

Water Resiliency

**Project Planning, Prioritization,
Development, Business Models, Alternative
Financing, and Lessons Learned**

*Water Energy Nexus Workgroup for
Navy Region Southwest and
Marine Corps Installations West*

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Water and Energy Resiliency Challenges



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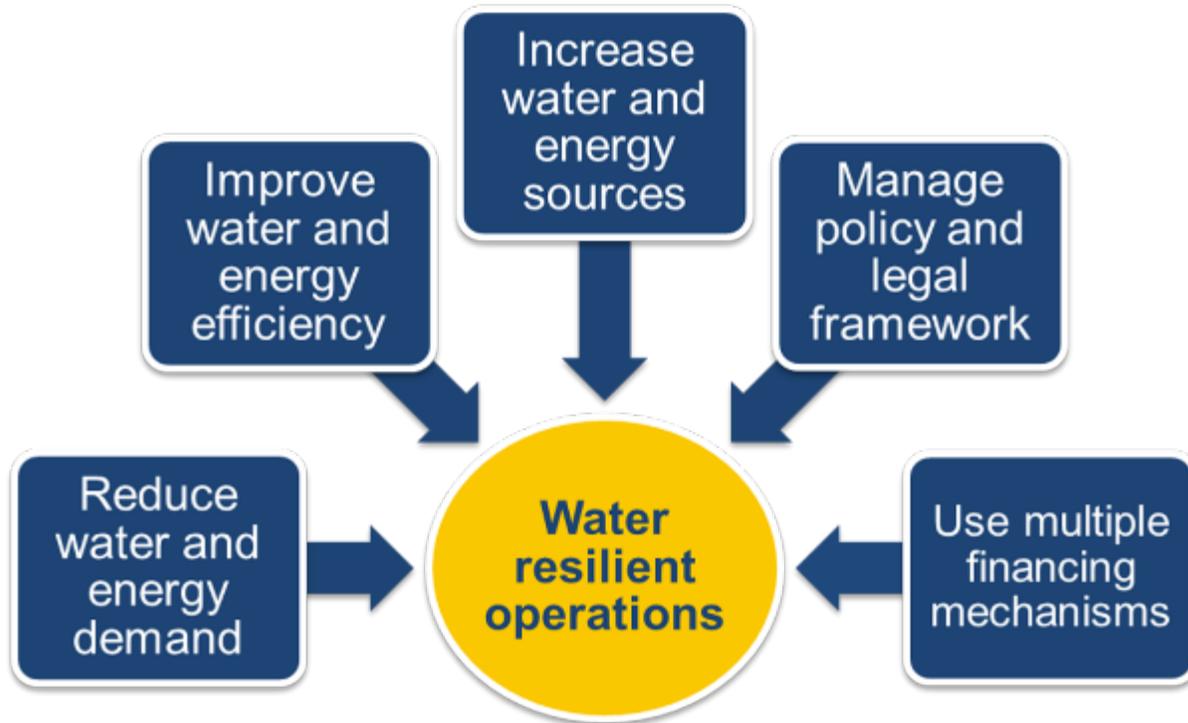


Objectives

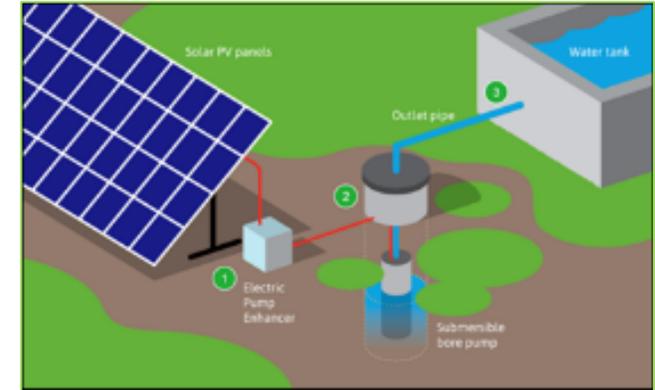
Water Energy Nexus Workgroup

- 1. Improve the resiliency and integrated management of water and associated energy resources**
- 2. Support continued viability of water supply and distribution systems**
- 3. Identify and implement procurement mechanisms, prioritizing alternative financing**
- 4. Develop and implement a portfolio of project opportunities to reduce water risks**

