SDG&E's ZNE CASE STUDY

DPR Construction San Diego Corporate Office

Presenter: Chip Fox, SDG&E

ZNE Stakeholder Meeting | November 28, 2012

DPR Construction
San Diego Corporate Office

- Owner: DPR Construction
- Team:
  - General Contractor - DPR Construction
  - Architect - Callison Architecture
  - LEED Consultant – DNV KEMA
  - Electrical Engineer - Bergelectric
  - Structural Engineer - Hope Engineering
  - M/P Engineer - Pacific Rim Mechanical
- Location: San Diego
- Completion Date: Oct 2010
- Building Type: Multi-tenant office
- Area: 33,572 Sq. Ft.
- EUI: 16 kBTU/Sq.ft-yr (ACTUAL)

PROJECT SUMMARY

Rehab near-obsolete 1984 office building

into a vibrant, Zero Net Energy, and sustainable "learning lab" and a great place to work.

PROJECT GOALS & OBJECTIVES

- Owner Goals of ‘cutting edge facility that respects the environment, our people and our culture’
- Design Team Goals of ‘making the best with what we have”
- Energy Efficiency Goals & Green Building Targets
  - Zero Net Energy
  - LEED Platinum
  - Best of the Best Green Project in So Cal
- Bring the outside in – connect occupants to the outdoors
- Respect the individual

ENERGY SAVINGS APPROACHES

- Energy efficiency by using
  - Daylight harvesting with roof monitors and Solatubes
  - Efficient light fixtures
  - Open ceilings and “sails” distribute light
- Cooling efficiency by using
  - Cross & stack ventilation strategies for passively ventilation
  - Roof monitors with operable windows & doors at the north and south side bringing fresh air, minimizing HVAC operating hours
  - High volume, low speed fans
- Minimizing heat island effect by
  - Reducing parking spaces and replacing with landscape
  - Replacing the roof with a high SRI Energy Star product
- Renewable energy with
  - Roof-mounted 64 kW-AC photovoltaic panel system
  - Solar-power water heater
- Water efficiency by using
  - Low-flow plumbing fixtures including dual-flush toilets and waterless urinals
  - Drought tolerant, native and adaptive plants with drip irrigation

ENERGY SAVINGS RESULTS

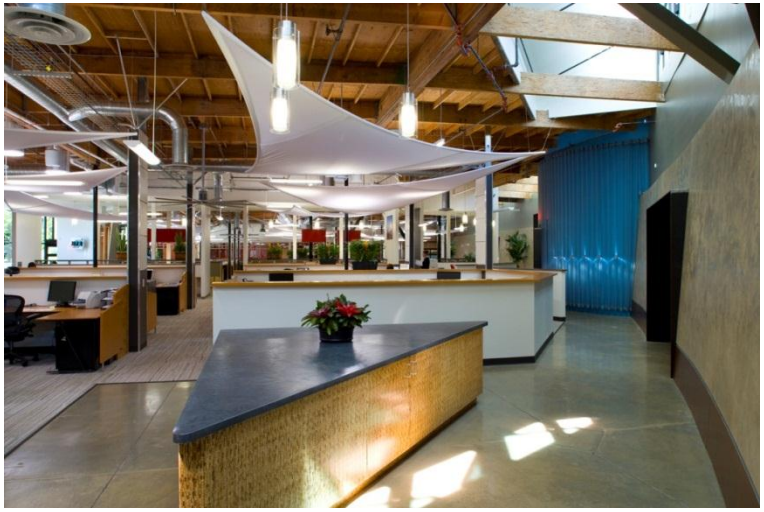
- 16,700 kWh excess on-site generation in first year of operation
- Monthly electrical bill averages less than $350/month
- Consumed 59% less energy than the baseline case
- Reduced KW peak demand by more than 50%
- Reduced HVAC operating hours by 79% annually
- Reduced landscape and office water consumption annually by over 60% and 51% respectively
- ECM's Incremental cost $435K for LEED Platinum
- Cost of $936K to achieve ZNE
- CCF generating NPV of $93K over 10 years

