Why LEED Makes Sense to A Municipal Water Agency

Wastewater Engineers Attain First and Largest LEED Platinum Public Facility

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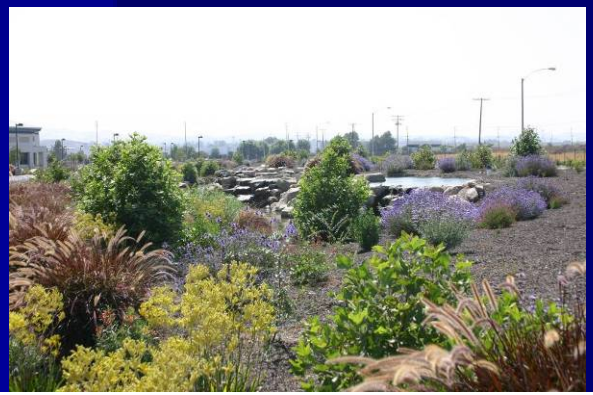
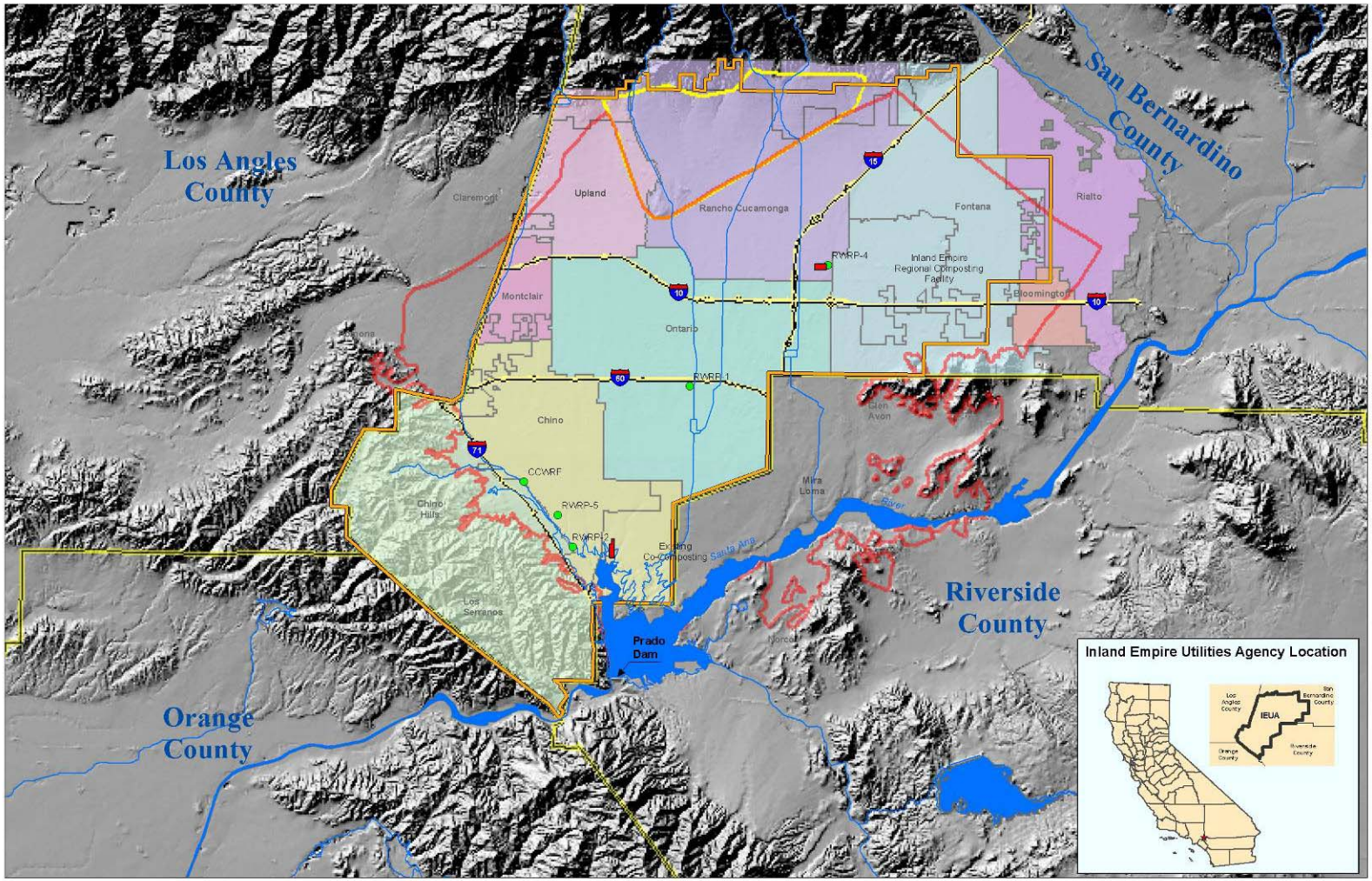


