Better Buildings
U.S. DEPARTMENT OF ENERGY

Energy/Water Nexus: Not Just a Drop in the Bucket

Moderator: Ira Birnbaum, DOE
Panelists: David Jacot, Los Angeles Department of Water and Power
Sam Steele, City of Fort Worth, TX
Eric Fitzer, Arizona Governor's Office of Energy Policy

U.S. DEPARTMENT OF ENERGY

Los Angeles Department of Water & Power

The Energy Utility Perspective on Water and Energy

Better Buildings Summit 2014
Washington, D.C.

May 8, 2014

David Jacot, P.E.
Director of Efficiency Solutions

Next Century Power:
LADWP's Energy Efficiency Efforts

- LADWP plans to exit coal by 2025
  - Environmental leadership
  - AB32 – 33% of power supply today
  - 2 years ahead of schedule
- Replacement power:
  - Natural gas
  - Renewables – Solar, Wind, Hydro, Geothermal, Biogas
  - **Energy Efficiency (EE)**
- Renewables and EE combined will serve at least 45% of power needs by 2025

Water Conservation and Energy Savings

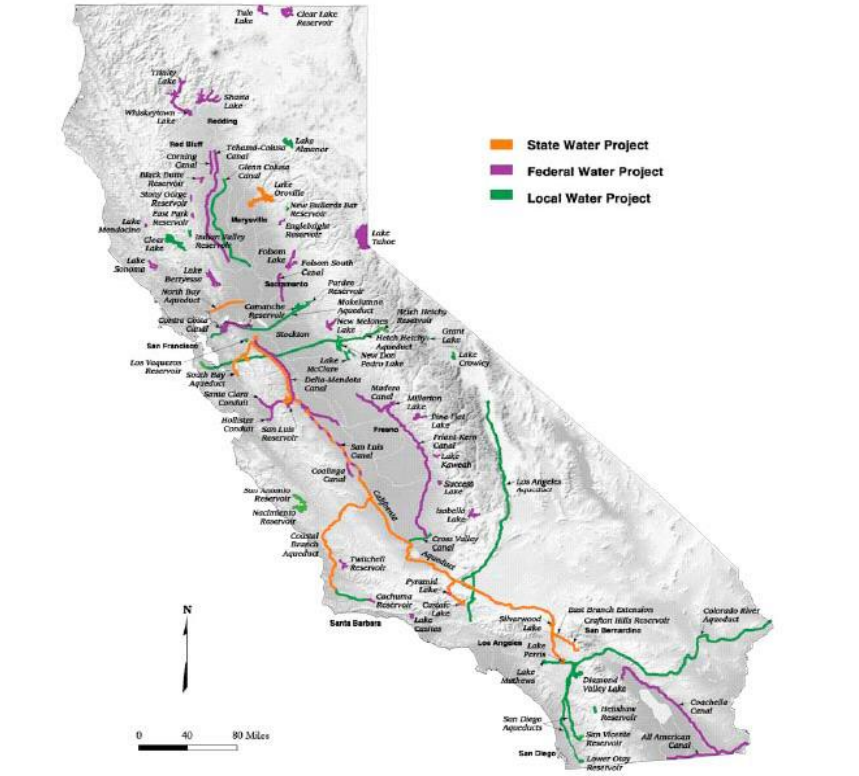
- Water – Energy Relationship in CA
  - Electricity use in California
    - California consumes about 250 Billion kWh/yr
    - Up to 50 Billion kWh/yr is related to water
  - Water-related energy use is about 20% of total electric consumption in California

Water Conservation and Energy Savings

- Water – Energy Relationship (cont.)
  - Water-related energy use
    - End uses: heating, cooling, on-site pumping
    - Upstream uses: surface conveyance, groundwater pumping, treatment, distribution
    - Downstream uses: wastewater pumping and treatment
  - Upstream and downstream water-related energy use in California
    - About 12.5 Billion kWh/yr embedded upstream and downstream of the water customer
    - In Southern California, majority is due to conveyance

Water Conservation and Energy Savings

- Water Conveyance
  - Most water used in Southern California is not locally obtained
  - Imported sources
    - Sierra snowmelt (SWP)
    - Colorado River (CWA)
  - Energy intensive aqueducts and pumping systems to deliver water to Southern California (except LA Aqueduct)



Water Conservation and Energy Savings

- Direct vs. Indirect Energy Savings
  - Direct energy savings are those that appear on the customer's energy meter
    - Traditional EE offerings address these opportunities
  - Indirect energy savings do not appear on the customer's energy meter
    - Occur upstream and downstream of the customer
    - Are due to the customer's reduction in use of some other resource

Water Conservation and Energy Savings

- Direct vs. Indirect Savings (cont.)
  - Energy embedded in water upstream and downstream of a water customer can be saved if that customer reduces their water use
  - Direct water savings = Indirect energy savings
  - Estimated embedded energy intensity for urban water throughout California
    - Northern California: 1,800 kWh/AF
    - Southern California: 4,200 kWh/AF
    - Lake Arrowhead: > 6,500 kWh/AF

Estimating Energy Savings from Conserved Water

- How much energy is embedded in water delivered by LADWP?

Average Energy Consumption Factors	kWh/acre-ft
Water Imported from MWD	2591
LADWP Water Treatment	34
LADWP Water Distribution	196
Wastewater Treatment	766

- Figures developed by LADWP for GHG reporting under AB32

Estimating Energy Savings from Conserved Water

- Total embedded energy vs. LADWP-sourced embedded energy - Assumptions:
  - Conveyance energy not provided by LADWP
  - Water and wastewater treatment and pumping provided by LADWP
  - Approx. 70/30 split between indoor/outdoor use
- With the best available current information, 611 kWh/AF of water supplied by LADWP's water system is provided by LADWP's power system
- LADWP in partnership with UC Davis to develop tighter estimates

LA's Water Conservation and Efficiency Efforts

- LA employs statutory and voluntary means to save water
- Statutory (LADWP helped develop)
  - High Efficiency Plumbing Fixture ordinance
  - Drought ordinance
  - Low Impact Development ordinance
  - Others in the works…
- Voluntary
  - Commercial and Residential water conservation and efficiency programs offered by LADWP

LA's Water Conservation and Efficiency Efforts

- Full range of commercial and residential water saving measures
  - Commercial: High efficiency toilets and urinals, food service equipment, cooling tower controllers, custom projects
  - Residential: Aerators and showerheads, high efficiency toilets and clothes washers
  - Cross cutting: Weather-based irrigation controllers and high efficiency sprinklers, turf removal and CA-Friendly® landscaping

LA's Water Conservation and Efficiency Efforts - Outcomes

- LA's average annual water consumption city-wide has been flat since 1980, despite adding 1 million residents in the same timeframe
- LADWP-sourced embedded energy saved through our water conservation efforts
  - Statutory efforts achieve 2160 AF/yr (est.)
  - Voluntary programs achieved 1993 AF in last FY
  - 4153 AF X 611 kWh/AF = **2,540,000 kWh/yr**

For More Information

- 1-800-Dial-DWP
- www.ladwp.com

Questions or Comments?

Innovative Replicable Solutions
The Energy-Water Nexus

Presented to:

The 2014 Better Buildings Summit
US DOE; Office of Energy Efficiency & Renewable Energy

Presented by:

Samuel C. Steele, C.E.M., Administrator of Sustainability Programs
City of Fort Worth, Texas; Department of Transportation & Public Works

08 May 2014

Presentation Outline

- Municipal Energy Programming
- Trinity River Watershed & Village Creek
- Wastewater Treatment Processes & By-products
  - WW Treatment>Discharge; Solids Treatment>Disposal
  - Reuse Water, Bio-solids, & Bio-gas
- *Village Creek Water Reclamation Facility* Upgrades
- Food for Thought…
  - …Questions, Comments, & Discussion

Municipal Energy Programming

Current Program History & Drivers

- Primary Drivers
  - ✓ State: *Texas Emissions Reduction Program* (TERP) Target
    (Senate Bills 5, 12, & 898 of 77th/2001, 80th/2007, & 82nd/2011 Legislatures Respectively)
  - ✓ City: Mayor & Council *Strategic Goals*
    (Public Safety, Mobility/Air Quality, Clean/Attractive City, Economic Base/Education/Quality Jobs, Orderly/Sustainable Development)
- City Response
  - ✓ Competitive Selection of an *Energy Services Company* (ESCo)
  - ✓ Authorize an *Energy Savings Performance Contract* (ESPC)
- Current Objective
  - ✓ TERP Goal with *State Energy Conservation Office* (SECO) Reporting
    (5%/yr. Electricity Consumption Reduction, now extended through 2021)

