CPUC WATER/ENERGY WORKSHOP

Eastern Municipal Water District
Integrated Demand Side Management
Case Study

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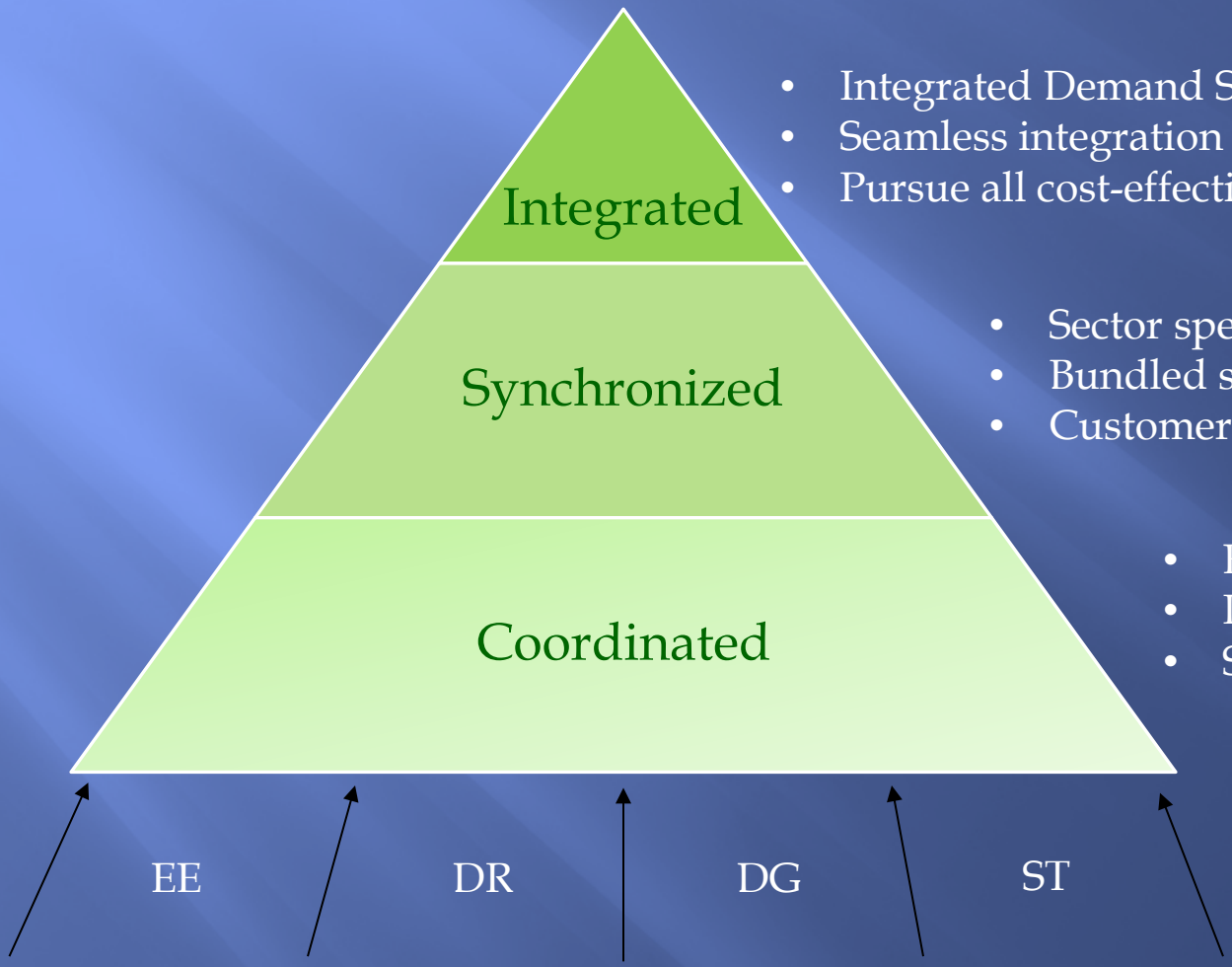
IDSM Theory – Purpose & Objectives



- Integrated Demand Side Management
- Seamless integration of measures and technology
- Pursue all cost-effective DSM opportunities

- Sector specific engagement & approach
- Bundled solutions for comprehensiveness
- Customer Loading Order preference

