accenture

High performance. Delivered.

Amsterdam Smart City project

Prague, 24 May 2011

Roman Šťáhlavský

Project overview

A collaborative approach bridging the gap between strategy and tactical execution

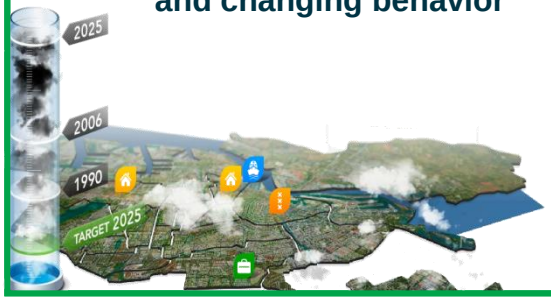
European Union (2020)
- 20% CO_2 reduction compared to 1990
- 20% energy reduction
- 20% sustainable energy

The Netherlands (2020)
- 30% CO_2 reduction compared to 1990
- Double energy reduction to 2% per year in the following years
- 20% sustainable energy

Amsterdam (2025)
- 40% CO2 reduction compared to 1990
- 20% sustainable energy
- Municipal organization climate neutral before 2015

Challenge

Contribute to ambitious climate goals through technology enabled sustainable solutions and changing behavior



Approach

Accenture has been instrumental to city of Amsterdam in new concept development; short listing / prioritizing of initiatives; coordination of multiple partiers and project initiations

Smart Grid Enabler

- SUSTAINABLE LIVING
- SUSTAINABLE WORKING
- SUSTAINABLE MOBILITY
- SUSTAINABLE PUBLIC SPACE

- GEUZENVELD PROJECT
- WEST ORANGE PROJECT
- ITO TOWER PROJECT
- SHIP TO GRID PROJECT
- THE CLIMATE STREET

Current Status
- Several pilots launched in 2009 and 2010
- Initiation of 'Global Smart City Network'
- Over 16 partners engaged

AIM, JCDecaux, alliander, NUON, CISCO, PHILIPS, accenture, I amsterdam.

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

Results

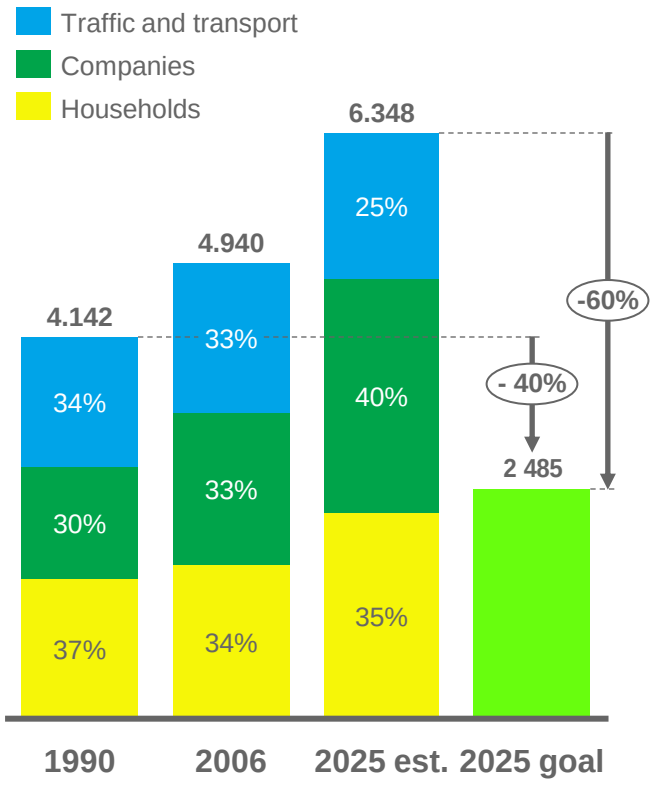
Amsterdam Smart City contributes to Amsterdam's climate goals in an economically sustainable way by enabling its partners to apply innovative technologies and stimulate behavioral change with end users in the program's sustainability projects:

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

Solution description – Focus areas

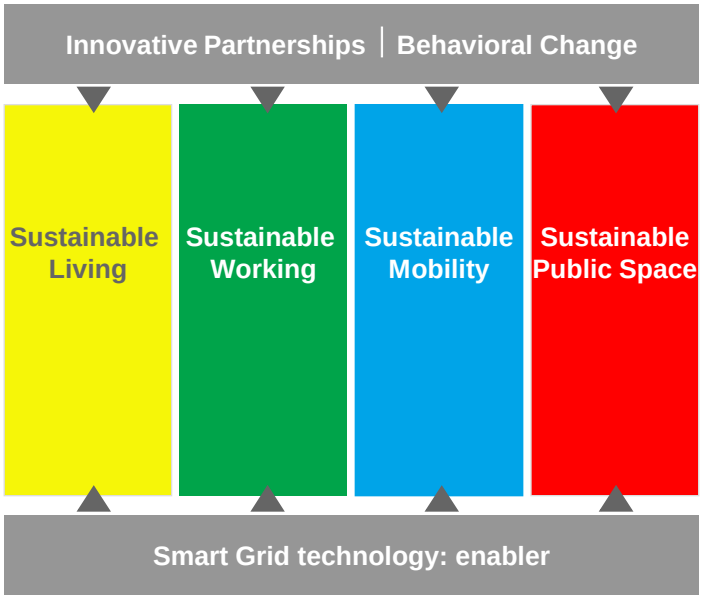
ASC reduces emissions by focusing on Sustainable Living, Working, Transport and Municipality enabled by Smart Grid technology

CO2 emissions Amsterdam



CO2 emissions in kton/yr

Focus areas ASC



Municipality is treated separately because of scope and ambitious internal climate targets

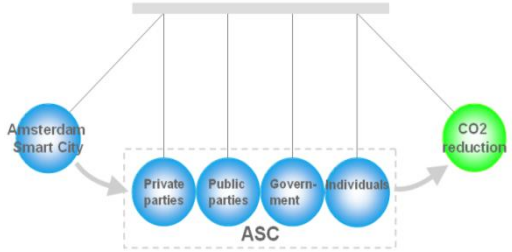
Solution description – Concept

ASC aims to fulfill its clients goals with a collective effort that combines innovative and economically viable technology with behavioral change

Solution Concept

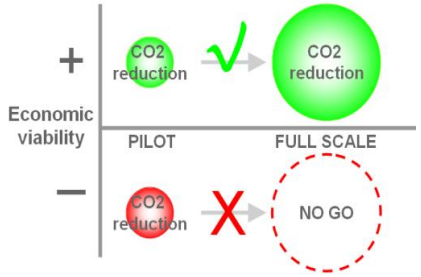
- Amsterdam Smart City is designed as an accelerator for climate/energy programs, bringing parties together and initiating projects that reduce CO2 and yield local best practices for full scale roll out
- Amsterdam Smart City is based on a few key principles:

1. Collective effort



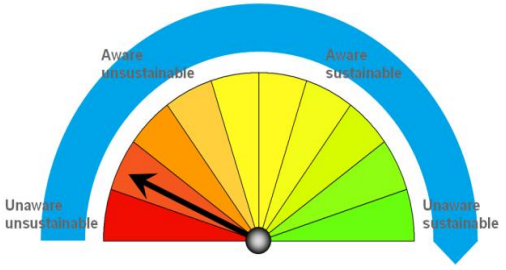
- The momentum for CO2 reduction is stopped without result if any of the required parties in society does not cooperate
- Therefore a collective effort of activating and involving all parties is required to realize CO2 reduction

2. Economic viability



- Economically unviable initiatives will never be applied in a large scale
- Only economically viable initiatives (for all stakeholders) are interesting to apply on a large scale and can therefore have a large CO2 impact