Municipal Energy Programming

ESCo/ESPC Program Development Interests

- Implement City Facility Improvements that:
  - ✓ Reduce Energy & Water Demand & Consumption
  - ✓ Reduce Operations & Maintenance Costs
  - ✓ Support Community Sustainability (*People>Planet>Profits*)
- Identify Creative Project Financing from:
  - ✓ Low-Interest Loan Agreements
  - ✓ Equipment Lease-Purchase Agreements
  - ✓ Federal-, State-, & other-Grants
- Provide Turn-key Project Implementation through:
  - ✓ Schematic & Design Development
  - ✓ Procurement & Construction
  - ✓ Measurement & Verification

Municipal Energy Programming

ESCo/ESPC Program Development Tools

- Texas Statutes: Title 9, Subtitle C, Chapter 302
  - ✓ *Energy Savings Performance Contracts for Local Governments*
  - ✓ Identify all Project Costs including those for Financing
  - ✓ All Costs Paid From Operation & Maintenance Reductions
  - ✓ Simple Payback of Project Not-to-Exceed 20-years
  - ✓ Independent Third-Party Review prior to Construction
  - ✓ Performance Measurement and Verification (M&V) Plan
  - ✓ Provider Guarantees Performance as Net-neutral, Annually
- Focus on Energy & Water Conservation Implementation
  - ✓ Electricity Budget: ~45-% Water, 10-% Traffic, & 45% Other Facilities

Municipal Energy Programming

Current Program & Project Implementation

- Energy/Resource Conservation Program
  - ✓ Implementation Process: Development > Construction > Performance
  - ✓ Delivery Methods: *Energy Savings Performance* & *Design-Build* Contracts
  - ✓ Selection: by RFQ w/Competitive, Best-Value Selection of Contractor
  - ✓ Current Snapshot: 11-Projects (1-Dev't + 1-Const. + 3-Perf. + 6-Complete)
- 1-ESPC: 9-Projects (Phase 1 + 8-Amendments (Phases 2, 3, 4, 5-1&2, 6-a&b, 7))
  - ✓ Over 220-City-Owned & -Operated Buildings (5.7M-sq.ft.)
  - ✓ *Building System Improvements*: Lighting/HVAC/Controls/Water/Electrical
  - ✓ *Utility System Improvements*: Basins/Digesters/Turbines/Steam/Ancillaries
- 1-Design-Build Contract: City Facilities/Traffic Services + Contractor
  - ✓ Over 570-City Traffic Signals (~17k-signal lamps & ~3,500-"PEDs")
  - ✓ *Traffic System Improvements*: LED & "Hand/Man" Signal Conversions

Municipal Energy Programming

Current Project Approvals & Projections

City of Fort Worth	Project Approval		Project Projections		
Resource Conservation Program	Mayor & Council Communication (M&C)		Construction Cost* (1)	First-Year Cost Avoidance* (2)	Simple Payback
Project Name	Date	M&C No.	$	$/Year	No. Years
ESPC Phase 1	02-Sep-03	C-19739	$3,063,090	$397,247	7.7
ESPC Phase 2	07-Feb-06	C-21289	$2,395,659	$342,854	7.0
ESPC Phase 3	26-Sep-06	C-21737	$5,198,937	$711,324	7.3
LED Traffic Signals	17-Apr-07	C-22063	$1,959,678	$536,624	3.7
ESPC Phase 4	17-Jun-08	C-22868	$9,248,307	$944,814	9.8
ESPC Phase 5, Section 1	02-Feb-10	C-24070	$13,577,350	$949,275	14
ESPC Phase 5, Section 2	20-Jul-10	C-24360	$17,889,397	$1,643,221	11
ESPC Phase 6, Part A	17-Aug-10	C-24406	$1,815,526	$211,387	8.6
ESPC Phase 6, Part B	25-Jan-11	C-24718	$3,363,841	$173,793	19
ESPC Phase 7	21-May-13	C-26273	$10,955,452	$565,268	19
Totals	**FY02-FY13**	**Various**	**$69,467,237**	**$6,475,807**	**11**

NOTES

(1) Construction Costs are original to the approved project development cash flow, and have not been reduced by the ~$2.0M in utility incentive revenues which are used to offset future energy conservation programming and project costs.

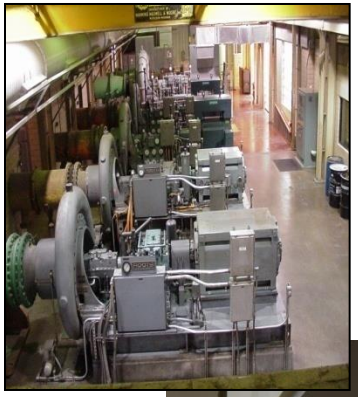
(2) First-Year Cost Avoidance are original to the approved cash flow with utility cost avoidance only, with the exception of:

a) ESPC Phases 1 & 5 which also includes O&M cost avoidance; Phase 1 also includes utility incentive revenues; &

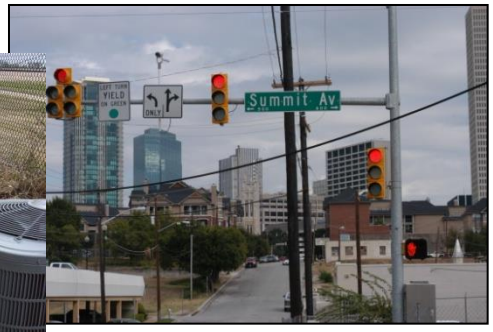
b) ESPC Phase 7 which also includes additional cost avoidance from refinancing ESPC Phase 4.

