

# BUILDING A WORLD OF DIFFERENCE

## RENEWABLE WATER

### A GLOBAL PERSPECTIVE

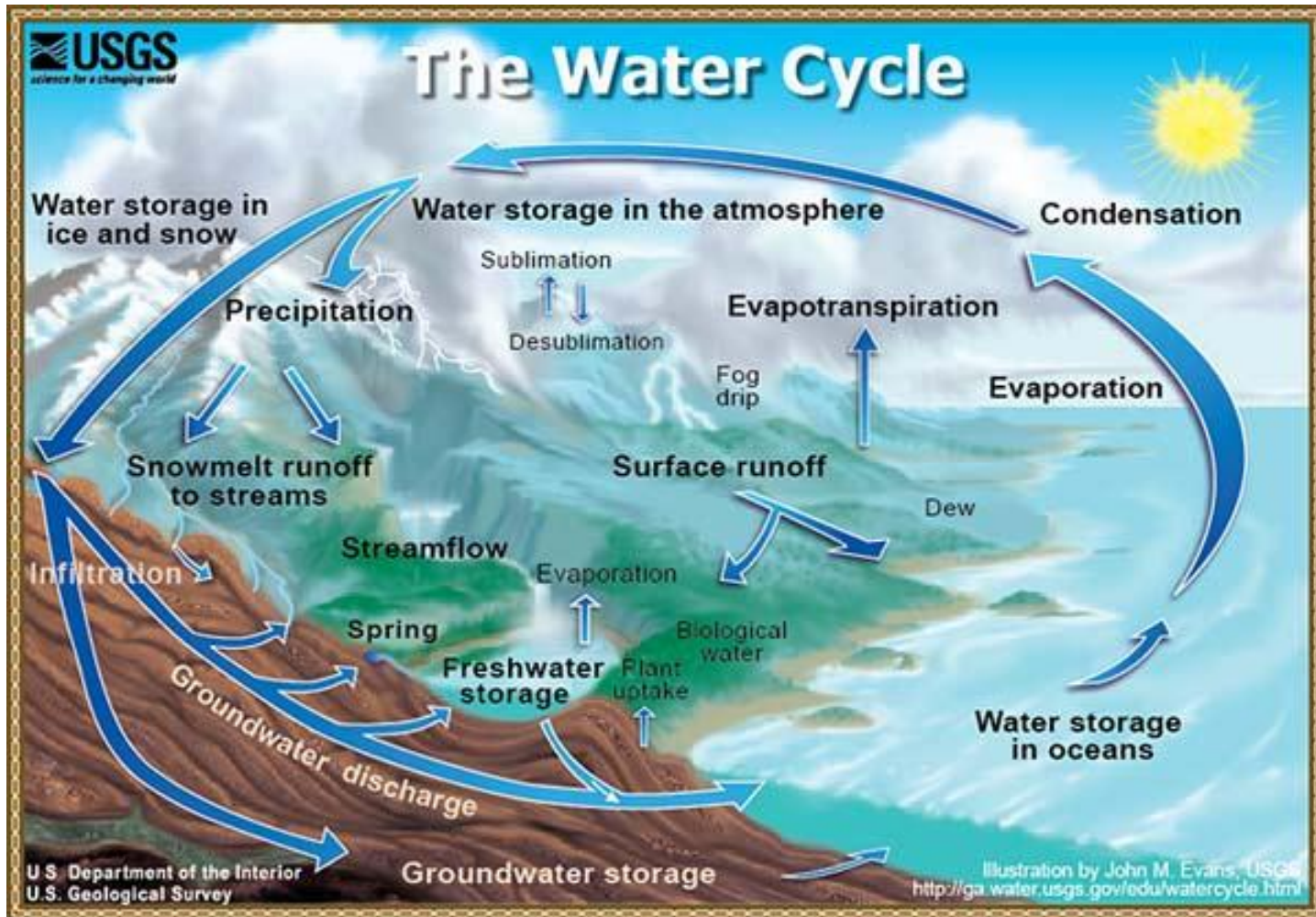


**BLACK & VEATCH**  
Building a world of difference.®

# AN EVER-CHANGING WORLD



# BUILD RESILIENT WATER SYSTEMS

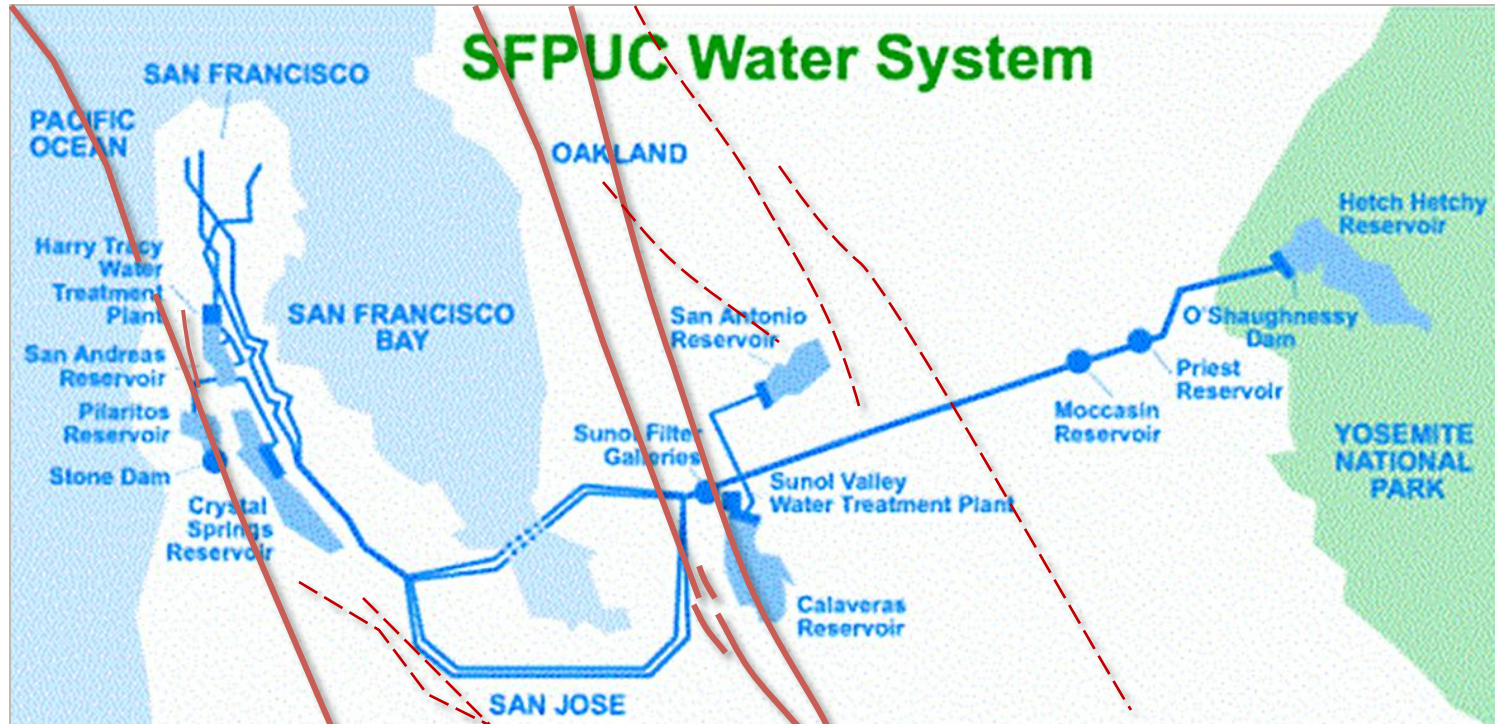


# AUSTRALIA



- Came dangerously close to losing water supply to major urban areas
- Added desalination plants, recycling facilities and grid systems on urgent basis
- Pre-planning and response continues to be heavily debated by the politicians.

