



International conference

May 3, 2011 - Vienna

Urban Development 2050

Planning resource-efficient cities

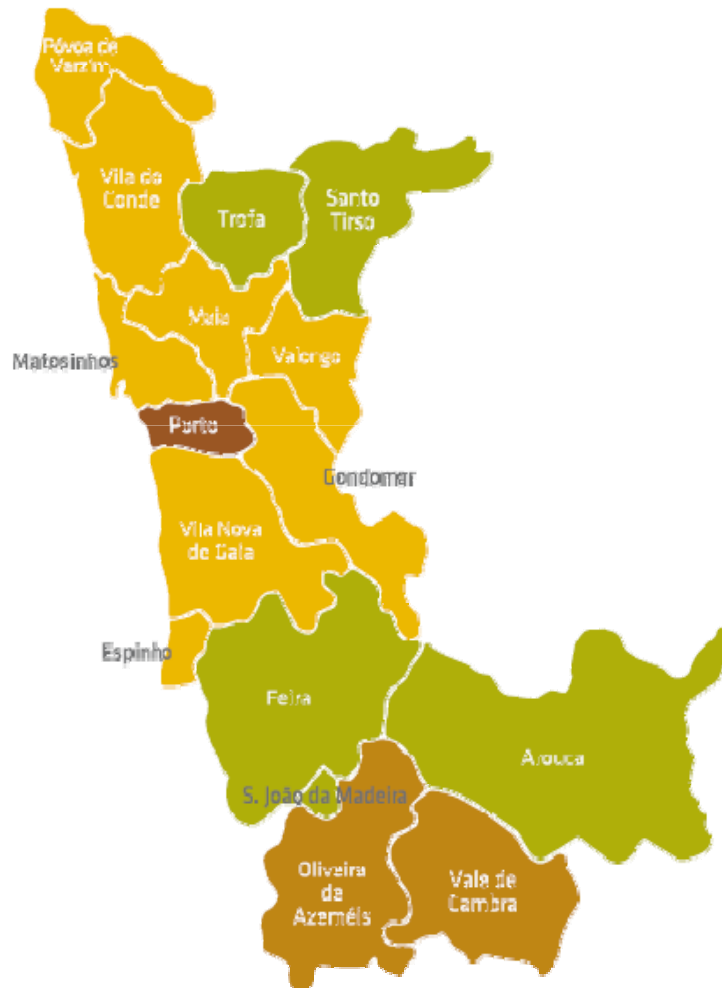
Innovative Strategies for Sustainable Planning

The Porto's Energy Case

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Porto and its Metropolitan Area



- $\approx 265\,000$ inhabitants
- centre of a Metropolitan Area of 1,7 Mio people
- $\approx 500\,000$ daily users
- 42 km^2 (compact city!)
- services town, little industry
- recent past history: a 100% electrical city

Porto Area: a recent energy management approach

- In October 2010, Porto Energy Agency extended its territorial scope to the northern margin of the Metropolitan Area of Porto covering now:
 - 1 M inhabitants
 - 300 km²