Municipal Energy Programming

Current Program Snapshots

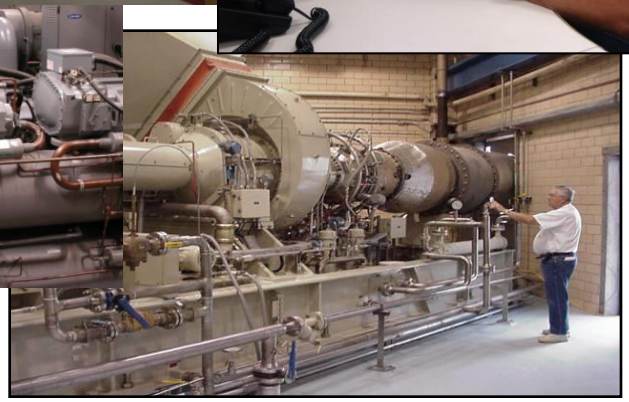












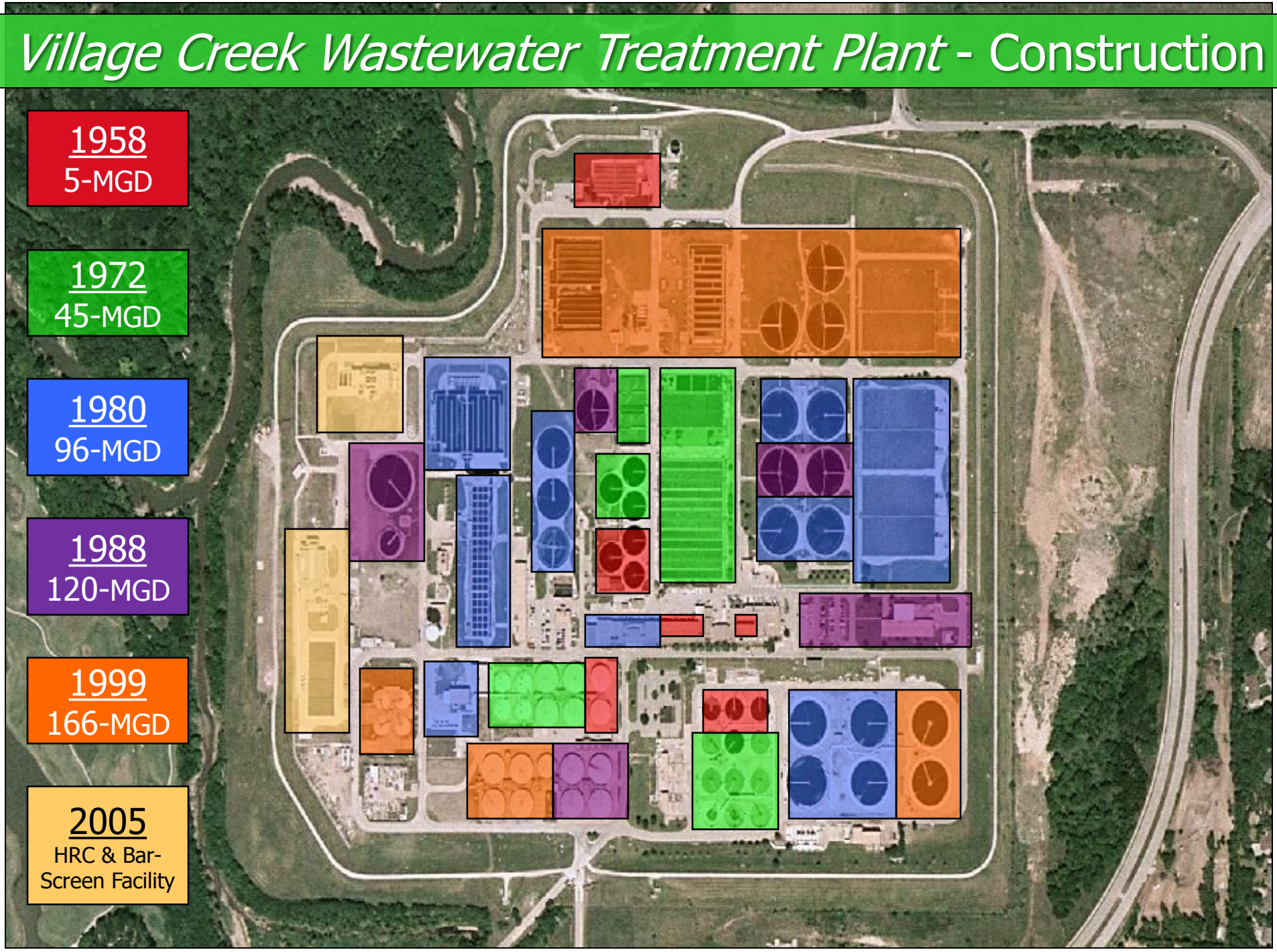
Trinity River Watershed

Fort Worth Water Department

Village Creek Water Reclamation Facility

- ✓ Original 5-MGD Facility Built in 1958
- ✓ Currently Serves 25-Communities (~1M-PPL)
- ✓ Q*design*=166-MGD; Q*average*=105-MGD
- ✓ Single-Stage, Activated Sludge w/Nitrification
- ✓ Anaerobic Digestion of Wastewater Solids

Village Creek Wastewater Treatment Plant - Construction



Village Creek WWTP

Wastewater Treatment Plant – Processes

- Liquids-Processing (Aerobic)
  - *Preliminary* – Screening (Bar>Fine)
  - *Primary* – Sedimentation (Solids Separation>Thickeners)
  - *Secondary* – Aeration (Biochemical Oxygen Demands)
  - *Advanced Secondary* – Filtration & Disinfection
  - Discharge to Village Creek…
- Solids-Processing (Anaerobic)
  - Thickening & Digesting
  - De-watering & Stabilization
  - Disposal by Land Application…

Village Creek WRF

Water Reclamation Facility – By-products

Homes & Businesses

"Wastewater"

Village Creek Water Reclamation Facility

Reuse Water

Bio-gas

Bio-solids

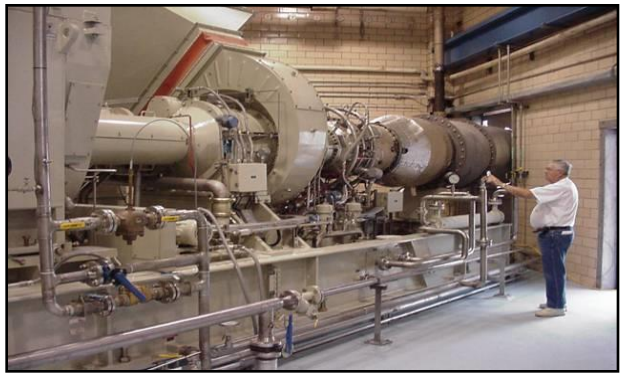
Trinity River

Village Creek WWTP

Recent Challenges & Potential Solutions

- Recent Challenges
  - ✓ Old Plant: Maintenance Deferments & Capital Improvements Needs
  - ✓ Upward Tendency of Electricity and Natural Gas Market Rates
  - ✓ Upward Pressure to increase Water/Sewer Rates
  - ✓ Limited Funding Availability for Capital Improvements
  - ✓ Increasing Costs of Operating and Capital Expenses
  - ✓ Increasing Pressure to more effectively Manage O&M Budgets
  - ✓ Increasing Competition for both Capital & Operating Funds
  - ✓ Interests in Commercial Water Reclamation Capabilities
- Potential Solutions
  - ✓ Consider increasing Debt Financing for Capital Funds
  - ✓ Consider changing Rate Structure & Levels for Operating Funds
  - ✓ Consider availability of *Energy Savings Performance Contracting*
  - ✓ Consider specialized/targeted/creative Financing Options

