

ID: TH210
Title: Replicable Net Zero Water Systems
Date: Thursday, June 21
Time: 7:30-9:00am
LU: 1.5 LUs/HSW/RIBA

Program Summary

Designing within the water-stressed region of Dubai necessitated World Expo2020 Sustainability Pavilion project team to address water use holistically, demonstrating leadership at a site that will receive millions of visitors from around the world over a six month period. This session is not to be missed for participants who want to know more about how to design and implement sustainable water strategies for a site with Net Zero Water and Net Zero Energy goals.

Learning Objectives

- A. How to approach water reuse design
- B. How water supports Better Cities
- C. Water reuse opportunities + constraints
- D. No “right answer” to sustainable water strategies

Speakers:

- Prentiss Darden
- Denzil Gallaher
- Aaron Vaden-Youmans
- Sarah Sachs

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Replicable Net Zero Water Systems

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Acknowledgements/Credits

Grimshaw Architects
Buro Happold Engineering
Sherwood Design Engineers



Speakers List

- Prentiss Darden, Sherwood Design Engineers
- Denzil Gallagher, Buro Happold
- Aaron Vaden-Youmans, Grimshaw
- Sarah Sachs, Buro Happold



Course / Learning Objectives

- How to approach water reuse design
- How water supports Better Cities
- Water reuse opportunities + constraints
- No "right answer" to sustainable water strategies



UAE Water Use

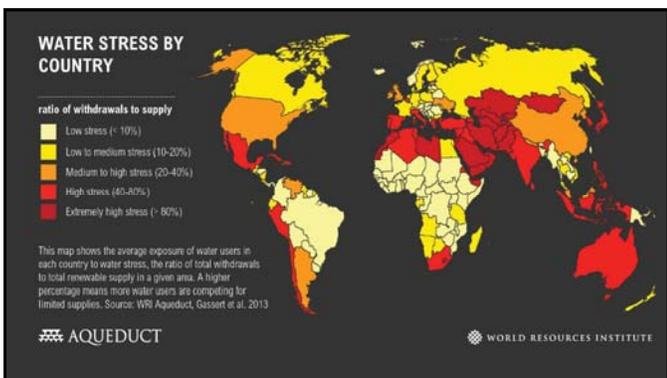
82%
above global average



Water Use

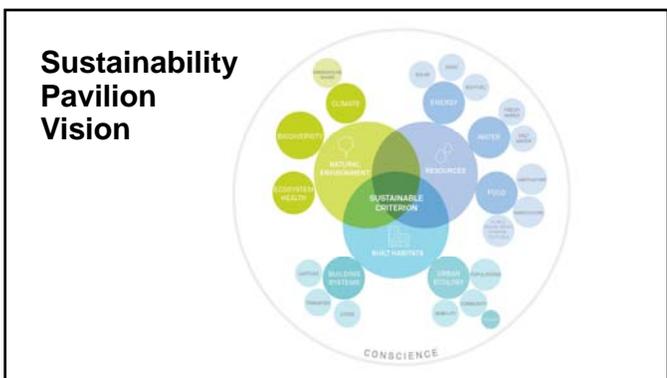
- **Dubai:** 145 gallons/ person/ day
- **New York:** 115 gallons/ person/ day
- **San Francisco:** 50 gallons/ person/ day
- **Cape Town:** 41 to 23 to 13 gallons/ person/ day





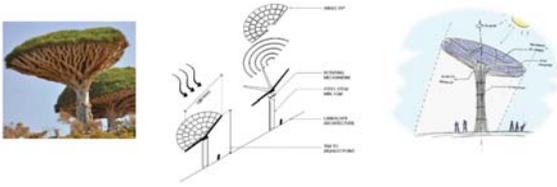


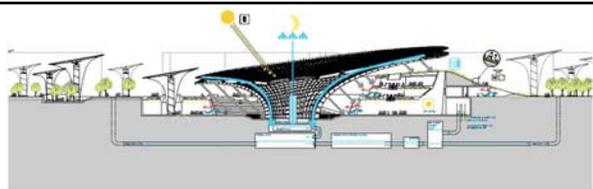




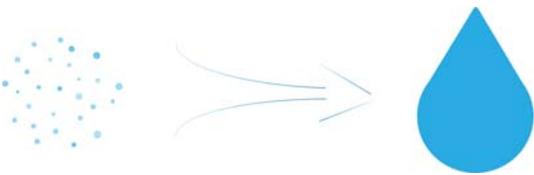


Design Ideas: Solar Energy Trees





Design Ideas: Capture water from air



Obstacles + Redesign

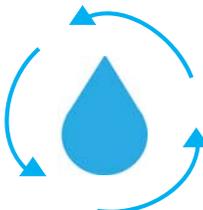
— The University of Michigan
— School of Engineering