Sustainability – a three fold value



environmental

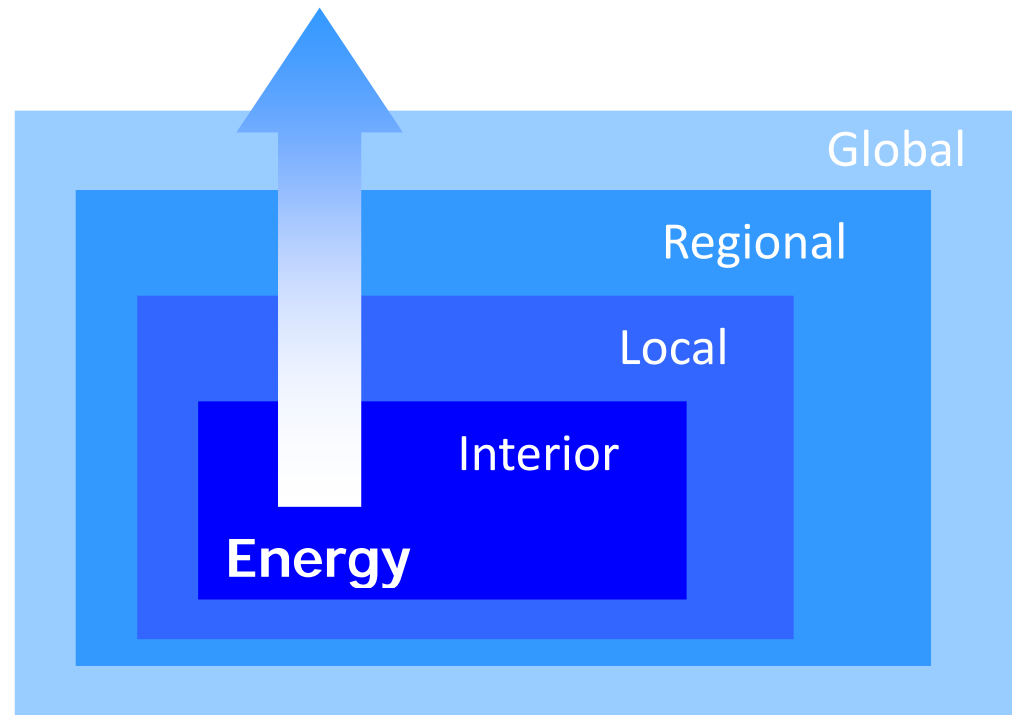
economical

social

holistic - integrated - accountable

Energy: the pressing factor of global environment

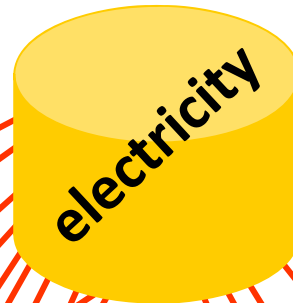
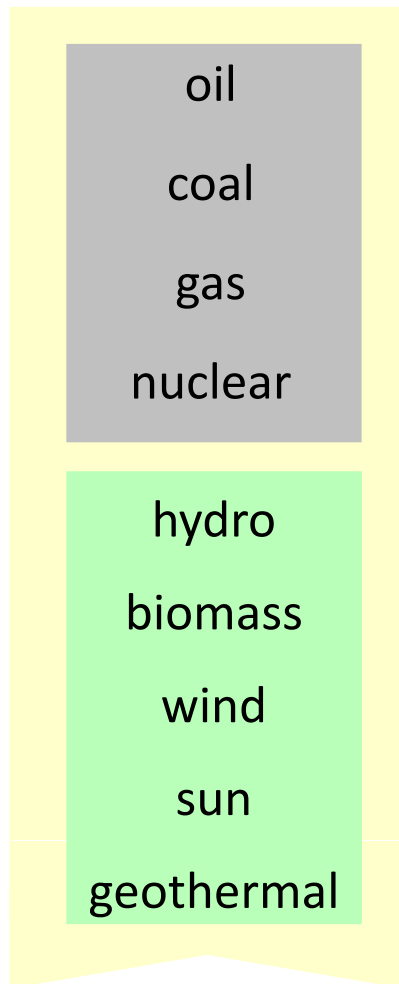
Global
Climate change
Biodiversity
Regional
Atmospheric pollution
Landscaping
Local
Microclimate
Morphology
Interior
Indoor air quality
Comfort
Energy use & CO ₂ emissions