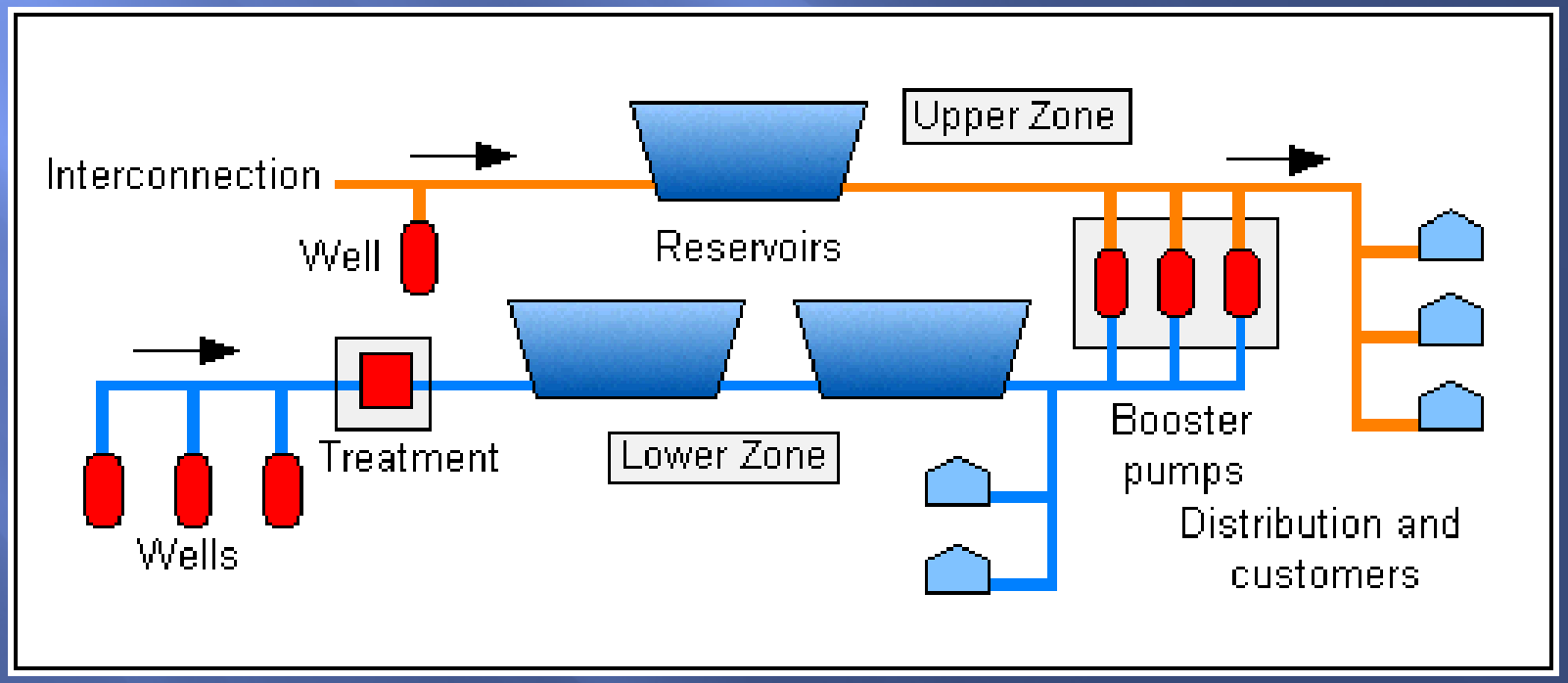
- EELT Strategic Plan based
- IDSM SW Task Force
- SCE 2013-2014 core policy

Why Water Districts for IDSM?

- Large aggregate demand
  - Multiple sites
  - Typically 100-500 kW per site
- Opportunities for diverse efficiency measures
- Good DR performers
- DG and Storage
- Key: SCADA systems
- Conclusion: water districts are “naturals” for integrated DSM solutions