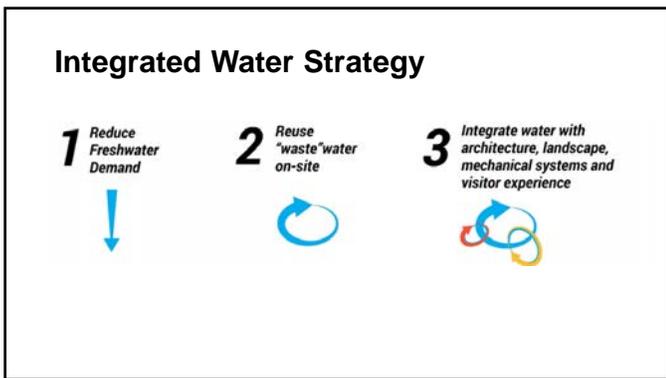
Met an Obstacle

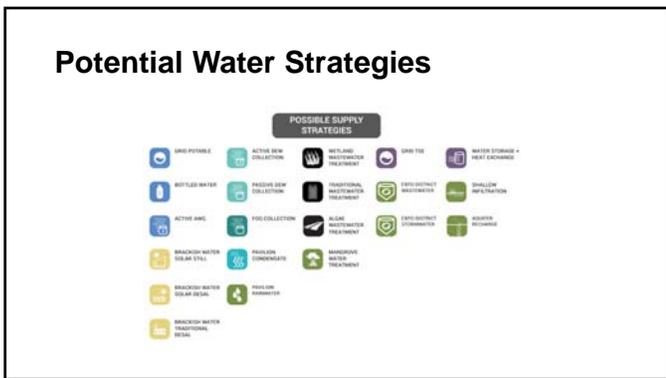


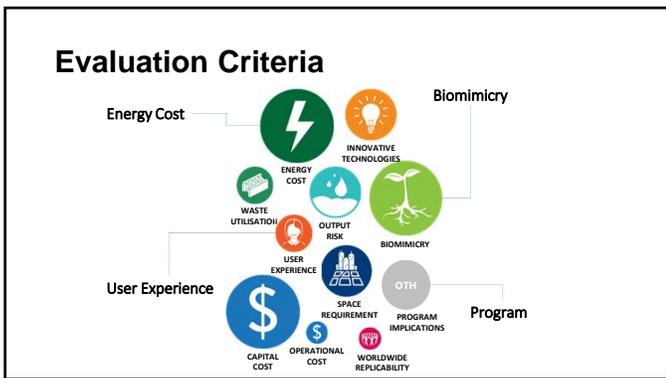
Reassess Design Ideas

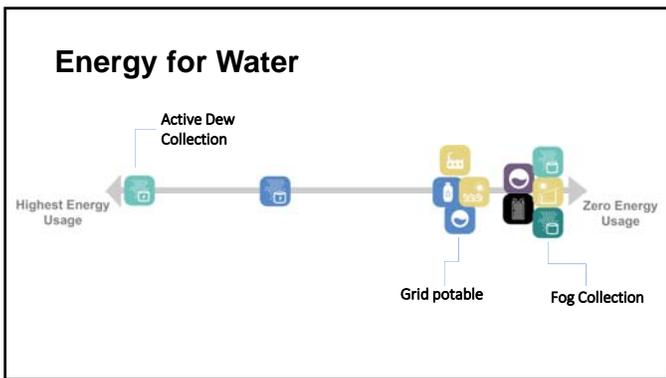
- Water as a **reusable** resource
- Opened the door for integrated design

