Sustainability issues in Water Supply and Sanitation Services in Europe

Spain, Italy, Netherlands, Germany, England, Belgium, and France

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The 4 Dimensions of Sustainability in the EAU&3E Project

1. Cost recovery including renewal of the infrastructure?

2. How much more to meet sanitary and environmental standards? (EU directives, national policy, water conservation policies etc.)

3. If 1 and 2 are met, is water price still socially acceptable?

4. And politically? Here a 4th axis is needed on multi-level governance, and on new authority – operator – users relationships.
Barcelona

A Two-Tier supply system

- ATLL: Public regional bulk water company
- AGBAR: Private company, produces and supplies water to Barcelona + 17 suburban cities (buys 40% of its water to ATLL)
- The rest: small direct utilities and mixed companies

AGBAR also responsible for sanitation and stormwater

In a Mediterranean Regime …
Median demand in **dense area**: 130 l/cd

**Barcelona** down to 109 l/cd in 2010

Median demand in **suburbia**: > 200 l/cd, up to 500 l/cd

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**Important Suburban Growth**

Development inadapted to climate

Reverse link between density and water consumption

*Source: Rivera, Capellades, Sauri, 2001*
Chosen option: new Infrastructure and Technology

- In 1997, dream to transfer water from the Ebro or Rhone, but shelved
- In 2008, 100-yr drought: tankers from Tarragona and Marseilles, and new disputes; then it rained …
- In 2009, Desalination & WW reuse: High OPEX, relatively low CAPEX (compared with additional dams & transfers)
But also, Aquifer recharge

• Llobregat Delta aquifer: early case of integrated management with users participation

• Agbar develops the ‘conjunctive use’ surface – ground; both aquifer and river recharge
Prices, droughts, water wars

Against
The
transfers

And ... 

Against
more levies
And IBTs
Barcelona and sustainability

- The long tradition to transfer water from long distance and subsidize the service (civil engineering / quantity issue) is out.

- Replaced by a problematique of quality (sanitary/chemical engineering) with sophisticated technology, implying little public participation, and no territorial conflicts.

- The consumer equity issue plus social tariffs: dealt separately.

- Control of the local aquifer needs to be extended.
Italy : a Governance Reform, Galli Law (1994)

- Before: 14000 WSS management units for 8000 communes, uncomplete infrastructure (sewage works), EU Directives not met
- The reform: concentrate water and wastewater utilities together at supra-local (optimal) level, and price services closer to full cost
- While water resources are public, utilities cannot be kept under direct labour, must have commercial status, and are regulated with same formula as in UK (rpi + k – efficiency gains)
- After 10 years’ debate, the concentration in the ATOs took place at the level of provinces, not catchments.
The 91 ATO

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A too ambitious reform?

- Strong tradition of autonomous municipalities and weak State
- It is the relationship between local authorities and utilities which is regulated, not private companies like in England
- Large delays in the designation of operators and in investments
- For investors, risks poorly spread, information asymmetry, complexity of regulation … Not very attractive
- The reform advantages the traditional municipal enterprises of cities (the Aziende)
- There are indeed efficient water utilities (e.g. Torino, Milano, Bologna)
Sustainable failure?

• Behind schedule for WFD and other Directives’ implementation

• Focus on catching up with collective systems, while decentralised systems would be better solution (e.g. France’s septic tanks)

• Implementing the law implies to treble the price of water! Politically impossible

• November 2009 law: County (ATO) authorities compelled to tender within 2 years for the operator’s choice: might push a privatisation of the water sector

• Mediatic-populist reply (Aqua Publica Europea): organise a national referendum to stop all reform and impose public water services management

• Lesson: water price reforms are slow ones …
Netherlands

- Half of country and 2/3 population below high tide level
- Very ancient local water institutions
- A strong tradition of subsidiarity and multi-level governance
- But water wastewater and sewage works separate policies
Decentralised water management

12 provinces (water resources planning)

441 municipalities (sewers)
Waterschappen & waterleidingbedrijven:
Voluntary concentration, complex governance

26 waterboards (user-based): payment per family
10 water supply companies (publicly owned): payment by meters
Transforming ‘no-alternative’ into sustainability

• Subsidiary governance & mixed payment schemes -> good cost recovery (internal cross-subsidization)

• Waterboards resisted projects to merge them with water companies

• Ecology-minded society now: give more space to water + decentralised schemes (water reuse)

• Sanitation paid through taxes: a form of social tariff? Split water charges better accepted.

… But growing pressure of globalisation and climate change and sea level issue
Germany: a dramatic fore-runner?

Demographic Change

Population dynamics at a small scale
‘Stadtwerke’ facing Sustainable development

- German tradition is to integrate public services (water-gas-electricity-district heating-public transport) in municipal enterprises: stimulate local economy, resist Prussian control

- Growing evolution towards formal privatization and partial integration at regional scale (concentration): *impenetrable*?

- Presently allows to face serious financing issues due to consumption collapse: *Typically in new Eastern Länder*

- Oversized systems push some urban ecologists to propose a radical shift combining reduced public services and decentral systems. Down to 45 lcf … *Paradox??*
Model City „netWORKS“

Depending on urban density, experiment various innovations in decentral. Or semi-decentral systems.

Neighbourhood level projects (e.g. IBA Hamburg) + assessment models comparing central. vs decentral.

