

A hazy, teal-tinted photograph of a city skyline reflected in water. In the foreground, several traditional wooden boats are visible on the water. The city buildings in the background are silhouetted against a light, hazy sky. The overall mood is serene and modern.

SMART CITIES - SETTING THE SCENE

LEEN GOVAERTS - UNIT MANAGER SMART ENERGY & BUILT
ENVIRONMENT

BICCI SEMINAR, MARCH '16, LEUVEN

VITO AREAS OF EXPERTISE

*WE ACCELERATE THE TRANSITION TO A SUSTAINABLE WORLD.
SUSTAINABLE ENERGY SUPPLY, (RE)USE OF RAW MATERIALS, FOOD SECURITY, AND QUALITY OF LIFE:
VITO HAS THE RIGHT EXPERTISE TO TACKLE THESE GLOBAL SOCIAL CHALLENGES.*

Energy



Materials



Chemistry



Health



Land use



VITO IN NUMBERS



- » 750 employees
- » 26 nationalities



- » More than 400 patents worldwide



- » HQ in Mol, België.
- » Subsidiaries in Qatar, China



- » 200 scientific articles in 2014



- » 5 research themes



- » 150 mio € turnover in 2015



- » More than 500 research partners

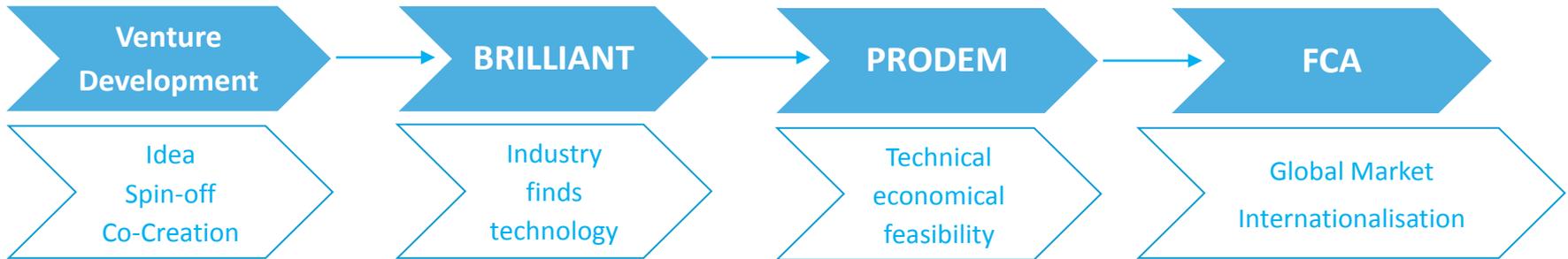


- » 200 industry partner contacts / year



- » Strategic Research Organisation led by Flemish Government
- » Governments at all levels (Flanders, Federal, EU, global) as stakeholder, partner and customer
- » Flemish Government is 100% shareholder of VITO

VITO - TOTAL LIFE CYCLE OFFER TO INDUSTRY



ENERGYVILLE - RESEARCH CLUSTER ON ENERGY & SMART CITIES



Thor Park, 250 researchers and 100 PhD's working on sustainable energy & smart cities