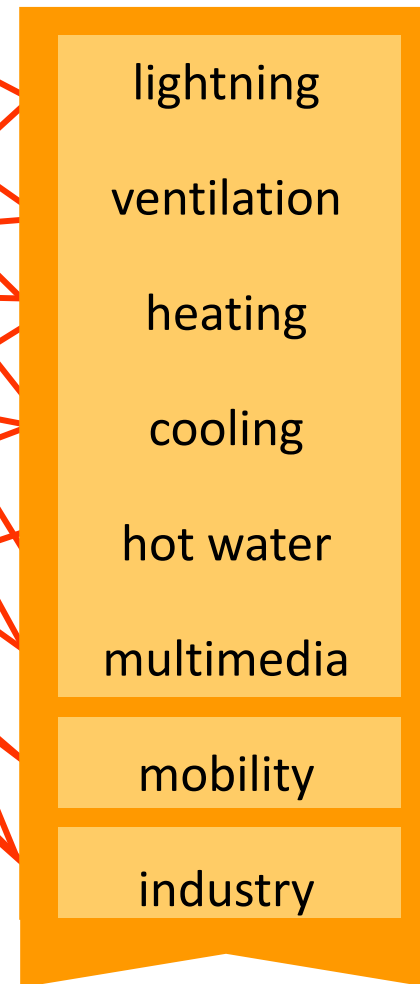
Problem:	Climate change
Strategy:	‘think globally’; act locally
Case:	energy vs CO₂ production

Energy: from natural source to service

Primary energy (supply)

