Transformative Water Projects & Partnerships

Sustainable Silicon Valley
Navigating the Bay Area Water
May 31, 2018
Agenda

Transformative Beneficial Water Reuse

Transformative Partnerships

Transformative Technologies
Local News

Water agencies band together

They plan on connecting their systems, which would help sustain disparate communities during disasters.

By Lisa M. Hietanen

SFPUC is close to connecting their systems with the Bay Area’s other water agencies in what is called the East Bay Regional Water Agency. This network will provide a more reliable, sustainable, and less costly water supply.

The agencies are working together to improve water reliability and reduce the risk of contamination.

Highway 4 carpool crackdown nabs dozens

Several people were nabbed in a crackdown on the carpool lanes. The California Highway Patrol conducted an operation in Sonoma County, targeting drivers who were not following the rules.

Your Kids and Virtual Reality

Navigating the Digital World

With the rise of virtual reality technology, children are being introduced to new ways of learning and playing.

But isolation is no longer good enough for the Bay Area’s $535 billion a year economic engine. The region is among the world’s highest concentrations of wealth and a center of innovation. With top universities and home to companies such as Apple, Google Tesla and Facebook.

“Water is the lifeblood of the Bay Area’s economy,” said Ritchie. “We happen to be the world’s top consumers of water, which makes it critical for us to be prepared for any situation.”

Bay M

A reservoir is being built to reserve water for the future.

A tank is under construction for a fragility test. The tank will hold 9 million gallons of water and be used to test the tank’s ability to withstand earthquakes.

The test will help ensure the tank can withstand the next major earthquake.
Executive Summary:

“Through this Drought Contingency Plan (DCP), BARR agencies are working together to leverage existing assets and resources and strengthen the region’s water supply reliability in ways uniquely possible through the partnership.”

East Bay Municipal Utility District (Lead Agency) and Bay Area Regional Reliability Agencies:
- Alameda County Water Agency
- Bay Area Water Supply and Conservation Agency
- Contra Costa Water District
- Marin Municipal Water District
- Santa Clara Valley Water District
- San Francisco Public Utilities Commission
- Zone 7 Water Agency

December 19, 2017
Prepared by
Brown & Caldwell

www.bayareareliability.com
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<th>Medium-Term (~5 years)</th>
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Energy neutrality

The energy content of wastewater is 2-4X the energy required to treat it.

Biological Wastewater Treatment ... the basics

Aerobic Metabolism

- Organic matter (carbon) → New bacteria cells
- Nutrients → H₂O
- O₂ → CO₂

Anaerobic Metabolism

- Organic matter (carbon) → New bacteria cells
- Nutrients → CH₄
- H₂O → CO₂
Traditional Wastewater Treatment

- Sewage sludge
- Aerobic Wastewater treatment
- Anaerobic Digestion
- Electricity
- Gas/Fuel
- Fertilizer
- Water

Organics: BOD/COD
Suspended Solids: TSS
Nutrients: TN, TP

https://www.epa.gov/sustainable-water-infrastructure/energy-efficiency-water-utilities
Neutral Energy Wastewater Treatment:
Source Separated Organic Waste (SSOW) Anaerobic Co-digestion

Landfill Source Reduction Legislation
- SB 1383
- AB 1826
- AB 939
- AB 901
- AB 341
Neutral Energy Wastewater Treatment:
Staged Anaerobic Fluidized-MBR (SAF-MBR)

* Stanford Codiga Resource Recovery Center
* ReNUWIT
* Silicon Valley Clean Water

https://cee.stanford.edu/research/labs-centers/codiga-resource-recovery-center-cr2c
Optimizing Wastewater Resource Recovery

- Food waste
- Sewage sludge
- Anaerobic Digestion
- Electricity
- Gas/Fuel
- Fertilizer
- Water

SAF-MBR Anaerobic Digestion

Rest of the World: $1,405 million (58%)
UK: $159 million (7%)
Municipal Indirect/Direct Potable Reuse (a.k.a. IPR/DPR)

- **Aerobic Wastewater treatment**
- **Microfiltration/ Ultrafiltration Membrane Bioreactor (MBR)**
- **Biological Active Filter**
- **Advanced Oxidation (AOP)**

**Constituents of Emerging Concern (CEC's)**
- Organics: BOD/COD
- Suspended Solids: TSS
- Nutrients: TN, TP

**Log Reduction Values (LRV):**
- Bacteria
- Pathogens

Note: SMGA = Sustainable Groundwater Management Act

- IPR: Environmental Buffer e.g. Lakes
- IPR: Aquifer Recharge SGMA
- DPR: to Water Distribution
IPR/DPR Brine Management

Aerobic Wastewater treatment

Microfiltration/ Ultrafiltration

Reverse Osmosis

Advanced Oxidation

Beneficial Reuse

HCl
NaOH
NaOCl
NaCl
CaSO4
MgOH

NF/RO Membranes/ Electrodialysis Reversal/ Bipolar ED/ Thermal Evaporation
GUIDANCE FOR PRODUCING SAFE DRINKING WATER

Membrane bioreactor Validation protocol

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Surface_Water_Augmentation_Regulations
China government agencies

- China’s 12th 5-Year Plan (‘11-’15) water targets
- Circular Economy Promotion Law (CEPL)
- “Water-for-Coal Plan”
SUEZ is ready to work by your side

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Appendix

Membrane Aerated Biofilm Reactor (MABR) technology
Neutral Energy Wastewater Treatment: **MABR Emerging Aerobic Technology**

Reducing Biological Aeration Energy

- Sewage sludge
- **Anaerobic Digestion**
- **Aerobic Wastewater treatment**
- **Membrane Aerated Biofilm Reactor (MABR)**

- Electricity
- Gas/Fuel
- Fertilizer
- Water
Membrane Aerated Biofilm Reactors (MABR)

Benefits:
- Intensify nutrient removal
- More treatment from existing tank volumes
- Reduce aeration energy
  - 30% lower than CAS, 50% lower than IFAS
- Simple solution
  - No civil work
Trinidad Rancheria – 1,200 gpd
Rancho Malibu – 17,500 gpd
Ventana Inn & Spa – 24,000 gpd
Smith River Rancheria – 25,000 gpd
Big Creek WWTP – 30,000 gpd
Carneros Inn – 37,000 gpd
Valley View Casino – 110,000 gpd
City of Malibu – 188,000 gpd
Viejas Casino – 300,000 gpd
Donner Summit PUD – 330,000 gpd
Cache Creek Casino – 350,000 gpd
Laguna County WRF – 0.5 MGD
Lancaster WRF – 1.0 MGD
Rio Vista WWTP – 1.0 MGD
Hi-Desert Water District – 1.0 MGD (NC)

Lathrop WWTP – 1.1 MGD
Corona WWTP – 1.1 MGD
Fillmore WWTP – 1.8 MGD
Modesto WWTP – 2.3 MGD
Imperial WWTP – 2.4 MGD (NC)
American Canyon WWTP – 2.5 MGD
West Basin Water District – 2.5 MGD (NC)
Hollister WWTP – 5.0 MGD
Fresno-Clovis RWRF – 5.0 MGD
Ironhouse SD WWTP – 5.3 MGD
Temecula WWTP – 5.5 MGD (NC)
Redlands WWTP – 6.0 MGD
Irvine Ranch WWTP – 11.0 MGD
Visalia WWTP – 18 MGD
Riverside WWTP – 26 MGD

NC = Not Commissioned