Public Private Partnerships (PPPs): Wastewater Treatment

Comprehensive Financial Solutions for City Resilience Conference

City Resilience Program

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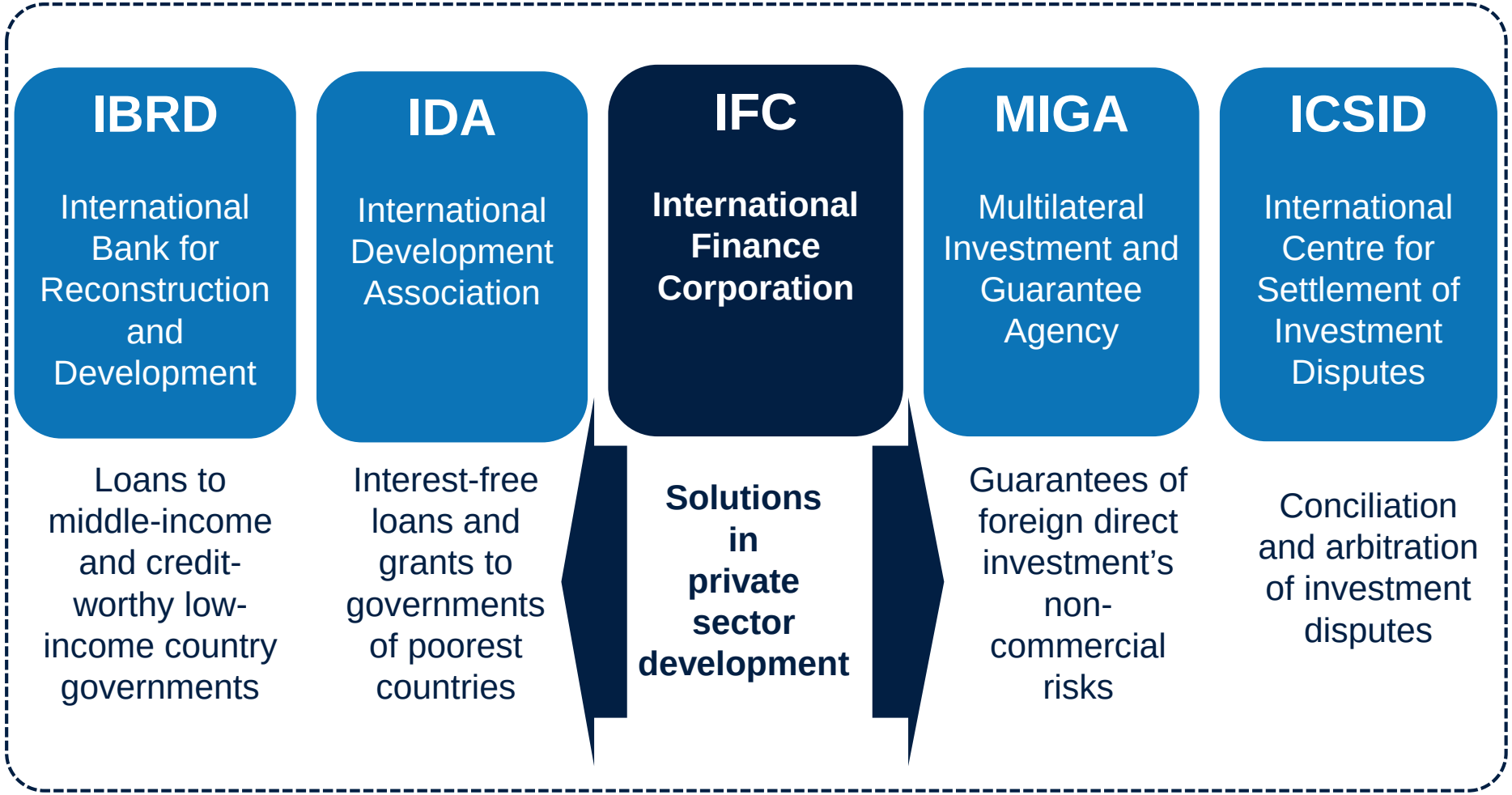
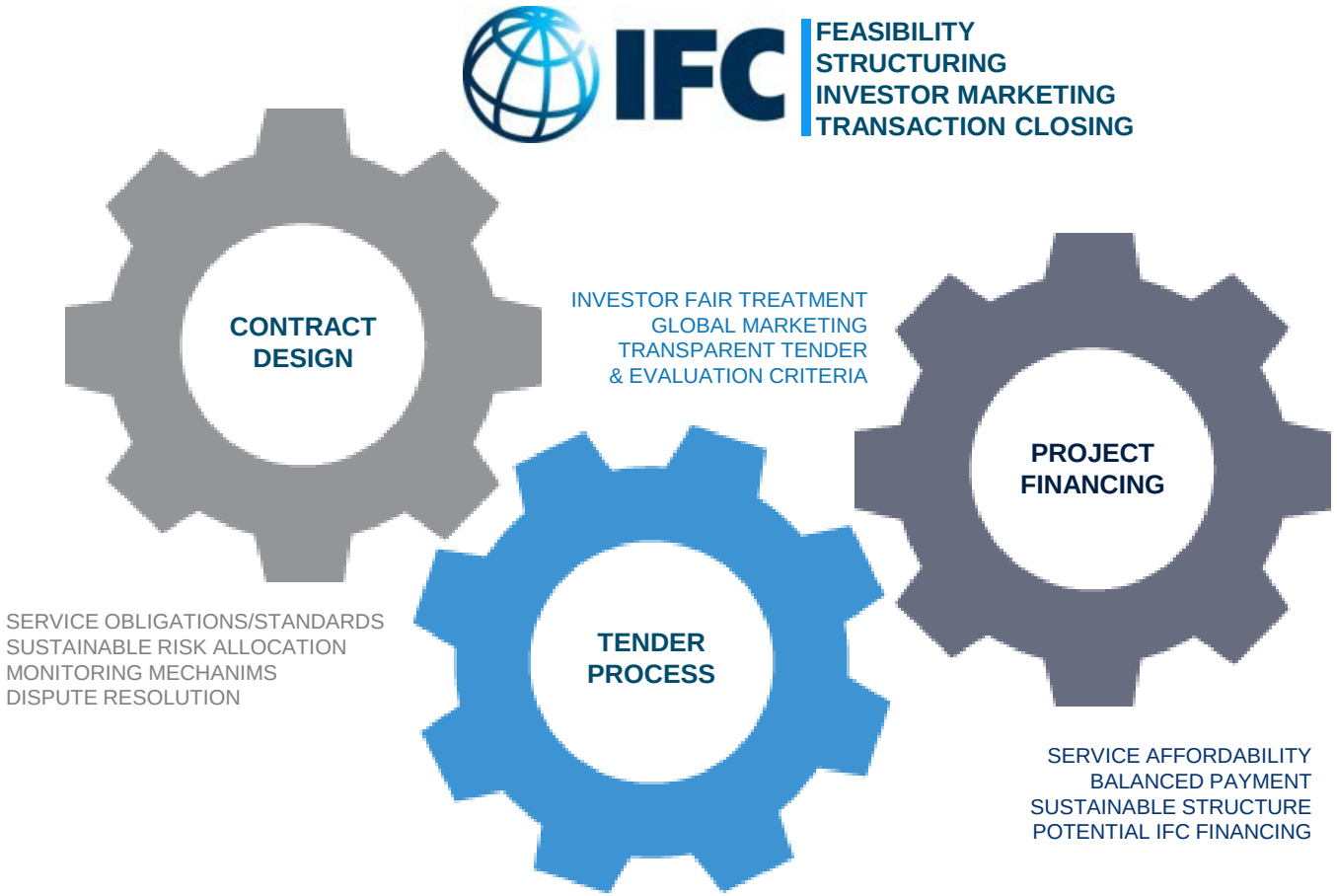
IFC: Who we are