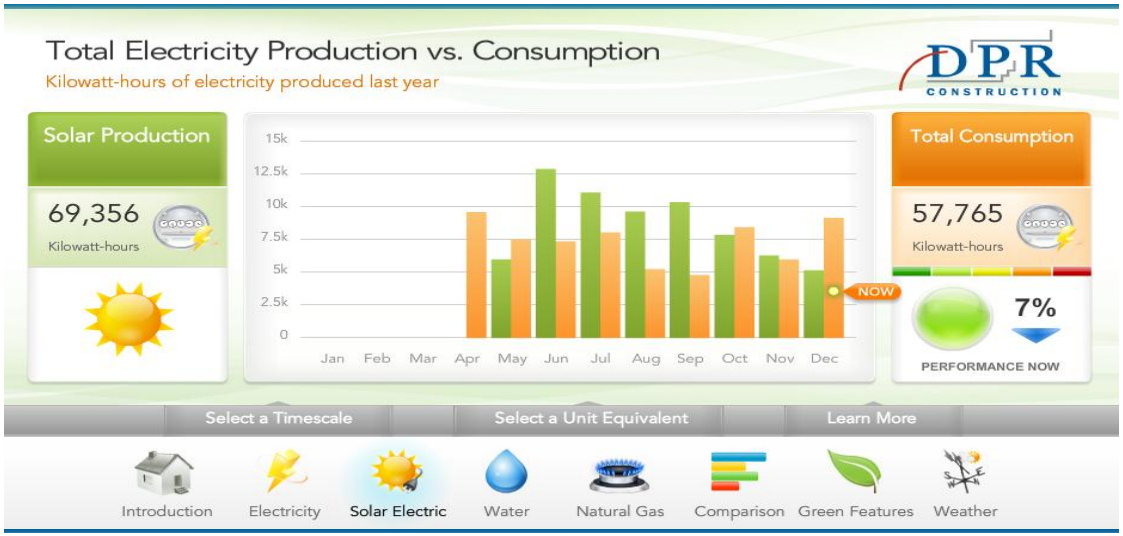
DPR San Diego Office Energy Statistics - 2011

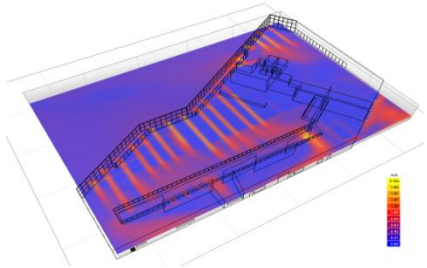
			STANDARD		PROPOSED		ACTUAL	
Area	**GSF of area**		**Annual K-Btu/SF or EUI**		**Annual K-Btu/SF or EUI**		**Annual K-Btu/SF or EUI**	
DPR's Tenant Improvement*	24,144	SF	NA	kBtu/SF	NA	kBtu/SF	15	kBtu/SF
Remaining Areas**	9,428	SF	NA	kBtu/SF	NA	kBtu/SF	20	kBtu/SF
Total Building*	33,572	SF	52.2	kBtu/SF	36.9	kBtu/SF	16.0	kBtu/SF
PV Generation	24,144	SF	NA	kBtu/SF	NA	kBtu/SF	(17.0)	kBtu/SF

LESSONS LEARNED

- Design Cost sticker shock
- Modeling, Modeling, Modeling
- Dimming Ballasts, locations of daylight sensors
- Communication Reiteration

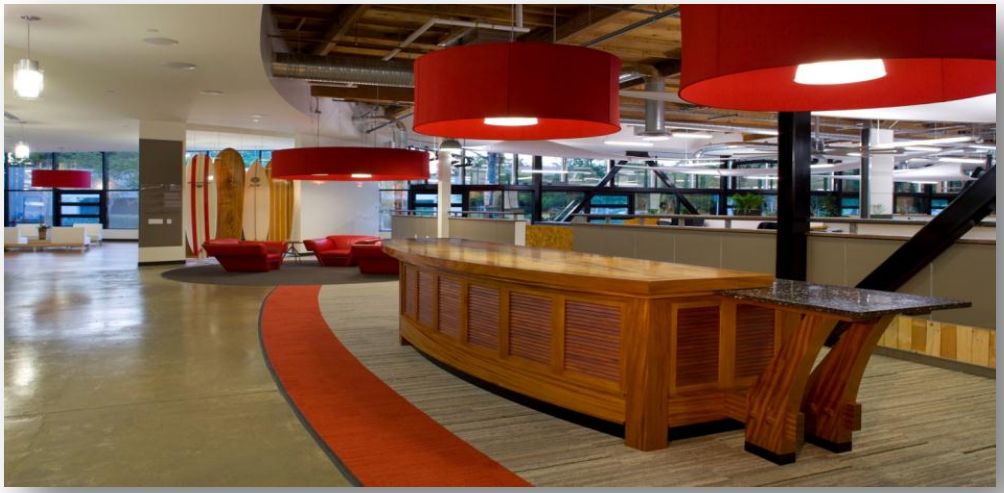






MORE LESSONS LEARNED

- Vampire Loads
- Fresh Air and Space Heaters
- Appropriate Clothing discussion
- You can never have too many Solatubes



FOR MORE INFORMATION

- Chip Fox
- cfox@semprautilities.com
- SDGE.com
- http://www.dpr.com/company/offices/san-diego-california