KU LEUVEN

vito

imec

 EnergyVille

 vito



**WE ACCELERATE THE ENERGY TRANSITION
FOR A SUSTAINABLE URBAN ENVIRONMENT**

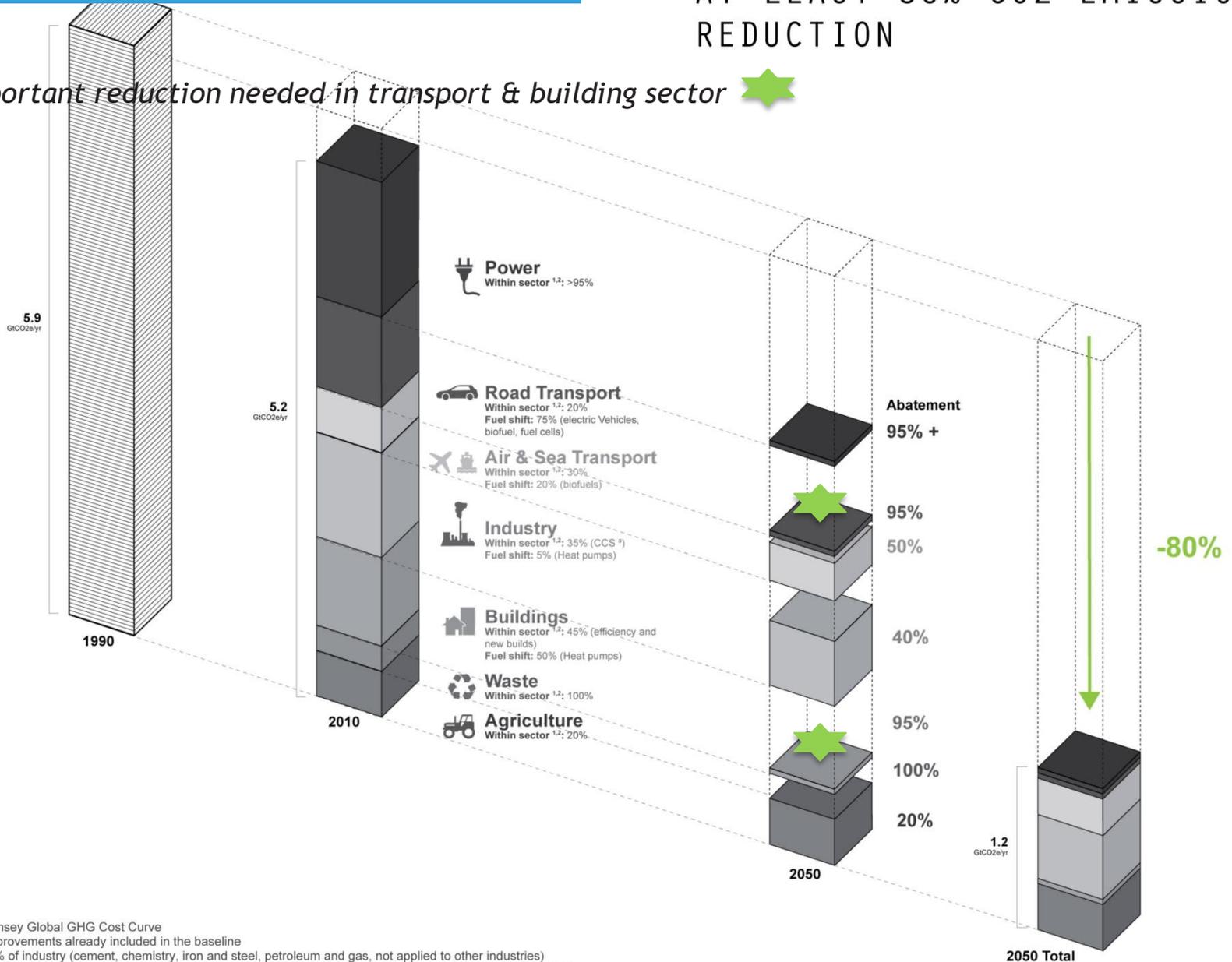
SMART ENERGY TECHNOLOGY, ENERGY STRATEGIES,
SUSTAINABLE URBAN DEVELOPMENT



STARTING POINT

AT LEAST 80% CO2 EMISSION REDUCTION

Important reduction needed in transport & building sector 



1 Based on the McKinsey Global GHG Cost Curve

2 Large efficiency improvements already included in the baseline

3 CCS applied to 50% of industry (cement, chemistry, iron and steel, petroleum and gas, not applied to other industries)

SOURCE: McKinsey Global GHG Abatement Cost Curve; IEA WEO 2006; US EPA; IEA; Decarbon 2050 Technical Analysis

