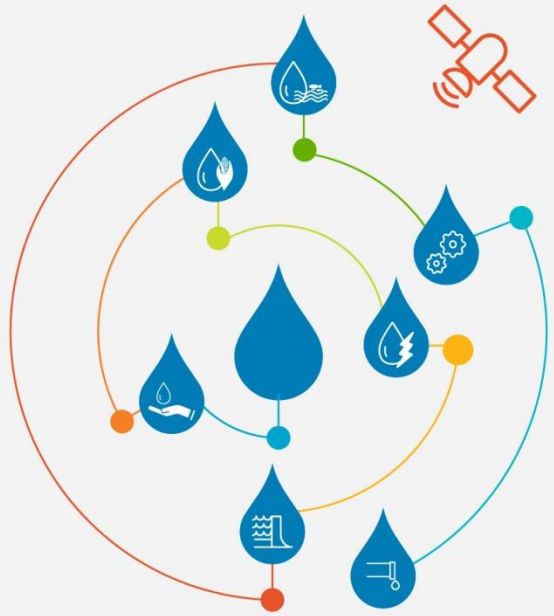
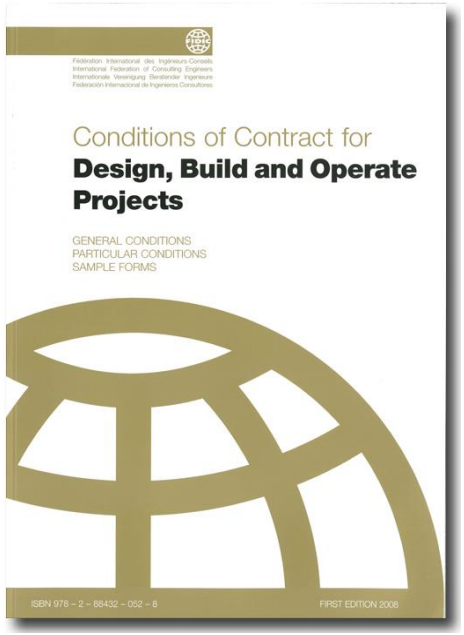
DBO (Design-Build-Operate) contracting in the water sector: Main assets of a growing practice worldwide



Vincent Leloup
Exequatur

What is a DBO Contract?

Design-Build-Operate (DBO) contracts are long-term contractual arrangements in between an Employer and a Contractor, for the design, build and operation of a facility



FIDIC DBO Contract (Gold Book), 2008 Edition, Foreword:

A DBO Contract combines a design-build obligation with a long-term operation commitment