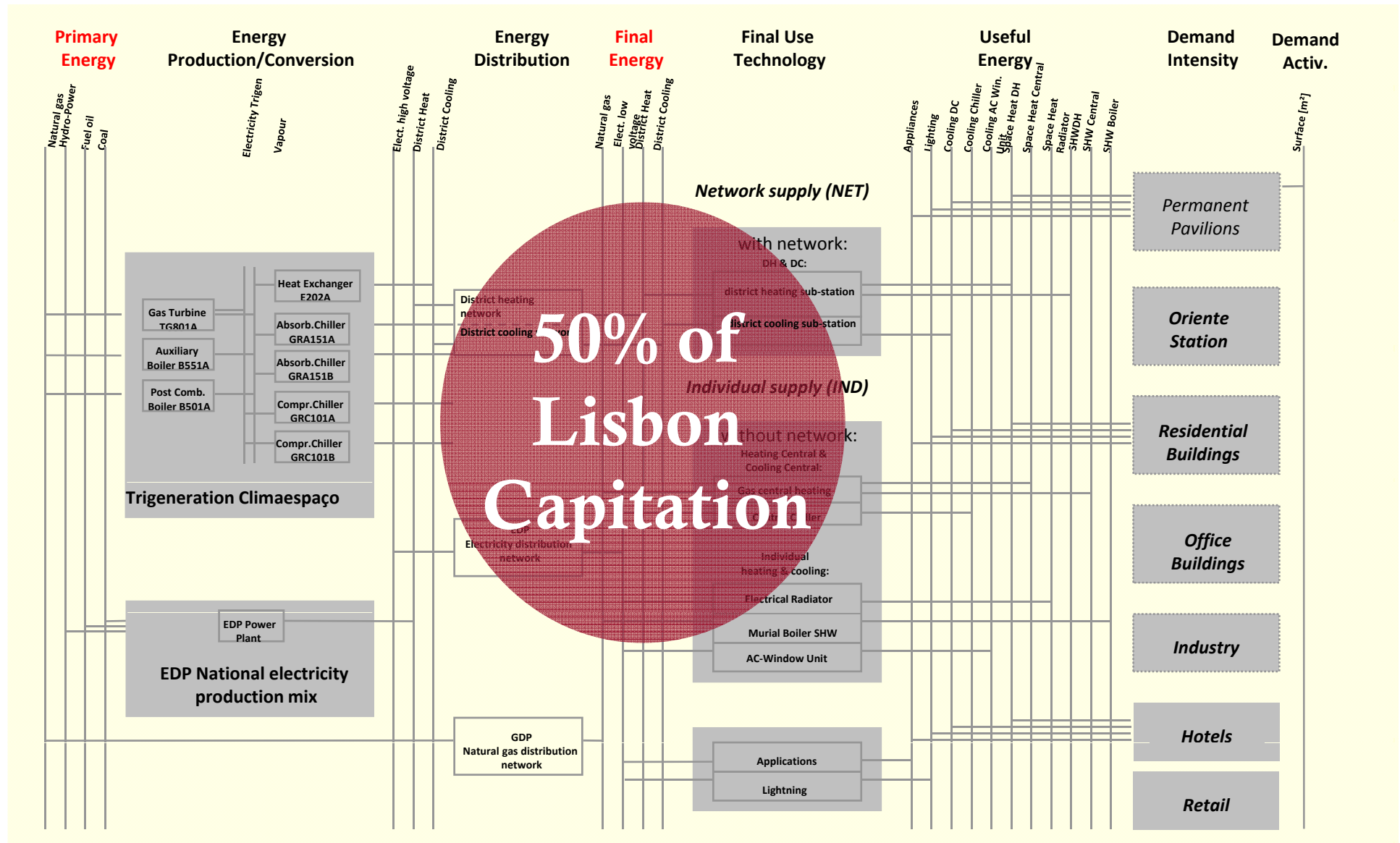


Final energy (demand)



hidrogen!
(2030!)

An Urban Energy System



Sustainability Strategy of Porto (1)

VISION

Sustainable City is the one that promotes:

- The responsibility for the use of the natural resources;
- Ensures the minimization and/or elimination of negative energy impacts;
- The pro-activity and the diligence in the pursuit for the means of socio-economical progress and development;
