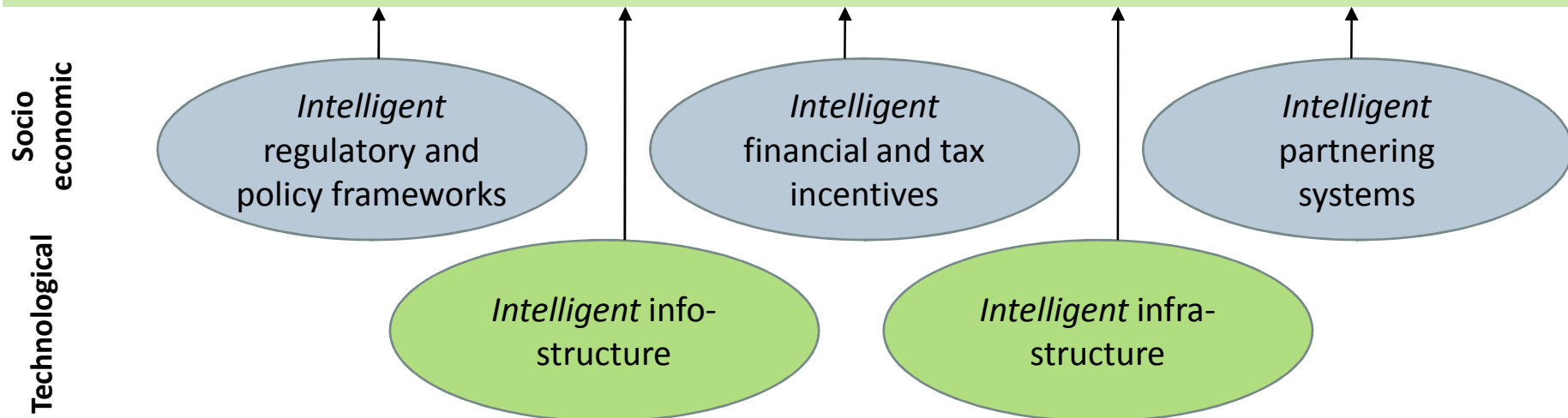
How to reduce traffic and pollutant emissions, improve quality of air and water, reduce and manage large volumes of waste produced by a city, and improve biodiversity?

## A new approach is needed to ensure cities can respond to globalization, urbanization and environmental challenges in a timely fashion!



- Cities need to rethink their strategies and adopt a fully integrated approach to successfully plan, develop and deploy **intelligent** and sustainable solutions
- This approach should drive behavioral change to maximize adoption of new concepts and technologies that will end up improving cities' sustainability and operational efficiency
- The 'intelligence' lets us have the good while minimizing the bad!

Intelligent City – An attractive economic and social environment in which citizens, companies and government sustainably live, work and interact



Key success factors are those elements of the Intelligent City framework that must be in place for the program to begin moving forward and succeed!



### *Key success factors*

- *Visionary leadership and governance*  
Curitiba, Brazil – A people-centered approach focusing on social inclusion, accessibility, public amenities, urban transparency, efficiency and environmental sustainability
- *Specific objectives and timelines*  
New York, USA – Million Trees NYC, a citywide, public-private program with the ambitious goal to plant and care for one million new trees across the City's five boroughs over the next decade
- *Stakeholder alignment and citizen engagement*  
Bilbao, Spain – 25 urban projects geared to kick-start the economy, clean up the environment and improve the quality of life of its people by first focusing on people's esteem
- *New operating and financial models*  
Yokohama, Japan – The Yokohama Green Valley Initiative facilitates collaboration across a large number of technology companies, universities, communities and the city



## To better understand solutions that large cities could deploy, Accenture conducted a thorough analysis of 15 cities in the world!