IEUA's Service Area is in Southern California



IEUA Profile: Municipal Water Agency

- Regional wholesale distributed water and wastewater treatment for 7 cities, two water districts, and two water companies
  - Imported water supply distribution
  - Four regional wastewater treatment plants
  - Two non-reclaimable wastewater sewer pipeline systems
  - One reverse osmosis desalination plant (joint power authority)
  - Biosolids and organics management, the State's first completely-enclosed composting facility (under construction)
  - Recycled water program
  - Water conservation program

- Serve 242 square miles of drought challenged Chino Basin
  - Desert climate zone of So. CA averages 13" rainfall per year

- High urban growth (part of Santa Ana River Watershed)
  - Annual population growth between 1990 and 2000 > 3% per year
  - Population 780,000 projected to grow to 1.0 million by 2025
  - Agricultural land conversion lands to urban use will increase demand for water

IEUA's Decision to Go Platinum

- An economic decision
- A better way to do business- *"I now think it is the only way to build a building"* Dave Wall, Manager OF Construction, IEUA
- It's implications on our WWTP designs
- Tapping in to other professions knowledge to find better business models

Saving Ratepayers' Money – The Process

- Bottom up - mid-level staff originally proposed the idea
- No one had ever heard of LEED and there were real concerns that it could be done

'But this is the architects profession – not ours'

Sustainability –
Wisely using natural, human, and capital resources

LEED Platinum Involves Sustainability in:

- Electricity consumption
- Potable water use
- Stormwater infiltration and control
- Raw material usage (recycled products)
- Construction activities
- Indoor Environmental/Air Quality

Going Back To The Basics

- Benchmarking
- Getting ‘buy-in’ at all levels
- Engineering economics 101
  - Lifecycle costs
  - Payback

IEUA's Ability To Attain LEED Platinum

- We produce recycled water – it is our 'product' and the HQ was located adjacent to the WWTP.
- We had renewable energy from the biogas generated in the WWTP anaerobic digesters
- Waste heat could be generated from this renewable energy source for heating and cooling needs
- Southern California was a perfect place for photovoltaic panels
- Executive Management had experimented with drought tolerant landscape before and was receptive to a different site design
- IEUA's team had knowledge about stormwater issues and knew that evaluating stormwater infrastructure could potentially save money

What It Took To Get LEED Platinum

- Stormwater charrette
- Energy charrette
- Hiring energy consultant at pre-design stage
- Participation in the CEC PIER research program for energy production and efficiency
- DOE grant for energy efficiency (siloxane treatment/ fuel cell analysis/ organic rankine cycle/ stirling engine/ thermal storage
- Modifying specifications

Critical *Economic* LEED Platinum Design Elements

- Energy balance – attaining the appropriate balance between daylighting and thermal energy gains and losses
  - Lighting levels
  - Natural light
- HVAC design and commissioning
- Site design
- Building type and materials

Stormwater @ IEUA's HQ

- Pervious Pavement
- No Curb/Gutter
- Bioswales
- Detention Basin
- Natural Drainage Systems
- Roof Runoff Controls
- Dry lake/pond via surface flow
- Landscape Planning

Innovative Pervious Pavements v. Traditional Paving

Unit Pavers (Vehicular) = 11,890 Sq. ft

Porous concrete = 12,000 Sq. ft

Natural Gray Concrete (vehicular) = 34,976 Sq. ft

Precast Concrete Pavers (Pedestrian) = 11, 077 Sq. ft

Decomposed granite = 12,000 Sq. ft

Asphalt = 89,239 Sq. ft

LEED Platinum Results

Activity	Agency Benefit
Stormwater charrette	Saved $1.4 Million in capital (untold savings in offset /future SW treatment)
Energy charrette	Installed 4 x 30 ton chiller units (efficient)
Hiring energy consultant at pre-design stage	Saving hundreds of thousands in electricity bills
Participation in the CEC PIER research program for increased energy production and efficiency	Selected as the public entity for 60 kW of PV – comparison of various types
DOE grant for energy efficiency	Ability to realize 65% efficiency in system
Modifying specifications	New specifications for WWTP facilities