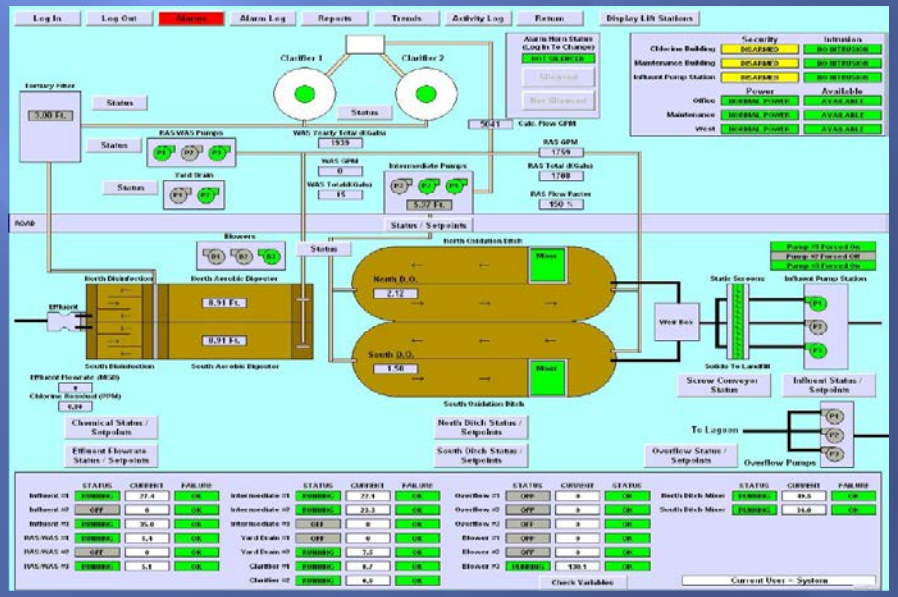
Water Facilities 101

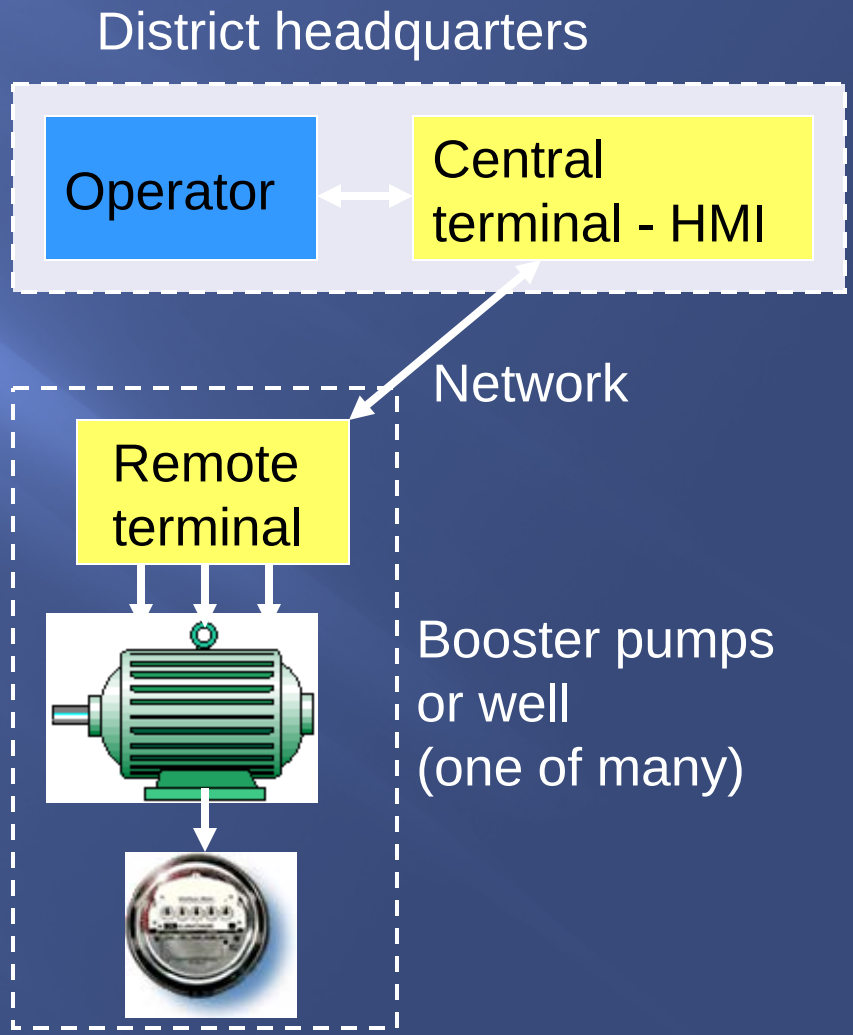
- Wells
- Booster pumps
- Treatment plants
- Reservoirs
- Interconnections
- Distribution & customers.