Material and energy balances, (indirect consideration of climate change), costs/recipes ...

Social dimension mentioned, but no tariff/charges impact study yet.
Privatisation created a peculiar situation of confrontation between companies and customers (bills in arrears up)

Despite investments in leaks control, still companies must face growing Scarcity in the South East.

Encourage customers to conserve, thru Refurbishing/harvesting-> Waterwise UK

But companies complain: no bonus from OFWAT while they lose money …
A continuing metering issue ...

- To meter or not to meter? Very high initial cost (£1.4 bn in 1990)

- Private companies would like to universalize metering and push water conservation in homes,

- But they want their recipes to stay the same, and to improve trust with customers

- Today more than 25% customers have above 6 months’ overdues; UK first country to study the ‘water poor’ issue
Belgium

• Water services in municipal hands, with unfinished sewage collection & treatment. New context of full cost pricing (WFD art. 9, taken seriously)

• Public water supplies concentrate quickly and sewerage is now regionalised, to compensate price impacts thru cross-subsidies

• Various (2-part) tariff structures with IBTs, not for conservation but for social reasons. Results are disappointing in Flanders

• Water companies fear spiraling down effect: large industrial customers quit, but they drill wells. So do residents with rainwater harvesting => consumption goes down (mean 91 lcd), prices go up (40% in 5 years - should continue), socially unacceptable ...
... and France?

- The most heterogeneous situation, with very tiny and very large utilities (more than 10000 for water supply alone, Paris 2.2 million; 900 000 km of water mains, more than 17000 sewage works)

- Difference with the US: revolving fund is our Agences de l’eau, which get their money from water bills (16% of total, sewerage incl.); metering widespread, but one bill per property (submetering in half of condominiums)

- Finishing water pollution control from cities while pipe renewal was increasingly needed => average prices double 1991-2004

- Water policy became a hot issue: water consumption down, prices up, a few corruption affairs, water a planetary issue, diffuse pollution from agriculture ... We need tools to address the global picture!
Conclusion

• In most European countries, concentration/centralisation of water utilities at supra-local level is taking place, but not really evaluated in the 4 dimensions of sustainability.

• Many software tools available to support long term infrastructure management, but use limited by lack of prioritization

• Few foresight tools for future water demands, while coupling with asset management might lead to partly re-design water systems

• A few models take other criteria than money into account (carbon; materials, energy …)

• The social sustainability dimension is still in infancy.
EAU&3E
Sustainable WSS Management in Large Cities
Are WSS sustainable, even in Europe?

Europe has some of the best WSS in the world. High connection rates, moderate consumption, pollution control; Yet looming crisis

1 – Enough investment to renew the decades’ old heavy infrastructure?

2 – How much more needed to improve environnemental performance (EU Directives, national laws, etc.)

3 - If 1 and 2 are met, is water price still socially acceptable? Social tariffs? Why not re-mobilise citizen on top of sole consumer payment?

4 – And politically? Need of a 4th axis, on governance ans re-territorialization
Analytical Framework

• **Specificity of water services** hard to grasp by usual economic toolbox: e.g., antinomy between water conservation and cost recovery

• Need to develop **New theoretical tools** to analyse water consumption decline: «macro» surveys are insufficient (cf. recent work by Jay Lund & coll.)

• **Redistributive effects** of tariff formulas result being **counter-intuitive**: need for socio-economic «before-after» field surveys

• Future WSS services resilience nécessite une **multi-level governance** relying on a double evolution: «up-scaling» & «down-scaling»
Methodology

• 2 first years: a survey on other developed countries’ practices (Europe, USA, Australia)

• Contribute to improve knowledge in the 4 dimensions considered:
  – What makes water consumption change?
  – How to make systematic & long term infrastructure management/renewal?
  – What sustainable management of the social dimension / right to water?
  – Which new governance formulas could be imagined?

• Case studies
  – Paris: important consumption decline (-25% in 15 yrs)
  – Bordeaux: deep aquifer overexploitation
  – Languedoc-Roussillon: water greedy urban sprawl

• Development of prospective scenarios
Major results (1)

• Evolution of institutional and functional territories of WSS services in Europe, USA and Australia
  – Concentration of utilities at supra-communal scale
  – Emerging « decentralized » solutions, alternatives to networks

• In France : growing role of the départements (counties)
  – Le département : services rationalisation / securing resources
  – County council: actor which could (?) play a key role in WSS and resource governance
  – Issue of controlling water resources by cities and water services?

• Paris : decrease in consumptions, redistributivity debate
• Dimension sociale : a simulation tool to assess the effects of tariff changes
Chief results (2)

- In Languedoc-Roussillon: Forecast drinking water demand in cities with large periurban growth:
  - Statistical analysis at communal (148), neighbourhood (100) and household (500) scale
  - Modelling future water demand: module demography & housing types, elasticity to price, individual well-drilling, Climate change impacts...

- In Bordeaux: deep aquifer overdraft under increasing water demand due to urban sprawl and out-migration
  - Infrastructure sizing and adaptation of the water levies of the Agence de l’Eau
  - Modelling water consumption in public housing (single family vs condominiums)
Future Perspectives

- EAU&3E: only drinking water: include sewage coll. & treatment
- Collaborations to maintain and develop
- Testing new tools on other areas in France and elsewhere
- A final EAU&3E seminar scheduled in 2013: communication and discussion of results
  - Thnks for attention