WORLD BANK GROUP



IFC: PPP Transaction Advisory Services

Specialize in advising public sector on the introduction of private sector participation in the delivery of infrastructure services



Wastewater Treatment: An Important Public Service

- Why? Ensure rivers/ streams can be used for agriculture, drinking water supply, fishing, and tourism services

- Many large cities aim to connect all households to centralized wastewater treatment plants (WWTP)
  - E.g. Only 45% of Bangkok's wastewater is treated - rest discharges from sinks and other sources directly into drains and canals

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PPPs: Where to start?

Project Selection is Key: Projects must be Bankable, Demonstrable, Simple

1. Establish project **need** and **viability** → feasibility study to determine project costs and benefits in the context of government strategic objectives, budget, legal and regulatory environment
   - What are the projects' fundamental economics? Likelihood for success? Project externalities? Social benefits/costs? Are all stakeholders accounted for?

2. What are the benefits of private sector participation? Assess private sector interest early on

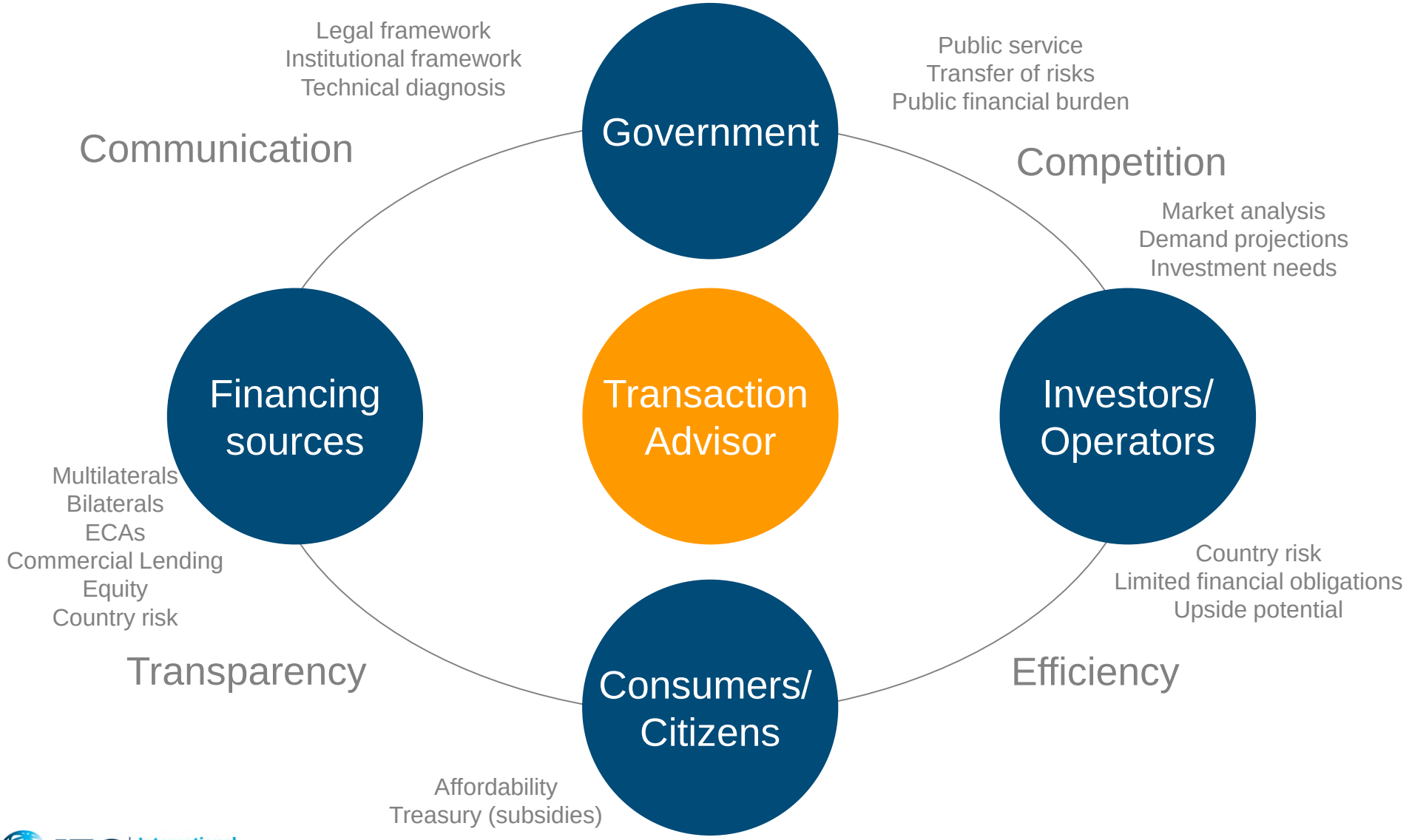
3. Optimal allocation of project risks – identify project risks, determine how best to mitigate these, and determine who is in a better position to bear them