15 large cities from emerging and developed markets analyzed through multiple criteria: transport, population, and energy

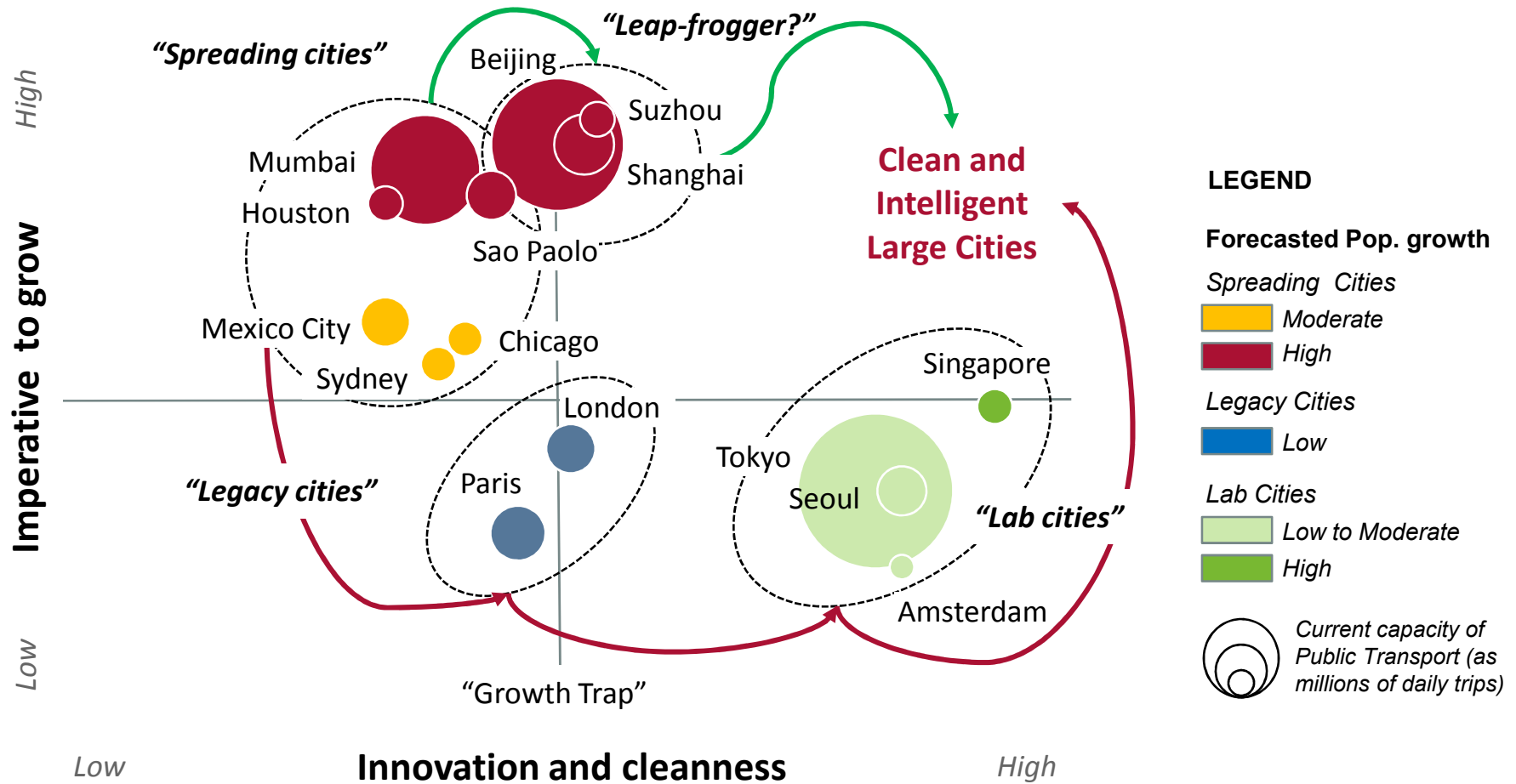


- Budget spent on Transport
- Age of Infrastructure
- Public transport reach & connectivity
- Trips by inhabitants using Public Transports
- Share of Public Transport use
- Share of Private vehicles use
- Share of walking and cycling
- Relative cost of a Public transport journey
- Dominant travel purpose
- Use of Clean vehicles
- Innovative Transport experiences
- Governance model for urban Transport
- Congestion Level

