Technical Deep dive
World Bank

*Illustrating PPP with example in Waste Management*
The industrial revolution leads to the development of cities in need of infrastructure for the sake of people’s hygiene and health: Water and sanitation networks are built over great distances, access to safe water is provided, and modern waste collection is invented.

After the war, big cities and suburbs increase their needs in water supply demand to provide a healthy water 24/7 for more people, to treat urban and industrial waste water, to collect but also store and incinerate increasing waste quantities.

At the dawn of the 21st century, a new chapter begins at the Rio Earth Summit. World leaders make the protection of the earth a priority. Cities and industries are seeking new solutions to face resource scarcity.
A world leader in the smart and sustainable management of resources, we help cities and industries optimize water management, recycling and waste recovery.

<table>
<thead>
<tr>
<th>Employees</th>
<th>Operating on</th>
<th>Industrial and business customers</th>
<th>Turnover in 2016*</th>
</tr>
</thead>
<tbody>
<tr>
<td>over 90,000</td>
<td>5 continents</td>
<td>over 450,000</td>
<td>€15.3 billion</td>
</tr>
</tbody>
</table>

- Drinking water produced (worldwide)*: 5.3 billion cubic meters
- Drinking water distributed (worldwide)*: 3,162 million cubic meters
- Waste water recycled (worldwide)*: 882 million cubic meters
- Wastewater depolluted (worldwide)*: 92%

- People benefiting from waste collection services*: 34 million people
- Waste treated*: 41 million tonnes
- Hazardous waste treated*: 2.9 million tonnes
- Recovered material from sorting centers*: 10.4 million tonnes

*Data as of 31/12/2016 without GE Water

Consolidated figures including GE Water & Process Technologies as of December 31, 2016.
PPP a tool to support Complexity of the Waste Management and Treatment Process
Why Public Authorities need PPPs in Waste Management

Performance Drivers

→ Improve the Quality waste management of the Services
→ Limited capacity for efficient management and innovation which results in risks.

Governance Drivers

→ Identify a responsible body with precise duties and charges
→ Transparency.

Economical Drivers

→ Discrepancy between limited revenues and strong financing needs
→ Including a private partner increases the credibility of their loan demands
→ Difficulties in getting access to international finance.

Environmental and Social Drivers

→ Infrastructure in need of capital improvements to meet environmental compliance issues
→ Difficulty in complying with regulatory standards.
Range of Contracts to improve clients' performance

Private Sector Involvement
Value creation for the client
Contractor's risk / revenue

Infrastructure contracts
Consulting engineering
Technical assistance
Consulting
Full Utility
Partial Utility
Public Utility
Operation & Maintenance (O&M) contract
Management contract
DBO contract
BOT / DBFO / PFI contracts
Lease / affermage contract
Concession contract

Legend:
- Service contracts
- Infrastructure contracts

Increasing PP/operator's time commitment and / or suitable context for PPP

Support
Privatization
Asset ownership
The contracting model should match the main clients drives

**Objective drivers**
- What is the **Objective** of the Client?
- Technical and management skills?
- Operational Efficiency ?
- Increase private investment ?
- Construction optimization?

**Responsibility Drivers**
- What part of the responsibility is the client ready to delegate?

**Scope of work Drivers**
- Which duration does the client want to be engaged?
- Which level of risk does the client want to transfer?
- Does the client have human resources to allocate for the project
- What is his level of technical capacity ?

**Financial resource Drivers**
- What part of investment can the client bring
- What finance benefit is the client expecting
<table>
<thead>
<tr>
<th>Contract models</th>
<th>Benefit from technical and management skills</th>
<th>Improve operational efficiency</th>
<th>Increase private investment</th>
<th>Outsource construction to operator/PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management contract</td>
<td>Yes</td>
<td>Possibly</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>DBO</td>
<td>Yes</td>
<td>Yes</td>
<td>(No)</td>
<td>Yes</td>
</tr>
<tr>
<td>BOT/DBFO/PFI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Affermage/Lease</td>
<td>Yes</td>
<td>Yes</td>
<td>Possibly</td>
<td>No</td>
</tr>
<tr>
<td>Concession</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Waste Management Activity** | **Type of contract**
---|---
Collection/Street cleaning | Concession
Recycling | DBO/O&M
Landfill | DBO/O&M
WTE / MBT or other treatment | DBO/BOT/O&M
## BOT: Transferring Risk to the Private Sector