4. Will a PPP match needs with requirements? Will it deliver Value for Money and the best use of resources?

PPPs: What needs to be analyzed

- ✓ Technical Analysis – Is it possible?
- ✓ Financial & Economic Analysis – How much will it cost & does it make economic sense?
- ✓ Legal Analysis – What is the legal basis for implementation & operation?
- ✓ Social & Environmental Analysis – What are likely impacts (positive & negative) on people and environment?

PPPs require a balance of different stakeholders



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Risk Allocation

- Identification, evaluation, allocation & management of risks is heart of effective PPP design

- Risks should be borne by the party that is best able to manage them
- Rationale: That party can bear the risks at the least cost

- How is risk transferred?
- Risk capital: private sector feels “pain” and “gain” of decisions
- Performance risk converted into payment obligation structured as financial incentive or penalty related to performance

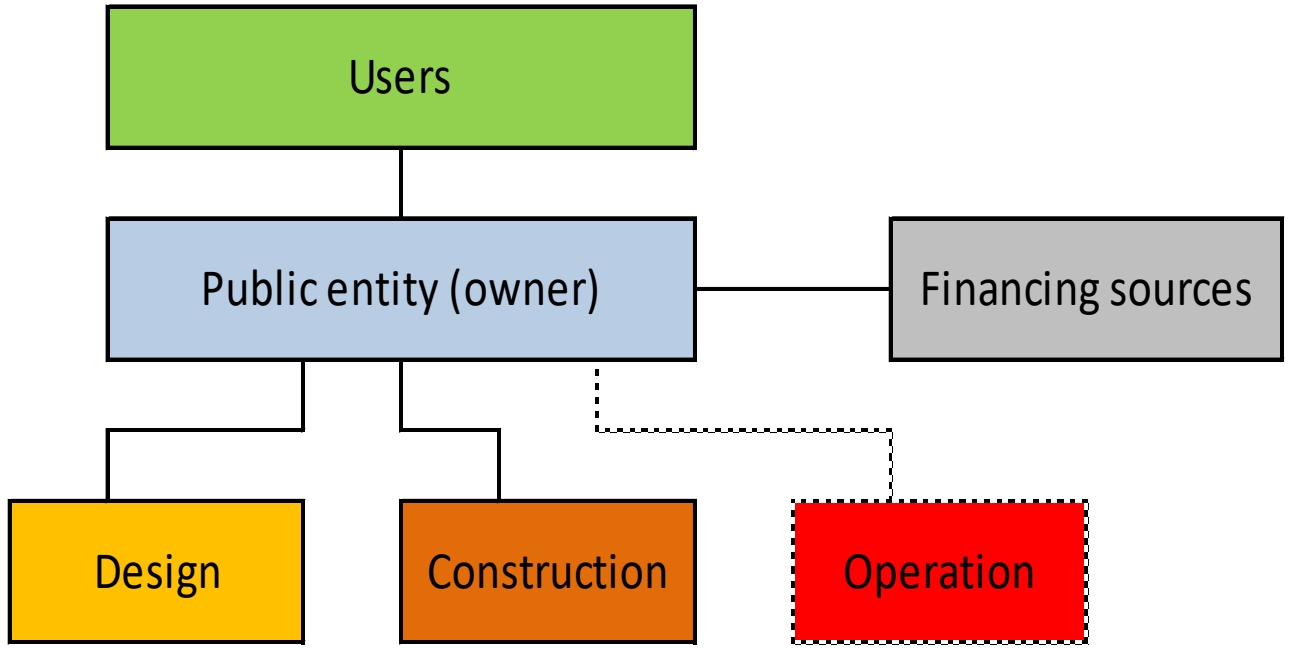
- What if Poor Risk Allocation?
- Price/cost increases
- Risk may not be effectively managed
- Borne by consumer → higher tariffs

- Residual risks, e.g. political force majeure & regulatory risks, can be mitigated through guarantees and insurance

Traditional Service Delivery: Net Separation of Functions

Separate procurement by public procures:

- Project design:
  - Demand and capacity forecasts
  - Technical designs
- Financing - public borrowing
- Construction:
  - Constructs assets
  - Commissioning
  - Warranty for construction + 1 year
- Operation and maintenance *(sometimes)*
  - Treats waste water to agreed standards
  - Manages inventory
  - Maintains assets
  - Re-tendered on a short-term basis



Public entity underwrites all risks (financing, design, operating performance)

