2014 UN-Water Annual International Zaragoza Conference

Preparing for World Water Day 2014: Partnerships for improving water and energy access, efficiency and sustainability

WORLD WATER DAY 2014
& water & energy
22.03.2014
Partnerships between water & energy utilities

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THE INTERNATIONAL FEDERATION OF PRIVATE WATER OPERATORS
Introduction

• Are water and energy partnerships common?
• Key similarities between water and energy
• Key differences between water and energy
• Water for Energy
• Energy for Water
• Shared Issues
  • Introductions to case studies
• Panel discussion
• Summary
Are water and energy partnerships common?

• It seems not
  – Not been able to identify very many
  – The Myth of the Multi-Utility
  – No mention of water in the energy chapter of the “World we Want” and vice-versa

• So why not?
  – What do we mean by partnership?
  – Are the issues and technologies compatible?
  – Are there other barriers?

• Is it worth trying to stimulate them?
  – Sustainable development, Climate Change, Water Stress
  – Post-2015 development agenda
Key similarities

- Key similarities between water and energy utilities include:
  - Networked public services
  - Level of natural monopoly
  - Undifferentiated ‘product’
  - Key in modern societies
  - Crucial to economic activity
  - Water poverty & energy poverty usually afflict the same users
  - Increasingly important in relation to environmental change
Key differences

- Key differences include:
  - Different languages & concepts used
  - Historic development
  - Geographic scale & degree of concentration
  - Role in national planning – strategic – controlling/adjustment
  - Economic basis and capacity to invest
  - Nature of the service
  - Production vs Distribution
  - Value chain vs life cycle
  - Nature of fixed assets
  - Public health impacts
  - Wastes & Pollution
  - Future evolution
Water for Energy

- A fuel - Hydro power
- Energy transfer (steam)
- A pollution remover (heat dissipation)
- A means of storing energy
- A fuel transport medium
- Enhanced fuel 'mining' (Fracking etc.)
- Production of bio-mass & bio-fuel
- Role of water in renewables
Energy for Water

• Energy essential for water services
• Energy efficiency in pumping & treatment
  – Pump scheduling
  – Energy use vs treatment speed
  – Energy use vs plant footprint
  – Energy use vs treatment level
• Desalination
• Energy recovery
• The 'heat' in hot water
Shared Issues

• Internal efficiencies
• Service interruptions & outages
• System losses
• Un-billed (non-revenue) production
• Resource availability & security
• Political involvement
• Sustainable development
Shared Issues

- Users efficiencies
  - Incentives & Awareness
  - Appliance standards & Codes
  - Saving water to save energy
- Regulated Tariffs
- Affordability
- Customer management
  - Domestic
  - Commercial & Industrial
  - Agricultural
Shared Issues

- Legal frameworks
- Regulation
- Demographic influences
- Technological evolution
- SMART Grids
- Long-term planning
- Territorial integration
- Stranded assets
Case studies

• Operational Water & Energy Efficiency
  – Dominique Gatel - Véolia

• Water, energy, wastewater & Waste in Casablanca
  – Saïd Chadli - LYDEC

• Water & energy production in Madrid
  – Ignacio Lozano - Canal Gestion
Operational Water & Energy Efficiency

Dominique Gatel - Véolia
Veolia for Environment, Resources, Economy & Society

Naugatuck
- Reliability-centered maintenance

Milwaukee
- GIS-based job management systems
- Veolia Water across US
- H&S performance program
- Balanced score cards
- CO₂ and water impact evaluation

Copenhagen
- Storm water and CSO management

Berlin
- Comprehensive job management system
- Automation of operations and flow optimization
- Co-fermentation in WWTP = energy optimization
- Trenchless sewer rehabilitation techniques

Budapest, Prague
- Energy efficient wastewater treatment plants

NYC - DEP
- WWTPs operated to ensure high level of compliance
- Unique watershed management system
- Comprehensive filtration avoidance determination program
- Green infrastructure and blue belts
- World's largest state-of-the-art UV plant
- Large scale AMR program