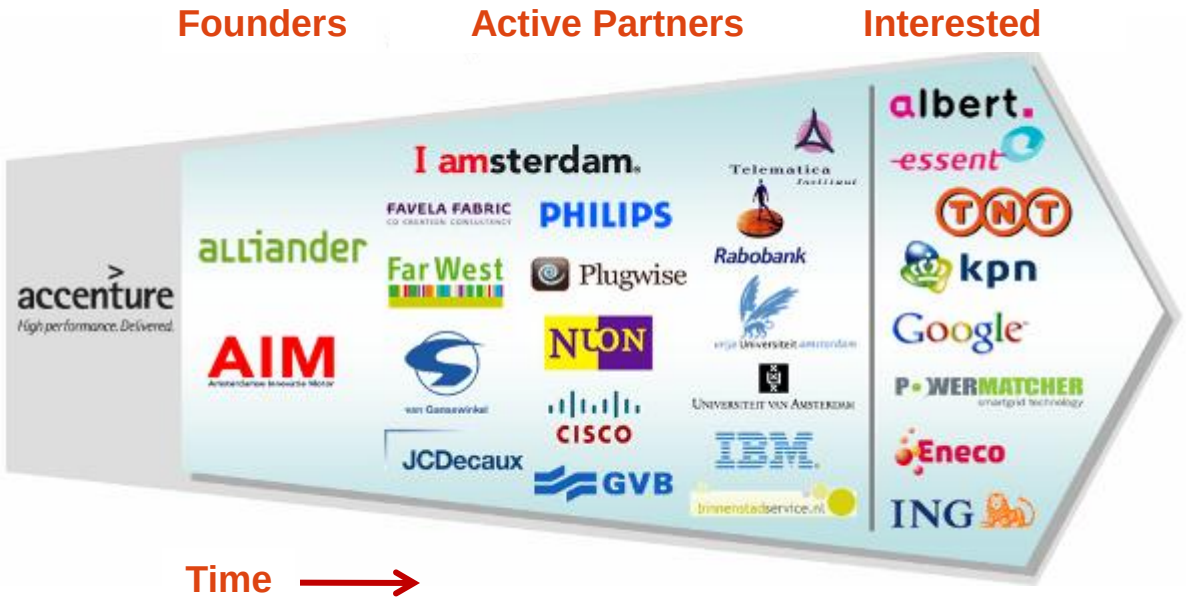
3. Tech push / demand pull



- Stimulation of behavioral change creates a demand pull for more sustainable technology
- Application of innovative technology results in a technology push towards sustainable behavior

Solution description – Partnership development

A key challenge is the successful establishment of public-private partnerships



Type of Partner Overview:

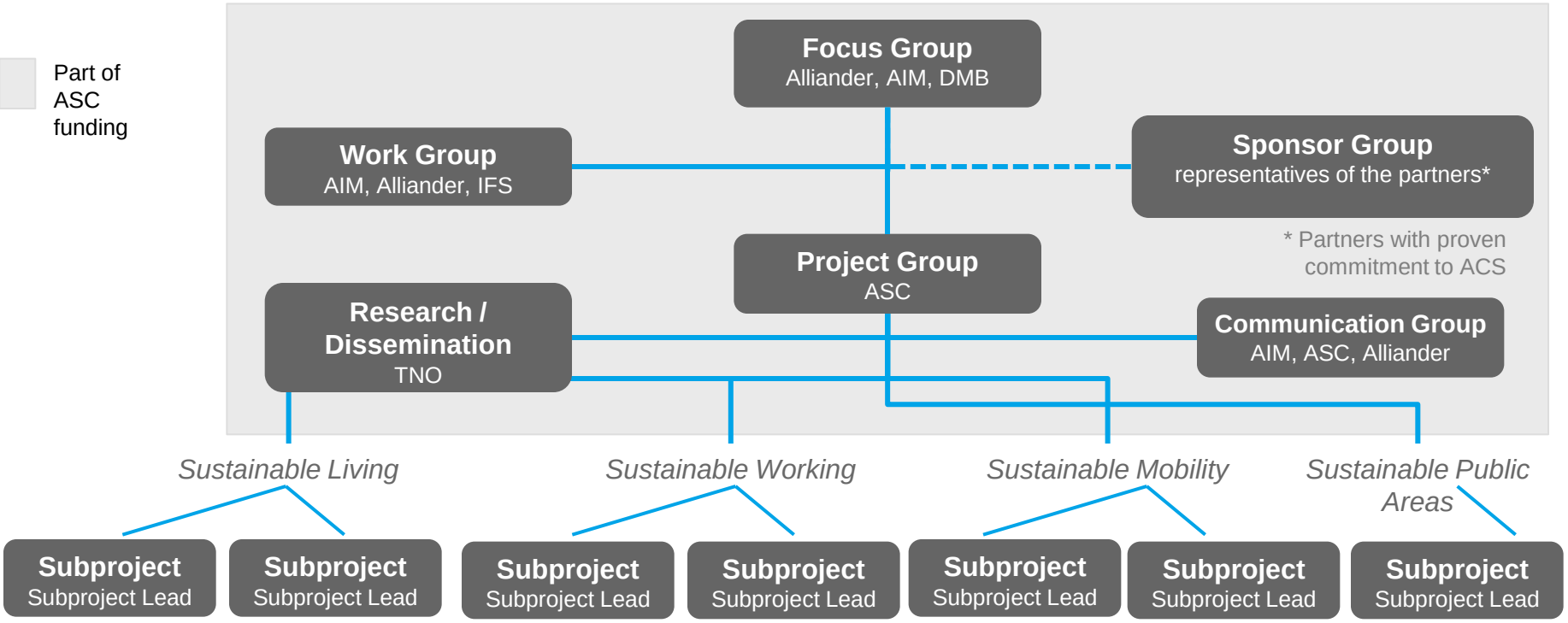
- Grid operators / Utilities
- Governmental org's
- Housing corporations
- Port of Amsterdam
- Techno starters
- Universities
- Financial institutions
- Telecom / ICT
- Transport / Waste
- Etc.