Technology—SCADA Systems

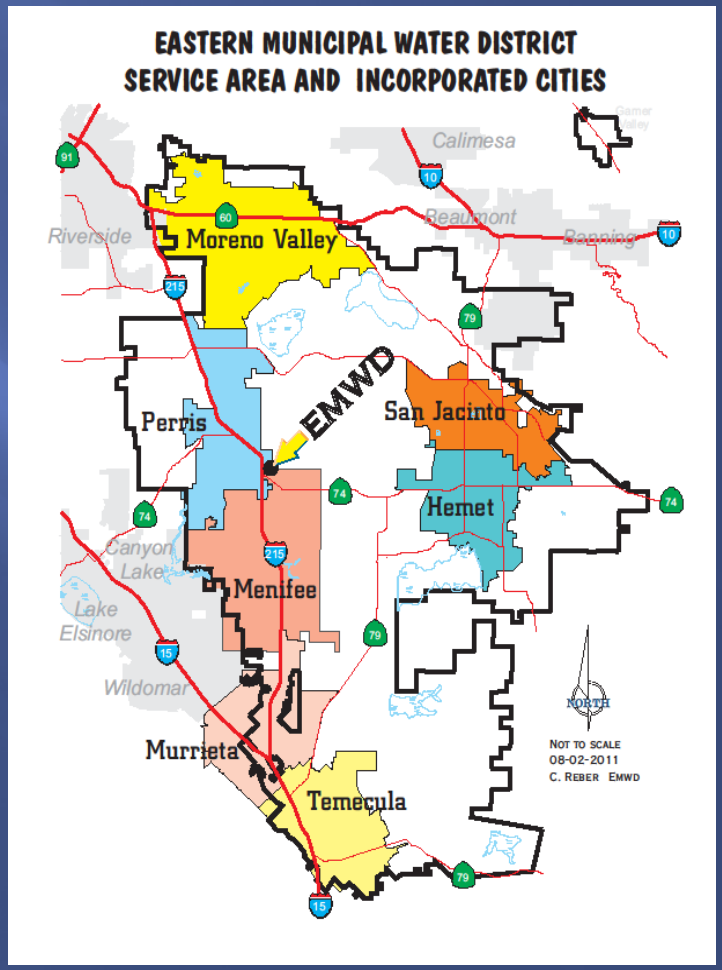
- Monitor and control remote facilities
- Nearly universal
- Like an EMS, but richer controls





Background – EMWD

EMWD – formed in 1950
~ 550 Square Miles
~ Population @ 750,000
~ $220 Million Operating Budget
~ Water, Wastewater, & Recycled