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Availability Risk</strong></td>
<td>The risk that the quantum of service provided is less than required under the contract</td>
</tr>
<tr>
<td><strong>Construction Risk</strong></td>
<td>The risk that the construction of the physical asset is not completed on time, to budget and to specification</td>
</tr>
<tr>
<td><strong>Demand Risk</strong></td>
<td>The risk that demand for the service does not match the levels planned, projected or assumed</td>
</tr>
<tr>
<td><strong>Design Risk</strong></td>
<td>The risk that design cannot deliver the services at the required performance or quality standards</td>
</tr>
<tr>
<td><strong>Inflation Risk</strong></td>
<td>The risk that actual inflation differs from assumed inflation rates</td>
</tr>
<tr>
<td><strong>Legislative Risk</strong></td>
<td>The risk that change in legislation increase costs. This can be sub-divided into general risks such as changes in corporate tax rates and specific ones</td>
</tr>
<tr>
<td><strong>Maintenance Risk</strong></td>
<td>The risk that the costs of keeping the asset in good condition vary from the budget</td>
</tr>
<tr>
<td><strong>Operational Risk</strong></td>
<td>The risk that operating costs vary from budget, that the performance standards slip or the service cannot be provided</td>
</tr>
<tr>
<td><strong>Planning Risk</strong></td>
<td>The risk that the implementation of project fails to achieve the terms of planning permission, or that detailed planning permission cannot be obtained, or it obtained, can only be implemented at costs greater than the original budget</td>
</tr>
<tr>
<td><strong>Residual Value Risk</strong></td>
<td>The risk relating to the uncertainty of the value of physical asset at the end of the contract period</td>
</tr>
<tr>
<td><strong>Technology Risk</strong></td>
<td>The risk that changes in technology result in services being provided using non-optimal technology</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Guarantee By the Private Party

- Time to completion
- Fixed Gate Fee (with inflation revision)
- Waste Volume swallowing capacity (ex: 1000 TPD)
- Truck turn around time (ex 20 min)
- Environmental compliance (Emissions to Air, Effluent)
- Community Management

Risk taken by the Private Party

- Construction risk and project Schedule
- Fixed Gate Fee
  - O&M Cost
  - Waste Calorific Value which influence electricity production
- Availability Waste Volume swallowing capacity (ex: 1000 TPD)
- Environmental compliance (design risk, Operation Risk)
- Safety Risk, Community risk

Guarantee by the Public Party

- Provide Land
- Definition of the Waste (MSW, Food Waste, C&I)
- Guarantee of minimum Waste Volume (ex: 1000 TPD)
- Payment Guarantee
- Terms of contract (20 years+)

Risk by the Public Party

- Demand Risk
- Change of Law
- Risk of Choosing …

Risk and Guarantees Example of WTE
Example of PPP
improving economic and environmental performance
The land of DBO

- All Waste management contract in HK are DBO
- Landfill, Transfer Station, Infrastructure of Treatment...
- Each project are tender separately by EPD (Environment protection bureau) and consist of Design, Construction and then operation and management contract which terms vary depending on the project.

Benefits for HK

- Private Parties design the project based on concept from EPD, no interface between construction and O&M
- Allow deployment of technology at low risk
- Private Parties in control of the operation with stringent guarantee
- Competitivity (Lower Gate Fee) as:
  - Low cost of operation as Asset financing and shareholder return is not part of the services fee.
  - Operators is incentivize both on the construction and long term O&M
BOT in South East Asia for WTE

A Challenging Environment

The Challenges

- Complex Legal Framework with several agencies involved and most of the time not cooperating with each other (Grid, Cities, Environment bureau..)
- Difficult for non-capital cities to interact at national level to ensure that the city follow all the necessary steps to get PPP Approve.
- Stability of government decision and legal enforcement of contract.
- Under-estimation of the need for government guarantee and the impact of Finance industry.
- Poor conception of project, wrong consultant (or not independent) pushing for non-proven technology. Misunderstanding of the driver.
- Conflict inside the public party.
- Transparency.
- Management of tender.
- Barrier to limit competition (language, ownership...).
- Decision making..

Why BOT

- Municipalities in SEA are looking at BOT as Capex for WTE is substantial and they have many others infrastructure project in development.
- Technology and Operation are complex, it’s allow the most secure risk allocation of the public party to the private party.
PPP, the future in smart and sustainable management of resources
Providing access to technology

- **PPP allows implementation**, fine-tuning, improvement and ability to stay up to date to municipalities in their digital strategy
- **PPP legal framework has to be adapt to allow this deployment especially:**
  - Draft specification to allow technical innovation
  - Speed – to avoid obsolescence at launch
  - Allow inter-connection of interface and system – example connecting waste data and traffic data and security …
- **Cities need Private Parties for Development And operations.**

Exemple

- **In Barcelona**: Operate CityOS, through a public-private partnership. Barcelona’s operating system, CityOS provides a shared environment for connecting to or using the city’s data. The recovery of urban data will enable Barcelona to grow by developing new services.

- **In Singapore**: WaterGoWhere uses smart meters to keep residents updated on your water usage. Enabling reduction of loss at the user.
  
