

Comprehensive Energy Projects (CEP) and Innovative Financing



February 16, 2012

Commitment to Sustainability



● **First decade 21st Century Projects:**

- 5-6 MW Landfill Gas
- Local Government Electric Vehicle Partnership
- 820 MW Solar 2 projects, more planned
- **CEP w/ 1.4 MW Fuel Cell CHP Power Plant**
- 1MW biogas (compost) in development
- 5MW to date – Sonoma County Energy Independence Program (SCEIP)
- 50MW of PV in Sonoma County
- Off bill, ARRA, and QCEB funded projects
- 5 MWh savings – Sonoma County Energy Watch (SCEW)



Comprehensive Energy Project



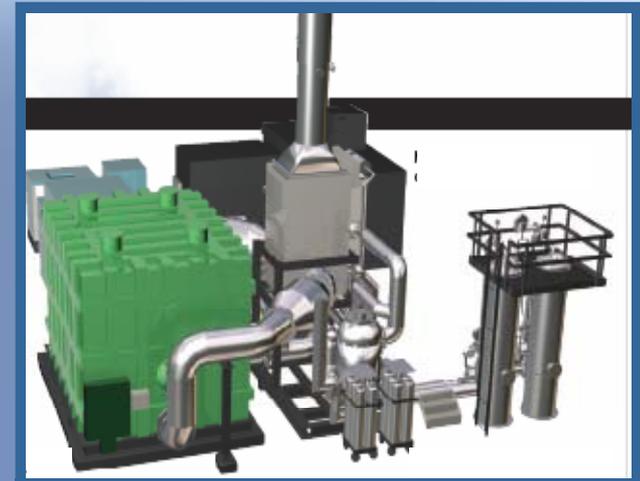
● 2008-2010 – CEP Process

– Phase I – Inventory County Facilities (1 year)

- Prepared Investment Grade Audit
- 180 Energy Efficiency Measures (EEM) assessed
- 101 EEM's recommended

– Phase II – CEP

- Phase IIA – 38 EEM measures, 24 buildings plus Fuel Cell
- Phase IIB – To be determined from remainder on list of 101 EEMs



Fuel Cell Module

CEP Objectives



- GHG reduction
- Positive Financial Impact
- Infrastructure Renewal



| MEASURE NUMBER | INCLUDED IN PROJECT | MEASURE DESCRIPTION | PROJECT COST | GHG Emission Reduction | Simple \$/Ton GHG Emission Reduction | Water Reduction, Gallons per Year | kWh Reduction per Year | kW Demand Reduction from Peak | Therms Reduction per Year | FIRST YEAR ANNUAL ENERGY SAVINGS (Excludes P2050) | PG&E Standard Rebate | ANNUAL MAINTENANCE SAVINGS | CAPITOL OFFSET | PAYBACK (In Years) |
|--|---------------------|---|-----------------|------------------------|--------------------------------------|-----------------------------------|------------------------|-------------------------------|---------------------------|---|----------------------|----------------------------|------------------|--------------------|
| 8-Jun-09 | | | | | | | | | | | | | % Electrical ^ = | 5.0% |
| | | | | | | | | | | | | | % Gas ^ = | 0.0% |
| Central Mechanical Plant | | | Building Area = | 9,110 | % of Total Area = | 0.80% | | | | | | | | |
| A | Y | Provide and install ALC DDC system at Central Mechanical Plant (savings included in measures 1 thru 7) - by Aircon Energy | \$252,287 | 0.0 | \$0 | 0 | 0 | 0.0 | 0 | \$0 | \$0 | \$0 | \$0 | 0.00 |
| B | N | Lighting Retrofit at Operations and CMP | \$24,420 | 0.0 | \$0 | 0 | 15,286 | 4.7 | 0 | \$1,750 | \$0 | \$450 | \$0 | 8.32 |
| 1 | Y | Replace Boiler #1 and Install VFDs on Heating Water Pumps | \$614,075 | 422.1 | \$1,441 | 0 | 26,727 | 6.1 | 66,015 | \$62,064 | \$6,000 | \$0 | \$0 | 9.60 |
| 2 | Y | Install Boiler Controls and VFDs on Boilers #2, #3 & #4 | \$246,121 | 265.9 | \$919 | 0 | 65,042 | 7.0 | 37,265 | \$40,755 | \$1,800 | \$0 | \$150,000 | 5.77 |
| 3 | Y | Install 50-HP motors on Existing Cooling Towers with VFDs for Capacity Control | \$146,740 | 110.2 | \$1,223 | 292,000 | 199,218 | 0.0 | 0 | \$27,456 | \$12,000 | \$0 | \$0 | 5.19 |
| 4 | Y | Remove Hot-well from Cooling Tower Circuit | \$814,285 | 72.4 | \$11,241 | 0 | 130,994 | 56.0 | 0 | \$14,999 | \$0 | \$0 | \$0 | 23.78 |
| 5 | Y | Replace Four Centrifugal Electric Chillers with Four Screw-type Chillers | \$1,647,151 | 338.7 | \$4,750 | 0 | 612,413 | 150.2 | 0 | \$70,121 | \$38,500 | \$0 | \$0 | 14.20 |
| 6 | Y | Water-side economizer as First Stage of Cooling; Install 50-HP Cooling Tower, Piping, Pumps & Heat Exchanger | \$398,562 | 0.0 | \$0 | 0 | 0 | 0.0 | 0 | \$0 | \$0 | \$0 | \$0 | 0.00 |
| 7 | Y | Replace the Existing Chilled Water Load Pumps P2050 & P2060 | \$303,050 | 6.8 | \$44,269 | 0 | 12,379 | 17.4 | 0 | \$1,417 | \$0 | \$0 | \$0 | 40.41 |
| \$ % of 'Y' Measures to the Total 'Y' Measures = | | | 24.4% | 1216.1 | | 292,000 | 1,046,773 | 236.7 | 103,280 | \$0 | \$0 | \$0 | | |
| Self-Generation - CMP | | | | | % of Total Area = | 0.80% | | | | | | | | |
| 8 | Y | One 1.4 mega-watt fuel-cell at CMP; waste heat recovery (power to campus + MADP) | \$9,763,781 | 3810.7 | \$1,775 | (86,400) | 10,693,216 | 1,258.4 | (358,723) | \$939,727 | \$3,000,000 | (\$400,000) | \$0 | 7.88 |
| \$ % of 'Y' Measures to the Total 'Y' Measures = | | | 52.0% | 5026.8 | | | 10,693,216 | | | \$939,727 | | | | |