- City size
- City density
- Population Size
- Population Projected Growth by 2020
- # Universities in the global top 500

- CO<sup>2</sup> emissions
- CO<sup>2</sup> emissions targets and timeframe
- Energy mix and targeted mix
- Water consumption
- Energy policy

Meeting the growing demand for urban transports, while ensuring an innovation and clean solutions, is a clear challenge for most of these cities!

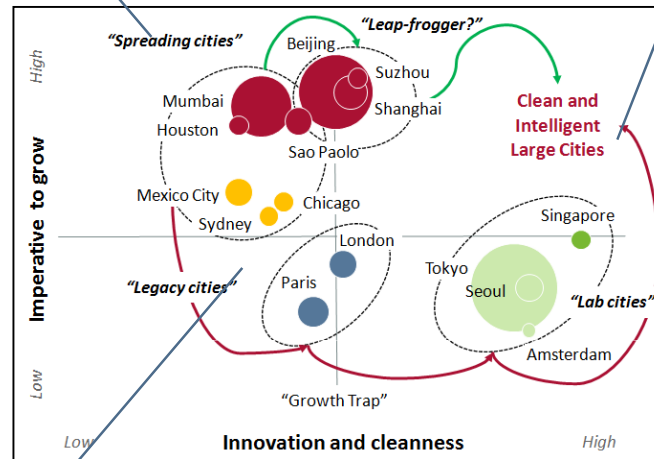




## To resolve this equation Lab cities, Spreading cities and Legacy cities have different priorities on their agenda!

### “Spreading cities”

- Limited public transport infrastructure
- Emphasis is put on **large new PT infrastructure plans**, but in emerging countries financial constraints may be an issue
- Key initiatives should combine quick wins and long-term investments to enable leap-frogging



### “Lab cities”

- Existing comprehensive and modern Public Transport systems
- Emphasis is now on **creating the “next generation” of systems and becoming “greener”**
- Key initiatives should focus on efficiency, quality, and increased multi-modality

### “Legacy cities”

- Existing comprehensive but often ageing public transport systems in the city centers. Private cars are still used heavily.
- Emphasis is put **on improving multi-modality and integrating the suburbs in the overall system.**
- Key initiatives should focus on improving the efficiency of existing infrastructures, and especially governance models. Large infrastructure investments can also be needed.



**European Union (2020)**

- 20% CO<sub>2</sub> reduction (1990 based)
- 20% energy reduction
- 20% sustainable energy