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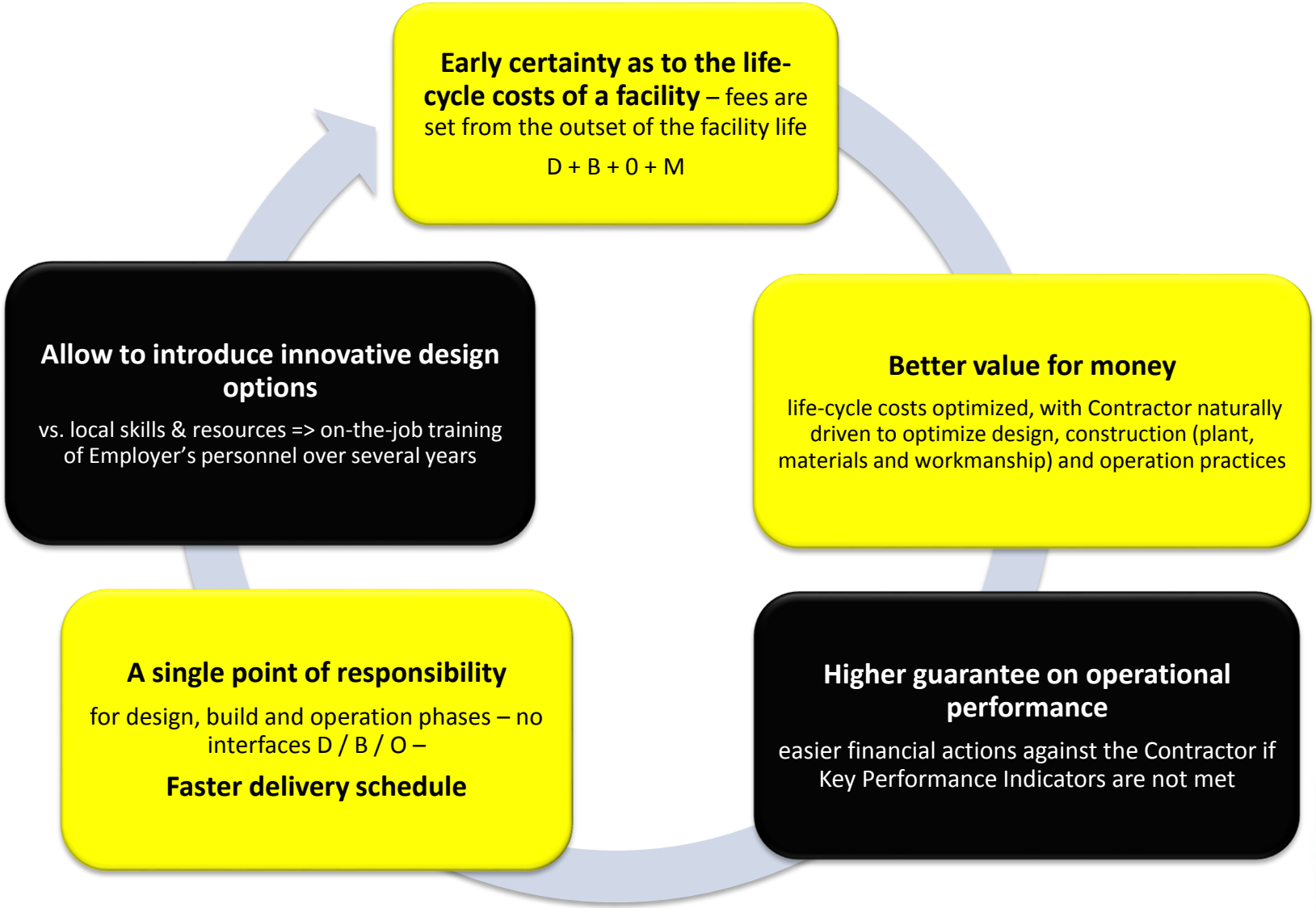
Key strengths of a DBO Contract



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DBO experience in the USA

- USA pioneered DBO projects in the late 90's, with the Tolt Water Treatment Plant in Seattle, delivering app. 450,000 m^3/day to Seattle urban area and serving some 30% of the total population needs. They assess a USD 70 million saving against initial budget
- Other sample DBO projects reported the following savings, compared to a traditional contracting with split D / B / O into individual contracts:

33 DBO projects, with construction completion occurring from 2001 to 2014, and with an **Operation Service period of 20 years as an average,** relating to either WTP or WWTP plants, of capacities ranging from some **7,000 m^3/day up to 450,000 m^3/day => 8 to 47% of estimated life cycle cost savings**

Life cycle cost savings generated by DBO contracts in US selected projects
Source – West Yost Associates Consulting Engineers - Lindsay Smith, '*Technical Memorandum: Water and wastewater operations: public or private contract*', West Yost Associates Consulting Engineers, 22 June 2012, accessible at http://epay.ci.walla-walla.wa.us:8066/docs/2014/ccws/20140114_132/937_Private-Public_Operations_TM_06-22-12_1.pdf

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DBO experience in the USA

American Water

"DBOs are increasing in popularity because in comparison to traditional project delivery methods, the process of integrating three functions into one project allows more to be accomplished, while also creating the simplicity of the city dealing with one entity throughout the life of the project, thereby removing the complexities of dealing with multiple entities"