  SUEZ’s AQUADVANCED® Urban Drainage in tropical environments To ensure maximum rainwater storage while preventing urban flooding with End to end water quality monitoring for a safe resource and a pleasant city

- **In France**: Just in time collection with connect bin to Optimize waste collection thanks to effective data management, Reduce CO2 emissions, Reduce maintenance and servicing costs; zero overflow
SUEZ, a Group committed to people and the planet
Process and Step for PPP Approval

1. Project proposed by SOE (*)
2. Approval of the project proposal
3. Preparation of draft bidding document by the host agency
4. Public selection process
5. Approval from Responsible Minister

- Feasibility Study conducted by an independent external consultant (compulsory)
- Both qualitative and quantitative assessments
- Approval from Affiliated Ministry, SEPO and PPP Committee
- Draft invitation to tender, draft TOR and draft PPP contract
- Appointment of selection committee by the host agency
- Transparent bid requirements
- Transparent evaluation criteria
- Nomination of preferred private bidder through the following process:
  - Issuance of Notice of Invitation
  - Announce shortlisted candidates
  - RFP
- SEPO and Attorney General approve of Preferred Bidder and PPP contract
- Review by responsible Minister and submission to the Cabinet for consideration
- Enforcement of « security bond »
- Signing of PPP contract and financial close
- Completed project file submitted to SEPO 30 days after signing
- Appointement of a Supervisory Committee

150 days
- Minister: 60d
- SEPO: 30d (if no revision)
- PPP Committee: 60d (if deadline note met: implicit approval)

Process of revision between Minister, SEPO, host agency & Committee is clearly defined

- SEPO and Attorney General: 45 days
- Responsible Minister: 30 days
### PPP 5-Year Plan (2015-2020)

#### Table 1: PPP implementation time-frame

<table>
<thead>
<tr>
<th>Group 1: Projects which must have private investment</th>
<th>Operation period</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of rail transit system in city area</td>
<td>2014-2020</td>
<td>Started from 2011</td>
</tr>
<tr>
<td>Development of toll road in city area</td>
<td>2014-2020</td>
<td>Started from 2010</td>
</tr>
<tr>
<td>Development of shipping port</td>
<td>2014-2020</td>
<td>Expected to be completed in 2014</td>
</tr>
<tr>
<td>Development of high-speed rail system</td>
<td>2014-2020</td>
<td>Expected to be completed in 2018</td>
</tr>
<tr>
<td>Development of telecommunication network</td>
<td>2014-2020</td>
<td>Expected to be completed in 2020</td>
</tr>
<tr>
<td>Development of high-speed internet</td>
<td>2014-2020</td>
<td>Expected to be completed in 2020</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2: Projects for which the state should encourage private investment</th>
<th>Operation period</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of logistics and distribution centre</td>
<td>2014-2020</td>
<td>Expected to be completed in the concession period</td>
</tr>
<tr>
<td>Development of toll road between cities</td>
<td>2014-2020</td>
<td>Expected to be completed in the concession period</td>
</tr>
<tr>
<td>Management and maintenance of common ticket system</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Business development and management of airport area</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development and management of water quality management system</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development and management of irrigation system</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of solid waste disposal system</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of public school</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of infrastructure for science, technology and innovation</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of public health infrastructure</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Management of medicines and medical devices</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of convention centre</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development of airport under supervision of government agency</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development and management of shelter for poor, elderly and disadvantaged people</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
<tr>
<td>Development related to digital economy</td>
<td>2014-2020</td>
<td>No information</td>
</tr>
</tbody>
</table>

| Note: Information is subject to change after the hearing. Source: SEPO |

### Table 2: Estimated investment amounts under the strategic plan for 2015-19

<table>
<thead>
<tr>
<th>Project</th>
<th>Value (million baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of rail transit system in city area</td>
<td>567,928</td>
</tr>
<tr>
<td>Development of toll road in city area</td>
<td>3,035</td>
</tr>
<tr>
<td>Development of shipping port</td>
<td>124,435</td>
</tr>
<tr>
<td>Development of high-speed rail system</td>
<td>380,492</td>
</tr>
<tr>
<td>Development of telecommunication network</td>
<td>28,000</td>
</tr>
<tr>
<td>Development of high-speed internet</td>
<td>19,537</td>
</tr>
<tr>
<td>Development of logistics and distribution centre</td>
<td>14,584</td>
</tr>
<tr>
<td>Development of toll road between cities</td>
<td>451,078</td>
</tr>
<tr>
<td>Management and maintenance of common ticket system</td>
<td>600</td>
</tr>
<tr>
<td>Business development and management of airport area</td>
<td>No information</td>
</tr>
<tr>
<td>Development and management of water quality management system</td>
<td>31,080</td>
</tr>
<tr>
<td>Development and management of irrigation system</td>
<td>No information</td>
</tr>
<tr>
<td>Development of solid waste disposal system</td>
<td>3,504</td>
</tr>
<tr>
<td>Development of public school</td>
<td>5,000</td>
</tr>
<tr>
<td>Development of infrastructure for science, technology and innovation</td>
<td>40,650</td>
</tr>
<tr>
<td>Development of public health infrastructure</td>
<td>1,000</td>
</tr>
<tr>
<td>Management of medicines and medical devices</td>
<td>195</td>
</tr>
<tr>
<td>Development of convention centre</td>
<td>26,000</td>
</tr>
<tr>
<td>Development of airport under supervision of government agency</td>
<td>No information</td>
</tr>
<tr>
<td>Development and management of shelter for poor, elderly and disadvantaged people</td>
<td>No information</td>
</tr>
<tr>
<td>Development related to digital economy</td>
<td>No information</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,706,158</strong></td>
</tr>
</tbody>
</table>