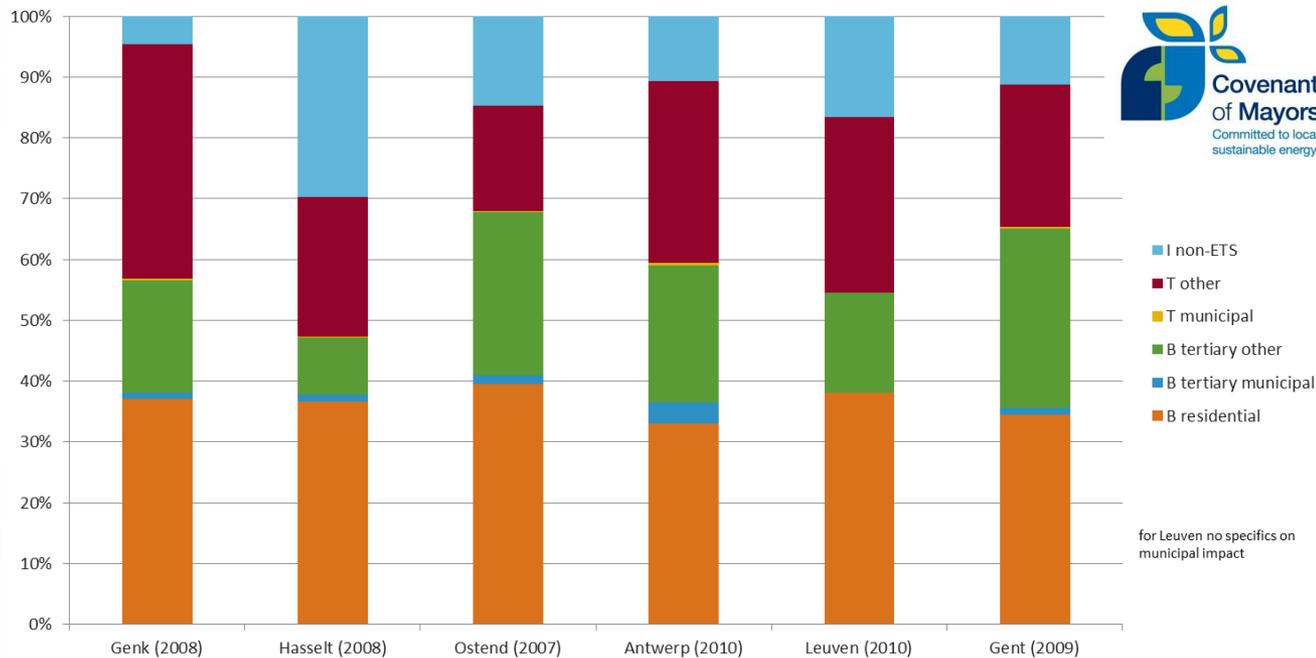
URBAN GREENHOUSE GAS MITIGATION STRATEGIES

Built environment: typically 40-60 % of emissions

Transport and mobility : typically 15-30 % of emissions

Industry and energy production : share strongly dependent on local context

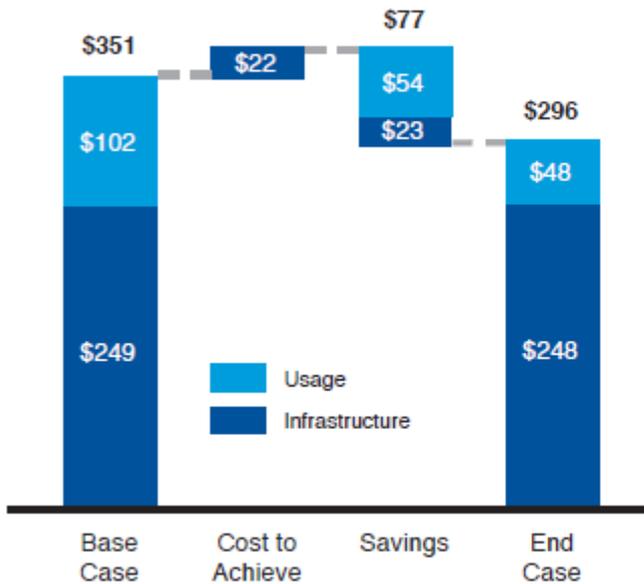
Urban greening : cooling effect of 4 to 10% in temperature decrease



