

VIEWPOINT  
**ONG KEY WEE**

# Rethinking Water Sustainability with Public- Private Partnerships



**Mr Ong Key Wee, head of Singapore's Public Utilities Board's (PUB) Public-Private Partnership (PPP) Management Office, defends the case for PPPs and highlights the considerations for positive outcomes in Singapore's water journey.**



## The PPP approach is ideal because such projects give the private sector a suitable platform for innovation.



To enable Singapore to adequately secure its water supply, national water agency PUB's strategy for procurement has evolved through the years to navigate the ever-changing business landscape and to tap on the growing capabilities of the industry. Beginning with only the outsourcing of infrastructure construction while retaining design and supervision in-house, PUB has since been able to outsource both the design and construction to the private sector. While PUB continues to operate our own plants, we now outsource some of our projects through Public-Private Partnerships (PPP) where the design, construction, operation and maintenance of the plants are all undertaken by the private sector. Such an arrangement allows for a robust and diversified water sector for Singapore.

As the first public agency to adopt a PPP approach, PUB has significant experience in such partnerships. Starting in November 2001, PUB called for its first PPP tender for a seawater desalination plant in Tuas under the Design-Build-Own-Operate arrangement. This resulted in the construction and opening of SingSpring Desalination Plant in September 2005. Since then, PUB has gone on to roll out six more PPP projects: three NEWater plants (Ulu Pandan NEWater Factory, and Changi NEWater Factories 1 and 2) and three seawater desalination plants (Tuas South Desalination Plant, Marina East Desalination Plant and Jurong Island Desalination Plant).

### Why the PPP Approach?

Value for money, a conducive environment for new technologies and innovation, and the growth of the country's private water industry are among the key benefits that PUB and Singapore have gained from adopting the PPP approach.

Under PPP, the design, build, operation and maintenance of the plant are undertaken by the same company or consortium. Private sector firms that design and build the plants are hence incentivised to also optimise the subsequent operation and maintenance of the plant to reduce costs. This has resulted in the competitive water prices put forward by the successful private bidders for the various PPP projects.

As part of efforts to drive research and development (R&D), and innovation in the water sector, PUB works closely with partners to implement new technology and design. The PPP approach is ideal because such projects give the private sector a suitable platform for innovation. Under the PPP tenders, broad technical specifications are stated to ensure successful delivery of the project. Beyond that, the rest of the requirements specified in the contract fundamentally relate to the performance of the product water (e.g., the quality and quantity of NEWater or desalinated water). For example, in the Marina East Desalination Plant project



Aerial shot of Marina East Desalination Plant (MEDP) and reverse osmosis system.  
*Image: Keppel Infrastructure*

(see box-out) undertaken by Keppel Infrastructure Holdings, PUB specified broad technical requirements to use membrane-based treatment processes, but left the bidders to innovate and optimise the detailed design of the plant.

Additionally, PPP also offers business opportunities for the growth of the private sector in Singapore's water industry. Formerly, private sector firms were only contracted to design and construct the facilities, while PUB's own

staff remained responsible for operating and maintaining the plants. Under PPP, however, PUB relies on the experience and expertise of firms to execute the entire design, build, operation and maintenance chain. This not only allows private sector companies to gain valuable project delivery expertise and operational experience, but also provides them with a track record that they can showcase for future undertakings, especially overseas.

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### Case Study: Marina East Desalination Plant

On 4 February 2021, Prime Minister Lee Hsien Loong witnessed the official opening of the Marina East Desalination Plant (MEDP). This PPP project, undertaken by Keppel Infrastructure Holdings, has several innovative and unique features:

- MEDP is the first dual-mode desalination plant in Singapore that is able to treat both reservoir and sea water into drinking water.
- It is also the first plant in Singapore to employ direct coupling of Ultrafiltration (UF) and Reverse Osmosis (RO) systems, which:
  - Reduces footprint due to the elimination of break tanks and booster pumps;
  - Reduces power consumption due to elimination of energy usage by booster pumps; and
  - Eliminates maintenance issues related to microbiological growth in the break tanks and cartridge filters.
- It seamlessly integrates into the surrounding greenery by doubling up as a public recreational space complete with a green roof, bicycle parking and toilet facilities. Its design also incorporates eco-features such as rainwater harvesting, and a lush landscape that promotes biodiversity.

### Putting in Place Safeguards

Notwithstanding the merits of PPP, PUB ensures that its staff acquire the relevant technical qualifications to adequately assess that the concession companies (companies which were awarded the PPP contracts) meet the necessary competencies, and are in alignment with the agreements relating to the construction and operation of the plants. Such in-house expertise enables PUB to regularly monitor and audit the PPP plants' performance to ensure that the product water meets the quality and quantity requirements, and to evaluate the remedial actions taken by the plants if performance standards are not met.

Retaining such expertise in-house also allows PUB to intervene should the concession companies default. Safeguards are built into the PPP contracts to allow PUB to step in and take control of the whole or part of the plant to ensure continued operation. PUB may exercise these step-in rights when specific conditions are met, such as when the concession company's operations or financial standing cross a critical threshold, or if the default (e.g. failure to deliver water supply of specified standard for a specified period) is not remedied within a stipulated timeframe.

### Partnerships That Last

PUB's PPP projects have largely gone well due to a rigorous selection process that first and foremost ensures selected PPP partners possess the technical and financial capacity. More than that, it is a mutually beneficial partnership that is championed from the top in both PUB and the concession companies. 😊