Resiliency and the Water Energy Nexus (WEN)



Examples



Water-Energy Microgrid
Power on-base water pump with on-base energy generation

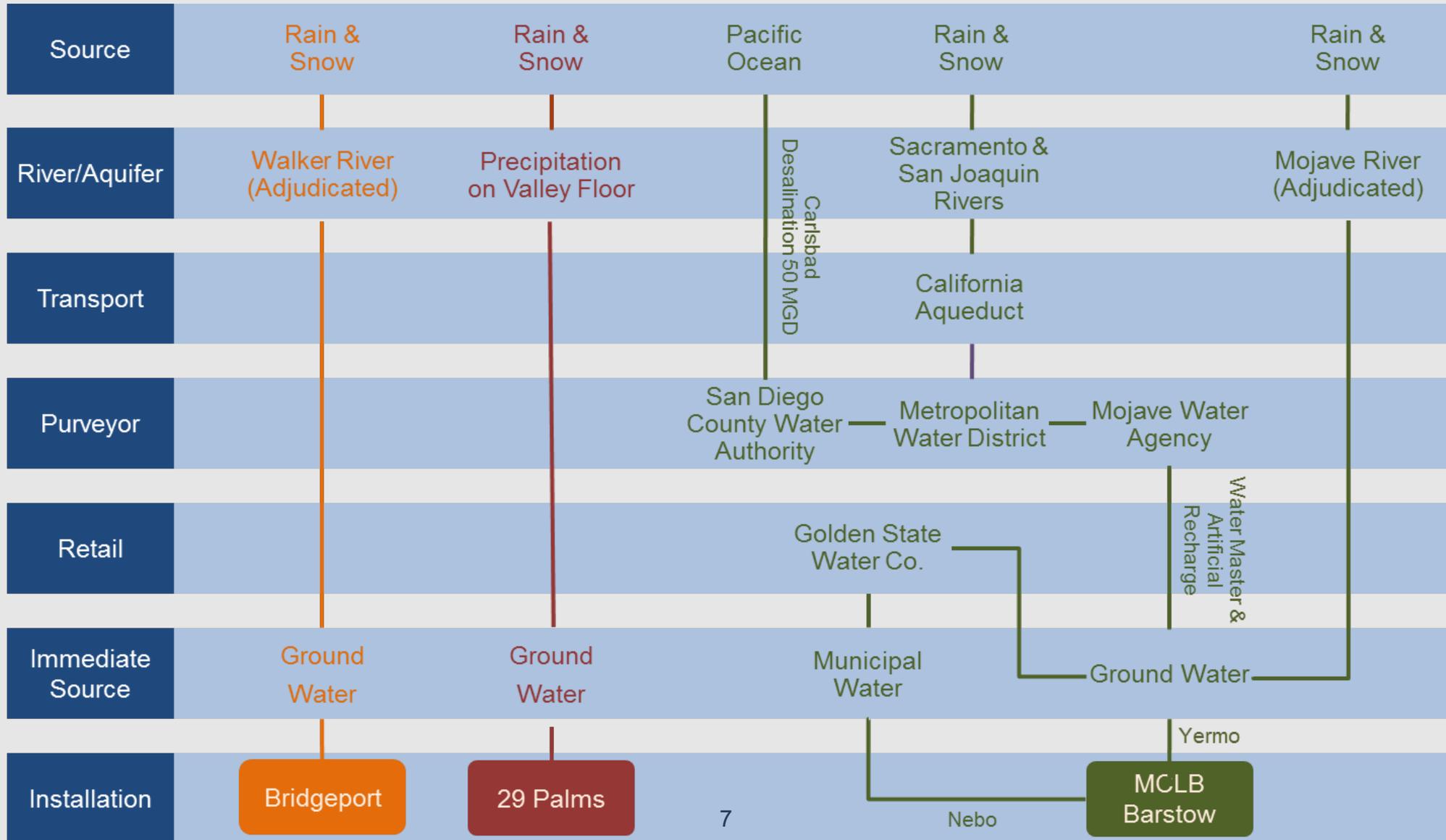


Tertiary Wastewater Treatment
Reuse non-potable water to support installation activities and potentially sell excess water off-base