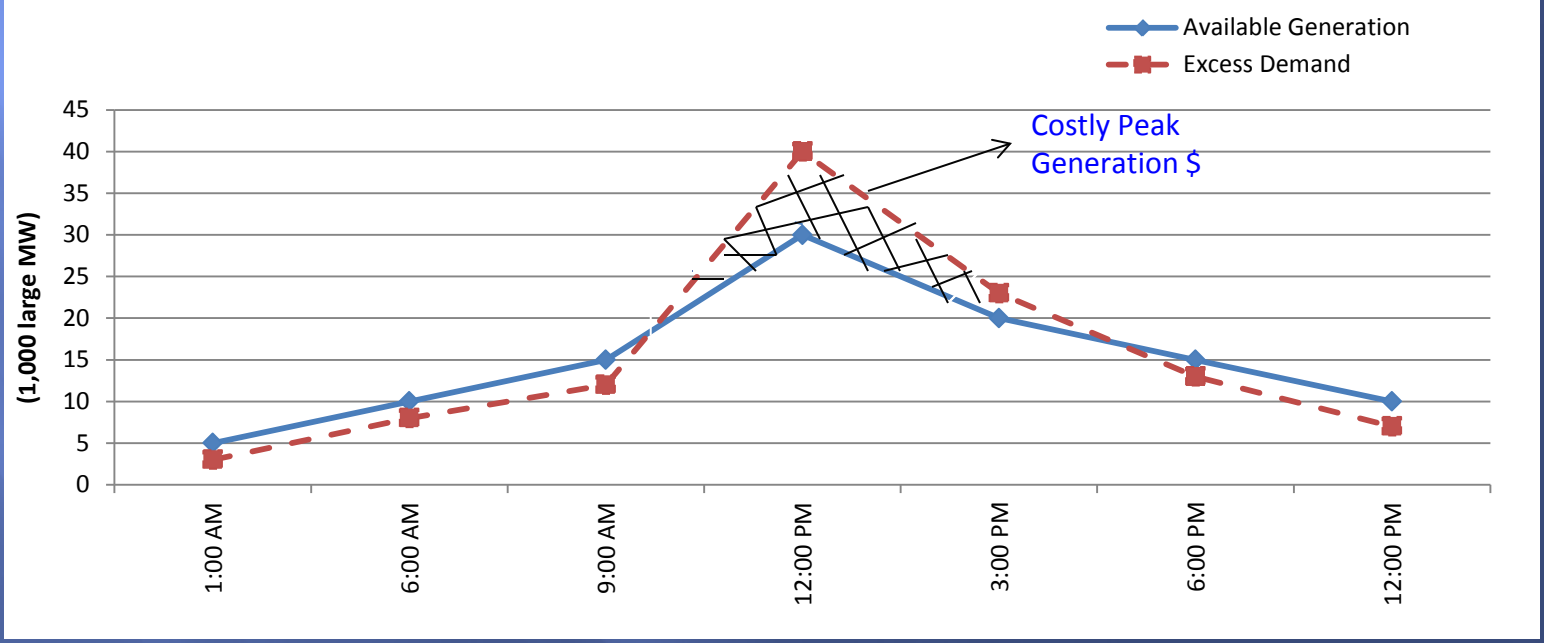


EMWD's Energy Picture

~ 256 SCE Electrical Accounts
~ 46 So. Cal. Gas Accounts
~ $14.6 Million Budget
~ Focus on Efficiency & Savings

What is Demand Response:

- Temporarily Reducing Electrical Usage During Periods of Peak Demand and/or High Supply Cost:
  - Lowers Cost of Wholesale Electricity (consumer surplus)
  - Reduces Chances of Local Forced Outages
  - Immediate and Low Cost Alternative to Marginal Generation



How Does DR Work?

- Demand Response is a "call to action" to customers to reduce load based on pre-assigned requirements
- "Temporary conservation" to replace generation
- Value is based on speed, duration, availability, location, and timing of the load drop

Types of Demand Response

Utility Type

3rd Party Type

Interruptible
(short notice)

Base Interruptible Program
AP-I (pumping controls)
(incentives)