Public Procurement: Advantages/Disadvantages

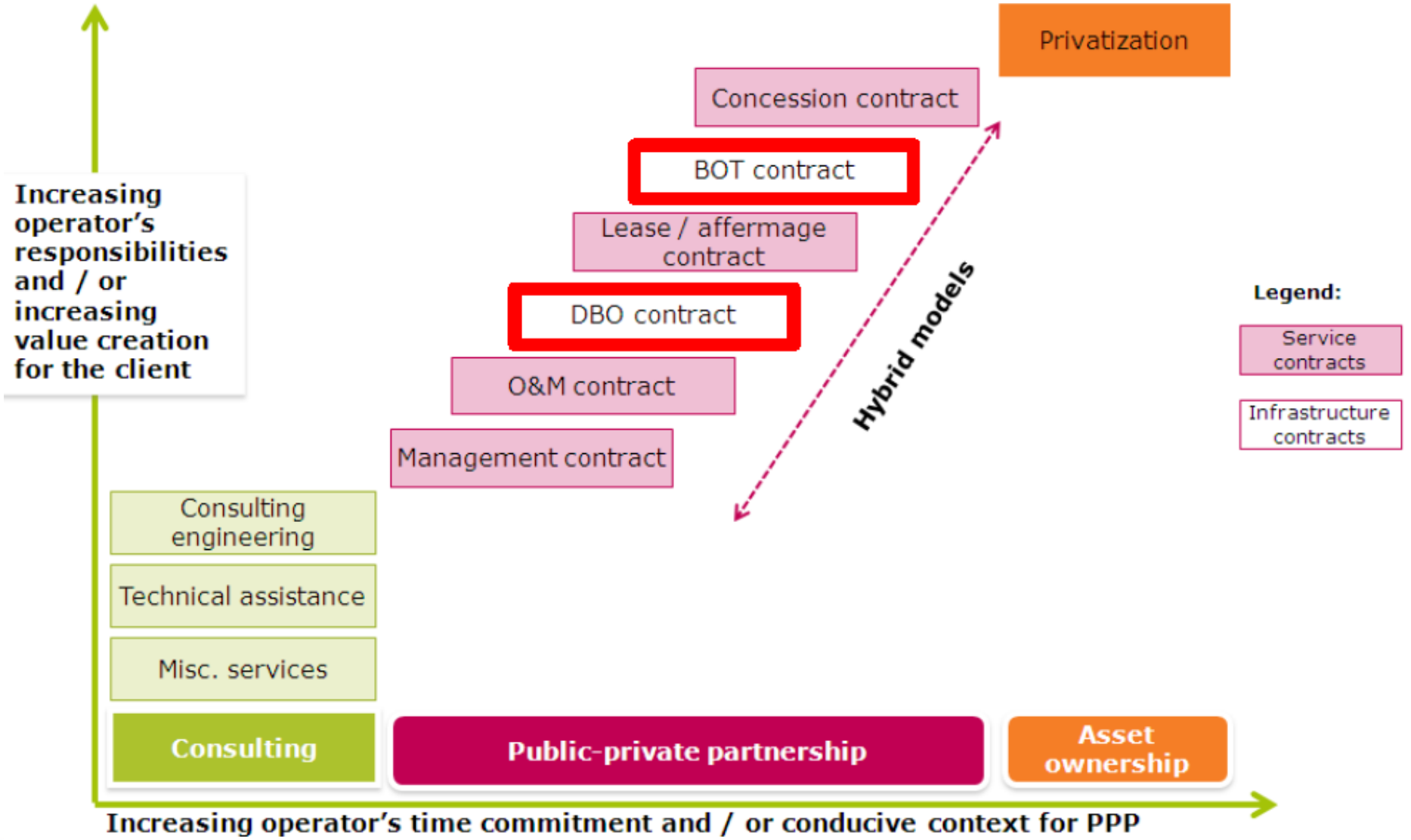
Advantages:

- Public procurement laws – clear and established track record / familiarity
- High degree of control during each development phase
  - opportunity for owner preferences
- Can be funded from subsidized sources of capital (ODA, central government funding)

Disadvantages:

- Multiple procurement processes - time-consuming and lead to delays
- No single accountability point for the final treatment performance
- Least cost design and / or least cost construction, does not translate into least-cost technical solution over the life of the project
- Risk of cost overruns, delays and operating performance on the owner / grantor
- Risk of unavailability of funding to cover operating costs and maintenance (risk of abandonment, asset depletion)

PPPs: Procurement of a SERVICE rather than an ASSET



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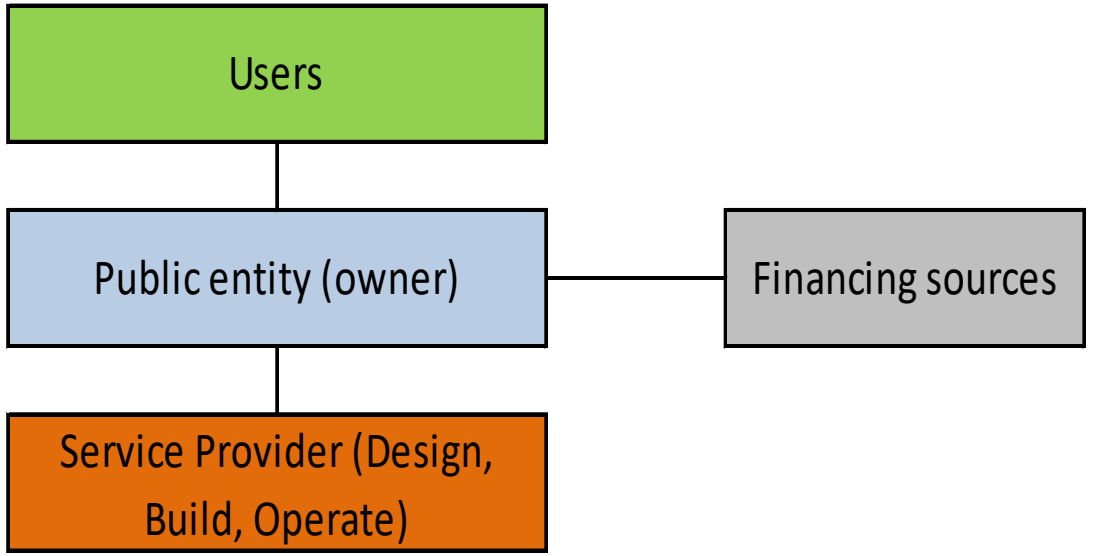
Most common models: DBO and BOT (1/2)