# SAN FRANCISCO - WATER SUPPLY IMPROVEMENT PROGRAM (WISP)



- Original system built in early 1900's
- Crosses 3 major seismic faults
- US \$4.6B program underway to reinforce system
- Scheduled completion 2016

# REGULATORY DRIVERS



- In the crosshairs
  - CSOs
  - SSOs
  - Nutrient Removal
  - Endocrine Disrupters
  - PPPs
  - Non-point source
  - Stormwater
- Issues create opportunities
  - Program Management
  - Alternative Delivery
  - Technology development

**Combined sewer overflows are a water pollution concern for more than 700 cities with combined sewer systems.**

# ECONOMIC PRESSURES



- Black & Veatch series
- Infrastructure Bank
- Water is in the eye of the storm
- Pricing to reflect value
- Do more for less

# THE DRIVERS OF INNOVATION

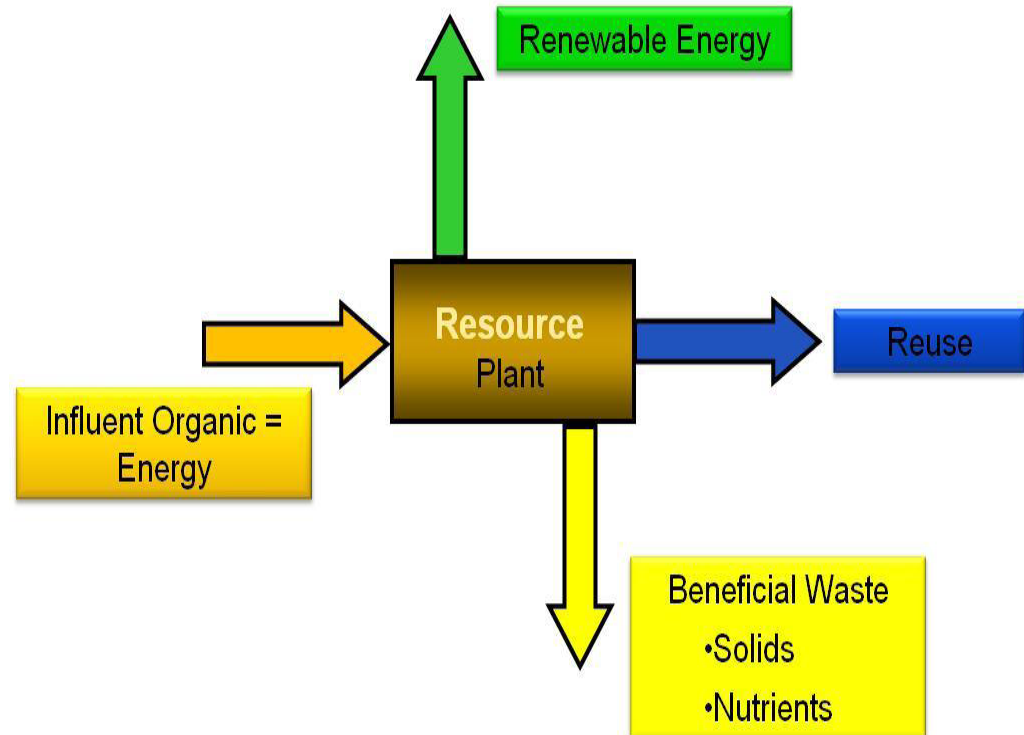


- **Market forces**
- **Do more for less**
- **Brain over Brawn**

**Thames Beckton Water Treatment Plant**

# RESOURCE PLANTS

- Paradigm shift from waste to recovery
- Business case to balances resource supply and demand
- Gearing of energy, water, and nutrients



**Resource plants recover energy, water, solids and nutrients.**

# LOS ANGELES DIGESTER GAS UTILIZATION PROJECT



- Renewable energy source produced through treatment of wastewater
- Third party solutions driven by innovation
- Effectively closes water and energy cycles