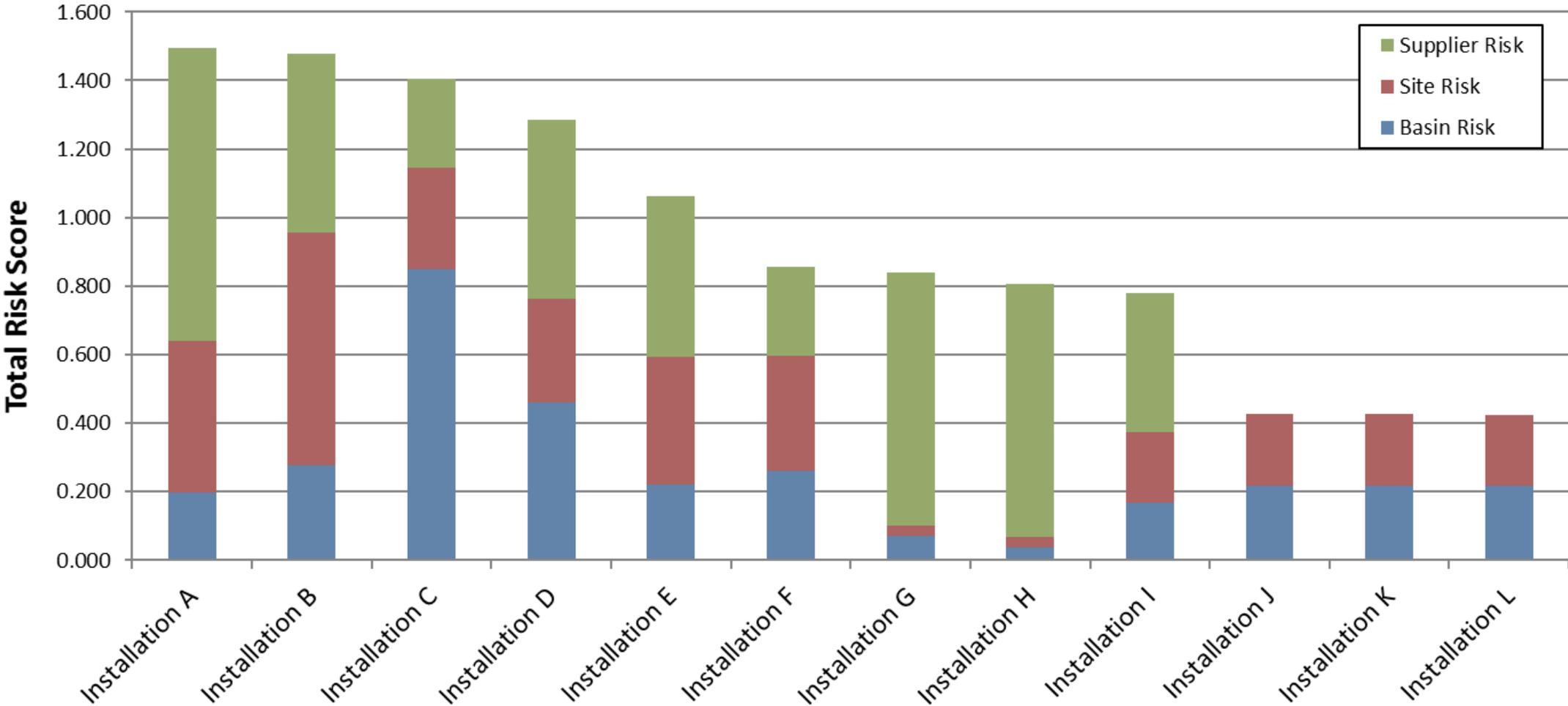
WEN Team



Facts, Assumptions, & Limiting Factors



Site Ranking by Overall Risk



Project Screening

- Interviews with representative at all installations
- Site visits to priority installations
- Developed Integrated Priority List (IPL) tool
- Southwest IPL includes 221 project opportunities with up to 32 attributes each such as:
 - Estimated viability via alternative financing and potential financing mechanisms
 - Benefits to DON, qualitative mission, and water risk mitigation factors
- Living database tool
 - Broad portfolio of project opportunities to improve water resiliency and mitigate risks
 - Opportunities can be sorted by attributes and prioritized by varying evaluation criteria