Private sector service provider:

- Designs, builds and operates the WWTP
- ***Funds the initial construction of the plant, and is paid upon progress and /or successful commissioning***
- Operates the plant for a period of 10-15 years (contract duration to match estimated obsolescence of the plant / need for major rehabilitation or expansion)

- Permits funding initial investment through subsidized sources of capital, if available
- Operational costs easier to sustain through tariffs

Design Build Operate ("DBO")



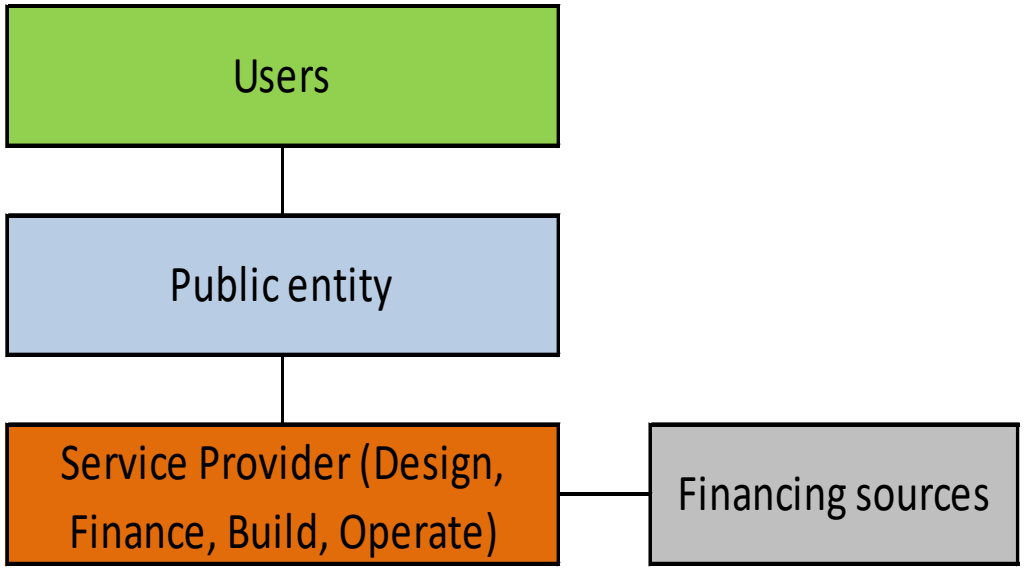
Most common models: DBO and BOT(2/2)

Private sector service provider:

- Designs, **finances**, builds and operates the WWTP
- ***Invests its own capital and procures debt financing to fund the initial construction and working capital***
- Operates the plant for a period of 15-25 years (contract duration to match investment repayment time).

- Leverages private capital, avoiding the need for public borrowing
- Can result in a more expensive service fee due to higher cost of private capital

Build Operate Transfer ("BOT")



DBO/BOT Risk Allocation

Risk	Owner	DBO Contractor	BOT Contractor
Site (acquisition and conditions)	✔		
Major environmental permits and unusual permit types	✔		
Building permits		✔	✔
Project financing	✔		✔
Scope of project	✔		
Design / technology		✔	✔
Raw water source and/or influent wastewater quality	✔		
Finished water-quality specification	✔		
Costs: DB & O&M		✔	✔
Performance guarantees		✔	✔
Construction / start-up / commissioning / acceptance testing		✔	✔
Schedule		✔	✔
Operation and maintenance		✔	✔
Regulatory permit compliance		✔	✔
Capacity to treat water or wastewater		✔	✔
Uncontrollable (change in law, third-party delay, force majeure, inflation)	✔		
Repair & replacement		✔	✔
Handover condition		✔	✔

PPPs vs. Public Procurement

- ✓ Lifecycle management - Capex and Opex optimization and incentivizes investments in new technology and maintenance
- ✓ Obligation to maintain the WWTP in good operating conditions
- ✓ Single-Point accountability
- ✓ Risks shifted to Service provider – design, build, operation non-performance
- ✓ Greater speed of delivery
- ✓ Greater cost certainty at early project stage
- ✓ Less administrative burden
- ✓ Requires careful initial definition of project scope given long term contract structure

DBO and BOT contracts offer value for money

Examples of BOT full-cost fees (capital and operating fees) resulting from competitive tenders in the Middle East:

- New Cairo: US$0.31/$m^3$ (secondary treatment)
- UAE Plants US$0.37/$m^3$ (tertiary treatment with sludge digestion)
- Bahrain: US$0.20/$m^3$ (secondary treatment)

Similar experiences in other regions (China, Brazil)

ADB Urban Innovations and Best Practices

www.adb.org/urbandev
November 2010

SUSTAINABLE URBAN DEVELOPMENT IN THE PEOPLE'S REPUBLIC OF CHINA*

Wastewater Treatment: Case Study of Public–Private Partnerships (PPPs) in Shanghai

Urbanization in the People's Republic of China

Urbanization in the People's Republic of China (PRC) has been on an extensive and accelerated path. In 2008, more than 600 million people were residing in 655 cities, pushing the urbanization level to 45.7%. Based on current trends, the urban population in the PRC is projected to cross the 1 billion mark in 2030 and eight megacities—each with a population of over 10 million—would

The savings generated through the PPP arrangement are reflected in the service fee, which was about 40% below the government's own projected cost.