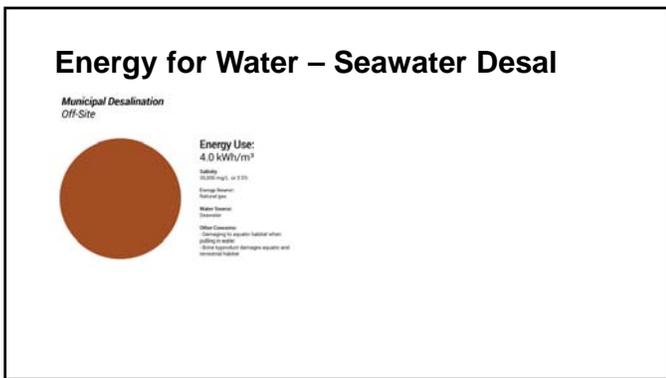


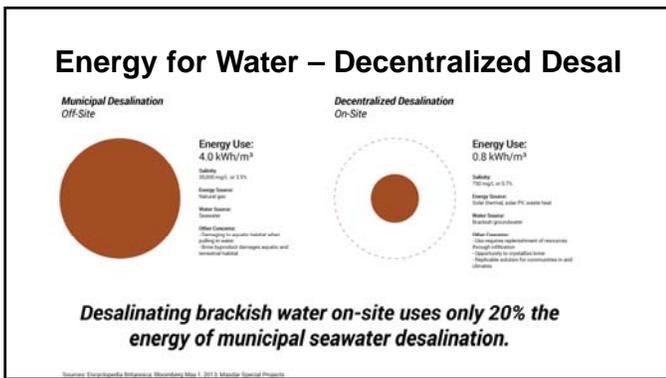


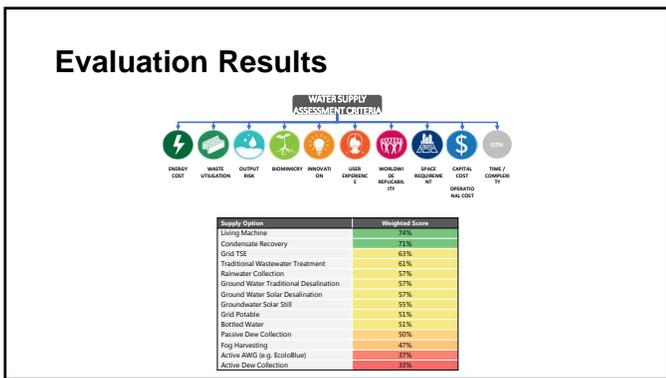


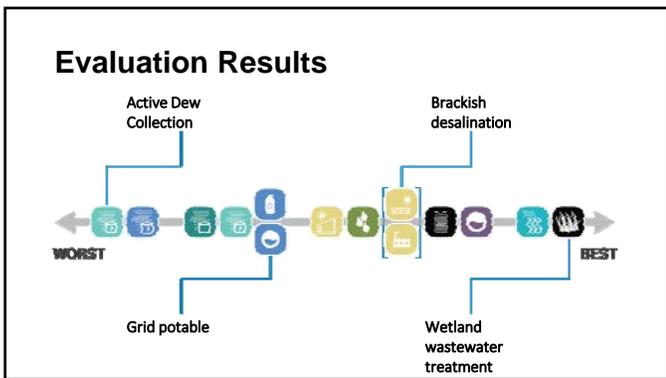


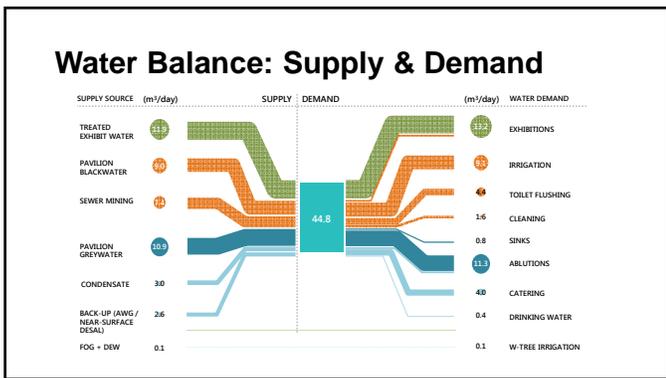


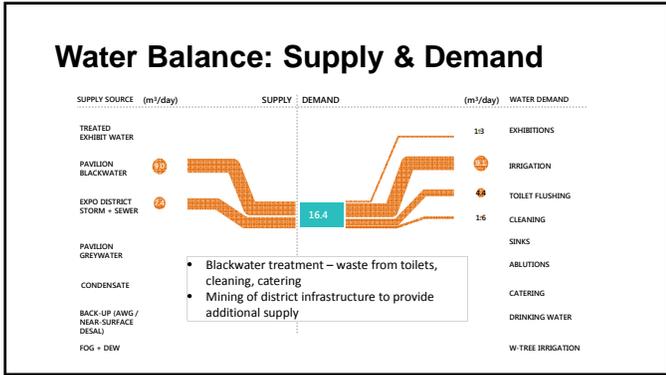


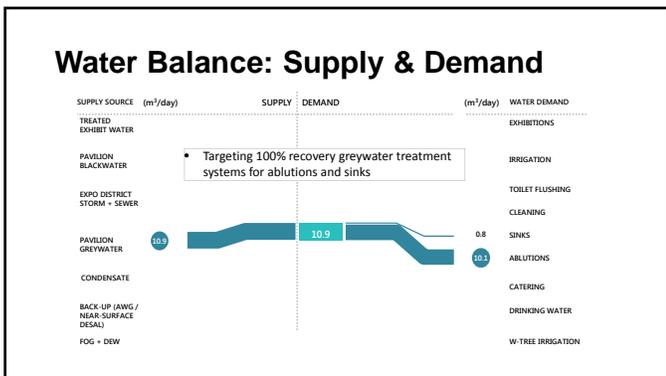












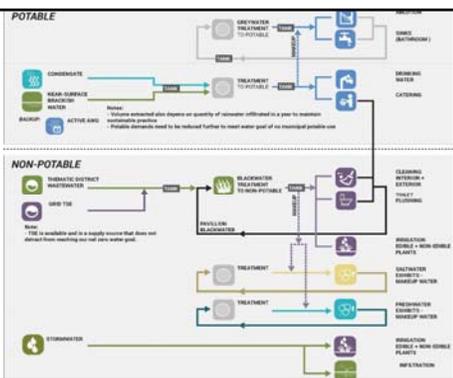
- ### Challenges
- Modeling water demands
 - Energy use of water systems
 - Barriers to implementation