- The prevail of the values of democracy and of the respect for the difference.



GLOBAL GOALS

- Promote the environmental values in the 3 dimensions: local, regional and global;
- Promote the social development;
- Promote and establish companies with high development value.

Source: Porto Sustainability Strategy, 2009

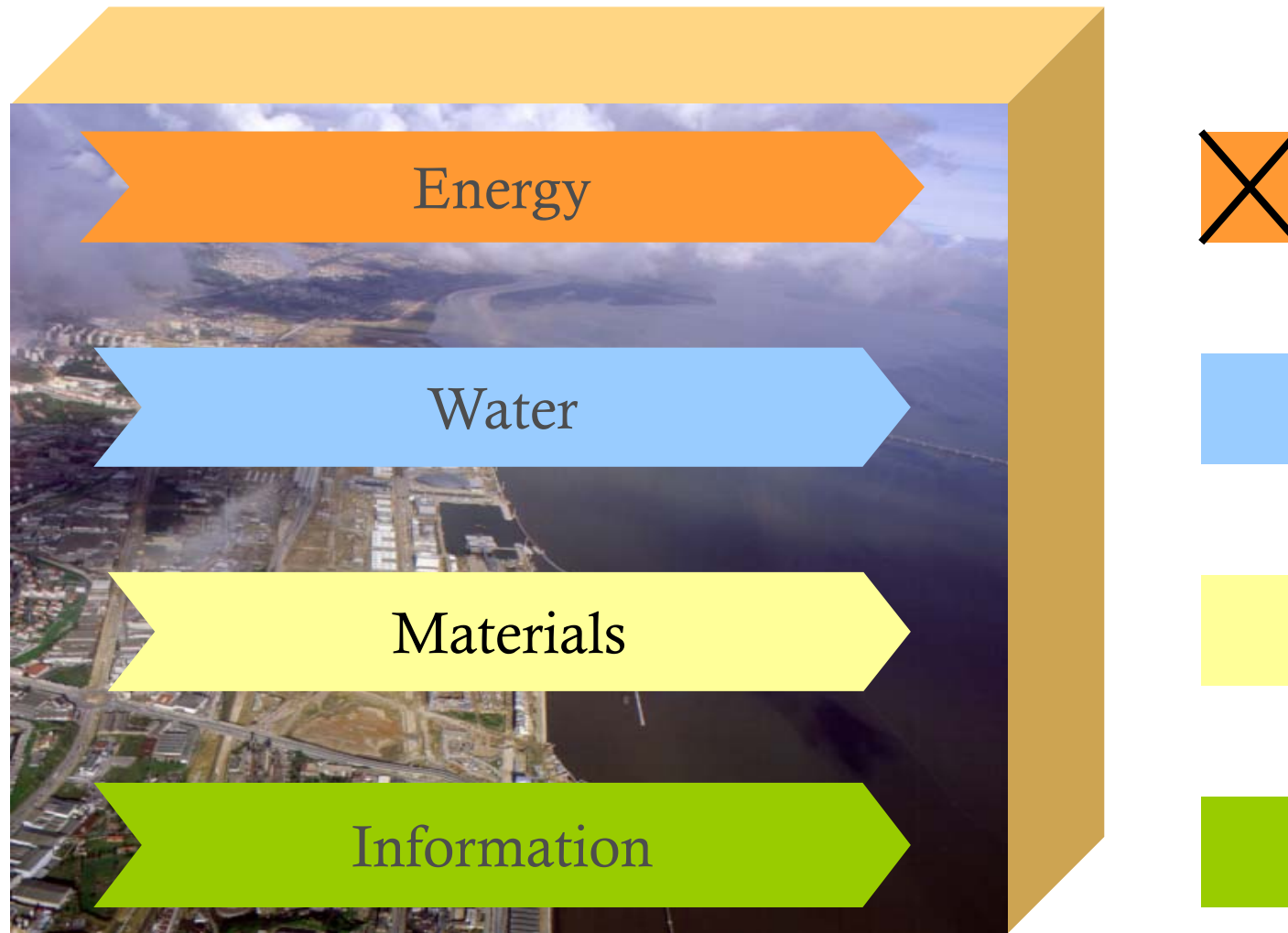
Sustainability Strategy of Porto (2)