Brussels
- Bioplastic recovery from wastewater

Paris-area
- Integrated control center
- Condition-based maintenance

Paris-area, Berlin, Shanghai
- Veolia Water training centers

Shanghai
- Integrated control center
- Underground asset management

Lyon
- Vacuum excavation
- Douai
- Green infrastructure and Eco-district

Singapore
- Water reuse
- Control systems
- Innovation through new technology
- Marketing and public engagement

Veolia Water across Australia
- Asset management (capital management planning)
Smart Territories: Real-time Energy & Water flows management

1. Sourcing Energy/ water at regional /local scale
   - Public transportation: tramways, bus
   - Organic waste recycling
   - Stormwater control and treatment
   - Electric vehicles

2. On site Energy/ water production/recovery
   - Urban cleaning using recycled water
   - Recovering and reusing rainwater
   - Selective pneumatic waste collection
   - Reusing process water
   - Photoelectric cell panels

3. Better measure & use of Energy/ water
   - Biomass co-generation plant
   - Urban outdoor cooling
   - Micro wind turbines
   - Plant treatment and solar drying
   - Underground waste containers
   - Geothermal energy
   - Solar plant
   - Drinking water
   - Waste sorting centre
   - Utility tunnel
Solutions for cities

- **Energy/Water audits**
  - Optimizing replacement of equipment
  - Re-engineering key-steps of the processes - Digestion of biodegradable material

- **New water & energy sources:**
  - Energy/Gas/heat to the grid
  - Water suitable for environmental flows/washing/irrigation and other community uses

- **Nagpur, India**
  - Around 3 million inhabitants
  - Intermittent water supply
  - 1 million slum dwellers
  - Network leakages > 50%

- **24/7 safe water supply for all with the same assets**
  - Using less energy & water
Solutions for industries

- Energy/Water audits
- Water Risks analysis
  - Physical / Regulatory / Price
- Portfolio of proven technologies
  - Ion exchange
  - Filtration / ultrafiltration solutions
  - Desalination of mine water
- Water suitable for
  - Irrigation, environmental flows and other community uses
  - And/or Up to Zero Liquid Discharge
Lydec Case Study Background
Saïd Chadli
Lydec - General Overview

• **Historical operator of services in the Greater Casablanca Area**

• **4 delegated services:**
  - Water distribution
  - Electricity distribution
  - Waste water collection and treatment, storm water collection
  - Public lighting (may 2009)

• **A 30-year management contract signed in 1997**

• **Around 3500 Employees**

• **Listed on Casablanca’s stock exchange market**
Focus on Lydec’s core businesses

**WATER**
- 29 water tanks and tower for a total 624 330 m³ storage
- 20 pumping stations, 68 pumps
- 4 661 km of network

**SANITATION**
- 76 wastewater plants of which 2 pre-treatment plants
- 176 pumps
- 4 251 km of wastewater collectors

**PUBLIC LIGHTING**
- 115 500 lighting points and 3 150 km of network
- 12,6 km of renewed network & 10 km of network extension – through 27 projects

**POWER**
- 10 source substations HV/MV generating 1 390 MVA
- About 3000 public distribution substation MV/LV et 1 650 client lines managed
- 2 260 km of MV network
Greater Casablanca

5 Millions inhabitants

20% lived in sub-standard housing

Municipalities supplied by Lydec with water, sanitation, electricity and public lighting

Municipalities supplied by Lydec with water and sanitation

Municipalities supplied by Lydec with electricity and public lighting
Contributing to urban inclusion of informal settlements: Services, leverage effect on development

- Development
- Social & economical Dynamic
- Improvement of the built environment
- Land Title Regularization
- Land Permits
- Housing
- Services
- Water / Waste Water/ Electricity
Lydec’s intervention in informal settlement areas

Lydec signed an agreement in 2005 with the Greater Casablanca Wilaya, the local authority of the Ministry of Home Affairs in charge of such agreements, aimed at offering underprivileged neighbourhoods in the Greater Casablanca area access to utilities:

- Lydec created the INDH-INMAE Department (70 people) dedicated to manage the technical, institutional and client aspects of the project.
- Lydec is involved in the upgrading program of existing housing by connecting **80,900 homes** to water and waste water services (around 500,000 inhabitants)
- The partners in the INDH-INMAE Project are the Ministry of the Interior, the delegating authority, the governors of prefectures, provinces, and municipalities of the Greater Casablanca area.
- Periodic meetings were held with various stakeholders and semi-annual reporting documents were produced.
Energy management

*Best practices– Canal Gestión experiences*

Ignacio Lozano Colmenarejo
*Head of Projects*
Canal de Isabel II Gestión is Madrid Region Water Supply, Wastewater and Reused water operator.