Issues in Commercial Financing of PPPs

Bankability

- ✓ Key requirements for bankability vary

Affordability

- ✓ Projects over-designed and over-capacity
- ✓ Demand may not be sufficient to support capacity/design
- ✓ Mechanisms for adjustment of tariffs/payments not predictable or tested; subject to political/social pressures

Government Support

- ✓ Government Guarantee
- ✓ Viability Gap Funding
- ✓ Availability Payments/Revenue or Demand Guarantee

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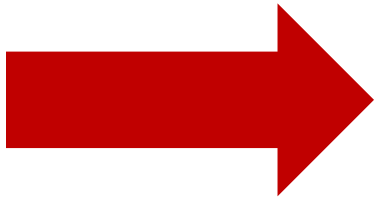
Content of a DBO or BTO tender

Tender Documents: Output Specifications



Bidder Submission: Technical Envelope

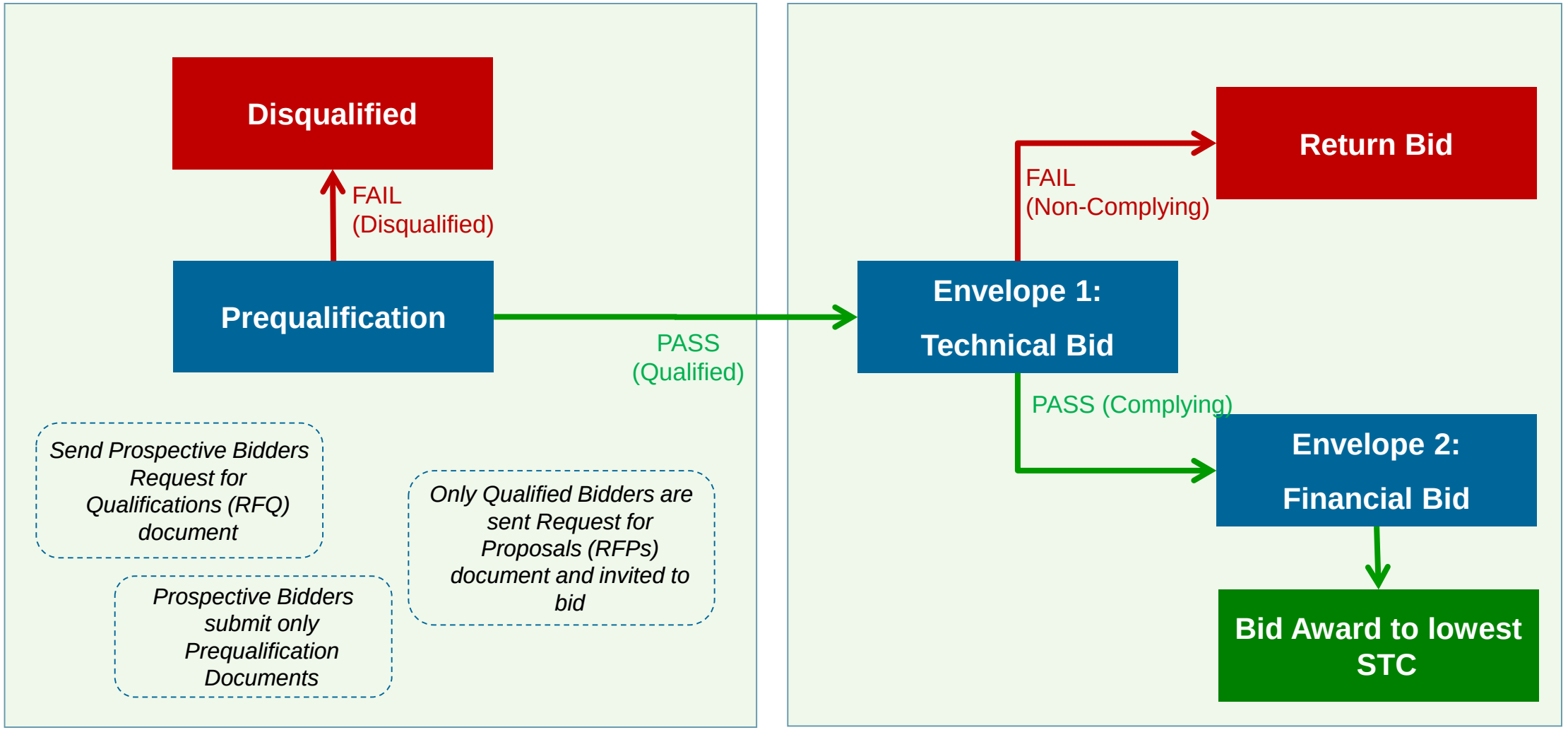
Specify:

- Volume of wastewater to be treated
- Pollution that needs to be treated
- Effluent standards that need to be met
- Emissions – Odors – Noise
- Condition of facility at end of contract operating period

Bidder submit a detailed Operations Plan to meet Output Specifications:

- Construction Plan
- Operations and Maintenance Plan
- Human Resources Management Plan
- Water Monitoring and Control Plan
- Odor Control Plan
- Energy Management Plan
- Reporting and Documentation Plan
- Quality Management Plan
- Environmental Management Plan
- Emergency Plan

Transparent Tender Evaluation



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Sample DBO: Tender Evaluation

1. Prequalification

- Financial (min. net worth, capital raising)
- Technical (previous WWTP experience)
- Legal documentation