Comprehensive Energy Project



● 38 EEMs at 24 buildings

- Lighting retrofits, 20 buildings, 1.3 MWh savings
- HVAC replace or rebuild in 4 buildings
- HVAC Motors & Controls MADF
- Central Mechanical Plant (CMP) upgrade
- Water retrofits, including detention, 20 M gallons/yr.
- Ozonator for Detention Laundry Water
- 1.4MW Fuel Cell Cogeneration Power Plant



1.4 MW Fuel Cell Power Plant



Fuel Cell Energy DFC 1500

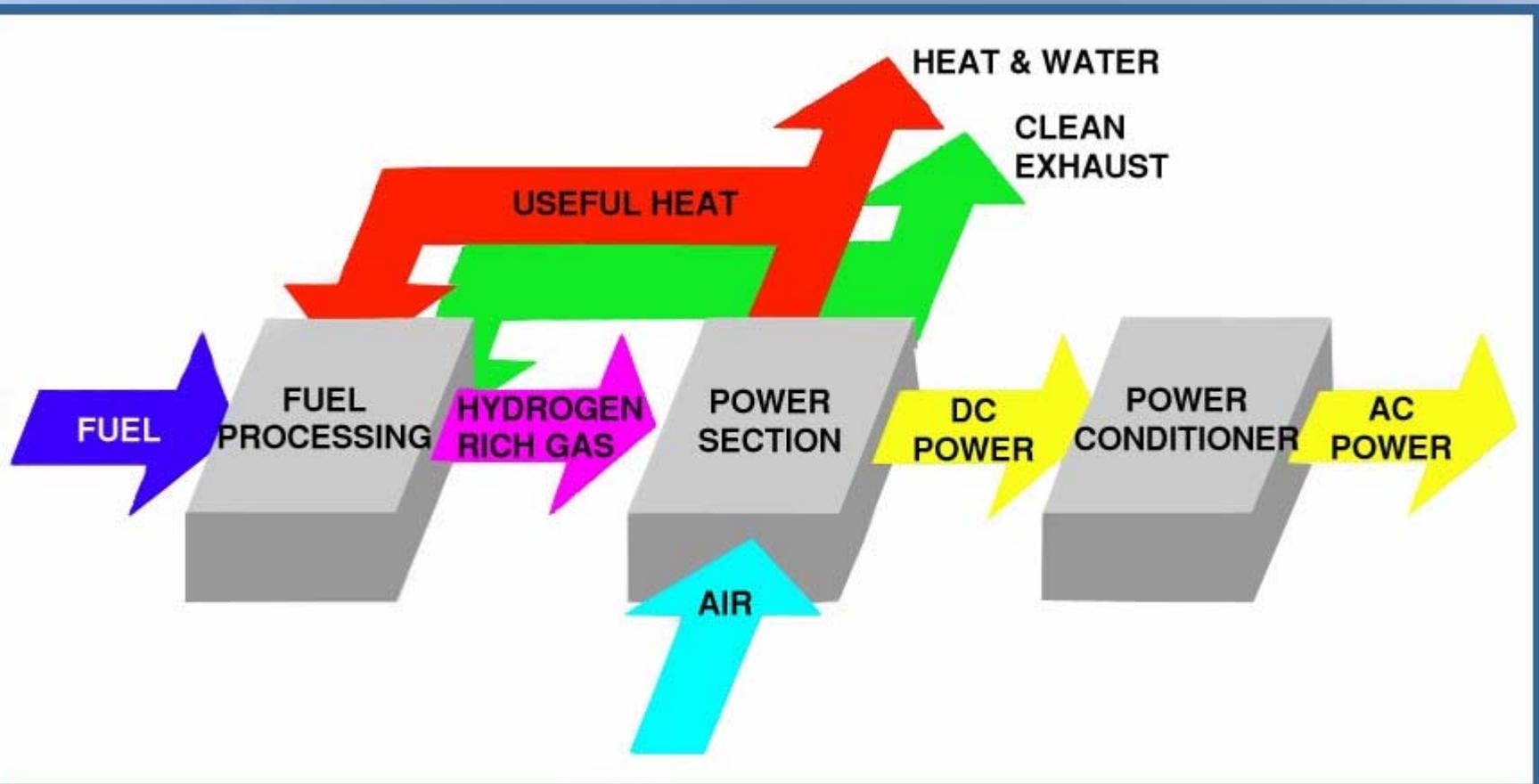
- Generates 10,693,216 kWh/year
- Produces 45 billion BTUs year
- Produces virtually no NO_x or SO_x pollutants
- Reduce GHG emissions by 69% versus grid power
- Designated “Ultra-Clean” by CARB
- Categorically exempt from CEQA



