The institutional and economic framework for water reuse on the Costa Brava

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Workshop on Desalination and Reuse
Rethinking future resources
Part 3 - Water reuse : How to make things happen ?
Marketing reclaimed water, funding water reuse projects

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The Costa Brava

- Name given to the coastal strip of Girona’s province, in NE Spain
- Mediterranean climate: hot, dry summers, mild winters and usually wet autumns and springs
- Rugged coastline, with beautiful beaches, tourism-oriented area
- Resident population, approx. 240,000 inhabitants. Maximum population in summer estimated at over 1 million inhabitants.
The Consorci de la Costa Brava (I)

- Water agency created in 1971 by the 27 municipalities of the area
- Deals with the whole water cycle:
  - Wholesale purveyor of drinking water to 14 municipalities (3 of them external to CCB) - 19 million m$^3$/year in 2007, which account for 63% of the total volume supplied in the area.
  - Biological wastewater treatment to 28 municipalities (2 of them external to CCB) in 18 WWTP – 30.1 million m$^3$/year in 2007. The 2 remaining municipalities to be connected to WWTP by 2010.
  - Reclamation and reuse of treated wastewater for non-potable purposes since 1989 - 5.5 million m$^3$/year in 2007 produced in 14 facilities
- Construction, operation and maintenance of water treatment facilities funded by the Catalan Water Agency (regional water authority)
The Consorci de la Costa Brava (II)

- Facilities operated by CCB (as of 2008)
The Consorci de la Costa Brava (III)

- Operation of the WWTP and reclamation facilities organized into four areas
- Until April 2006, operations were contracted out through periodic public tenders for each of the areas. Since then, the four areas have been operated by Empresa Mixta d’Aigües de la Costa Brava SA (EMACBSA – “Costa Brava Water”), after a public tender in 2005.

<table>
<thead>
<tr>
<th>Operational area</th>
<th>Number of WWTP</th>
<th>Volume of wastewater treated in 2007, million m³/year</th>
<th>Number of reclamation facilities</th>
<th>Volume of reclaimed water produced in 2007, million m³/year</th>
<th>Percentage of water reclamation, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>9</td>
<td>6.3</td>
<td>7</td>
<td>1.0</td>
<td>16</td>
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<tr>
<td>Central I</td>
<td>4</td>
<td>4.1</td>
<td>2</td>
<td>0.6</td>
<td>15</td>
</tr>
<tr>
<td>Central II</td>
<td>2</td>
<td>10.4</td>
<td>2</td>
<td>0.9</td>
<td>9</td>
</tr>
<tr>
<td>Southern</td>
<td>3</td>
<td>9.3</td>
<td>3</td>
<td>3.0</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>30.1</strong></td>
<td><strong>14</strong></td>
<td><strong>5.5</strong></td>
<td><strong>18</strong></td>
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</tbody>
</table>
The Empresa Mixta d’Aigües de la Costa Brava, SA

- Created on April 1st, 2006. Registered capital: 600,000 €.
- Headquarters in Girona
- Shareholders:
  - Public: Consorci de la Costa Brava (33 %)
  - Private: Grouping of Economic Interest (67 %), formed by the following companies:
    - SEARSA
    - SOREA
    - AQUALIA
- Operates all the wastewater treatment and reclamation facilities owned by the CCB and some owned by the municipalities served by the CCB (i.e., pumping stations)
Reasons for water reuse on the Costa Brava

- Over-extraction, depletion and pollution of the small coastal aquifers since the mid 60’s due to the development of touristic activities and the lack of adequate facilities
- Increase in non-potable urban demand (golf courses, private and municipal gardens)
- Significant investment has been required to ensure an adequate supply of drinking water in the area (water transfers and desalination)
- Significant investment in wastewater collection and treatment to biological, secondary level. Most of the water is discharged into the sea through submarine outfalls
- Additional treatment was devised (in the form of reclamation) to produce safe water to cope with non-potable demands in order to achieve a more rational and efficient management of water resources in the area
Evolution of water reclamation on the Costa Brava (1985-2007)
Reclaimed water uses on the Costa Brava

- Golf course and landscape irrigation: 51%
- Environmental uses: 8%
- Aquifer recharge: 2%
- Agricultural irrigation: 23%
- Urban non-potable uses: 16%
Financing of water reclamation facilities on the Costa Brava

- Initially, no fully defined thought-out scheme – decisions taken and changes made according to the circumstances of each time and place.
- Early days: reuse of chlorinated secondary effluents. Investment made by users.
- Second half of 90’s: Application for EU’s Cohesion Funds. Seven reclamation projects approved. Funding: EU 80%, CCB 20%.
- Since 2000: Funding by Catalan Water Agency. Initially, it provided complete funding but the recent trend is aimed at recovering a portion of the investment through reclaimed water pricing.
Types of reuse according to reclaimed water pricing (I)