8 MAIN AXIS 'PLUS'

- **'Porto' Brand** – Porto as a people with a history, a will and a responsibility
- **Urban rehabilitation** – Building a urban bridge towards the future
- **Mobility** – A centrality and a metropolis of over 1 million people
- **Environmental resources** – While cities cannot be sustainable they owe to be solidary
- **Education** – Preparing the next generations
- **Tourism, culture and leisure** – Welcoming and exchanging
- **Competitive edge** – Affirming and developing its skills
- **Governance** - Citizens and not consumers

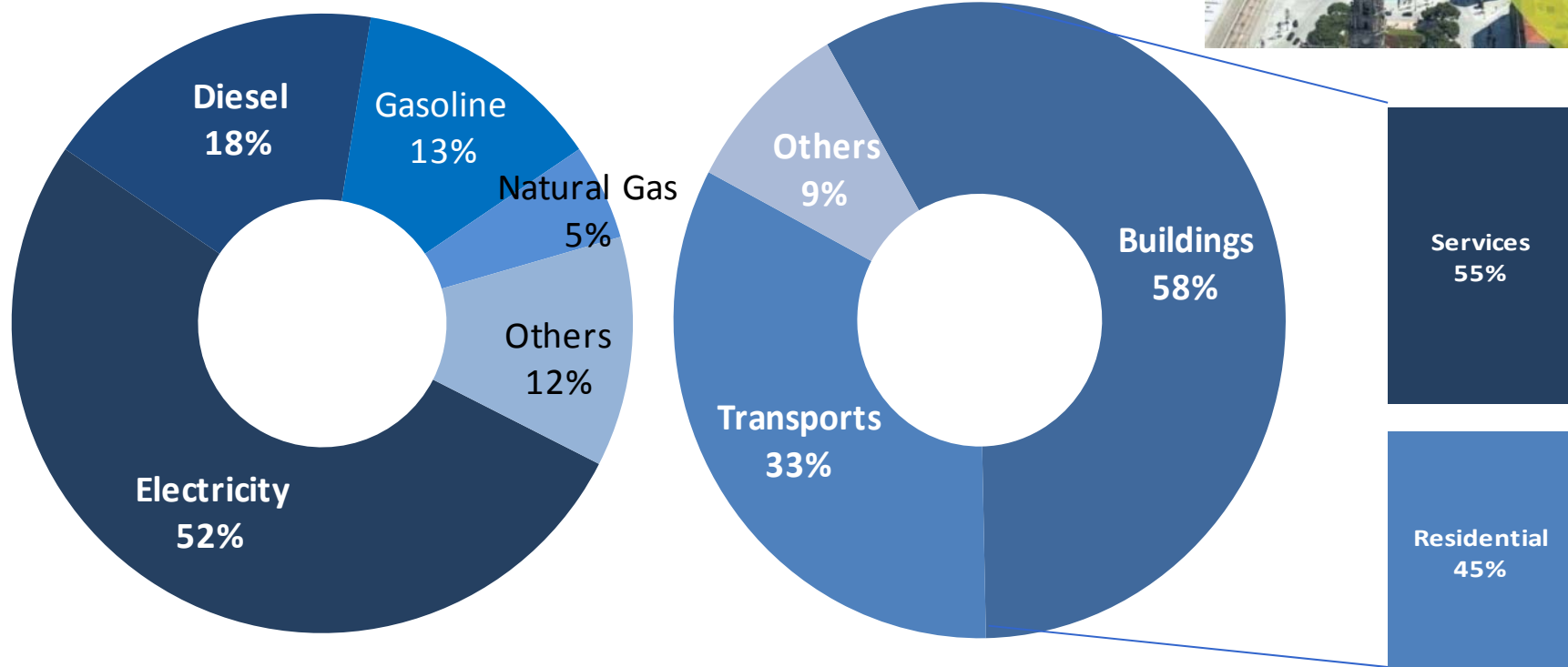
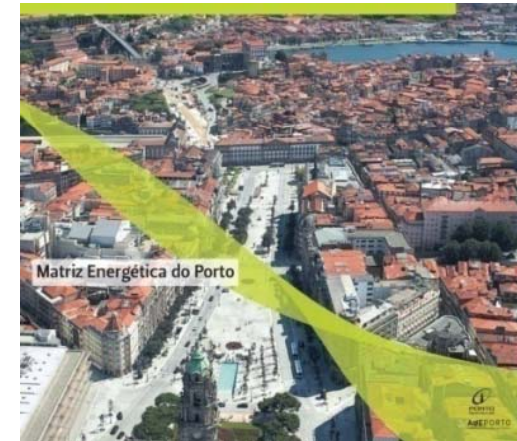
Sustainability Strategy of Porto (3)

Cities to process all natural resources



Porto Energy Matrix

Porto profile: 5.661 GWh primary energy (2004)
~ 5ton CO₂/capita.year



Source: Porto Energy Matrix, 2008

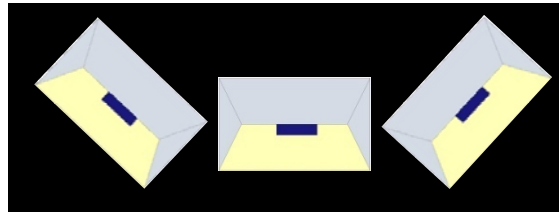
REABILITATION IN PORTO

- Sustainability Strategy
- Observatory of the Energy-environment Sustainability of Buildings
- Guidelines for the Energy Efficient Rehabilitation of the Porto's Historical Centre
- SIM-Porto – Multicriteria Information System



Guidelines for Energy Efficient Rehabilitation

Solar collectors



Sustainability: The Political Commitment

Porto signed, together with more than 400 European cities, representing about 60 million citizens, the

Covenant of Mayors

in Brussels on February 10, 2009



SEAP - Intervention Areas

POLITICAL MEASURES

Supply in the city

- **Shift of Energy Vector**
 - Natural Gas vs Electricity
 - Solar thermal vs electricity or NG
 - RUTE - District Heating and Cooling Network
- **Solar Thermal**
 - Solar Hot Water & Indoor Comfort
 - On Rehabilitations and New Construction
- **Local Electricity Production**
 - Solar Photovoltaic
 - Urban Waste Valorization