2. Technical Evaluation

- Technical design, construction and operations plan

3. Financial Evaluation

- Bid evaluation price = design-build (DB) price + discounted O&M price
- Typical: 5% discount rate, 20 years operation
  → discount factor of 12.462

Example:

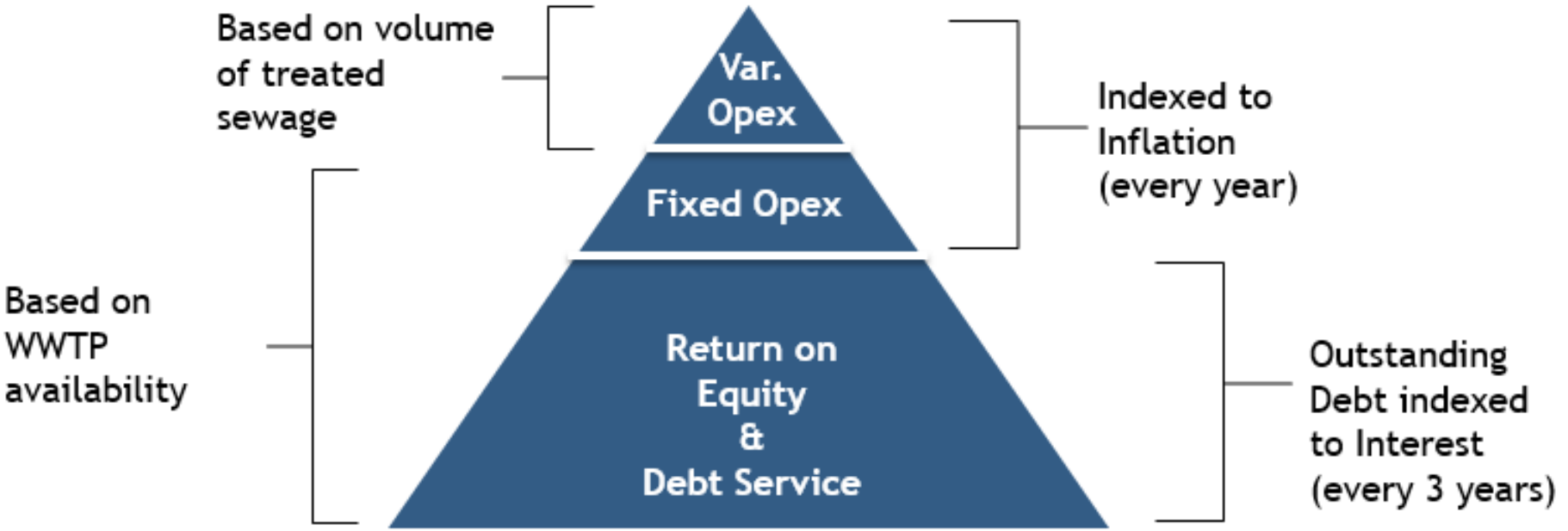
- *Construction cost: 190 Mill $*
- *Annual O&M cost: 6.28 Mill $*
- *Discounted O&M cost: 6.28 * 12.462 = 78 Mill $*
- *Bid evaluation price = 190 + 78 = 268*

Note: Same rates used for sewerage flows and electricity prices (if pass-through) for all bids

Sample BOT: New Cairo WWTP

- 20-year BOT for a 250,000m³/day WWTP
- Awarded to Orasqualia (Orascom/ Aqualia)
- Operational since 2013
- $120 million in investment.
- Winning bidder selected based on lowest Net Present Value of quarterly Sewage Treatment Charge (STC), composed:
  - fixed portion (fixed opex, debt service, RoE)
  - variable portion (variable opex)

Bid STC	EGP/m^3	US$/$m^3$
Orascom / Aqualia	1.74	0.31
Samcrete / Befesa	2.10	0.38
Al Kharafi	1.98	0.36
Veolia / Abdel Warith	2.50	0.45



Tendering Considerations

- **Selective strong pre/post qualification**
- **Technical pass / fail assessment**
  - No detailed drawings
  - No “compulsory” specific technology
  - Output based (performance) approach
- **Financial evaluation** on:
  - Capex + O&M costs (DBO), or
  - All-in treatment cost (BOT)
  - *Possibility to set maximum bid price limits to guarantee affordability*
- Construction Phase: **Performance guarantees by service provider**
- Operation Phase: **Performance incentives/penalties**

- **Reduce unknowns best managed by owner:**
  - Completed geotechnical, environmental, and social reports on project site
  - Identify where utilities and other facilities need permits and government approvals
- **Ensure operation contract specifications are complete, accurate and reliable**

