

A vision: Urban Sustainability

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Brundtland definition of Sustainability

- Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

UN World Commission on Environment and Development 1987

Other common definitions of Sustainability

- We did not inherit the earth from our fathers; we borrowed it from our children.

Ancient native-American way to say

- Sustainability is the ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

Umpqua Watersheds glossary

Closed cycle definition of Sustainability

- Sustainability is reached when human activities do not consume resources and do not produce waste

Orecchini F. and V. Naso "La società No Oil" 2003

Is Sustainability in these terms achievable in cities?

- To answer this question four practical questions have to be answered:
 - How much energy does a city use?
 - Would there be room for rationalisation?
 - What would be needed to rationalise?
 - How much renewable energy is available in a city and would there be room to use it effectively?

Some figures of energy consumption in Rome

kTOE	Electricity	Combustibles	Total	Percentage
House holding	304	925	1229	31.7%
Mobility	11	1945	1956	50.4%
Industry	38	14	52	1.3%
Offices	321	289	610	15.7%
Services	35	0	35	0.9%
Total	709	3173	3882	
Percentage	18.3%	81.7%		

Source: Energy-environmental plan of the city of Rome 1995

Some room for mobility energy use rationalisation

	Vehicle consumption [l/100km]	Vehicle occupancy [pax/veh]	Passenger consumption [l/100pax·km]	Modal share [%]	Average consumption [l/100pax·km]
Individual (car)	10	1.2	8.33	60	6.66
Collective (bus)	50	30	1.67	20	

Inverting the modal share of private and public transport

	Modal share [%]	Average consumption [l/100pax·km]
Individual (car)	20	3.33
Collective (bus)	60	

Some room for energy use rationalisation in residence and office buildings

- Micro-generation of energy in buildings
 - using renewable energy (solar and aeolian) generators and distributing it to local and remote users through ad-hoc networks and
 - using high efficiency heat and electricity co-generators.

Measures needed to rationalise the energy use

- Pull measures – which attract people toward a more rational use of energy
 - usually technological measures which improve service quality making it more attractive
- Push measures – which push people away from a non-rational use of energy
 - usually political measures which make less attractive the “usual” behaviour

A technology that may pull a more rational mobility

- Info-mobility could make:
 - conventional Public Transport (PT) more reliable and flexible;
 - some innovative PT service (e.g. collective taxi) viable;
 - automated guidance feasible;
 - traffic control effective.

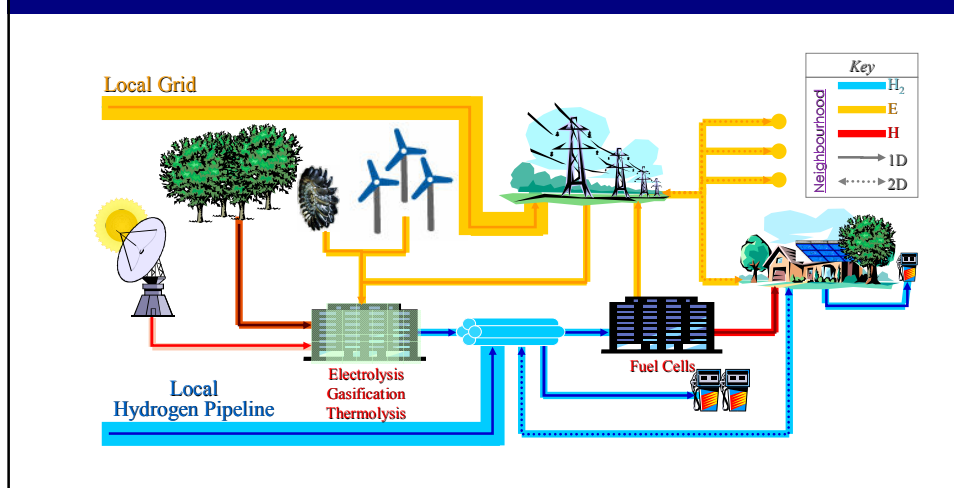
Some example of push measures for mobility

- Parking pricing
- Parking rationing
- Road pricing
- Access rationing

A technology that may pull a more rational energy use in buildings

- Implementation of an integrated energy network:
 - organised on three levels:
 - national,
 - local and
 - single building;
 - supervised and controlled in remote.

Integrated energy networks



Push measures to favour a more rational energy use in buildings

- Differentiated energy pricing
- Strict control on environmental impact
- Incentives to use renewable energy

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Some figures on solar energy available in Rome and its potential use

- City surface 600 km²;
- Average energy radiating in a year 1700 kWh/m²
- Energy available in a year 87000 kTOE;
- Maximum potential use 1-2%;
- Maximum usable solar energy 1750 kTOE/y

Is Urban Sustainability achievable?

Yes ... but

only if city is defined in a broader sense;
including the production areas which
serve the city and the factories whose
headquarters are in the city

Which are the keys to seek urban sustainability

- Technology
 - to make rational uses of energy more attractive;
- Technology
 - to convince politicians to adopt push measures toward a more rational use of energy;
- and Technology
 - to shift the “energy response” on the “energy needs”.