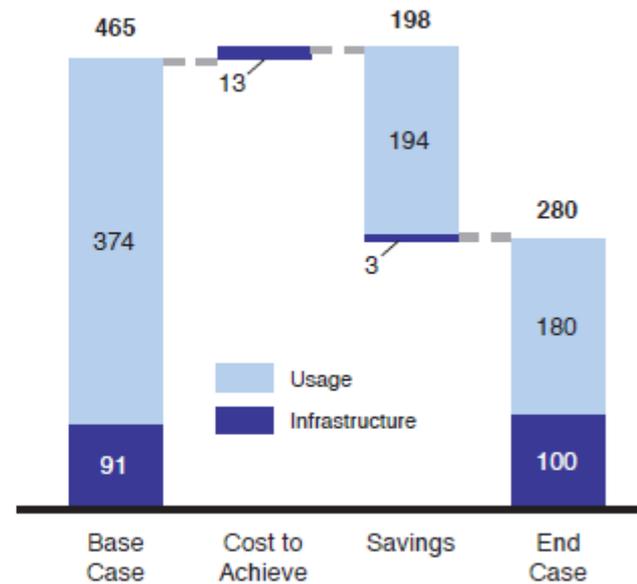
INVESTMENT NEEDS

Next 30y, about \$350 trillion will be invested in global urban infrastructure. Extra investment of \$22 trillion (6%) for zero-carbon infrastructure will result in savings of \$55 trillion and emissions reduction by more than 50%. The largest impacts are made in small but fastest-growing cities and developing nations.

30-Year Cumulative Urban Expenditure
(Aggressive Case, in Constant US\$ Trillions, Year 2000)



30-Year Cumulative Urban Emissions
(Aggressive Case, in Gigatons CO₂)



Note: Totals may not be exact due to rounding.
Source: Booz & Company analysis

EUROPE SMART CITY PROGRAMME



2 Meet our Partners

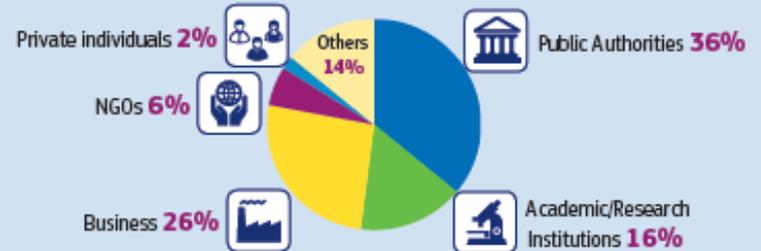
In 2014, **370 commitments** around smart city projects & solutions were submitted by more than **3 000 partners**.

The lead organisations come from **31 countries**.



■ high/ ■ medium/ ■ low participation

Classification of lead organisations



3 Some of the areas we are working on



Urban Mobility



Open Data



Business Models



Finance & Procurement



Policy & Regulation



Metrics & Performance Indicators



Integrated Energy, Transport & Communication Networks



Energy Efficiency & Low carbon Solutions

SUSTAINABLE CITIES

Green, low carbon economy
80 to 95% emission reduction by 2050
Able to adapt
resilience, citizen centred approach
High quality of living for all
Good air quality & urban climate, social justice
Strong economy
Providing efficient urban services, resource efficient



SUSTAINABILITY IS THE GOAL, SMARTNESS A WAY TO GET THERE

Attractive, Adaptive, Intelligent, Effective
Integrated approach, Efficient

Generally with a focus on energy, GHG and ICT layer

Technological solutions, policy instruments, behavioral
changes, new business concepts, integrated solutions