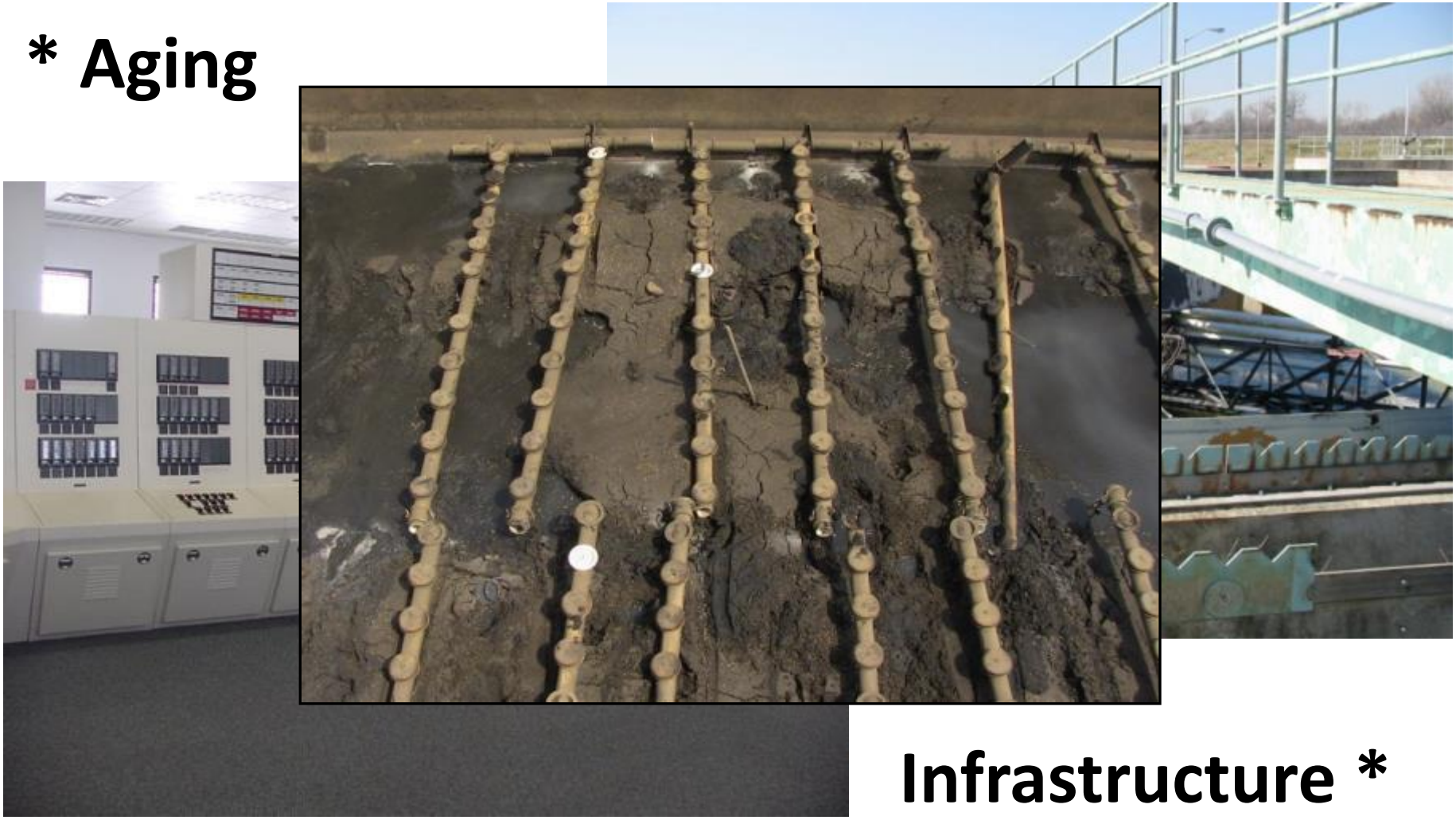
Energy
Savings
Performance
Contract



Village Creek WWTP

Primary Driver toward ESPC

*** Aging**



Infrastructure *

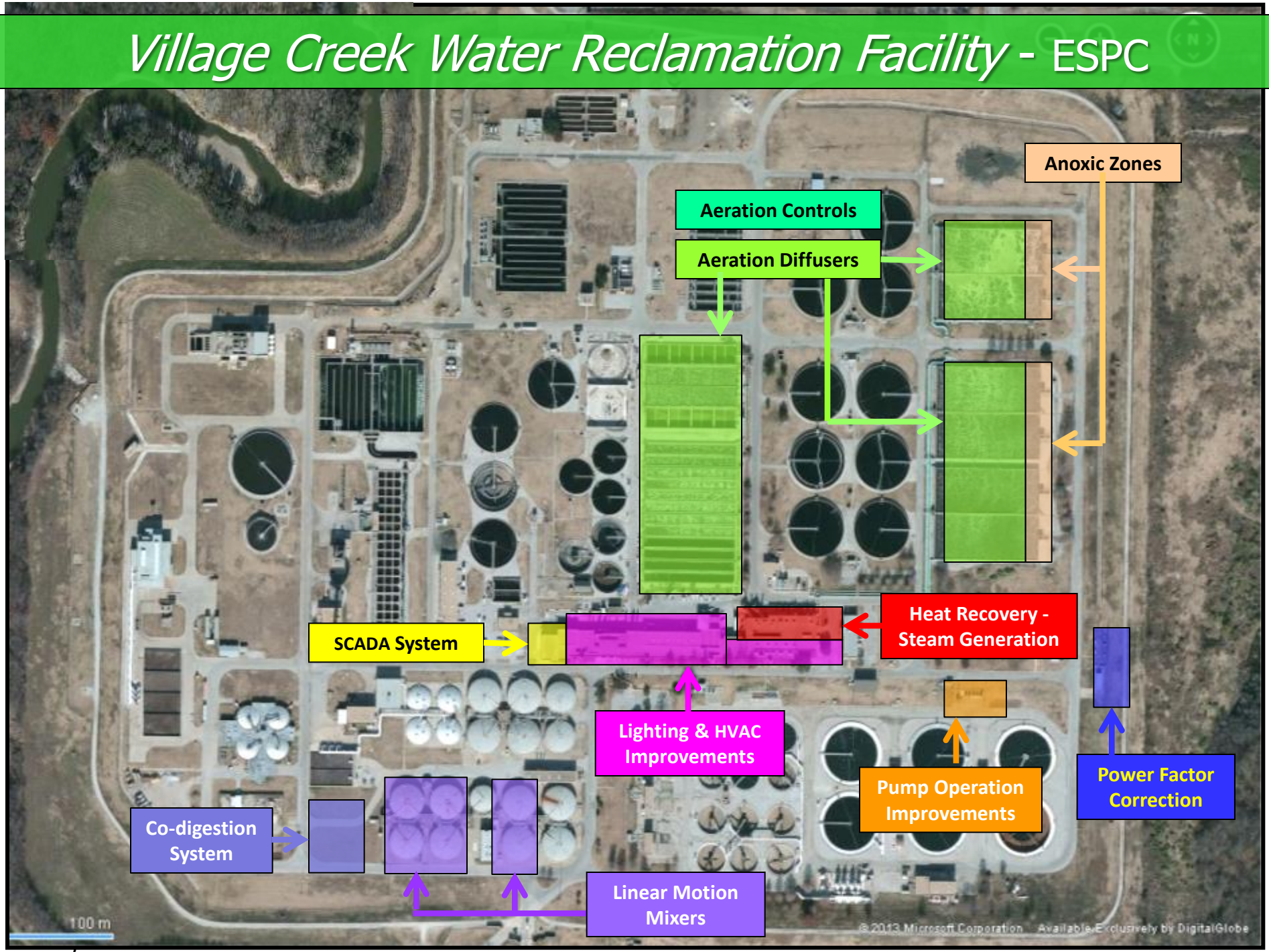
Village Creek WWTP

Compelling Events > *Paradigm Shift*

- FWWD recognition that Energy Savings could be used as an Alternative Source of Project Funding, and that this is promoted as a *Best Management Practice* (BMP)

- FWWD recognition that an existing, amendable City *Energy Savings Performance Contract* (ESPC) was being used to implement its Energy Conservation Projects

Village Creek Water Reclamation Facility - ESPC



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Village Creek WWTP/WRF

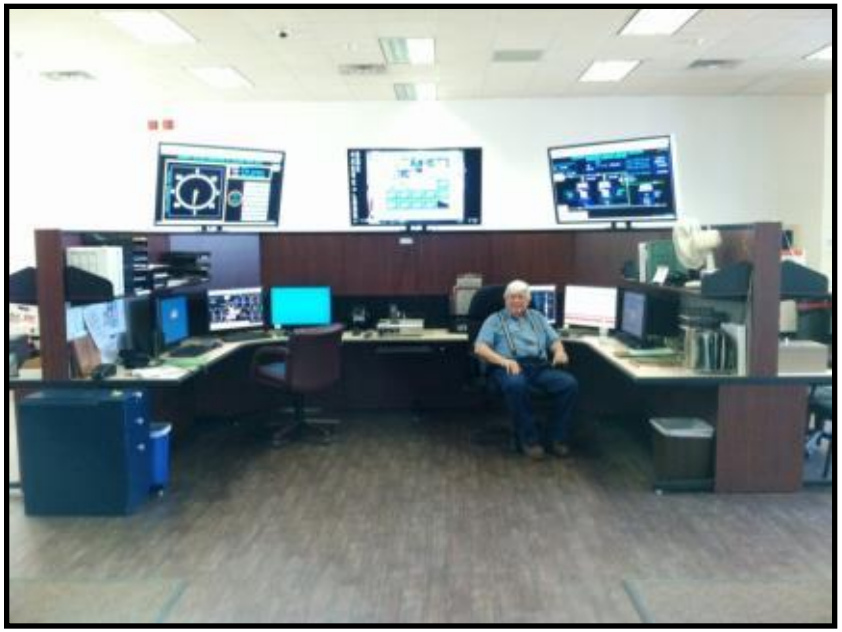
Energy Savings Performance Contract

Facility Improvement Measure Description	Turn-key Implementation Cost	Annual Electric Cost Savings	Total Annual Cost Savings (w/ O&M)	Simple Payback (years)
SCADA System Replacement	$7,046,826	$125,242	$136,242	52
Aeration Control Improvements	$469,999	$178,917	$178,917	2.6
Aeration Diffuser Upgrades	$5,322,054	$100,026	$276,756	19
Aeration Anoxic Zones	$2,875,318	$164,737	$155,112	19
Digester Mixing Upgrades	$3,012,951	$342,603	$455,173	6.6
Anaerobic Co-Digestion	$3,339,371	$276,379	$398,300	8.4
Heat Recovery-Steam Generation	$8,183,662	$1,106,101	$968,727	8.4
Other Facility/Building Systems	$1,613,979	$232,870	$236,948	6.8
Total Project (w/ Detailed Audit, Final Engineering, Construction Management & Bonds)	**$37,344,393**	**$2,526,875**	**$2,806,175**	**13**

Village Creek WRF ESPC

SCADA System Replacement

- Older-technology *Supervisory Control & Data Acquisition* (SCADA) System was past its useful life
- Repair & replacement parts were difficult to acquire
- Replacement with a state-of-the-art *Distributed Control System* (DCS) SCADA was necessary



Village Creek WRF ESPC

Aeration Basins: Diffuser Upgrades

- New, 9-inch Membrane Diffusers
- PTFE-Coated
- 10-year Manufacturer Material Warranty

Village Creek WRF ESPC

Aeration Basins: Anoxic Zones w/Nitrate Recycle

Village Creek WRF ESPC

Anaerobic Digesters: Mixer Upgrades

Village Creek WRF ESPC

Anaerobic Digesters: Co-digestion System

- Dedicated Facility
  - ✓ Truck unloading pad
  - ✓ 30,000-gallon mix-tank
  - ✓ Two 8,000-gallon batch tanks
  - ✓ Recirculation, transfer, and feed pumps (six-total)
  - ✓ PLC equipment feeds to each digester once-per-hour
  - ✓ Receiving up to nine 6,000-gallon trucks-per-day

Village Creek WRF ESPC

Turbine-Generators: Heat Recovery

Gas-Turbine Exhaust Duct Burner

Burning digester gas boosts exhaust temperatures to help produce enough steam to power new aeration blowers

Heat Recovery Steam Generator

HRSG on gas-turbine exhaust after duct burner generates enough steam to drive the two, new steam-turbine blowers

Village Creek WRF ESPC

Aeration Blowers: Steam-Turbine Drives

2-unused, 1,200-HP
31,000-cfm Blowers

Rehabilitated Blowers equipped with Steam-Turbine Drives

Village Creek WRF ESPC

Measurement & Verification

- Accepted Best-Practice and Required by Texas Statue (LGC.302)
- Standard of *International Performance M&V Protocol* (IPMVP in 3-volumes as published by the *Efficiency Valuation Organization* (EVO))
- A follow-up to Construction so that the Performance of Facility Improvement Measures is Validated
- A working-together to ensure that the Guaranteed Savings are both Achieve and Maintained
- Involves Pre- & Post-Construction Testing and Coordination with Local Utility to secure Program Incentives
- Monthly Report Delivery follows a Validated Modeling Plan
- Management & Staff all Stay Engaged