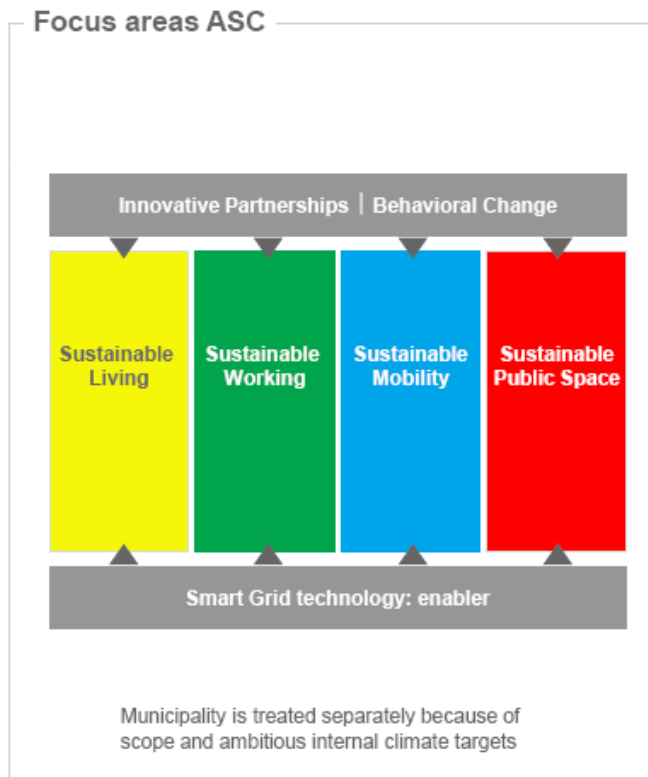
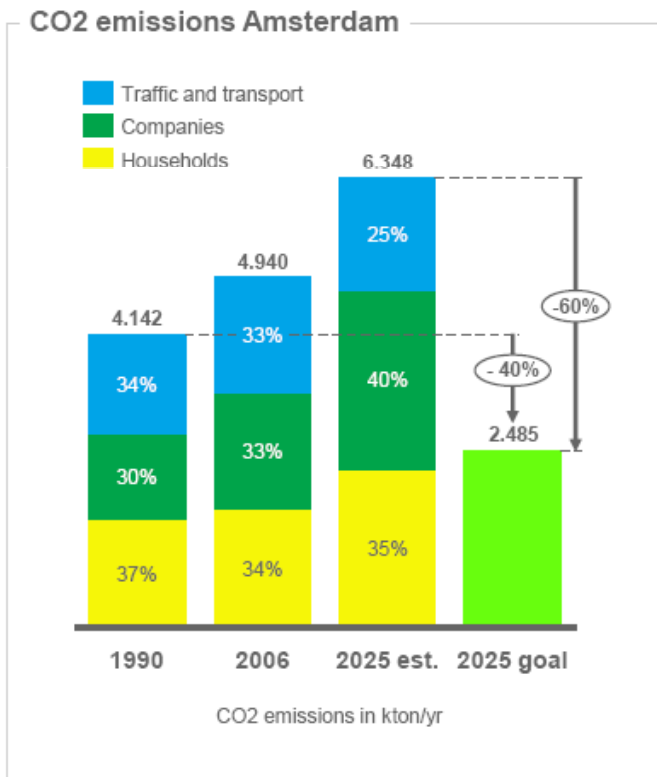
**The Netherlands (2020)**

- 30% CO<sub>2</sub> reduction (1990 based)
- Energy reduction of 2% per year
- 20% sustainable energy