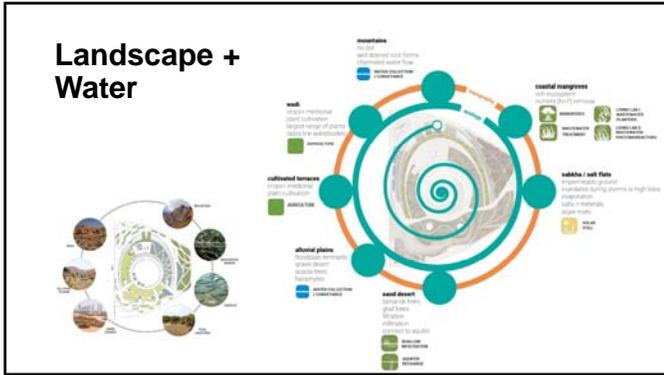
District Scale Water Reuse

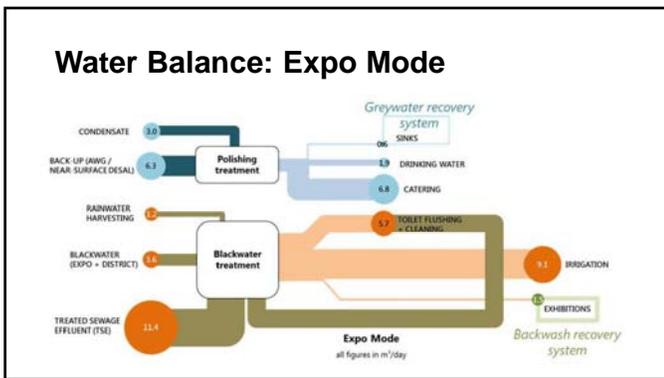
- Sustainability Pavilion: Site within a larger city
- Existing infrastructure: Coordination with neighbors
- Looking to connect: What worked, what didn't

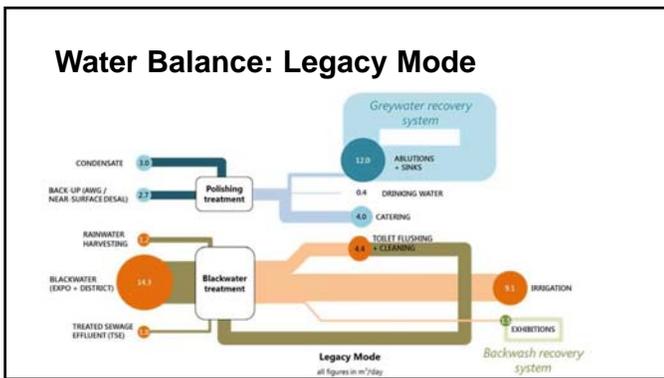
Final Design Solutions

Basis of Design



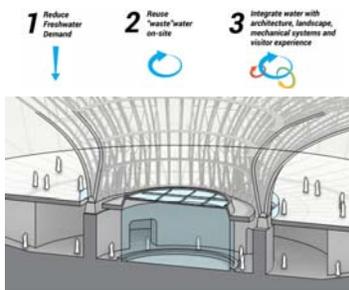






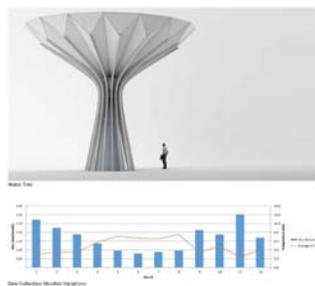
Innovation: Water Reuse

- Low Flow Fixtures
- Greywater Reuse
- Blackwater Reuse
- Condensate Reuse
- Stormwater Reuse
- Exhibition Backwash Reuse
- Low energy water systems
- Integrate visitor experience



Innovation: Water Tech + Design

- Demonstrate to replicate
- Innovation Gallery
- Technologies
 - Sewer mining
 - Passive water desalination
 - Renewable powered desalination
 - Metal organic framework
 - Dew capture



Innovation: Water Policy

- Dubai's progressive building code
- Progressing even more
- Role in shaping policy



Image Credit: Dubai Municipality

Conclusion

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Questions?

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THANK YOU

Thank you!

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