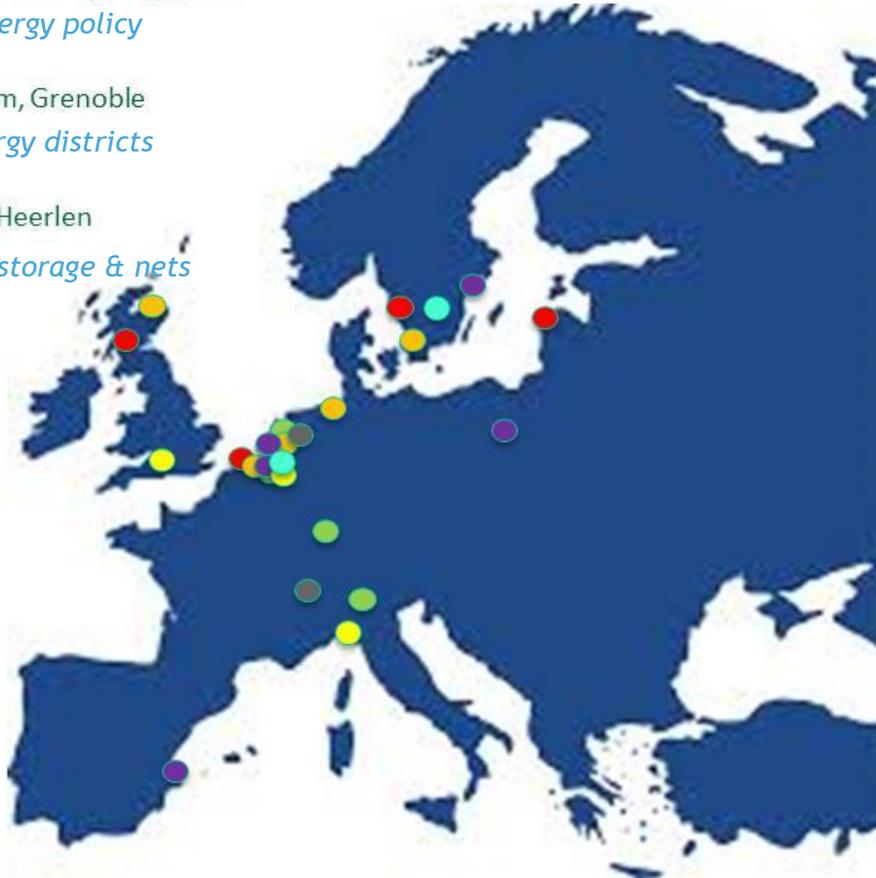
<http://www.eera-set.eu/>



EUROPEAN SMART CITY PROGRAMME - LIVING LABS AS A PROOF OF CONCEPT

Testing our technologies, concepts and business models

-  Glasgow, Göteborg, Riga, Gent
Urban energy policy
-  Amsterdam, Grenoble
Zero energy districts
-  Vaxjö (S), Heerlen
Thermal storage & nets



-  Antwerp, Aberdeen, Malmö, Hamburg, Zaanstad, A'dam
Energy efficient harbour districts
-  Antwerp, Stockholm, Valencia, Rotterdam, Warsaw
Urban sustainability
-  Leuven, Freiburg, Houthaven, Bergamo, Dalian (China)
Urban energy hubs
-  Hasselt, Savona (I), Ebbw Vale (Wales)
Retrofit strategies

