How to implement a NRW program: perspectives on Performance-Based Contracts (PBCs)

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The traditional approach for contracting NRW reduction services

- Many utilities rely on outside help to carry out a NRW reduction program
- Typically, a private firm is contracted to carry out a series of tasks (leak detection, repairs, meters replacement...) and is paid against a price schedule
- The private firm gets the same remuneration, regardless of the results achieved in NRW reduction
- What counts is whether the work contracted has been done: an input-based approach
Shortcomings of the input-based approach

- The utility is responsible for designing the work program, and the contractor has little flexibility both to add its expertise in program design, or adjust to what is found during implementation.

- Even if it has, it will choose to do the tasks that are most profitable according to the contract’s cost schedule, instead of those with the most NRW impact.

- The contracting utility takes most of the risk, and the financial incentives are weak: no wonder NRW programs can be disappointing! (but not the sole reason)
What is Performance-Based Contracting?

- With a performance-based contract (PBC), the contractor still is paid partly on completion of works…

- … but part of its remuneration is also becomes based on the achievement of pre-determined targets in NRW reduction

- If all the works are completed but the NRW targets are not met, the contractor receives only a portion of the contract’s remuneration
Advantage of PBC approach

- Under a PBC, the contractor has **flexibility** to decide how to achieve NRW targets: leaves room for creative solutions (experiences from elsewhere), adjusting the program to what is found during implementation.

- The contractor has stronger **incentives** to focus on actions that have the greater impact on NRW.

- The contractor takes more risks, but can increase it remuneration accordingly. The utility pays the full contract’s price only if NRW targets are achieved:

  A well designed PBC should be a **win-win**.
Example 1: Selangor State, Malaysia (1998)

- The contractor decides on establishment of DMAs (sizing and location)
- It also decides on activities for NRW reduction: leak detection, repairs, new pressure valves, meters…
- All costs are paid based on fixed price schedule
- Baselining as soon as each DMA is established
- Variable portion was only 5% (penalty), fixed target
- By year 7: NRW reduction of 60 M m3 per year, but at a cost of $500 / m3… and leaking elsewhere…

- 3 contractor, each with one predetermined area of the city (about 25% in total)
- Focus on leakages, ranging from about 500 to 1,500 liters per connection per day
- Reimbursable: DMA establishment, leak detection, leak repairs, main rehabilitation
- No fixed NRW targets: payment on m3 saved based on baseline measured once DMA established
## Results of Bangkok PBC (4 years)

<table>
<thead>
<tr>
<th></th>
<th>Before PBC contract</th>
<th>After PBC contract</th>
<th>Cost per m3/saved per day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NRW liters/con.d</strong></td>
<td>1475</td>
<td>548</td>
<td>1096</td>
</tr>
<tr>
<td><strong>Number of connections</strong></td>
<td>99,000</td>
<td>239,000</td>
<td>142,000</td>
</tr>
<tr>
<td><strong>DMAs established</strong></td>
<td>76</td>
<td>86</td>
<td>73</td>
</tr>
<tr>
<td><strong>Mains replacement (km)</strong></td>
<td>130</td>
<td>158</td>
<td>255</td>
</tr>
<tr>
<td><strong>Leaks repaired</strong></td>
<td>71,307</td>
<td>31,182</td>
<td>51,905</td>
</tr>
<tr>
<td><strong>Leakage reduction (m3 per day)</strong></td>
<td>39,905</td>
<td>33,397</td>
<td>91,905</td>
</tr>
<tr>
<td><strong>NRW liters/con.day after contract</strong></td>
<td>1,072</td>
<td>408</td>
<td>451</td>
</tr>
<tr>
<td><strong>Cost per m3/saved per day</strong></td>
<td>US$ 400</td>
<td>US$ 507</td>
<td>US$ 240</td>
</tr>
</tbody>
</table>
These two early cases illustrates major issues with PBC design

- What should be the proportion of variable vs. fixed remuneration?
- What should be the flexibility left to the contractor?
  Selangor shows that 5% not enough if lot of flexibility
- Fixed targets/penalties vs. bonus per m3 saved?
- NRW is complex, contractors are not the same an won’t make same decision: importance of technical qualifications and competition
Where have PBCs for NRW been tried?

- Brazil: SABESP (São Paulo) has been pioneer for NRW PBCs (large meters replacement, NRW), Itapeva city
- South Africa: leakage / energy efficiency (Enfuleni)
- Commercial losses: Burkina Faso (ONEA), Madaba, Jordan
- Recent contract in Bahamas (2012) and Jamaica (tender phase)
PBCs with wider objectives including NRW

- Remuneration based partly on performance for NRW reduction, with other indicators: bills collection, financial ratios, % metering…

- Malawi (with Vitens)

- Tegucigalpa, Honduras 2011

- Colòn, Panama, tender phase

- More ?....
Still a new, incipient approach

- Complex in terms of contracts:
  - Reliable database
  - Independent monitoring
  - Higher risks of conflicts

- Need ring fencing

- Need cooperation of utility staff

- What to do if no reliable data?

- What about risky countries? How much risk (i.e. variable payment) will contractors accept?
Beware the “magical wand” mistake

- A PBC may be more efficient than a traditional service contract…
- But this should not provide an excuse to forget the “difficult issues”
- Address conflicts between commercial and technical departments
  1. In house NRW taskforce coordinating all aspects
  2. Address illegal practices (meters…)
  3. Ensuring that the savings will be sustained
PBC taskforce at IWA

- Goal: support the development of PBC in the water industry, as a new/more efficient manner to improve operational efficiency of utilities
- Group of experts contributing time and experiences, on a voluntary basis
- Next 2 years:
  - Article on Water21 magazine of IWA
  - Dedicated page on IWA website, gathering articles, studies and contracts + discussion forum
  - Book on PBC gathering contributions from taskforce members for IWA congress in Lisbon Sept. 2014
Thank you for your attention

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