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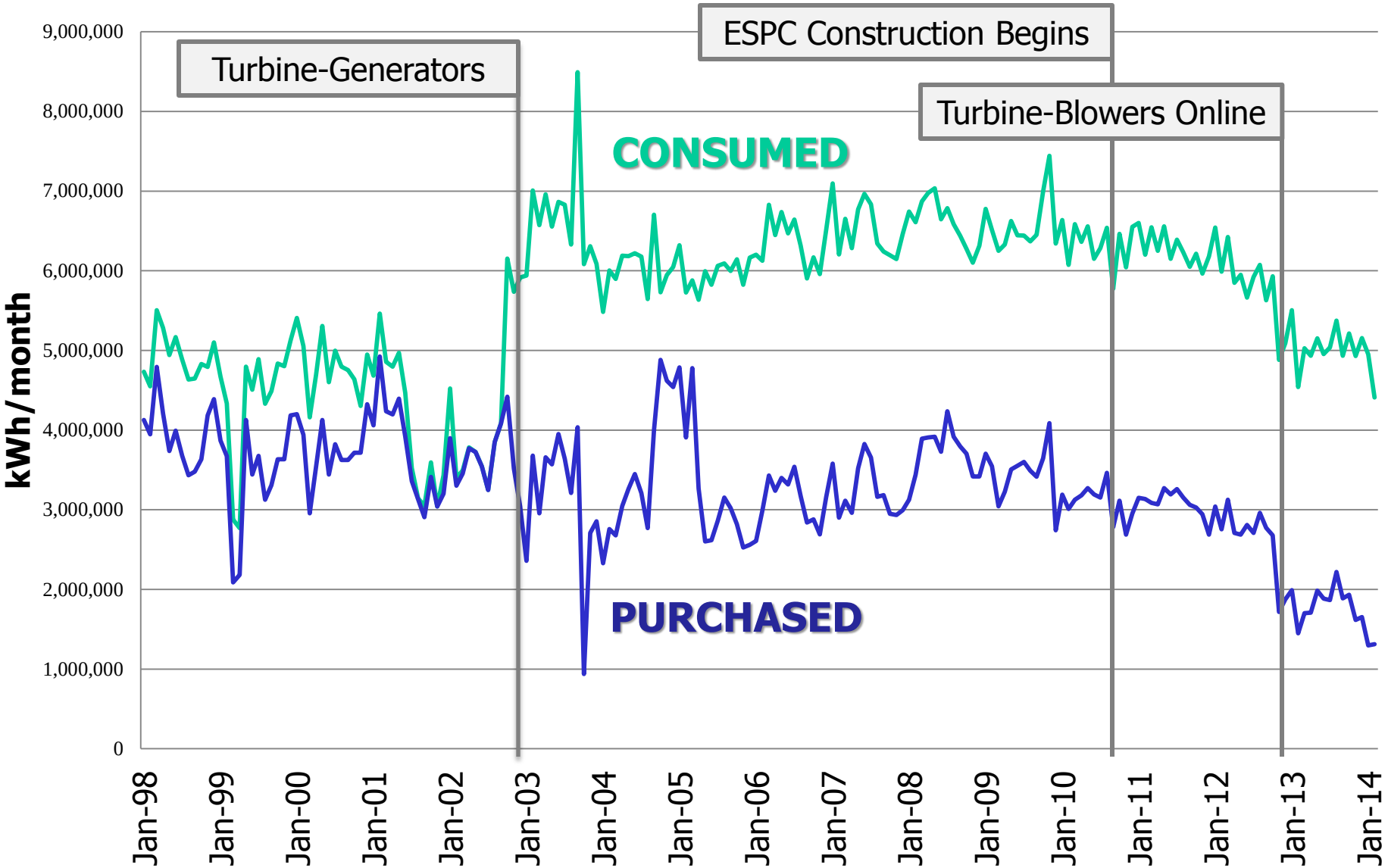
Village Creek WWTP>WRF

Electricity Consumption, 1998-2014



Municipal Energy Programming

Current Program Performance Reporting

City of Fort Worth	Project Performance				
Resource Conservation Program* (1, 2)	**Guarantee Period**	**Performance Period**	**Guaranteed Cost Avoidance**	**Reported Cost Avoidance**	**Pos./(Neg.) Variance**
Project Name	**Start-date**	**to-date**	**$-to-date**	**$-to-date**	**Delta-$**
T/PW ESPC (Phs.1-4, 6b)	Oct.2004	Sep.2013	$12,981,833	$16,356,680	$3,374,847
T/PW LED Traffic Signals	Oct.2007	Sep.2013	$3,085,588	$3,085,588	$0
FWWD ESPC (Phs.5/1&2, 6b)	Oct.2010	Sep.2013	$1,006,952	$3,955,852	$2,948,900
Totals	**Oct.2004**	**Sep.2013**	**$17,074,373**	**$23,398,120**	**$6,323,747**

***NOTES**

(1) Program Projects listed are part of the city's current *Energy Savings Performance Contract* (ESPC) with the exception of the *LED Traffic Signals* Project for which Project Performance is not guaranteed by the city's *Energy Services Company* (ESCo). For that project the Cost Avoidance listed was estimated by the city and validated with Utility Incentive Program Reporting.

(2) On-going building energy performance aided by City Management issuance of *Administrative Regulation for Facilities No.1* (AR F-1) *Air Temperature Regulation within Conditioned Spaces*; with some exceptions granted, includes specific City facility HVAC thermostat set points for occupied/un-occupied times: Heating max. of 70-/50-deg.F & Cooling Min. of 73-/85-deg.F.

SPECIAL NOTE: Portfolio Manager® for FWWD's VCWRF currently indicates an 18%-increase in *Energy Productivity* against a 13%-reduction in *Average Annual Inflow* (City of Fort Worth/US.DOE *Better Buildings Challenge*, reporting 2009 v. 2013)

Food for Thought…

Organizations of Influence

- Governmental Organizations – State of Texas & U.S. Federal
  - TCEQ – *Texas Commission on Environmental Quality* (Office of Water)
  - EPA – *Environmental Protection Agency* (Office of Water)
  - DOE – *Dept. of Energy* (Office of Energy Efficiency & Renewable Energy)
- Representative Organizations – *just a few of many…*
  - WEF – *Water Environment Foundation* (VA, 1928)
  - NACWA – *National Association of Clean Water Agencies* (DC, 1970)
  - WERF – *Water Environment Research Foundation* (VA, 1989)

Food for Thought…

Recent Organizational Efforts

- Energy Roadmap; *Driving Water & Wastewater Utilities to More Sustainable Energy Management*
  - WEF published V1.0 on 01Oct12; Topics included are:
    - *Strategic Management*, *Organizational Culture*, *Communication & Outreach*, *Demand Side Management, Energy Generation*, *Innovating for the Future*

- The Water Resources Utility of the Future: *A Blueprint for Action*
  - NACWA/WERF/WEF; ©2013; Sections include:
    - *Defining the Utility of the Future* (UOTF)*; Creating an Environment of Innovation; Extending the Vision with Bold Transformative Thinking*
  - Two of the Concepts raised for Consideration:
    - *Advanced Research Projects Agency for Water* (DARPA>ARPA-E>ARPA-W?)
    - Clean Water Act of 1972 > 21st Century Watershed Act