National supply

- **'Greener' electricity**
- **Biodiesel introduction**

Demand in the city

- **Buildings**
 - Rehabilitation
 - New construction
 - More efficient household appliances
- **Mobility and Transports**
 - Collective Transport
 - Individual and Commercial Transport
 - Electric vehicle
 - Cycleways
 - Walkways

SEAP - URBAN THERMAL ENERGY DISTRIBUTION

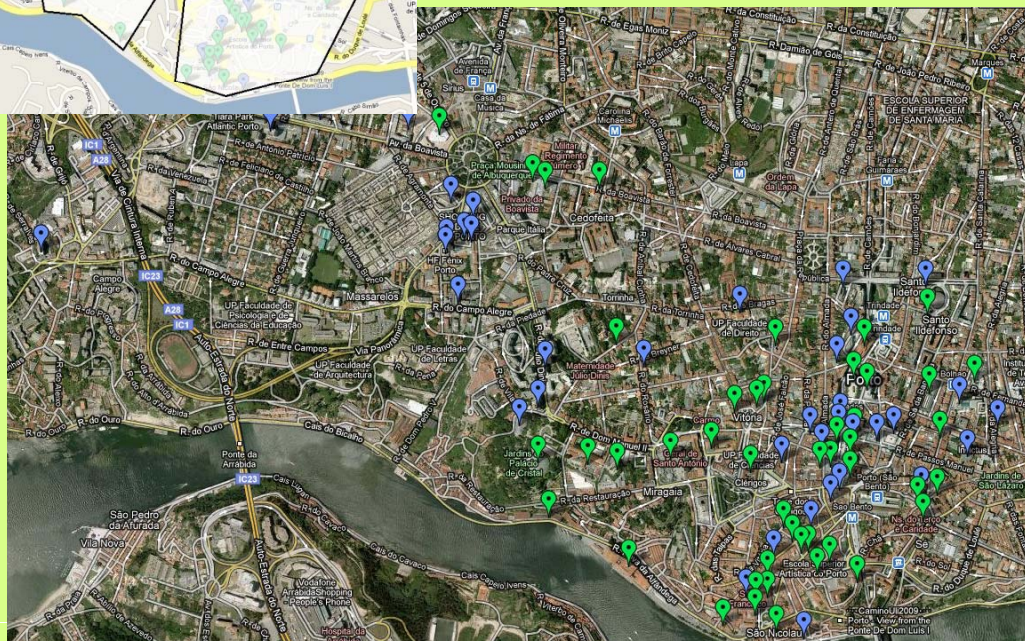


RUTE – District heating and cooling network 4 km

2020
- 23 900 tCO₂



Three power stations to better accommodate the existing urban conditions



SEAP - Intervention Areas

		Actions	Results in the reduction of emissions by 2020 (tCO ₂ /yr)			
			Energy efficiency	Biodiesel 10%	National electric Mix 2020	Total
Local	Municipal	Municipal Buildings: New constructions, Large rehabilitations and others	4 750		5 270	10 020
		Solar Hot Water in Social Housing	3 600			3 600
		Public lighting + Traffic lights	6 380		5 160	11 540
		Urban Thermal Energy Distribution Network	23 900		0	23 900
		Cycling ways and "Porto Gravítico"	6 050		4 100	10 150
	Stakeholders	Private Buildings: New, Large Rehabilitations and others	94 800		222 900	317 700
		Natural Gas penetration	13 200			13 200
		Cogeneration and incineration	55 200			55 200
		Smart Metering, household appliances and other	25 400		15 600	41 000
		Renewable sources: Solar Hot Water and PV	12 700		630	13 330
		Collective Transports (NG in STCP and new Metro lines)	73 530	4 400	2 100	82 030
		Individual transport (Private and commercial)	48 840	39 200		88 040
		Estimated increase in energy consumption	-21 960			-21 960
Total		346 390	43 600	255 760	645 750	

**Total CO2 reduction: about 50% !
being 25% due to national and 25% to Porto actions**



THANK YOU!

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