American Water, Maureen Duffy, '*White Paper – Design/Build/Operate*', 2013, accessible at http://files.shareholder.com/downloads/AMERPR/0x0x381252/9F7679F3-BAA8-43D8-B6A4-8EE12C840A3B/WP_DBO_White_Paper_FINAL_6.8.10.pdf , page 3

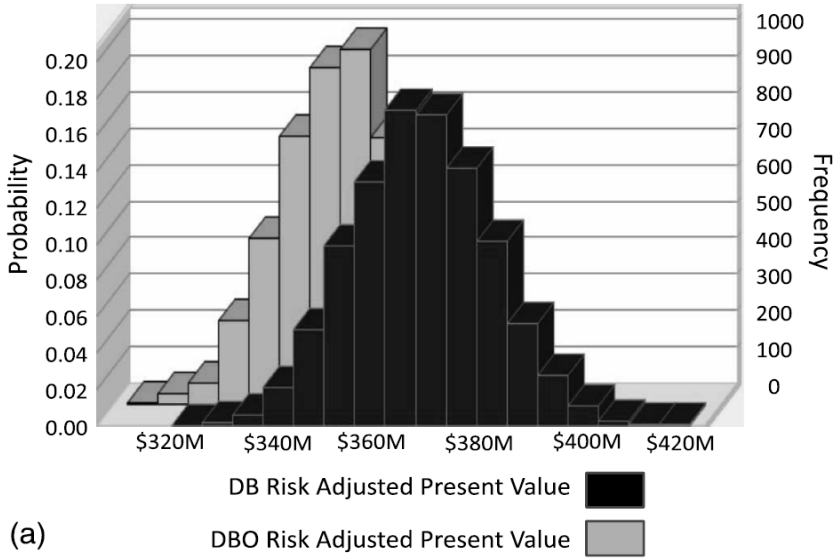
DBO Contracts allow for

reduced capital and maintenance costs, use of advanced technology and equipment, more appropriated risk management, shortened delivery schedules, working within one contract rather than multiple contracts, performance guarantees and significant end-user savings

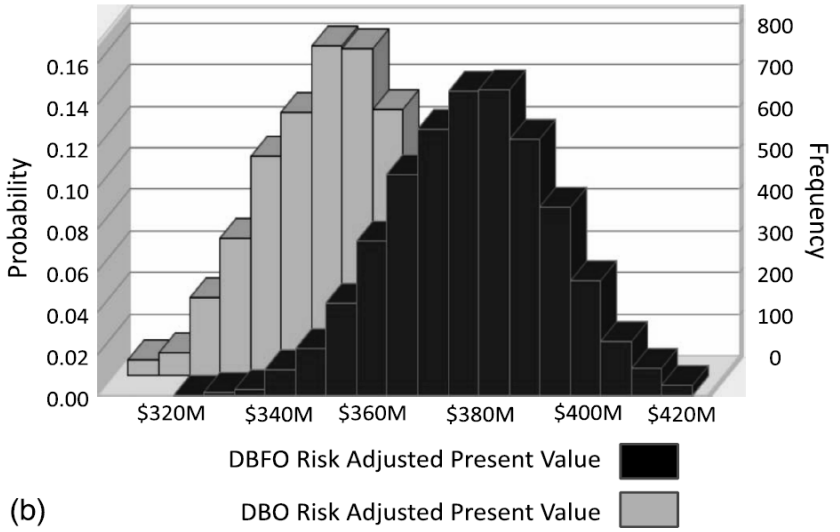
Tim Adams, Contributing Editor, '*Design-Build-Operate gains popularity in US market*', WaterWorld, 2012, accessible at http://www.waterworld.com/articles/print/volume-19/issue-12/editorial-focus/design-build-operate-gains-popularity-in-us-market.html

Risk-adjusted Present Value analysis which included 5,000 trials

DBO experience in the USA



(a)



(b)