Why LEED Platinum HQ Was A Success

- Significant capital and O&M Savings
  - $1.4M in stormwater infrastructure
  - Hundreds of thousands saved on electricity
  - $18,000 to $140,000/year on car washing
  - $5,000/ year on parking lot maintenance
- 100% support by Executive Management and Board of Directors
- Closely worked with the D/B Contractor
  - Tilt-up concrete (low technology) building type
  - Off the shelf items/ standard sizes for windows, skylights, etc.– no items for building were specially made
  - Most economical building envelope
  - Panelized building system
- Construction phase had a LEED action plan

IEUA's 'New' WWTP Design Criteria

- Recycled materials considered
- Low VOC paints required for all interior buildings
- Consideration of geothermal or other non-traditional heating/cooling systems for pump stations and other facilities
- Fly ash in concrete for non-water bearing structures – up to 10% in walls, 30% in foundations
- Native or drought tolerant plants at all WWTPs
- Skylights in maintenance and other buildings in areas that were never used before, such as bathrooms
- Interior and exterior light fixture designs with the latest technology
- Elimination of intensive light designs within the WWTP by using motion sensing fixtures and putting

IEUA Cross pollinates

IEUA engineers had to go outside of their professions' technical knowledge base to attain LEED Platinum

Engineers now have a culture of going 'outside'

Being Receptive To New Ideas Pays

The first public agency to receive LEED Platinum 2.0, and at the time, the largest LEED Platinum building constructed in the world, occurred because upper management was willing to consider an alternative approach – an approach from a different professional field

IEUA's Results of Cross Pollination

- Rotary press for solids dewatering (38% solids for manure)
- Food waste addition to generate additional methane gas (food industries and willingness to participate in CEC funded research)
- Waste heat and energy efficiency optimization
- Chillers for HQ heating/cooling (energy charrette highlighted ability to use 40 ton units)
- Strategic Planning Mtg- *The World Is Flat, by Friedman* given to engineers *(Christmas present)*

Other Professions (or even our own) May Have Already Solved Our Problems - We Just Don't Know It !

- Pulp and paper
- Food industry
- Chemical companies
- Various industrial plants
- Energy producers/ power plants
- Building/ construction - residential/commercial
- National and International University Researchers

- Stormwater/ wastewater/ water/ wetland treatment/ solid waste/ transportation

Have you ever considered…

- Picking up a different trade's magazine?
- Going to a conference on an 'unrelated' topic 'just for fun' ?

- Would you be supported?
- Or more importantly, would you support such an activity of someone you manage?

Water and Wastewater Engineers Play An Important Role In The Energy-Water Nexus

"The continued security and economic health of the US depends on a sustainable supply of both energy and water. These two critical resources are inextricably and reciprocally linked; the production of energy requires large volumes of water while the treatment and distribution of water is equally dependent upon readily available, low cost energy. The nation's ability to continue providing both clean, affordable energy and water is being seriously challenged by a number of emerging issues..."

Sandia National Labs, Jan 2006

National and State Interest In The Water/Energy Relationship

- DOE/BOR sponsored Water/Energy Nexus 3-day workshop – Jan 2006
- CEC – Integrated Energy Policy Report
- CPUC – mandated energy efficiency programs by utilities
- CEC/CPUC mtg in March 2006

Demand More Of Your Consulting Engineers

- Site design – are they understanding benefits of SW BMPs ?
- Did they give you a HVAC commissioning plan?
- Did they give you lifecycle and payback calculations when they gave you recommendations?
- Did they consider more energy efficient technologies?
- How are they optimizing energy efficiency in their designs?
- Don’t let them give you specifications that they have used for more than 2-3 years (or at least have not revisited):
  - Lighting : fixtures, bulbs, switches, poles, safety requirements, etc
  - SCADA technology
  - Building materials

When To (Re) Evaluate 'New' Technologies

in a dynamic economic environment

- Annually – as part of your CIP process and O&M budgeting process
- As contracts are renewed
  - Gas
  - Electricity
  - Chemicals
- As plant needs change
  - plant modifications
  - plant expansions

Questions

- How many willing to listen to the ‘new technology’ guy?
- Do you have or make time for them?
- Even if you did, would your management/governing board be willing to support/ fund research or a ‘new’ way of doing business?

- How can we afford not to?