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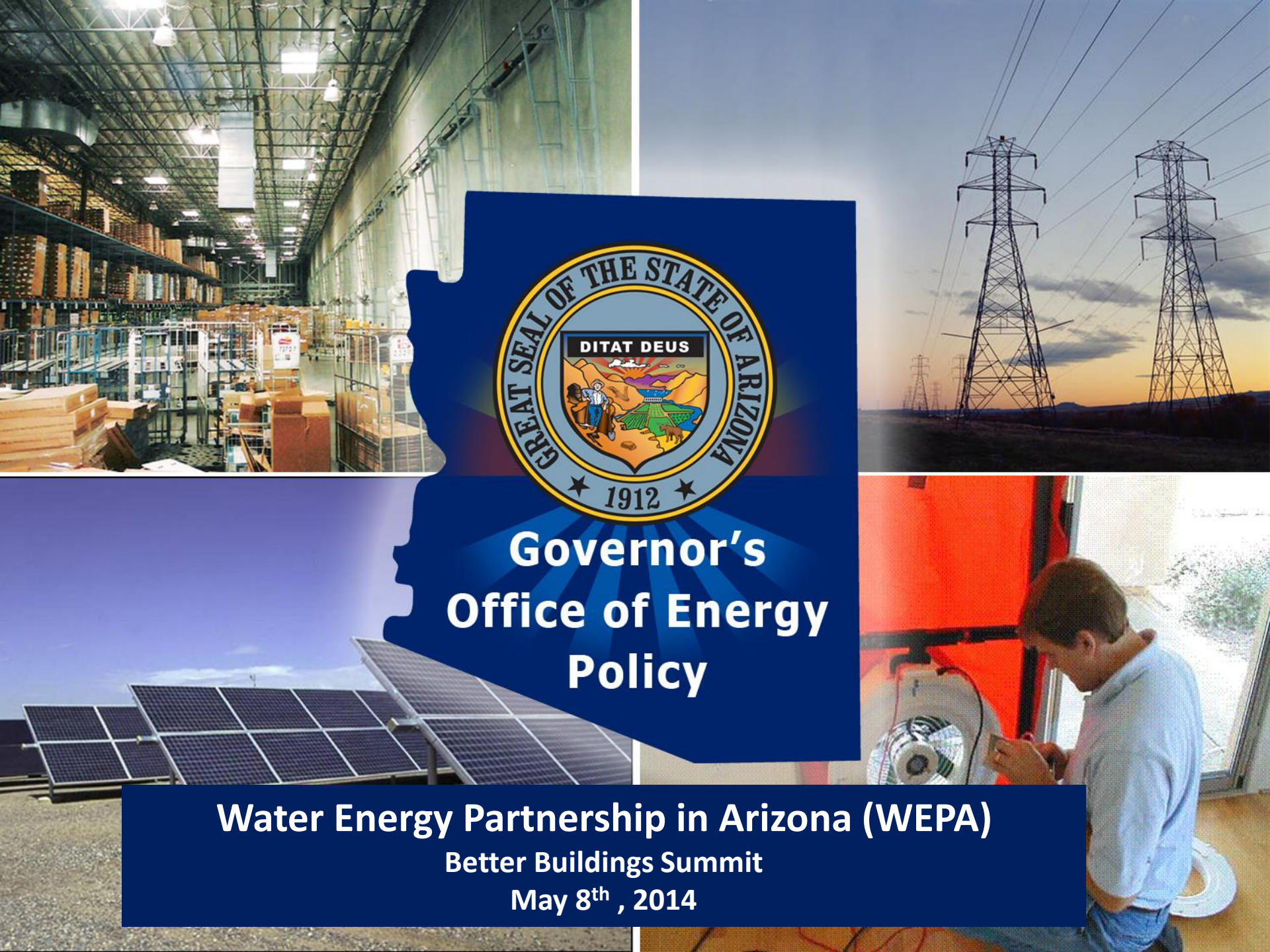


Water Energy Partnership in Arizona (WEPA)

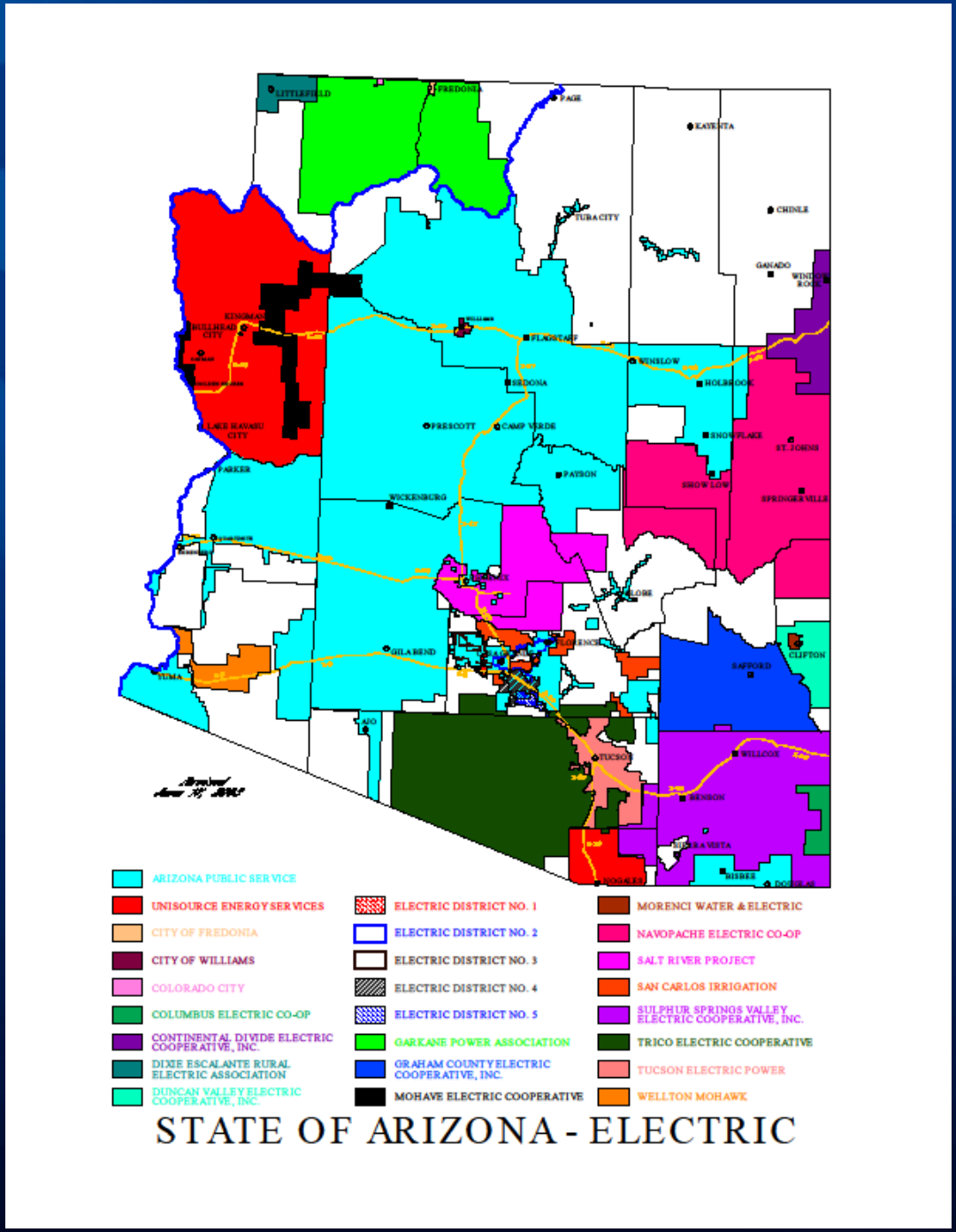
Better Buildings Summit

May 8th , 2014

Arizona Facts

- 6th Largest State
- 15 Counties
- 30 State Parks
- 20 Native American Tribes

Arizona Utility Map



Water Energy Nexus

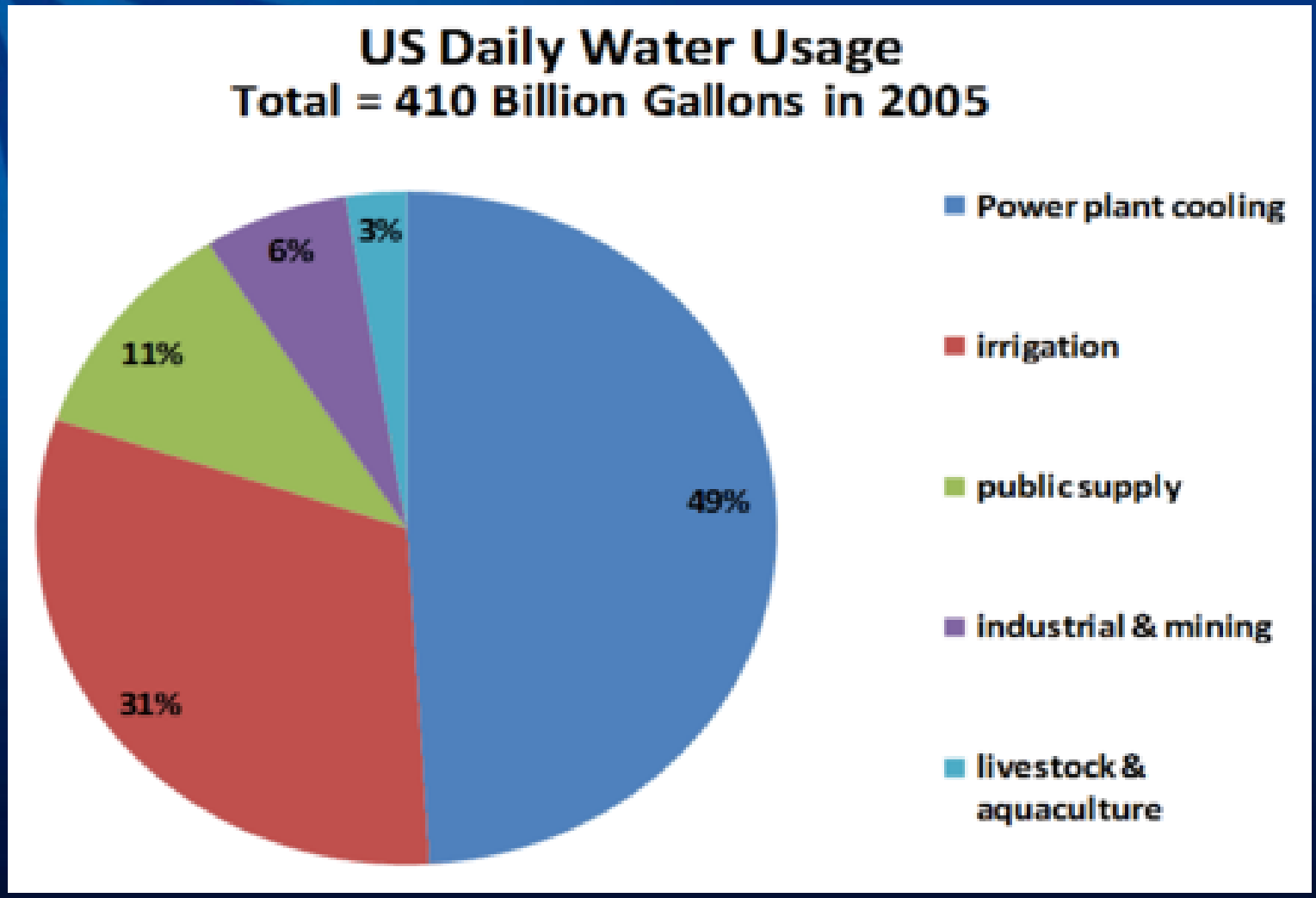
The EPA estimated that on average, 2 gallons of water are lost to evaporation for each kWh consumed at the point of end use. This number varies state by state, depending on the energy-mix. In Arizona, for example, 7.85 gallons of water are lost to evaporation per kWh consumed.

