How utilities are addressing the Water-Energy-Food Nexus

Water-Energy-Food Nexus – A strategy for future water security?

Ricardo Sandoval
The nexus model

Water utilities: functions, incentives and regulations (1)

- Functions: determined by legal & regulatory framework
- Resources: limitations & restrictions
  - People
  - Natural resource: availability, legal access
  - Financial resource: tariffs & subsidies
- Institutions
  - Formal framework: laws & organizations
  - Non-formal rules: enforceability of rules (users/servants)
- Framework determines relationship with other sectors
  - Interactions
  - Exchange of resources
Water utilities: functions, incentives and regulations (2)

The Mexican case
Water utilities: functions, incentives and regulations (3)

The Mexican case

- Water resource regulation
  Under Federal Jurisdiction

- Water Utility

- Assets

- Financial resources

- Energy Production

- Agricultural production

- Heavily dependent on Federal subsidy programs for CAPEX
  + weak & unstable tariff systems for OPEX
Experiences: basin-wide cooperative projects

Environmental assets: Chapala lake and other water bodies

Urban systems: Guadalajara, León, Querétaro

Agricultural production (ID’s and IU’s)

Power generation

http://www.springerimages.com/Images/RSS/1-10.1007_s12685-009-0002-7-3
Experiences: joint projects between WSS services and agriculture

Potential benefits
• Exchange saved water
• Reduce water and fertilizers use
• Generate income for poor peri-urban dwellers

Issues to be solved
• De facto use
• Water rights and permits
• Downstream impacts
• Food safety
• Market integration
### Experiences: energy efficient use in water utilities

<table>
<thead>
<tr>
<th>Existing Programs</th>
<th>CONAGUA (IMTA, GIZ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Watergy</td>
</tr>
<tr>
<td></td>
<td>FIDE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>Technical assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Financial support</td>
</tr>
<tr>
<td></td>
<td>Subsidies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Short term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long term</td>
</tr>
<tr>
<td></td>
<td>Energy savings</td>
</tr>
<tr>
<td></td>
<td>Cash flow</td>
</tr>
<tr>
<td></td>
<td>Capacity building</td>
</tr>
<tr>
<td></td>
<td>Technology transfer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technology</td>
</tr>
<tr>
<td></td>
<td>Human Resource</td>
</tr>
<tr>
<td></td>
<td>External drivers</td>
</tr>
<tr>
<td></td>
<td>Institutional stability and accountability</td>
</tr>
<tr>
<td></td>
<td>Appropriateness</td>
</tr>
<tr>
<td></td>
<td>Sustainable adoption</td>
</tr>
<tr>
<td></td>
<td>Long term development</td>
</tr>
<tr>
<td></td>
<td>Source depletion &amp; pollution</td>
</tr>
<tr>
<td></td>
<td>Land use mismanagement</td>
</tr>
</tbody>
</table>
Mitigation in the water sector through carbon neutral WWUs

Water –––––––––––– NEXUS –––––––––––– Energy

GHG reduction in WWUs (> 3 pilots) in Peru, Mexico, Thailand

A | Pilot Measures
Technology effect and viability demonstrated in 3 pilot utilities
Utility advice and training on
• Technology introduction, operation and maintenance
• Economic viability of technologies
• GHG monitoring

B | Framework
Institutional / political framework favourable for GHG reduction in WWUs
Advice to sector institutions on
• Regulation
• Financing mechanisms
• Mitigation strategies

C | Multiplication
Experience on GHG reduction in WWUs disseminated
Dissemination through
• Operator’s Partnerships
• National and regional associations
• Internet-based knowledge platform, events

New approaches: WaCCliM (GIZ)
Issues and opportunities

- **Financial**
  - OPEX
  - CAPEX

- **Human resource**
  - Training
  - Development

- **Operational**
  - Monitoring

- **Legal**
  - Flexibility
  - Enforcement

- **Institutional**
  - Governance
  - Org. Stability

- **Coordination**
# Perspectives and way forward

## Financial
- Incentives via energy pricing mechanisms
- Budgetary support linked to performance results
- Capital markets development for CAPEX in WSS

## Human resource
- Training and certification linked to concrete incentives
- Promote research and development linked to technology transfer

## Institutional
- Improve accountability mechanisms and regulation
- Promote organizational stability through institutional reforms

## Coordination
- Design flexible and agile coordination programs
- Promote joint projects between WSS systems, energy providers and agricultural producers

## Legal
- Adapt existing water rights and permits mechanisms to allow flexible arrangements
- Improve measuring, monitoring and law enforcement

## Operational
- Improve the quality of electricity provision
- Improve operational capacities of the WSS providers
Thank you!

Ricardo SANDOVAL
rsandoval@sexanteconsultores.mx