2015 economic research study on DBO projects in the water sector

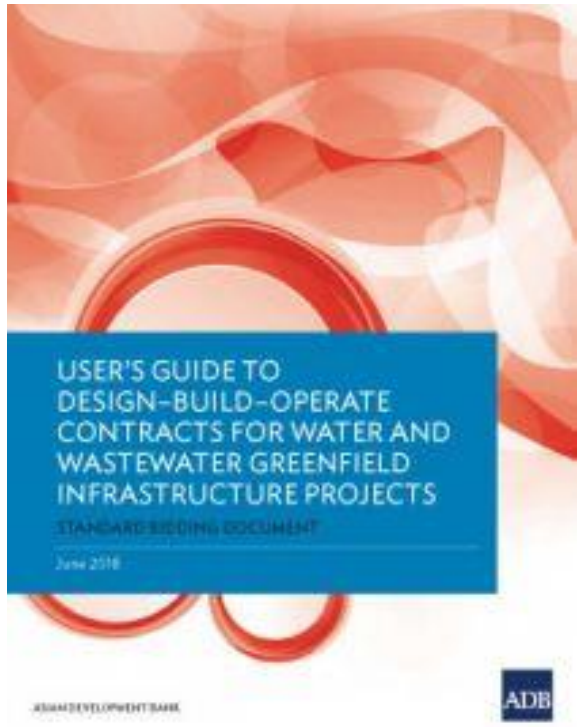
Case study : Agua Nueva WWTP, 120,000 m^3/day, Pima county, USA commissioned in 2014, 20 year Operation Service Period.

DBO contract = statistically the least cost option, compared to DB and DBFO

Source: 'Gregory J. Fitch, Ibrahim Odeh, C. William Ibbs, '*Economic sustainability of DBO Water based on Wastewater projects in the US: three case studies'*, American Society of Civil Engineers, January 2015, J. Constr. Eng. Manage., 2015, 141(5): 05015001