What's the Cost

EPA estimates **3-4 percent of national electricity consumption**, equivalent to approximately 56 billion kilowatt hours (kWh), or $4 billion, is used in providing **drinking water and wastewater services** each year.

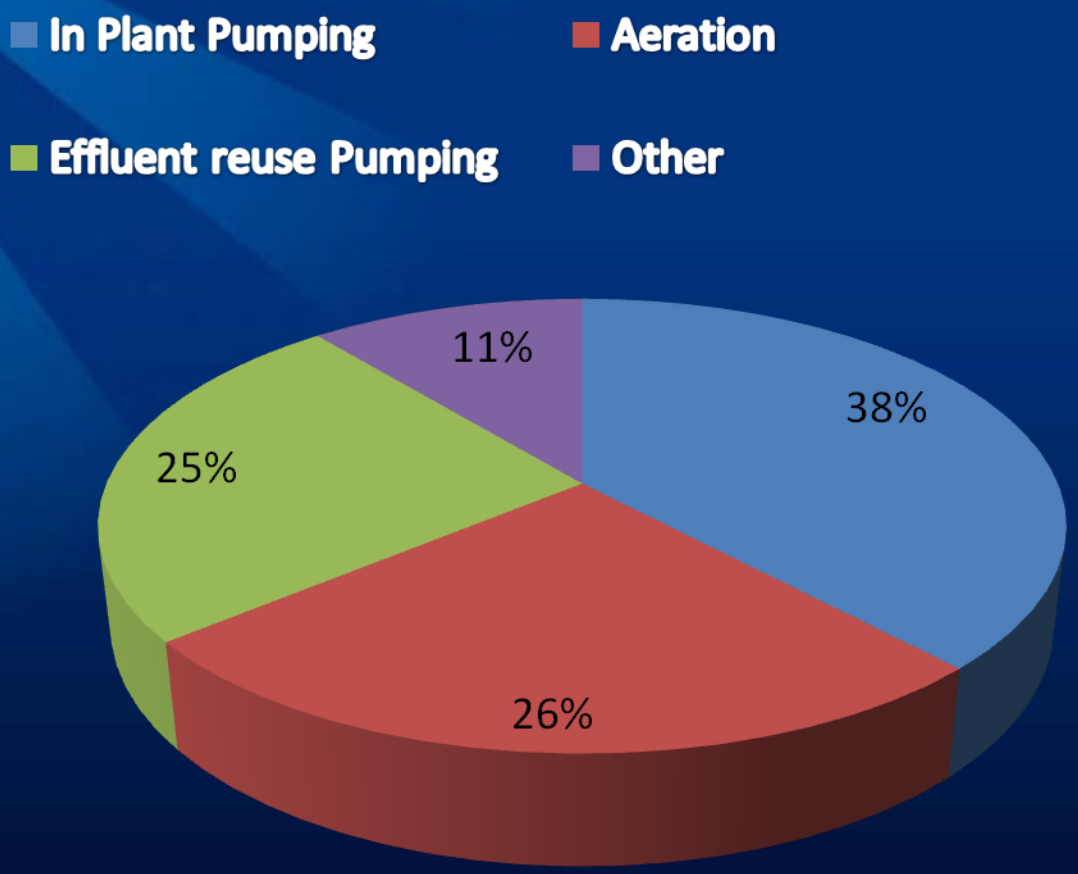
Water and wastewater utilities are typically the largest consumers of energy, accounting for **30-40 percent of total energy consumed.**

Energy Use



Source: US Geological Survey 2005

Energy Use


In Plant Pumping
Aeration
Effluent reuse Pumping
Other
11%
38%
25%
26%

Future Energy Demand

- Energy demand increase » 20% - 30% in 15 years
  - *In water and wastewater*
- Population & more stringent regulations
  - *Aging infrastructure*
  - *Increasing threats to watersheds and aquifers*
  - *Changing compliance and public health standards*
  - *"Rising cost" industry*
  - *Higher customer expectations*
  - *Emerging contaminants (pharmaceuticals)*
  - *Increasing competition for raw water sources*

Water & Energy Efficiency

Becoming water and energy efficient provides a wide range of benefits—for utilities, consumers, businesses and the community as a whole.

Using less water means moving and treating less water, reducing the strain on our water supplies, drinking water and wastewater infrastructure.

What Can the Water Supplier Do?

System owners and operators can pursue best industry practices for water efficiency, such as:

- System-wide water loss accounting
- Leak detection and repair
- **Benchmark** energy consumption

Develop A Strategy

Develop a successful strategy that utilizes planning, development incentives, and other tools to leverage limited funding. Create goals that build upon and maintain current assets before building new facilities.

Develop an approach to focus on:
1) efficiency;
2) economic & community development potential &;
3) quality of life

Grant History

In February 2012 the U.S. Department of Energy (DOE) issued a competitive funding opportunity announcement (FOA) to states to advance policies, programs, and market strategies that accelerate job creation and reduce energy bills while achieving energy and climate security for the nation.

The focus : *To advance Energy Efficiency in Public Facilities to assist states to develop holistic, whole-building, deep retrofit programs and strategies across as broad a segment of public facilities as possible to achieve significant energy and cost savings.*

Grant History

July 2012 - the Governor's Office of Energy Policy was awarded a 3-year grant of $715,000 by the U.S. Department of Energy.

Arizona was one of 22 states to receive funding through this competitive grant program.

Arizona is only one of two states given funding to improve energy efficiency in wastewater and water treatment facilities.

WEPA

Goal:

- Benchmark 100 facilities
- Identify Energy Efficiency Opportunities and match facilities with funding
- Conduct Energy Efficiency Training

Status:

- 70 WWTP Benchmarked into Portfolio Manager
- Preliminary Analysis
  - ✓ Visits to 6 facilities and EPA Energy Audit
  - ✓ Technical Assistance to 15 facilities
- Developed Benchmark curriculum and presented 8 trainings

Grant Application Partners

State:

Arizona Department of Environmental Quality

Water Infrastructure Finance Authority

Federal:

U.S. Department of Agriculture Rural Development

Private:

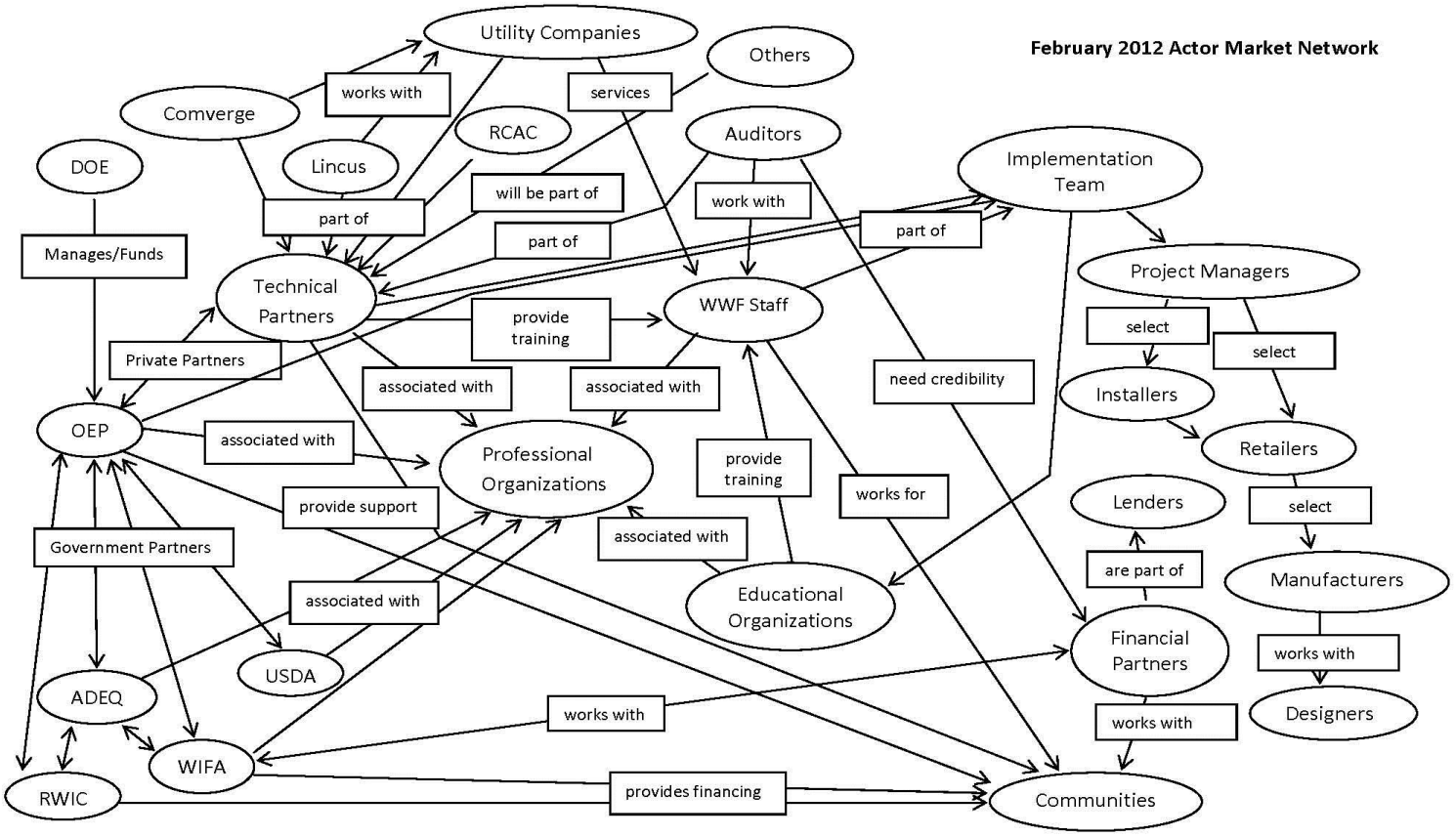
Arizona Public Service

Honeywell

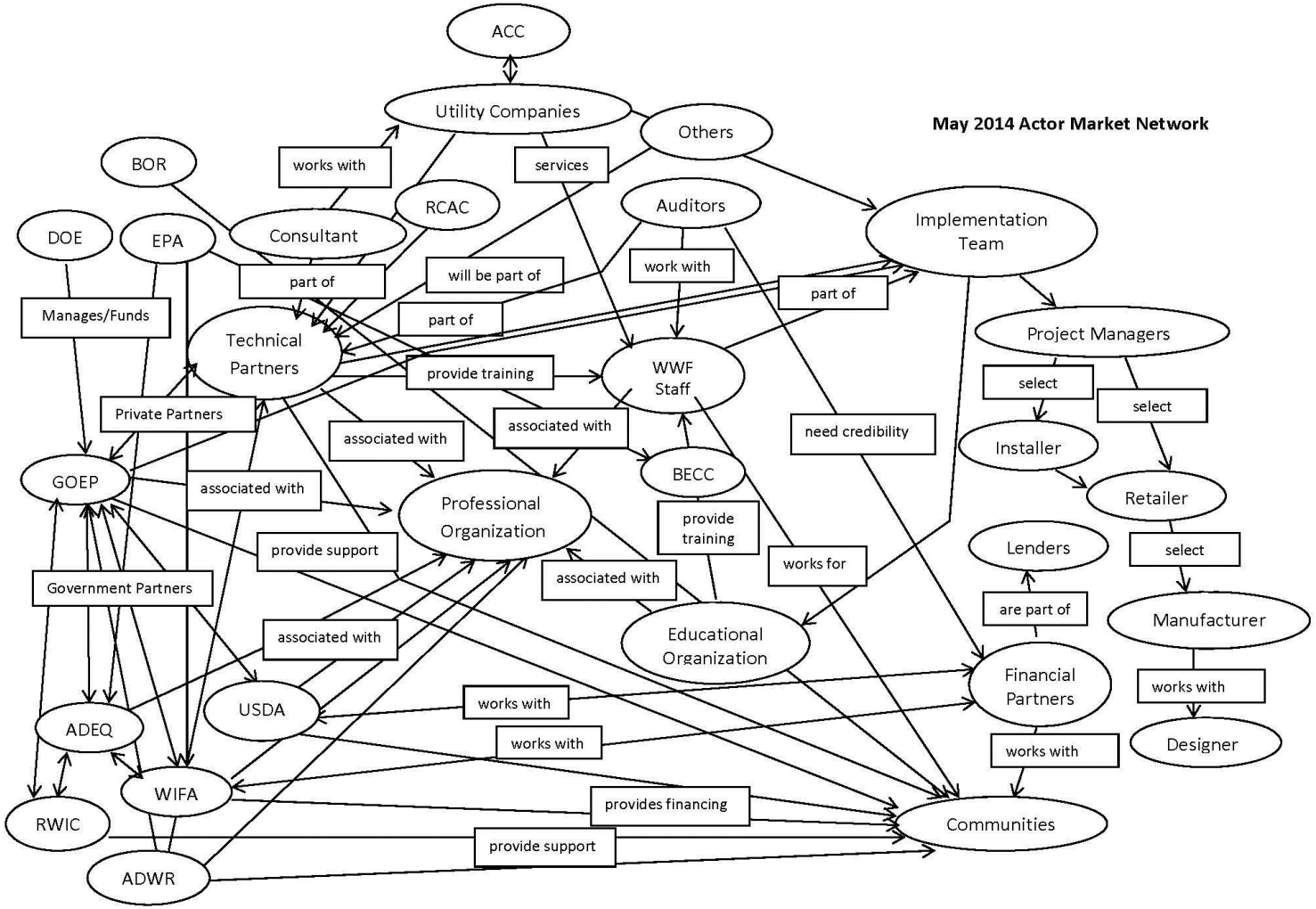
Lincus Energy

Rural Community Assistance Corporation

Partners Market Network



Partners Market Network



Current Partners

State: AZ Department of Environmental Quality, Water Infrastructure Finance Authority, AZ Department of Water Resources, AZ State Parks, AZ Department of Transportation, Arizona Corporation Commission

Federal: USDA Rural Development, EPA, U.S. Bureau of Reclamation

Utility: Arizona Public Service, Unisource, Salt River Project, Sulphur Springs, AZ Electric Power Cooperative, Mohave Electric Co-op

Private: Honeywell, Lincus Energy, AMERSCO, TRANE, NCS Engineering, Chelsea Group, Border Environment Cooperation Commission (BECC)

Professional Organizations: AZ Water Association, Rural Water Association, AZ Co-op Association

Energy Efficiency at WWTPs

Water and wastewater transportation, processing, and treatment accounts for about 4% of the US electrical use

Water and wastewater energy is typically 35% of a municipality's energy budget (1)

Electricity is the 2nd largest operating cost at WWTPs – about 25% to 40% of the operating budget (2)

Energy audits through identification in process efficiencies can save 15 to 30 percent of energy costs at water and wastewater facilities (3)

(1) – EFAB, 2001 ; (2) PG&E, 2003 ; (3) CEE, 2008 - ESMAP, 2012 estimates between 5 & 25 percent.

WEPA Arizona Activities

INVESTIGATION

- Facility Identification
-Benchmarking
- Education/Training

TECHNICAL ASSISTANCE

- Needs Assessment
- Funding Options
-Education/Training

IMPLEMENTATION

- Project Upgrades
- Education/Training

Coordination/Collaboration

Why Coordination and Collaboration?

Energy issues are here to stay and will only get more serious—no quick fixes!

- Individual projects and technologies are fine, but something is needed to pull it all together (**a process**)

- Systematic process will provide a **focus on energy efficiency**
  - Reduce operating costs
  - Financial savings can be reinvested back into system
  - Less pressure on resources
  - Less strain on current energy grid

Create Resource Teams

Develop teams to assist facilities as they provide information to elected officials and the general public.

Keys to Successful Communication

Challenge


PICK UP THE
phone
AND MAKE SOMETHING HAPPEN


Get
Out of the office

Thank You



Eric Fitzer

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