OPTIMAL INTEGRATION OF RENEWABLE ENERGY SOURCES

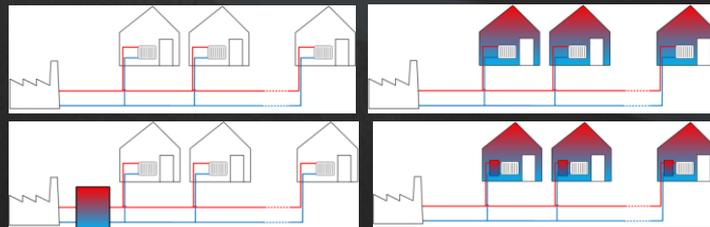
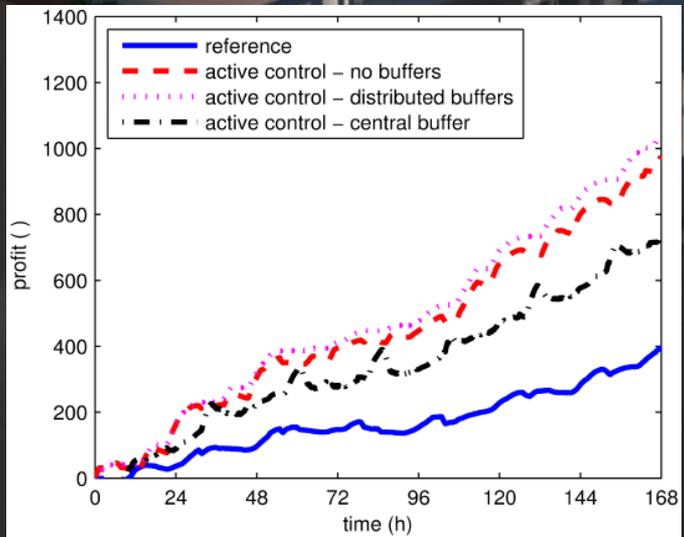


Macro - Meso - Micro and their integration in urban and spatial planning



SMART MULTI-ENERGY SYSTEMS

Smart exchange between electrical and thermal systems: maximization of the profit of a cogeneration unit with centralised and decentralised thermal energy storage



New project

Return to previous page

Project details

Project ID

TBC

Gross area

m²

Latitude

25.2916097

Longitude

51.530436799999996

Project name

Certified area

m²

Description

Car park area

m²

Construction year

Project plot area

m²

Address

Location plan

Bestand kiezen Geen bestand gekozen

Location

Site plan

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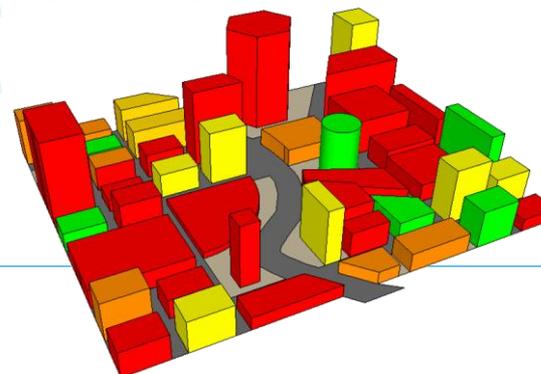
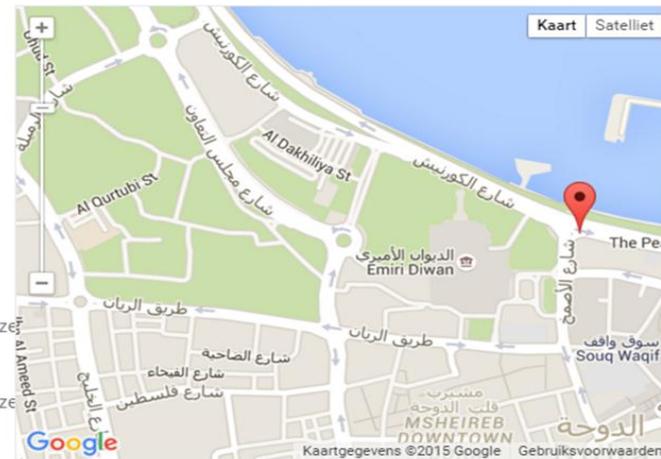
Country

Design brief

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Project narrative

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SMART CITIES - AMSTERDAM & GRENOBLE



The Project



Aims to develop and demonstrate Zero Energy Cities with a centrale role for citizens. 23 partners are working together to achieve a future-proof grid, innovative heat and cold solutions and energy efficient buildings.