| Note: Information is subject to change after the hearing. Source: SEPO |
The Design-Build-Operate (DBO) is a contract where the Private Partner provide assets and on-going operation and maintenance services in respect of the assets. But the Public Partner pays for the asset on completion and for services when provided.

<table>
<thead>
<tr>
<th>Client’s scope of work</th>
<th>Contractor’s scope of work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal ownership and regulatory responsibilities</td>
<td>Design &amp; Construction (performance based)</td>
</tr>
<tr>
<td>Project finance for new or existing works</td>
<td>Operation (performance based)</td>
</tr>
<tr>
<td>Setting and collecting tariffs</td>
<td>Provision of staff (+ transfer of existing staff)</td>
</tr>
<tr>
<td></td>
<td>Managing renewals and finance (depending on contract duration and client’s requirement)</td>
</tr>
</tbody>
</table>

**Characteristics:**
- Contract of results seeking for performance
- Construction part pre-dominant on short term DBO and balanced on long term DBO
- CAPEX owned by Client
- Operator’s investment responsibility limited to renewal as defined in the contract depending on duration and client’s will
- Design, Performance and O&M risks are transferred to DBO contractor
- Duration: 2 to 30 years
- Opportunity for some transfer of technology and good practices in long term DBO only
- Long term DBO appropriate for client willing to build and operate an infrastructure with performance objectives and able to finance the investment
- Short term DBO appropriate for clients willing to build an infrastructure and train its operators
• The BOT for Build-Operate-Transfer (also BOOT for Build-Operate-Own-Transfer) is a form of a public partnership for the development of treatment facilities (transfer stations/sorting and recycling centres/ EfW plants).
• The private Party takes the responsibility for the “Financing”, “Design”, “Construction” and “Operation& Maintenance” of the facilities during the term of the BOT contract.
• The project is often developed by a Single Purpose Company (SPC) specially incorporated for this purpose (design, construction, financing and O&M).
• The SPC has the possession of the assets during the term of the contract and hand them back to the Client (Public Authority) at the end of the contract duration.

**Characteristics:**
- Contract seeking for performance & results
- Construction and operation risks transferred to Operator = high risk transfer (integrated risk management)
- Payment for investment and operations over whole contract life, which must be long enough to enable asset amortization (20 to 30 years)
- Operation by field experts => guarantee for financiers (particularly when non recourse financing)
- Single Client – Single Contractor => Single Contract
- Particularly suited for new infrastructure entrusted by Public Sector

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Private operator has full control of the operations and investments.</td>
<td>• Bid costs considerably higher.</td>
</tr>
<tr>
<td>• High turn-over and income for the Operator with long-term partnership.</td>
<td>• High degree of risk transferred to private operator.</td>
</tr>
<tr>
<td>• Socio-economical role of the Operator who becomes a major player in the country.</td>
<td>• Capital-intensive business model.</td>
</tr>
<tr>
<td>• Ability to generate side business or spot new opportunities</td>
<td>• Capital-intensive model</td>
</tr>
<tr>
<td>• Off-balance sheet financing; leverage effect.</td>
<td>• Client insolvency and affordability risk</td>
</tr>
</tbody>
</table>
A Lawyer’s dream

BOT

Typical Structure

LENDERS

Shareholder 1  Shareholder 2  Shareholder 3

SPV

Financial risks
Interest rates
Currency exchange

Contract Agreement

Authority
Gateshead/Sunderland/South Tyneside

Political risks
Change in law
Third Party revenues risks

EPC (EfW) Sub-Contract

Construction risks
Delay, costs overruns
Meeting technical specifications

EPC Project Management

D&B Subcontracts

O&M Contract

PPA

Operation risks
Non-performance
Costs overruns

Third Party revenues risks