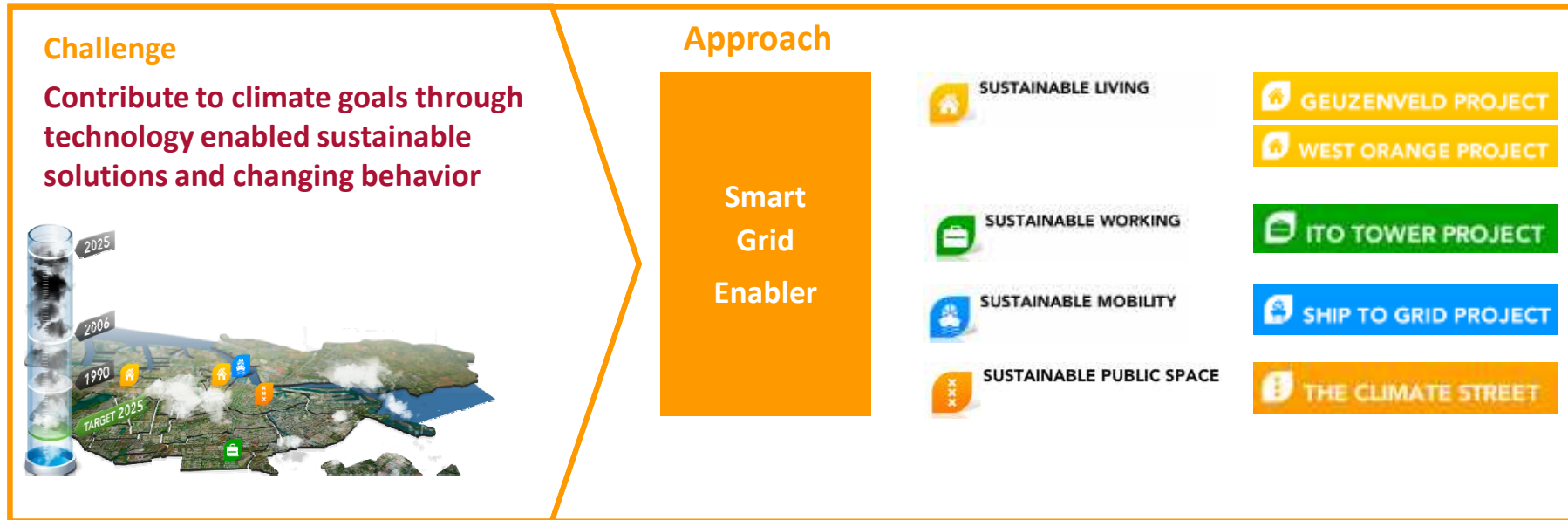


**Amsterdam (2025)**

- 40% CO<sub>2</sub> reduction (1990 base)
- 20% sustainable energy
- Municipal organization climate neutral before 2015



Accenture have been engaged as a Strategic partner to deliver the vision, roadmap and program management



**Current Status**

- Several pilots start Q1 2009
- Initiation of ‘Global Smart City Network’
- Over 16 partners engaged



**Applied Technologies**

- Smart meters
- Energy displays
- Energy advice
- Smart (LED) lighting
- Electric vehicles
- Recharging stations
- New logistics solutions
- Etc.

**Results**

Amsterdam Smart City contributes to Amsterdam’s climate goals in an economically sustainable way by enabling its partners to apply innovative technologies and stimulate behavioral change with end users in the program’s sustainability projects:

“Smart projects that can change the world. We test them first in Amsterdam”



## Smart meters and energy displays



### Challenge

40% CO<sub>2</sub> reduction in 2025.

### Concept

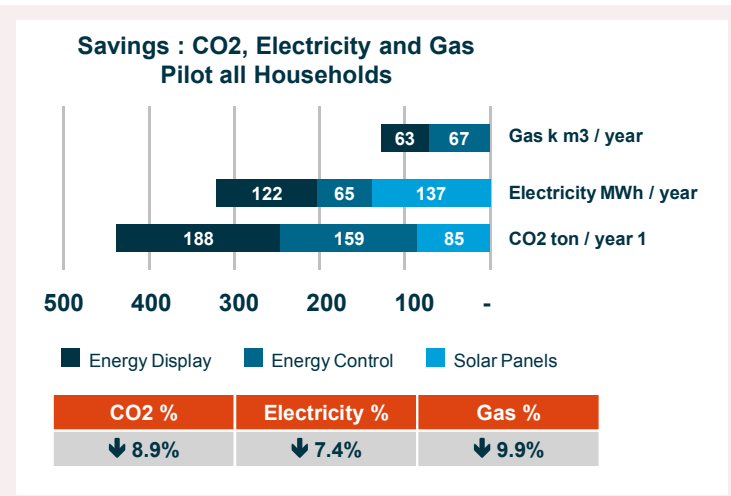
Smart meters and an energy feedback display will be installed in more than 700 homes. During the one year period the behavioral changes and corresponding energy savings will be monitored.

### Approach

- Smart meters that measure the energy usage and that can be connected to appliances that help to save energy
- An energy display that gives feedback about energy usage and personal savings advice based on the information of the smart meter
- The possibility to acquire energy saving tools (“Energy Control”)
- Stimulate behavioral change for example an online platform
- Monitor and report on behavioral change and energy savings



### Results





## West Orange project



### Challenge

40% CO<sub>2</sub> reduction in 2025.