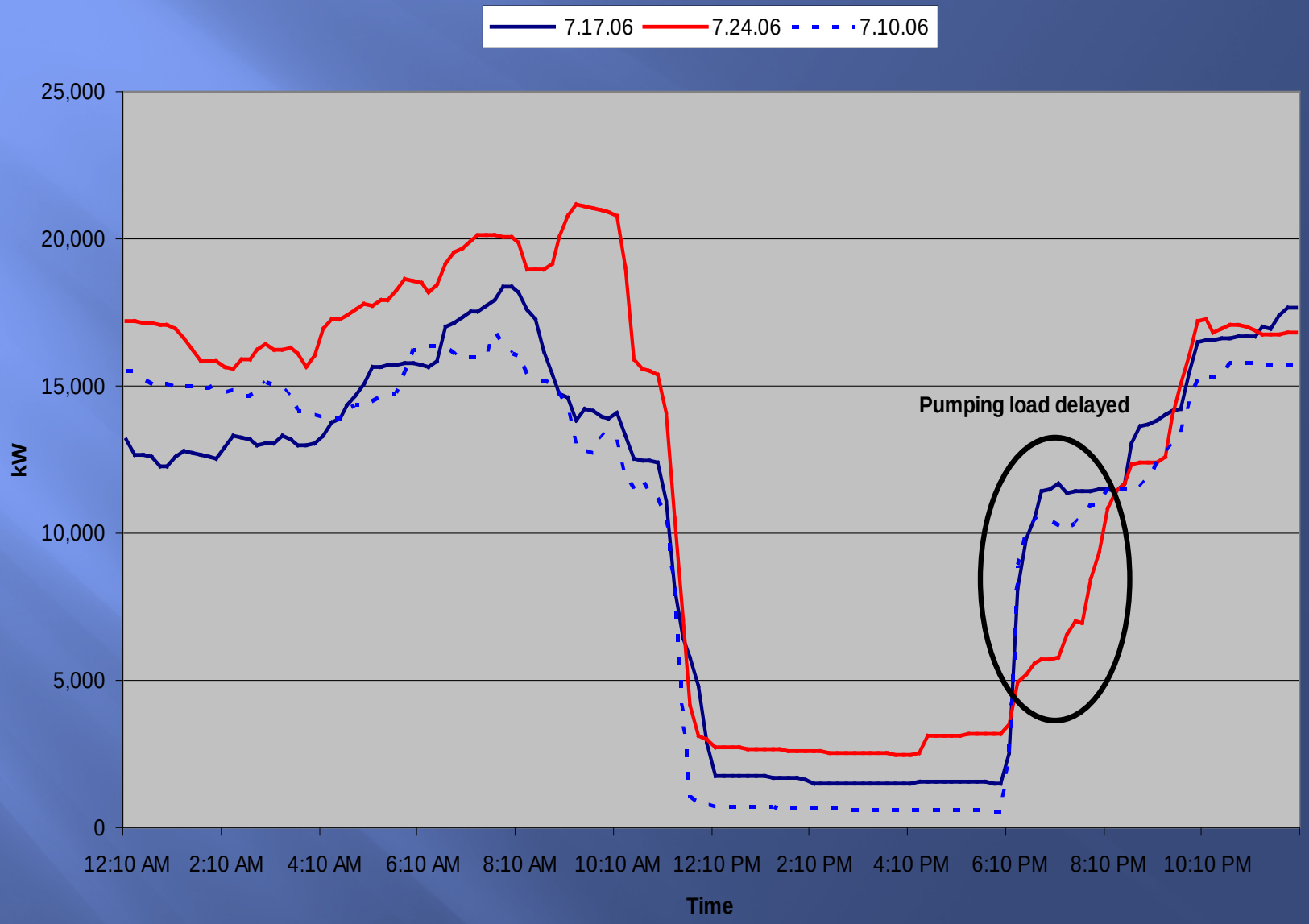
Aggregation

Flexible Solutions
Several Choices
Participation Based
Payments
Technology Solutions

Price Based
(day ahead)

SAI (Critical Peak Pricing)
Demand Bidding
Real Time Pricing
(variable rates or credits)

Illustrative Example



EMWD's Demand Response Portfolio

Combined Annual Savings @ $555,000

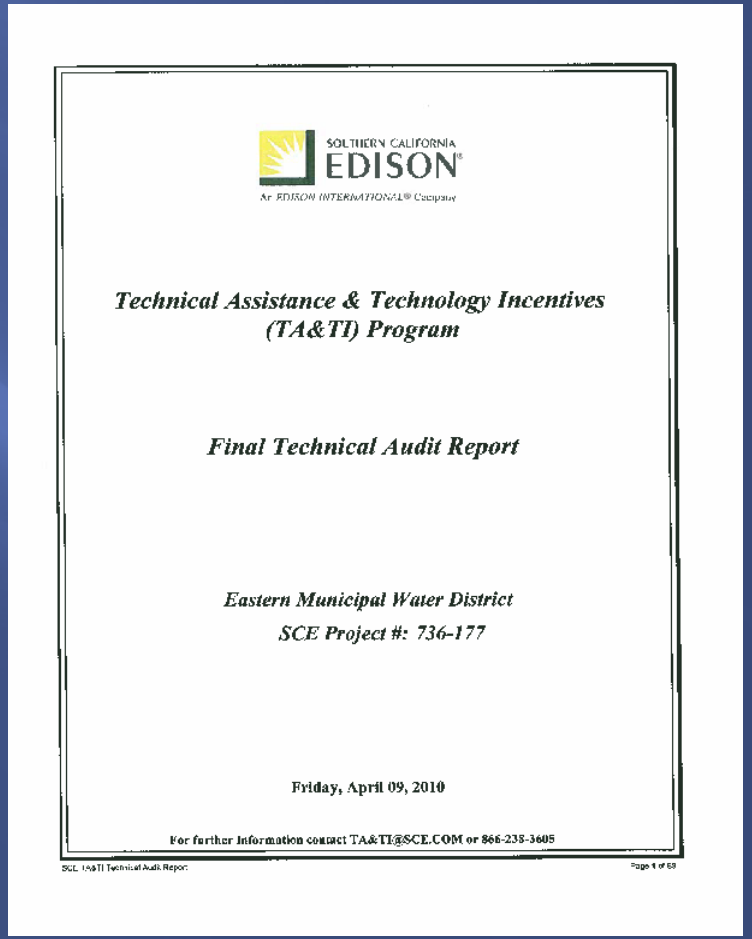
Enrolled Demand

Utility Type	Demand Amount	3rd Party Type	Demand Amount
BIP -3 Accounts	6 MWs	Aggregator -7 Accounts (anticipate moving to 16 accounts and 3.7 MWs with Auto DR Project Completion)	3.1 MWs
AP-I -20 Accounts	2.5 MWs		

11.6 MWs @ 33% of EMWD's Peak Demand

Increasing DR participation

- How did EMWD expand the DR program?
  - Long Term DR Participant
  - SCE Technical Assistance (TA/TI)
  - Consulting Assistance
  - Team Effort
    - SCE representative
    - Consultant
    - 3rd Party Aggregator
    - EMWD Operations