- **Non-billable**, when reclaimed water is used in the public interest and expenses are covered by the Catalan Water Agency. Such cases account for 77% of the reclaimed water produced in 2007. Examples:
  - Aquifer recharge for resource augmentation in Blanes and for seawater intrusion control in Llançà and Pòrt de la Selva
  - Environmental reuse at the Aiguamolls de l’Empordà (Empordà Marshes) Nature Reserve
  - Agricultural irrigation for users who have had their resources reduced to favour the production of drinking water (Torroella de Montgrí)

- **Billable**, when there is a private end user. This accounts for 23% of the reclaimed water produced in 2007. Examples:
  - Golf courses (6) & Pitch & Putt facilities (2)
  - Farmers growing corn (2) and fruit and vegetables (1)
  - Wineries (1)
Types of reuse according to reclaimed water pricing (II)

- Reclaimed water supplied to municipalities for their own non-potable urban uses may be subject to pricing in the near future.

- On the Costa Brava, most of the water produced so far has fallen into the “non-billable” category.

- **Observation 1:**
  In the initial phase of development of water reuse projects, the non-billable type may be the predominant kind.
Billable reclaimed water

- Main idea: If the supplying of reclaimed water to a private user has positive side-effects on a wider scale (i.e., groundwater conservation), arrangements should be made to make it happen.

- Principles:
  - Pricing is aimed at covering the additional direct expense due to reclamation (energy, chemicals) and reuse (monitoring)
  - Reclamation treatment is organized within the WWTP to ensure economy of scale in terms of the existing operating team (processes, maintenance, laboratory use)

- Observation 2:
  Efforts to keep reclaimed water prices low may favour the conservation of drinking water and, in some cases, delay the need for new and expensive resource developments.
Supply of reclaimed water to private users

- Regulated by a contract between the CCB and the user
- Possible only when the user has a reclaimed water concession from the Catalan Water Agency – or has applied for one
- Agreements on:
  - Flow to be delivered
  - Quality (regulated by the Spanish legislation -RD 1620/2007-)
  - Monitoring requirements
  - Price
  - Other issues: duration of the agreement, specific conditions, etc.
- Prices:
  - Average: 0.12 €/m³
  - Range: from 0.02 – 0.54 €/m³
  - Differences due to the volume supplied and to specific local factors
- CCB regularly issues a bill to the user (usually, monthly). EMACBSA is paid by CCB for the reclamation and reuse work, aside from the wastewater treatment work.
- CCB/EMACBSA are entitled to stop the reclaimed water supply if quality criteria cannot be met and there is a suspected risk to public health.
Future trends – What lies ahead?

- Increase in aquifer recharge for resource augmentation and seawater intrusion control
- Increase in supply through specific reclaimed water pipelines
  - Two municipalities already have reclaimed water distribution pipelines in operation and several others are interested in having their own
  - Possible arrangement:
    - CCB / EMACBSA to be responsible for the production of reclaimed water and to become wholesale suppliers to the municipalities
    - Municipalities to be responsible for the sale of reclaimed water to the customers.
    - Allocation and distribution of costs and administrative issues such as concessions are still to be fully defined
The keys to success – so far!

- A change of mentality from “treating wastewater so it can be discharged” to “reclaiming it so it can be reused”
- Leaving scope for learning and working towards gradual improvements
- Decision-making based on the protection of public health
- Coordination and team work between local authorities, operating companies and users is essential
- Helping to develop users’ own schemes and being sensitive to the users’ need for success

Local farmers that use reclaimed water for irrigation
Conclusions

- Reclaimed water has become an additional water resource on the Costa Brava since 1989. It has helped to cover non-potable demands and to improve water resource management in the area.
- The initial, simple disinfection devices were funded by private users. Later funding for the construction of reclamation facilities has come from public sources (CCB, Catalan Water Agency, EU).
- 77% of the reclaimed water produced on the Costa Brava is non-billable, since it is used in the public interest (aquifer recharge, nature enhancement and resource exchange).
- The billable 23% is supplied to private users under contracts. Average price of reclaimed water is 0.12 €/m³, and price range varies between 0.02 – 0.54 €/m³.
- Two municipalities have reclaimed water distribution pipelines in operation and several others have projects in different phases. Administrative and financial arrangements to be fully defined yet.
- A change of mentality, team work and encouraging user success have been instrumental in the development of water reuse on the Costa Brava to date.
Thanks for your attention!

Questions?