### Concept

500 Ymere / FarWest houses are equipped with an In-home Energy Feedback and Residential Energy Management. During the one year period the usage of appliances and the savings will be monitored.



### Approach

- Energy display: touch screen display that gives real-time feedback. Inhabitants can set personal saving targets
- E-wizard: shows the energy usage of appliances in the house
- Online Thermostat: combines the easy installation of the thermostat (via internet) with advice how the thermostat can be set energy efficient. The thermostat can be set remotely. Expected gas savings 15%
- NuOn Off: helps inhabitants by switching off all appliances at once. This saves a lot of (stand-by) usage.

### Results

- The overall expected results by using innovative IT solutions are : 14% energy savings and 13% CO2 reduction.
- Scientifically significant proof of positive client attitude and energy savings potential
- Proof of economic value and value for a society as a whole



## Climate Street



SUSTAINABLE PUBLIC SPACE

### Challenge

40% CO<sub>2</sub> reduction in 2025.

### Concept

Holistic concept for shopping streets, targeting all aspects: hardware in the public space, logistics in the street and the interiors of shop/bar/restaurant owners and people living there.



### Approach

- New sustainable street/facade lighting
- Tram stops and billboards are replaced by more sustainable versions, the required power for displays & light is generated by solar panels
- Garbage bins with built in solar-powered garbage press reduce the empty frequency by 5 times! Saving fuel, money and congestion
- Goods of various freighters are delivered at a central location outside the city centre and forwarded (bundled) with electric vehicles; as they leave the street they collect the waste in new clean waste 'boxes'

### Results

- Participation rate of more than 80% for smart meters and displays
- Participation rate of more than 90% for the electric garbage collection
- Participation of more than 30 entrepreneurs in the sustainable logistics
- Next to the participation rates there are numerous learning goals, like insight in the behavior and energy usage of entrepreneurs



## Ship to Grid



SUSTAINABLE MOBILITY

### Challenge

40% CO<sub>2</sub> reduction in 2025.

### Concept

In the port of Amsterdam 73 shore power connections with 154 outlets for inland cargo vessels and river cruisers. This way ships can be connected to the grid and avoid using polluting diesel generators.

### Approach

Charging terminals with payment by phone: Shore power is available through shore power units on the quays with a telephonic payment system. The skipper can activate the connection by dialing in his personal code with his mobile phone. By disconnecting the hardware or signing out by telephone, the connection is closed and the payment automatically transferred from the vessels account. By transmitting only electricity that is generated by renewable energy, the overall CO<sub>2</sub> impact is minimized.



### Results





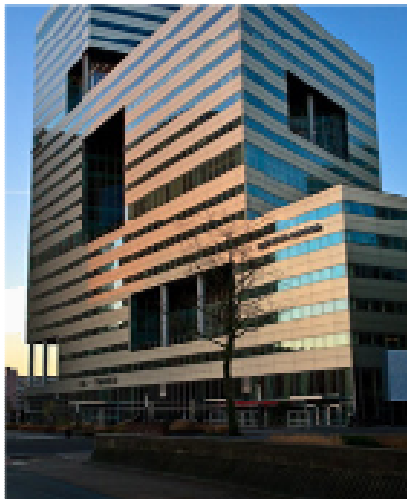
## ITO Tower

### Challenge

40% CO<sub>2</sub> reduction in 2025.

### Concept

The Project ITO-tower focuses on sustainable housing of companies.



### Approach

The so-called Smart Building concept is aimed to minimize the energy use while at the same time making sure that the usage and comfort in the building are not negatively influenced.

The Smart Building concept is a sensor driven total solution, based on detailed data analysis of the energy consumption in a building.

In Smart Building lighting, heating, cooling and safety management system in a building will be installed and directed as energy efficient as possible.

### Results

#### Estimated savings

Electricity Consumption	10-20% (850-950 KWH ~€40k)
Carbon Savings	300-500 tons/year
Payback Period	1.5-2 years
Maintenance Cost Reduction	5-10%