Technologies Applied in Projects:

- Smart meters
- Energy displays / feedback
- New logistics/waste models
- Smart (LED/saving) lighting
- Electric vehicles
- Charging terminals
- Energy advice
- Etc.

Solution description – Governance and Stakeholders

The founders of Smart City Amsterdam, Liander and AIM, play an active role in the organization of the project



Stakeholders

Next to the founders we have identified 3 types of stakeholders:

- **External parties:** Press, Residents of Amsterdam, other cities
- **Partners and interested parties:** like: Amsterdam Climate Office, Far West, Philips, Plugwise, Nuon etc.
- **End Users:** Entrepreneurs, Residents, Shippers

Solution description – Funding model

In order to facilitate private-public partnerships, the program has been structured as a foundation

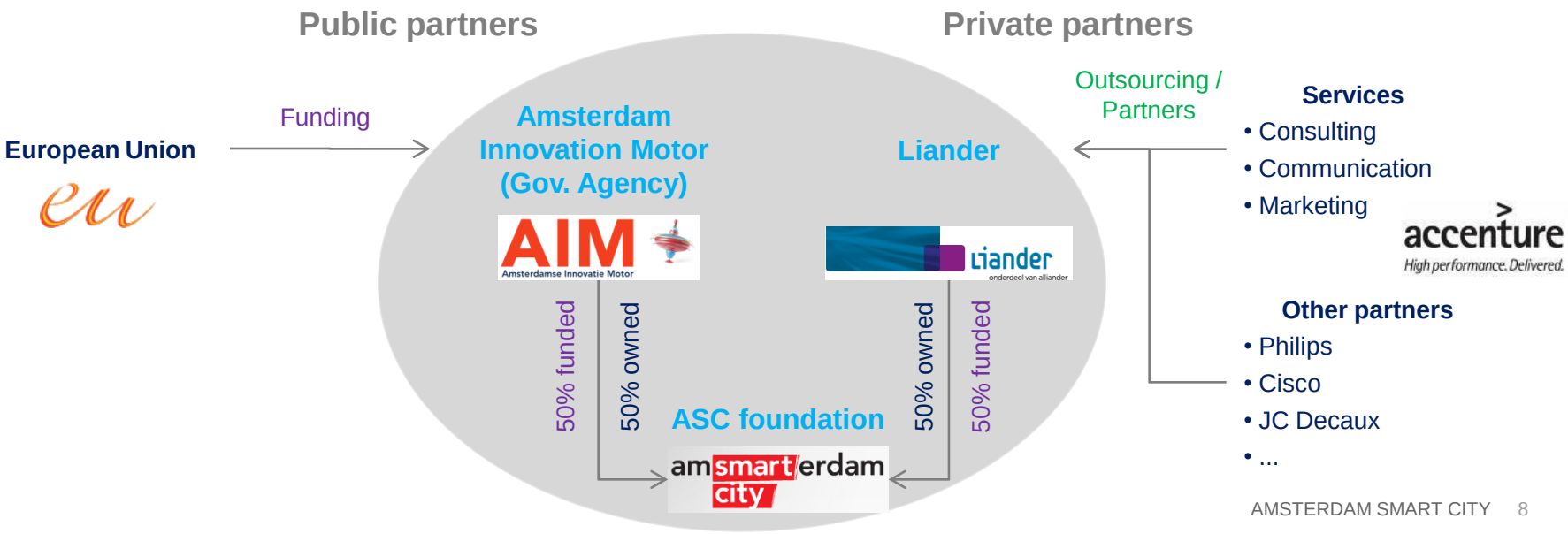
Foundation

- The program is managed by the foundation *Amsterdam Smart City*, which is **owned by**:
  - The city of Amsterdam (50%), represented by the independent organization AIM (*Amsterdam Innovation Motor*)
  - Liander (50%), Dutch energy transportation operator

Funding

- The foundation is 50% **funded by** AIM, which receives EU subsidies, and 50% by Liander.
- Service expenses and some outsourcing deals are under Liander responsibility and account for its contribution to the foundation.