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Technical Assistance & Technology Incentives (TA&TI) Program

Final Technical Audit Report

Eastern Municipal Water District
SCE Project #: 736-177

Friday, April 09, 2010

For further information contact TA&TI@SCE.COM or 866-238-3605

SCE TA&TI Technical Audit Report

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3rd Party Demand Response

Industry:
Water Agency

Location:
Perris, CA

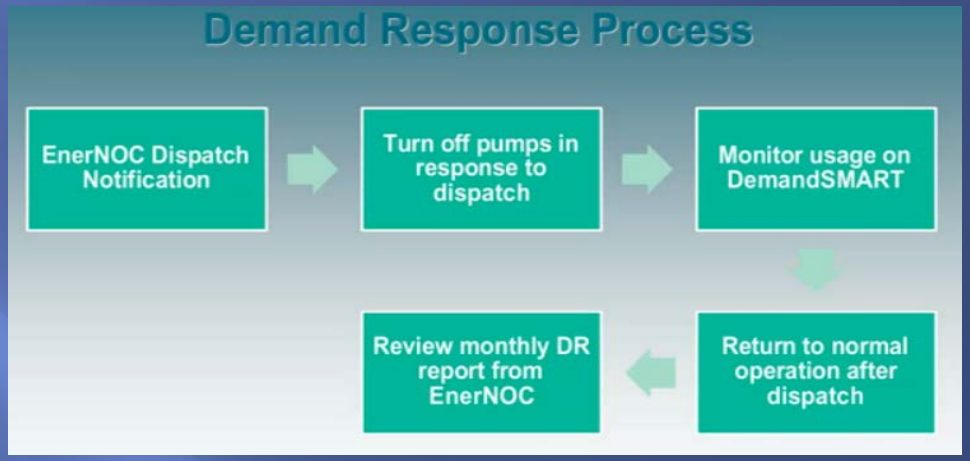
Application:
DemandSMART™

Program:
EnerNOC Demand Response at SCE

DR Strategy:
Curtailment only, 3.1MW (moving to 3.7MW)