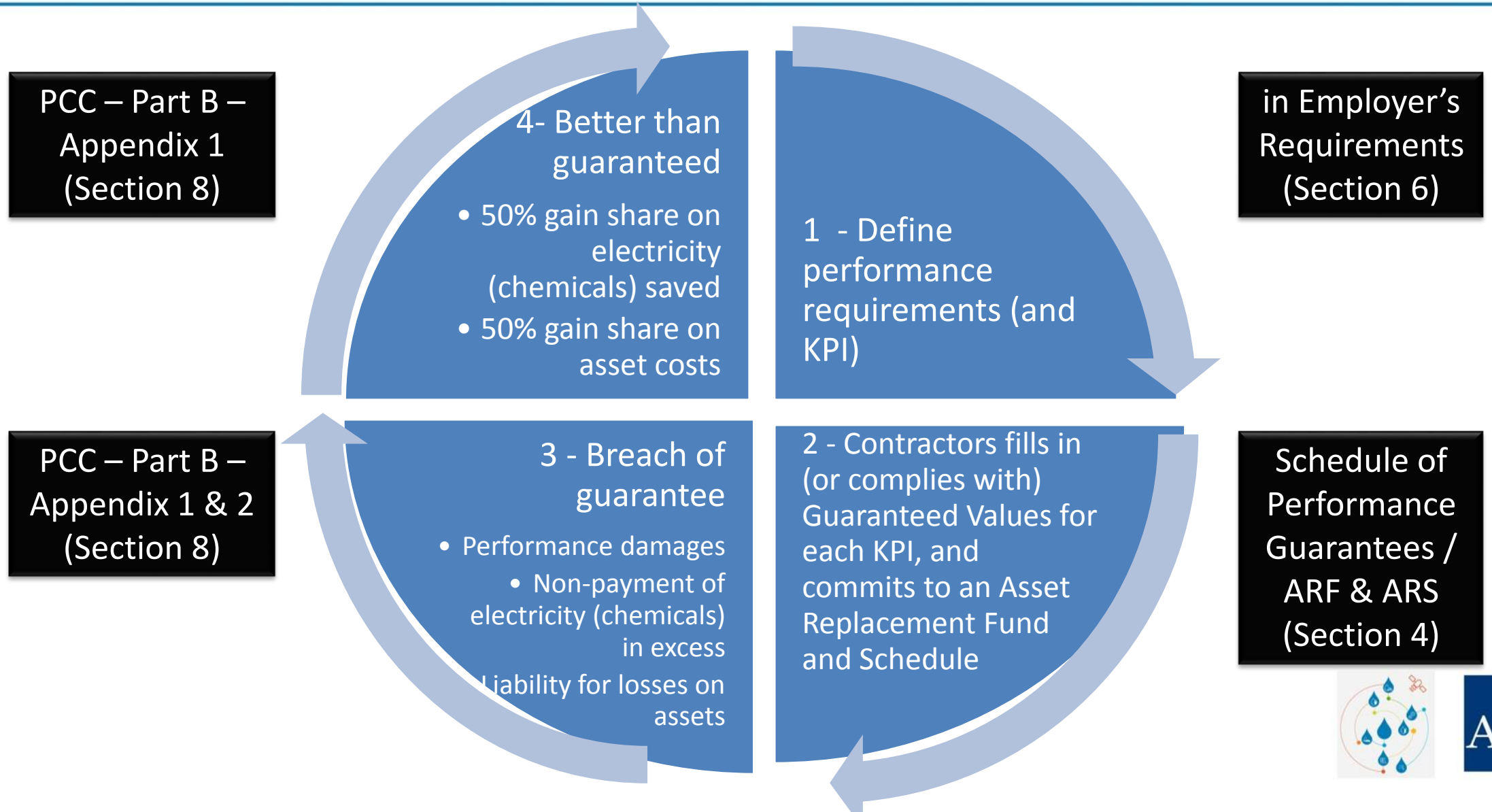
ADB and DBO

- ADB developed in 2017 a Standard Bidding Document and a User's Guide to DBO Contracts for Water and Wastewater greenfield infrastructure projects
- Currently used for several ADB financed projects:
  - **Fiji** – Reva Water Supply Scheme – 40,000 m^3/d WTP + associated facilities / 7 years of Operation
  - **Bhutan** – Thimpu 12,000 m^3/d WWTP / 5 years of Operation
  - **India** – Kundalia (MP) Irrigation project over 125,000 ha / 5 years of Operation
  - **Sri Lanka** – Jaffna 24,000 m3/d Seawater RO desalination plant / 7 years of Operation



https://www.adb.org/documents/design-build-operate-guide

ADB SBD for DBO contracts: Performance management



ADB SBD for DBO contracts: Performance management

No	KPI description	KPI Breach	Performance damages
1	Guaranteed Maximum Energy Consumption Rate	Failure to meet the rate by less than 5%	No damages apply
2		Failure to meet the rate by more than 5%	Calculated as per formulae below
3	Guaranteed Minimum Sludge Dry Solids Contents	Failure to meet the rate by less than 5%	No damages apply
4		Failure to meet the rate by more than 5%	Calculated as per formulae below
Etc.			

As applied upon Tests Prior to Contract Completion (GCC SC 11.11)

Formula for performance damages under item 2

$$PD = (AECR – (GMECRx1,05)) \times V \times RLE \times CE \times I$$

PD = Performance Damages in currency
AECR = Actual Energy Consumption Rate (in kWh per m^3 of water production)
GMECR = Guaranteed Maximum Energy Consumption Rate (kWh/m^3)
V = Production Volume (in m^3/year)
RLE = Residual Life Expectancy
CE = Cost of Electricity, in currency per kWh
I = Inflation rate over the RLE, in percentage

DBO – scalability in Asia

Challenges:

- **Awareness** – DBO contracting model remains to date far less known than others such as BOT
- **Psychological barriers** in some countries against a long-term contracting with the private sector / Lack of trust
- **Capacities**
  - DBO Bids evaluation (based on different processes proposed by bidders, and whole-life cycle cost projection) requires skills & competencies that may not be readily available
  - DBO Contract Management - Ditto
  - Contractors – a few large-scale players only…

ADB and DBO

Thank you for your attention

For more information:

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