Our Activities

-  building retrofitting
-  heating and cooling
-  smart grids
-  monitoring
-  integrated issues
-  societal issues



Expected Impacts

22 innovations in Grenoble & Amsterdam

59,000 tonnes per year CO₂ savings

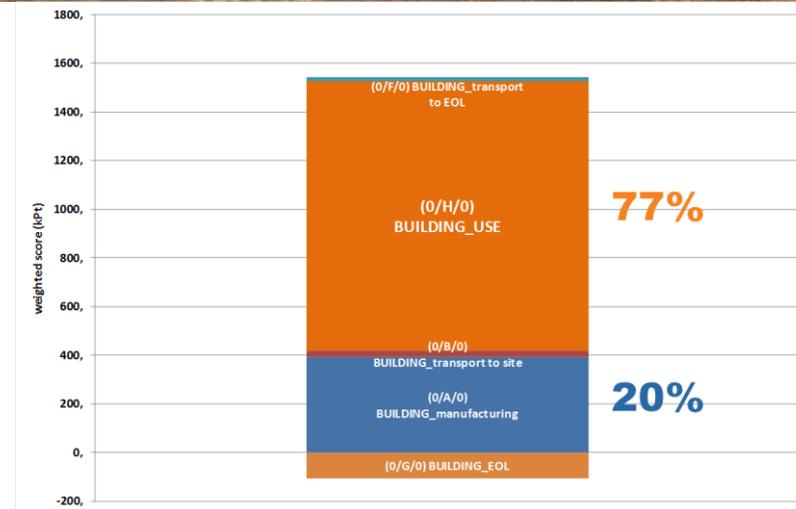
90,000 m² renovated residential buildings

10,000 connected dwellings with a Smart Grid

MORE THEN ENERGY...