Funding mechanisms overview



Wave 1 pilots

1 Geuzenveld

Test smart technologies in more than 500 households in order to increase awareness on energy use

- Smart meters that measure energy consumption and can be connected to energy-saving appliances
- Energy displays that provide feedback on energy consumption and give personal energy-saving tips based on the information from the smart meters

2 West Orange

Test smart technologies in 500 households in order to increase awareness on energy use

- Wireless energy displays connected to the digital gas and electricity meters, including mobile phone feedback.
- Possibility to turn off all appliances at once.
- Online thermostat that can be set remotely.

3 ITO Tower

Minimize energy use without impacting negatively the functional and living comforts provided by the building to employees

- Detailed data analysis of energy use based on information gained by smart plugs.
- Sensors that can register energy use and ensure lighting, heating, cooling are operated as energy efficiently as possible.

4 Ship to grid

Install shore power connections for ships in Amsterdam harbor to allow green energy to replace polluting diesel generators onboard

- 73 shore power stations with a total of 154 connections connected to renewable electricity sources
- Pay-by-telephone system

5 Climate street

Make one of the city's shopping streets more sustainable by focusing on logistics, entrepreneurs and the public space

- Waste and goods collected using electric vehicles.
- Integrated street-lighting using energy-saving lamps; sustainable tram stops; solar-powered waste bins.
- Smart meters, energy displays and smart plugs provided to entrepreneurs.

Wave 2 pilots

1 Onze energie

Collectively finance 7 windmills with the ambition to have 20% of the Amsterdam population become member of this cooperation

- Local generation of sustainable energy.
- All Amsterdam Noord residents can become member for a €50 membership fee.

2 Energy management

Test an energy-management system in 250 households in order to enable the user to gain insight into energy use of each connected appliance

- Smart wall plugs.
- Online monitoring of energy use.
- Possibility for the user to switch the appliances on and off remotely.

3 Sustainable monument

Support several monumental buildings in Amsterdam to become more carbon-efficient

- Energy scans; energy monitoring systems; insulation; small-scale combined heat and power.
- Awareness created among users and visitors.

4 Smart schools

Make 10 primary schools compete on energy efficiency program results, by comparing performance through an online portal

- Online portal with schools performance and ranking.
- Tips and tricks sharing.

Results from Wave 1 projects

Outcomes are focusing on CO2 reduction, energy efficiency and behavioral change

Geuzenveld

Estimated savings from energy display, energy control, and solar panels:

CO2 %	Electricity %	Gas %
↓ 8.9%	↓ 7.4%	↓ 9.9%

West Orange

Estimated savings from using innovative IT solutions:

CO2 %	Energy %
↓ 13%	↓ 14%

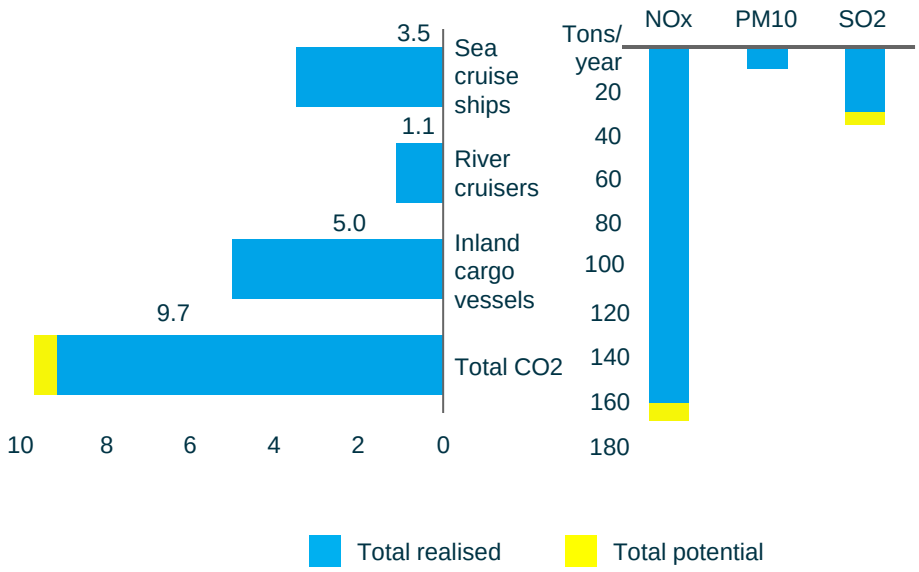
ITO Tower

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%

Ship to Grid

Estimated savings:



Climate Street

Estimated participation rates:

Smart meter and displays	80%
Electric garbage collection	90%
Sustainable logistics	30 entrepreneurs