Primary Curtailment Strategy:
Temporary pump shutdown

Annual Payments:
Approximately $100,000



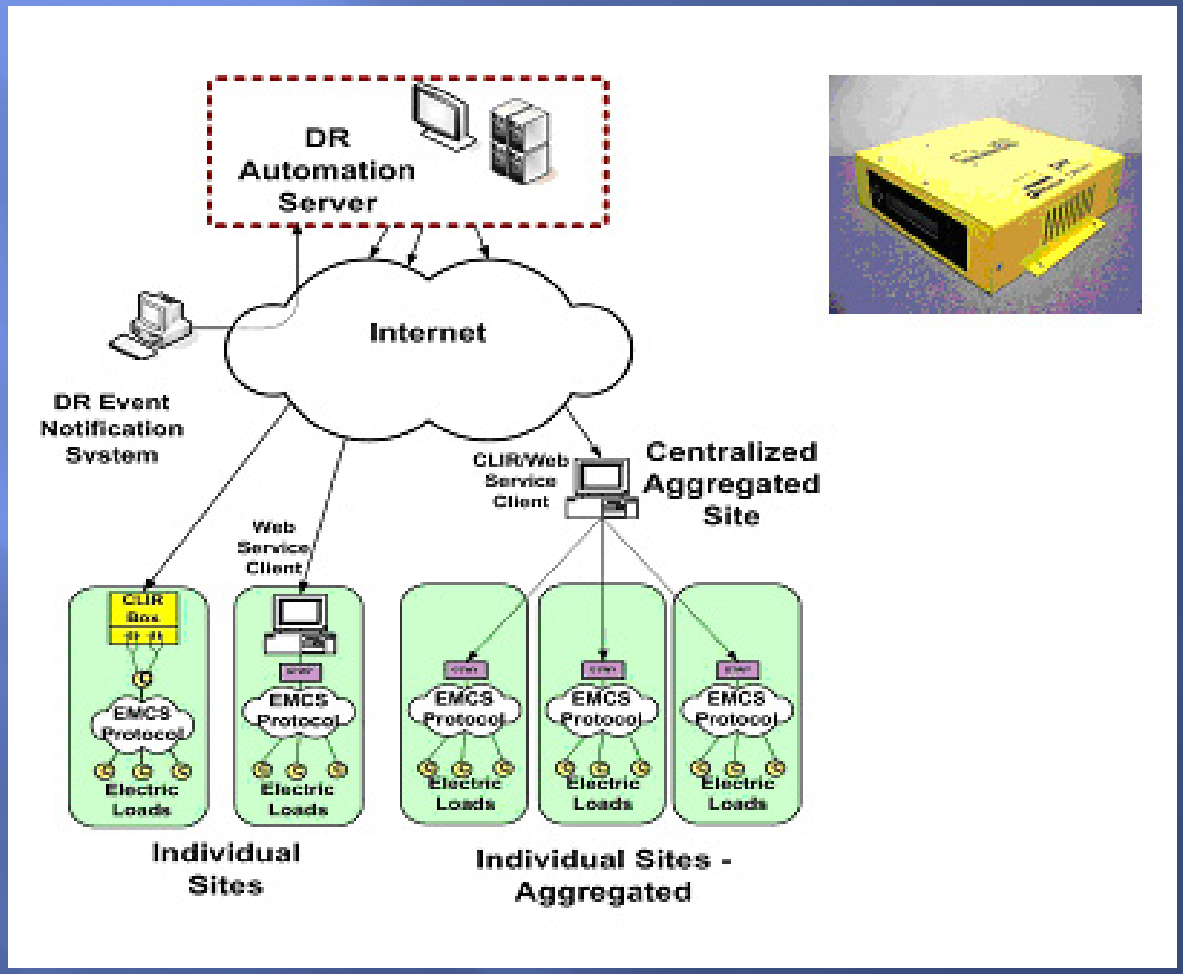
Portfolio Aggregation

- No risk approach, variable level of participation based on system operational needs, no penalties, no backup generation needed, comprehensive strategy

Future DR Solutions

Automated Demand Response:

Participants: SCE, Honeywell; Derceto; EnerNOC; EMWD



EMWD IDSM Forecast

- Automate the evaluation & implementation of DR Events to enhance performance and minimize burdens
- Enable greater enrollment in DR programs
- Enhance EMWD's ability to Participate in:
  - Critical Peak Pricing (dynamic rates)
  - Demand Bidding Program (voluntary reductions)
  - Other DR price based offerings
- Coordinate the IDSM options (energy efficiency, demand response, distributed generation, and storage/load shift/rate response) for cost reductions

EMWD Best in Class

Eastern Municipal Water District:
A Case Study of Best-In-Class Water-Energy Programs and Practices

A Study Conducted by:

California Sustainability Alliance

A Navigant Consulting Program,
Funded by California utility customers under the auspices of the California Public Utilities Commission

October 1, 2012

Summary of Best Practices

Reduce Energy Consumption within Water and Wastewater Treatment and Distribution Systems

- Optimize pump efficiency (high efficiency motors, pumps & VFDs; regular testing and O&M; reduction of friction in pipes & pumps)
- Optimize aeration system efficiency (high efficiency blowers, fine bubble aeration, DO Control)
- Install efficient lighting, HVAC, other building systems
- Reduce wet weather pumping & treatment energy by reducing storm water infiltration
- Reduce heat losses & recover/productively use waste heat
- Retrofit systems for new cost-effective efficiency technologies

Improve Energy Management Systems

- Monitor/manage energy consumption at the sub-system and/or driver level (e.g. use of SCADA)
- Continually re-balance systems and processes to maximize efficiency

Increase Ability to Participate in Demand Response

- Integrate flexibility into systems design and operations to enable load shifting
- Integrate storage (water, wastewater, electric &/or gas) where beneficial to minimize on-peak electricity consumption

Self-Produce Energy (Electricity & Gas) as a By-Product of Systems Operations

- Produce electricity through transport of water & wastewater (e.g., in-conduit hydropower)
- Increase production & use of biogas/bio-methane from wastewater treatment (anaerobic digestion, co-digestion with other bio-wastes, upstream collection of FOG)

Best-in class take aways

- *A* **close relationship** *between water agencies and energy utilities is instrumental to achieving significant energy savings in the water sector.*
- *A significant amount of data is available to baseline the energy use of water agency; however, availability of data is not required to identify* **promising energy saving opportunities.**
- *Technology* **risk** *and the need for* **investment prioritization** *may prevent water agencies from installing certain efficiency measures.*
- *Newly adopted South Coast Air Quality Management District (AQMD)* **emissions limits** *may prevent EMWD and other water agencies from continuing to beneficially use biogas without significant and costly alterations to their system.*
- **Integrating** *all energy management activities into one central location can prove* **challenging** *for water agencies.*

THANK YOU

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Southern California Edison

Special thank you to
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