**Digester facility at Hyperion Treatment Plant**

# NEXUS OF ENERGY AND WATER



# THE GEARING OF WATER & ENERGY

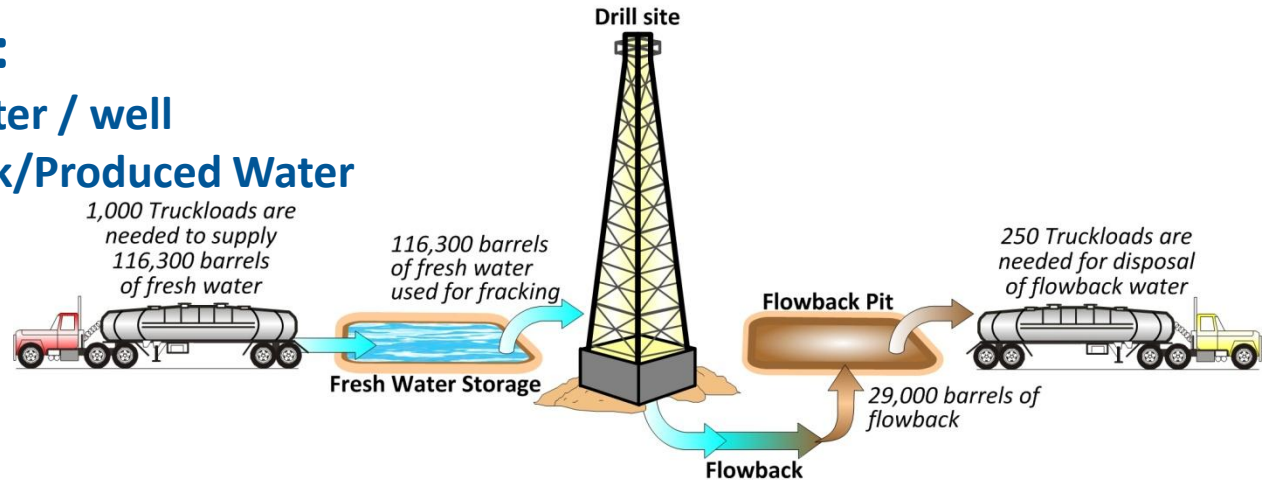


- The growth engine of our global economy
- Inextricably linked at every stage of production
- Renewable solutions must address both

# SHALE GAS – HOW CAN WE BETTER MANAGE THE WATER RESOURCES?

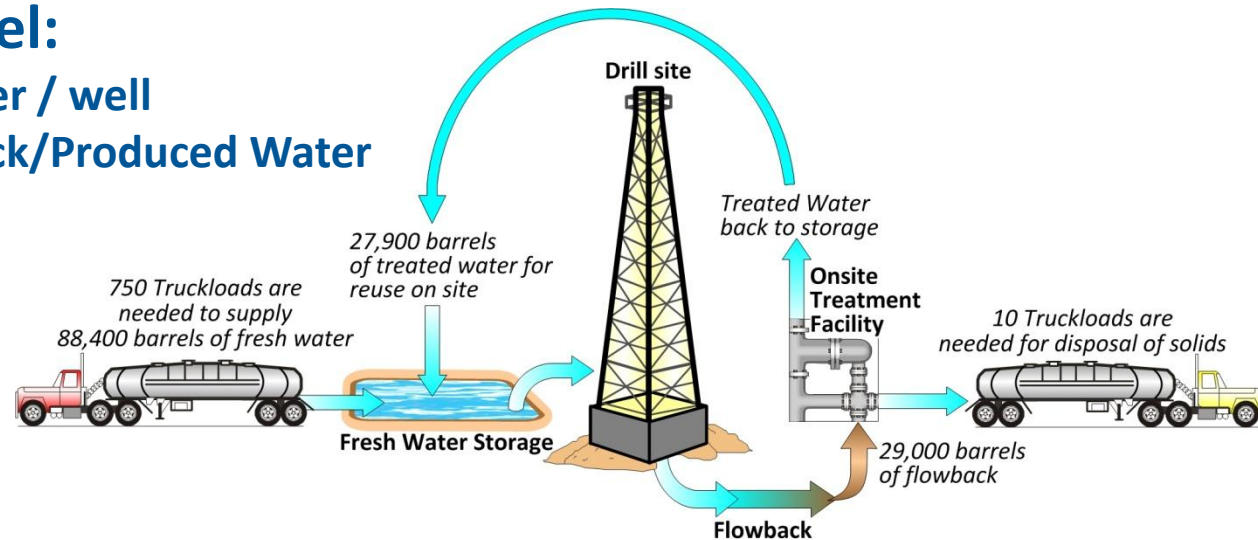
## Current Approach:

- 5 MGallons of Freshwater / well
- 2 MGallons of Flowback/Produced Water Hauled for Disposal
- 1000s of Trucks



## 100% Recycle Model:

- 3 MGallons of Freshwater / well
- 0.2 MGallons of Flowback/Produced Water Hauled for Disposal
- 100s of Trucks





**It is not the strongest of the species that survives,  
nor the most intelligent that survives. It is the one  
that is the most adaptable to change."**

**— Charles Darwin**

Building a **world** of difference.®

**Together**



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