### Abstraction

<table>
<thead>
<tr>
<th>Reservoirs</th>
<th>Water taken for consumption</th>
<th>Sanitation</th>
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<tbody>
<tr>
<td>Reservoirs</td>
<td>Million m³</td>
<td>Sewage network</td>
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<tr>
<td>14</td>
<td>946</td>
<td>Kilometres</td>
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<td>11.148</td>
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### Treatment

<table>
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<th>Potable water treatment stations</th>
<th>Treatment capacity</th>
<th>Sanitation</th>
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<tbody>
<tr>
<td>Treatment</td>
<td>Million m³/day</td>
<td>Collector and omission network</td>
</tr>
<tr>
<td>13</td>
<td>4,5</td>
<td>Kilometres</td>
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<td></td>
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<td>751</td>
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### Distribution

<table>
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<tr>
<th>Distribution network</th>
<th>Large water tanks</th>
<th>Re-use</th>
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<tbody>
<tr>
<td>Kilometres</td>
<td></td>
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<tr>
<td>17.087</td>
<td>24</td>
<td>25</td>
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</table>

Canal de Isabel II Gestión is responsible for providing water services to 6,5 millions inhabitants (1,39 millions of clients).
Our Electricity Consumption

Canal de Isabel II Gestión is a major consumer of electricity.

Due to southern Europe weather conditions, our electricity consumption varies in relation to rainfall and water reservoirs.

**Dry years imply lower inflow to the reservoirs** and greater use of alternative resources (pumping from rivers and wells). Due to this fact, last year electricity consumption rose significantly.

![Electricity Consumption Graph]

- Water supply (44%)
- Waste Water (54%)
- Reuse and other (2%)

200 GWh!!
Our Electricity Generation

Canal de Isabel II Gestión is a considerable producer of electricity.

We have a considerable generation capacity. Canal Gestión is the company with the largest installed capacity for production of electricity in the Region of Madrid: **82 MW**

**Electricity Consumption and Generation**

Hydro generation of electricity varies among years in opposite direction than our electricity consumption.

Cogeneration, Biogas and microturbines are more stable sources of electricity generation.
Best Practices adopted

Increasing in new renewable energy.

- New microturbines implementation in the water supply network
- New biogas plants development

Energy purchase

- Enhancing negotiation capabilities of the auction with two rounds
- Reduce open positions of suppliers (reducing time to sign contract)
- Selecting the best moment to buy electricity

Energy optimization

- Optimize use of energy whilst producing water and treating water (for instance: pump from lower reservoirs according energy economic model – Alberche reservoirs pump system)
Panel Discussion
A 3 LEVEL PRICE EQUALIZATION SYSTEM FOR WATER CONSUMPTION

Equalization at National level

- Purchase of water at a price above the calculated cost of production

Contractual Equilization

- According to the delegated management contract, allowing a multi-fluid management, the incomes from power activity are used to finance water and sanitation infrastructure.

Price Equalization

- Social Equalization Application of a social tariff and a progressive pricing

<table>
<thead>
<tr>
<th>Water for domestic use</th>
<th>Quantity</th>
<th>Monthly price (excluding 7% VAT)</th>
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<tbody>
<tr>
<td>Price bracket 1</td>
<td>≤ 6m²</td>
<td>2.99</td>
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<tr>
<td>Price bracket 2</td>
<td>6m³ ≤ 8m³</td>
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<td>Price bracket 3</td>
<td>8m³ ≤ 20m³</td>
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<td>Price bracket 4</td>
<td>&gt; 20m³</td>
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<td>Fixed fee</td>
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SUMMARY & CONCLUSIONS