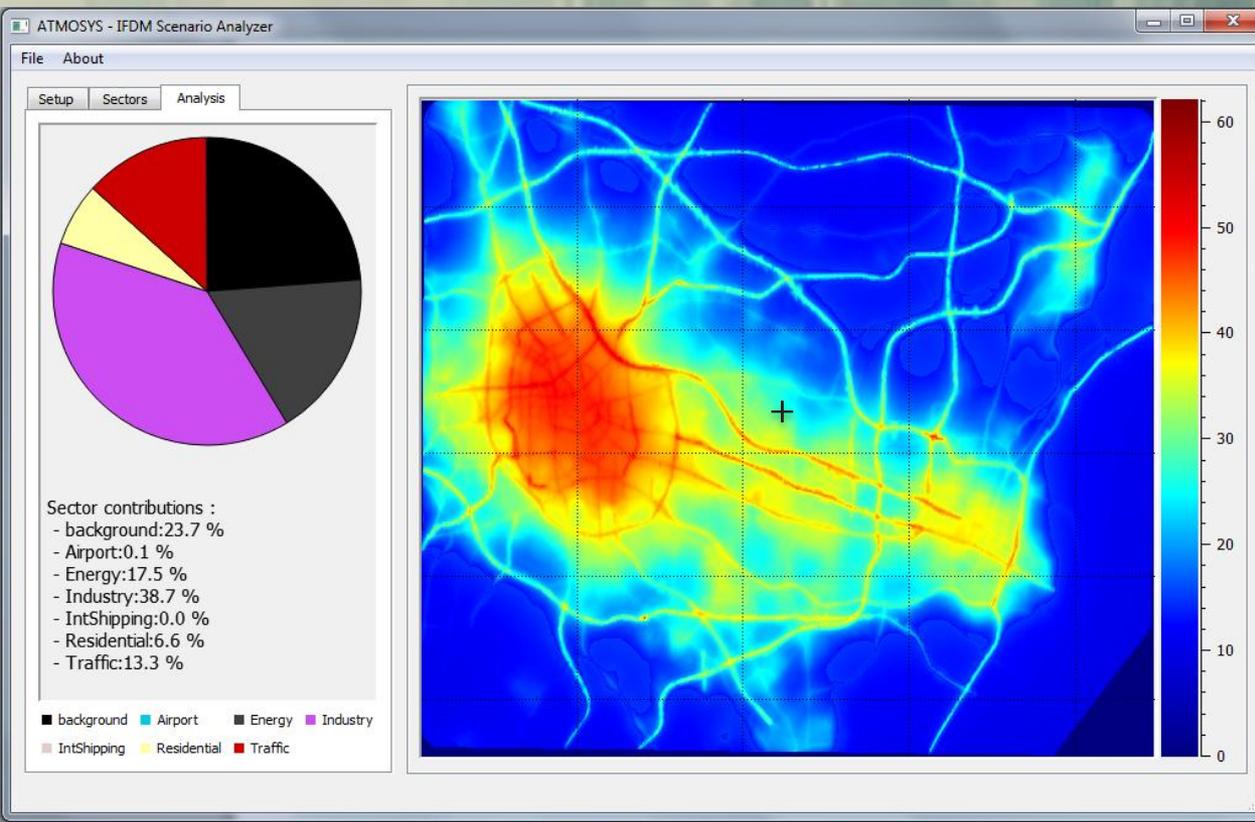
Sustainable use of materials

- » More than 50% van of all materials excavated on earth are used in construction
- » Construction and demolition waste about 31% of the total waste production in the EU
- » Material use accounts for 20% of environmental impact during total life cycle, and this is increasing through more use of insulation materials



URBAN ENVIRONMENT

Air quality
Urban Climate



SUSTAINABLE DISTRICTS

Integrated decision support tools on sustainable urban development

IDSS Dashboard

Analyse problem ▾ Collect data ▾ **As is** To be Develop alternatives Assess alternatives Compare alternatives

Blanca ▾

Sustainable Urban Renovation of Campanar ▾ Last saved: 12:15:10 ▾

As is situation

KPI list Map

As is ▾

ENERGY - Total Final Energy Consumption (per m2) in kWh / m² ▾

Previous Next

IDSS Dashboard

Analyse problem ▾ Collect data ▾ As is To be Develop alternatives Assess alternatives

Sustainable Urban Renovation of Campanar ▾

Send data to MCMSMV module

Compare alternatives

Show scores Show kpi values

Stakeholder filter

Alternative filter

KPI filter

- Biotope area factor
- Change of global
- ENERGY - Final E
- ENERGY - Percen
- ENERGY - Total F
- Green Area per C
- Proximity of the p
- Thermal Stress W
- Thermal Stress in

0 50

KPI List

KPI name	Stakeholder	KPI
1. Conservative Scenario		
Biotope area factor	Architects & Engineers	3
Biotope area factor	Facilitator	3
Biotope area factor	Ayuntamiento Valencia	3
Biotope area factor	Municipality of Valencia	3

INDIAN SMART CITY CHALLENGE



Provide basic infrastructure to all citizens,

Use 'smart' solutions to make infrastructure and services better,

- Quality of life
- Clean and sustainable environment

STRATEGIES

FORMULATION OF AREA BASED DEVELOPMENT PLANS

1

Retrofitting

Develop existing built area **greater than 500 acres (250 acres)**



2

Redevelopment

Replace existing built environment in an area of **more than 50 acres (25 acres)** and enable co-creation of a new layout, especially enhanced infrastructure, mixed land use and increased density



3

Greenfield

Develop a previously vacant area of **more than 250 acres (125 acres)** using innovative planning, plan financing and plan implementation tools with provision for affordable housing, especially for the poor

STRATEGIES

PAN CITY SMART INITIATIVES

E-Governance and Citizen Services



- 1 Public Information, Grievance Redressal
- 2 Electronic Service Delivery
- 3 Citizen Engagement
- 4 Citizens - City's Eyes and Ears
- 5 Video Crime Monitoring

Waste Management



- 6 Waste to Energy & fuel
- 7 Waste to Compost
- 8 Waste Water to be Treated
- 9 Recycling and Reduction of C&D Waste

Water Management



- 10 Smart Meters & Management
- 11 Leakage Identification, Preventive Maint.
- 12 Water Quality Monitoring



Energy Management



- 13 Smart Meters & Management
- 14 Renewable Sources of Energy
- 15 Energy Efficient & Green Buildings

Urban Mobility



- 16 Smart Parking
- 17 Intelligent Traffic Management
- 18 Integrated Multi-Modal Transport

Others



- 19 Tele-Medicine & Tele Education
- 20 Incubation/Trade Facilitation Centers
- 21 Skill Development Centers

THANK YOU !

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