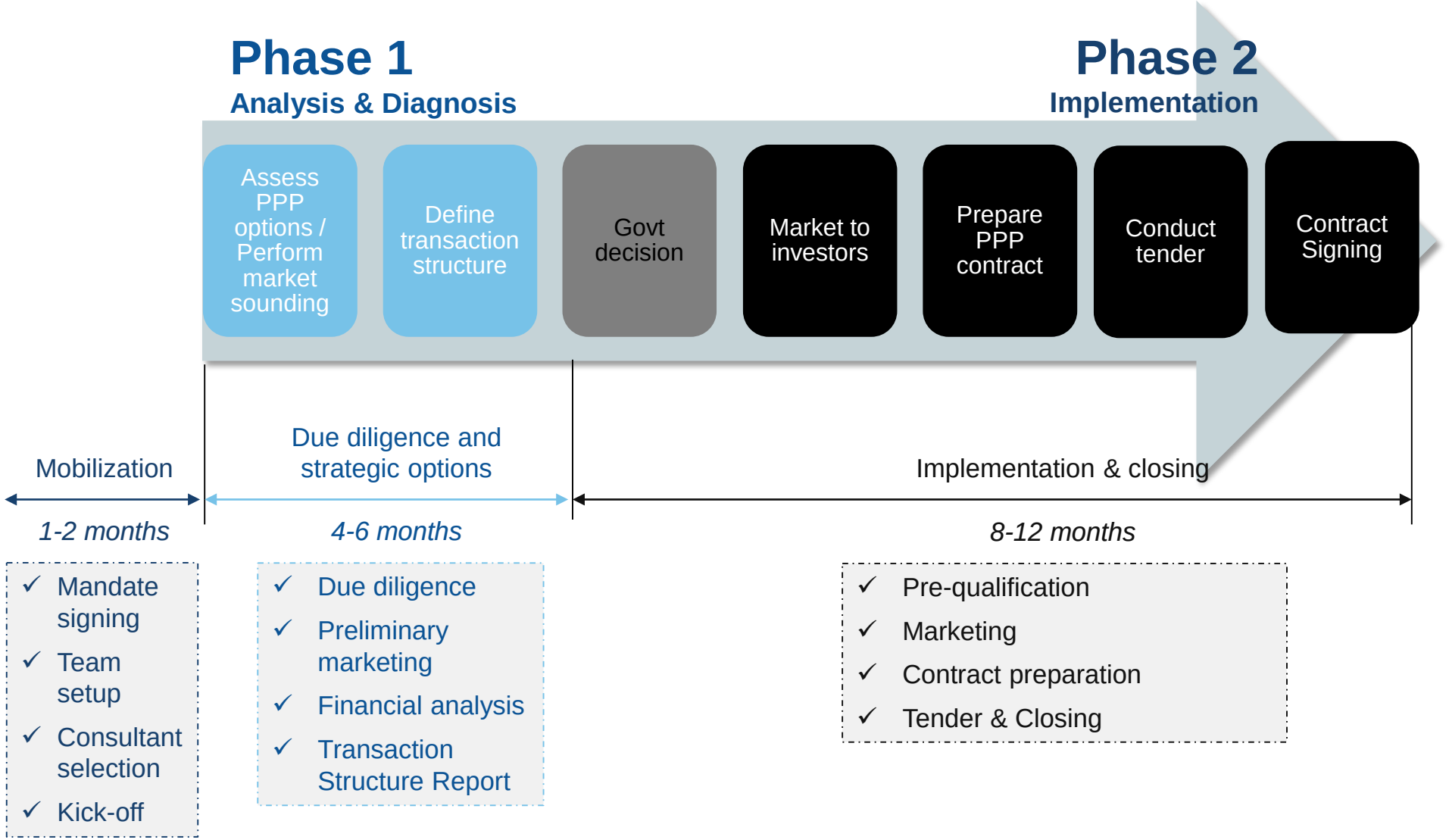
Tariff Considerations

- **End-user tariff** will depend on:
  - Today's tariff level
  - Level of subsidy from the Municipality *(in the absence of subsidies, the full water treatment fee - and, in case of DBO, loan repayment costs - would need to be recovered through the end-user tariffs)*

- **IFC's tariff philosophy:**
  - Encourage tariff adjustments but realize that they may be politically sensitive and may be agreed over a longer time horizon
  - ….so in the short term, if the additional cash flows from end-user fees are not sufficient, Municipalities need to repay the DBO loan/investment (or part of the water treatment fee in case of BOTs) out of their general budget

Recent BOT project tariffs
0.20 - 0.40 US$/m^3
depending on plant size and treatment type

Two-Phased Implementation Process



THANK YOU

www.ifc.org/ppp

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Risk Mitigating Instruments (1/3)

Risk	Type	Mitigation
Construction	• Cost overruns • Delays	• Contractual arrangements (fixed price turkey contracts) • Impose warranties, liquidated damages • Penalties and incentives • Use experienced contractors • Contingency funds and lines of credit • Private insurance • Sponsor guarantees
Operation	• Revenue forecasts - Revenue build-up - Operating costs - Management failure • Service quality	• Obtain long-term contracts (supply, off-take) • Use experience operators • Performance guarantees • Loan covenants and DSCR triggers • Contingency reserves • Insurance • Risk compensation devices
Market / Demand	• Demand	• Long term contracts • Availability Payments • Traffic Guarantees • Take-or-Pay provisions

Risk Mitigating Instruments (2/3)

Risk	Type	Mitigation
Interest, Inflation, FX	• Fluctuations	• Hedging • Match forex exposures • Use fixed interest rates • Pass through in contracts • Insurance/capital market instruments
Financial	• Debt/equity ratio • Return on capital • Risk reward ratio • Debt service cover • Taxation	• Do not allow excessive leverage • Do not allow excessive Equity IRR • Dividend constraints • Impose acceptable coverage ratios • Impose debt service triggers • Lenders syndicate their loan • Escrow accounts / Reserve accounts
Political	• Regime stability • Political intervention • Change in Law • Breach of Contract • Expropriation • Foreign exchange	• Clear regulatory regime • Political Risk Insurance (e.g. MIGA) • Government/local shareholder participation • Hard currency contracts • Natural dispute resolution mechanism

Risk Mitigating Instruments (2/3)

Risk	Type	Mitigation
Legal / Regulatory	• Change in Law, pricing formulas, right of way, currency convertibility & transfers • Rule of law / judicial system /access to justice & arbitration	• Use experienced lawyers • Clear, simple documents and laws • Political risk insurance against breach of contract • Strong regulatory framework • International arbitration
Technical	• Performance • Safety	• Obtain long-term warranties • Use proven technologies
Supplies	• Quality, quantity and price of raw materials/services	• Minimize mismatch between supply and purchase contracts, either by contract or by hedging
Environmental & Social	• Pollution, resettlement, biodiversity	• Public consultation and approval • Environmental Audit
Natural disasters & Operational accidents	• Typhoon, earthquake, etc. • Injuries	• Insurance