Translating Australian Permitting, Design, and Construction Experience to the Texas Market

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Hurricane Harvey

- 1,000-year flood
- 50 inches of rainfall in some locations
- 20 trillion gallons of precipitation over duration of storm

Why pursue desalination in Texas?



Lessons from Australia

Important Issues

- Variable weather patterns
- Limited natural storage capacity
- Conventional infrastructure limitations

Value of Desalination

- Climate-proof water supply
- Flexible and transportable supply
- Creates robust water supply portfolio

Permitting and best practices in design, construction, and delivery can be leveraged to enable desalination, creating a robust water supply portfolio for a region.





Variable weather patterns

Millennium Drought Australian Government Bureau of Meteorology Bureau of Meteorology Rainfall Decile Ranges Highest on Record Very Much 10 Above Average 8-9 Above Average 4-7 Average

Millennium Wet



Limited natural storage capacity

Source: Australian Government Department of Sustainability, Environment, Water, Population and Communities using data from Australian Hydrological Geospatial Fabric (Geofabric) v1.0, Bureau of Meterology

Conventional infrastructure limitations

- Brisbane flooding, 2010 2012
- Traditional water treatment plants overwhelmed
- Inlet turbidity ~10,000 mg/L
- Nearly half of the region's water treatment capacity temporarily eliminated during 2011 flood

Case Example: Gold Coast desalination

- Emergency-level operation assisted conventional plant shortfalls
- Reverse osmosis operating philosophy enabled quick ramp-up
- 25 km pipeline enabled widespread distribution while overcoming storage limitations

Variable weather patterns

December 27, 2016

September 5, 2017

Limited natural storage capacity

As of August 28, 2017

Limited natural storage capacity

Buffalo Bayou at Shepherd Drive

Infrastructure limitations

As of August 28, 2017

Implementing desalination in Texas

Lessons from Australia can be applied to the Texas market to develop desalination

Permitting

Permitting process affects project delivery timing and efficiency

- Keys:
 - Adherence to federal and state environmental regulations
 - Early and ongoing communication with regulators
 - Coordination with agencies and stakeholders
 - Public education
 - Time

Design and construction

Engineering best practices enable robust, sustainable facility development

- Keys:
 - Process design to address ramp-up and up-time requirements
 - Appropriate materials of construction for durability
 - Manufacturing quality control
 - Pumping and distribution system testing
 - Fouling management

Project delivery

Flexibility in delivery structure overcomes time and cost constraints

Sydney Desalination Plant

250 ML/day Design-Build-Operate-Maintain Alliance

Victoria Desalination Plant

410 ML/day Public Private Partnership

Perth Desalination Plant

144 + 275 ML/day Competitive Alliances

Conclusion

- Australia and Texas share many similarities, including flood events.
- Lessons from Australia can be applied to the Texas market to develop desalination.
- Permitting processes can facilitate quick and efficient project delivery, but requires coordination, education, and patience.
- Engineering best practices will ensure robust, sustainable facility development.
- Flexibility in delivery structure can be applied to address time and cost constraints.

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