Installation	Estimated Installation Water Risk Level	Description	Alt. Finance Economic Viability	Water Efficiency or Supply Ranking	Alternative Execution Options	Benefits to DON Mission
Example Site	High	Host wastewater treatment plant expansion	Very High	Very High	Leverage - Real Estate	Protect aquifer, onsite water supply, cost savings, reduced O&M, in-kind consideration

Abridged Example



**Project
Prioritization**

Criteria
1. Third Party Economic Viability
2. Installation Water Supply Risk Level
3. Mitigate Short Term Mission Impacts
4. Total Water Saved at the Installation
5. Total Water Produced
6. Cost Savings
7. Predevelopment Capital Cost
8. Total Water Saved for the Region
9. Environmental Constraints and Viability
10. Project Duration

Business Models & Alternative Financing

A. Leverage Assets

Real Estate for IKC

Commodity for IKC

Grants, Loans,
Rebates, Credits

REPI Funds

B. Finance Purchases

ESPC/UESC

WPA/PPA/USC

Service Contracts /
IGSA

PPV/Privatization

C. Control Activities

Rates, Contract
Incentives, Policy, and
Culture Change

Example Water Resiliency Projects

Host City's WWTP Expansion

- **Benefit:** Protect aquifer, onsite water supply, cost savings, reduce O&M, and staff
- **Mechanisms:** A. Leverage real estate for in-kind consideration, Grants



WWTP Expansion on DON land

Water and Energy Nexus Micogrid

- **Benefit:** Increase daytime onsite water storage, reduce water hammer, waterline breaks, and mission impacts, reduce energy costs
- **Mechanism:** B. Finance purchase via UESC



New controls, pumps, and energy generation sources



Pump groundwater uphill to water storage tanks

Example Water Resiliency Projects



Service Agreement for Wastewater

- **Benefit:** Protect aquifer, cost, and O&M Savings
- **Mechanisms:** B. Finance Purchase via IGSA, Grants
- Send wastewater to City wastewater treatment plant (WWTP)
- Send reclaimed water back to DON installation
- Mothball DON WWTP



Provide Brackish Water for Desalination

- **Benefit:** Increase local water supply
- **Mechanisms:** A. Leverage assets, commodity for in-kind services
- Exchange brackish groundwater for in-kind services and/or water supply

Example Water Resiliency Projects

- **Benefits:** Reduce DON capital expenditures, staffing requirements, and O&M. Potentially avoid outages, identify leaks, achieve water and cost savings
- **Mechanism: B. Finance Purchase** - Service contract in lieu of DON capital outlays (meters, trucks)



Advanced Water Leak Detection

Cost effective satellite technology to remotely detect potential leaks and prevent line breaks



Filtration Truck for Hydrant Flushing

Recycle water vs. flushing, remove scale on pipe, maintain residual chlorine and improve water distribution system

Example Water Resiliency Projects

Irrigation and Landscape Design

- **Benefit:** Protect aquifer, onsite water supply, cost savings, reduce O&M, and staff
- **Mechanisms:** C. Control Activities



Top 10 Lessons Learned

- 1. Potable water rates are low and water resources are undervalued**
- 2. Irrigation is a primary water consumer for the Department of Navy (DON) in the Southwest**
- 3. Irrigation for PPV housing is often a predominant water use and several challenges exist to reduce PPV water use**
- 4. Limited staff, inadequate resources, and bureaucracy create challenges to operate and maintain some water systems**
- 5. Conflicting viewpoints on privatization and/or 3rd party finance can hinder projects**
- 6. DON lease terms and conditions can delay or impede water resiliency projects in a lease model**
- 7. MCIWEST lacks water meters and several DON installations in the SW lack SCADA system to better manage water systems**
- 8. The cyclical response to droughts is out of synch with the long timelines and consistency required to execute water projects**
- 9. DON control of external water consumption (e.g. agriculture) is limited, yet it can greatly impact installations' water risk**
- 10. A portfolio of water projects may better mitigate risks and result more resilient water and energy systems**

Disclaimers

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Back up

Water Energy Nexus (WEN) Workgroup

- **What water and associated energy project opportunities and initiatives can be implemented and partnerships established to:**
 - Plan, prepare, and provide for an adequate water supply
 - Improve Department of Navy (DON) water resiliency and water security
 - Meet mission requirements at DON installations in the Southwest