1.4 MW Fuel Cell Power Plant



Fuel Cell Energy Production



1.4 MW Fuel Cell Power Plant



Sonoma County Fuel Cell Power Plant

- Largest fuel cell in California - 1.4MW
- Adjacent to CMP for Combined Heat and Power (CHP)
 - Certified Combined Heat and Power (CHP) per CPUC §2840 Guidelines, Section III
 - 47% electrical efficiency , plus 20% due to CHP (compare fossil fuel plants 33% efficient)
 - No transmission loss to deliver to 12kV loop
- Natural gas provided by utility non-core.
 - renewable gas supply to expensive
- SGIP incentive of \$3,000,000 from PGE toward the \$9,763,271 cost

1.4 MW Fuel Cell Power Plant



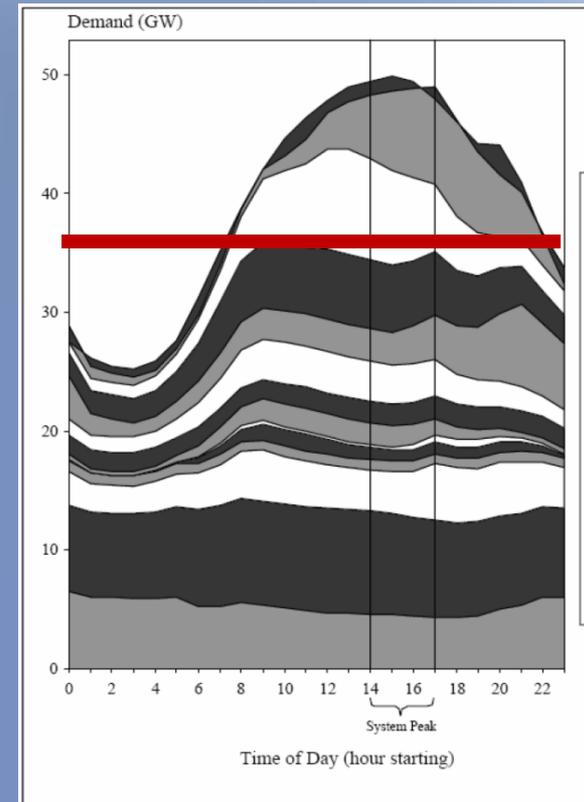
County Utility Costs –

- New and Prior County electric bill \$1.5M annually
 - Gas bill for fuel cell is \$350k
 - Amortize equipment costs (debt repayment)
 - Pay FCE maintenance costs
 - Prepay (amortize) stack replacement @ 5th year

County Load Characteristics –

- Demand at night – 850 kW due to detention 24/7
- Demand summer peak – 2,500kW or more
- Supply constant 1.4MW (Part Peak Load match)

Fuel Cell Payback is Seven Years!



Financing



Directive: Make CEP Expense Neutral Day 1 →

- California Government Code §4217.10 finance based on savings
- Obtained Private Loan Financing – Banc of America
 - Based on equipment lease model
 - Collateralized on improvements
- Bond package option as backup

Financing



Financing Plan

| | |
|--|---------------|
| Project Cost | \$22,272,029 |
| Incentives, Grants, and Rebates | (\$3,941,226) |
| Financed Amount | \$18,730,803 |
| Estimated Interest Rate* | 4.98% |
| Repayment Term | 16 years |
| Assumed Closing/Funding Date | 1/1/09 |
| Assumed Annual Energy Cost Escalation* | 5% |
| First year of positive cash flow | Year 12 |
| Total payments | \$31,794,615 |
| Total cumulative positive cash flow after 25 years (estimate life of equipment) | \$38,404,231 |

* Rates are estimates and are subject to change. 5.4 was max rate

Rebates

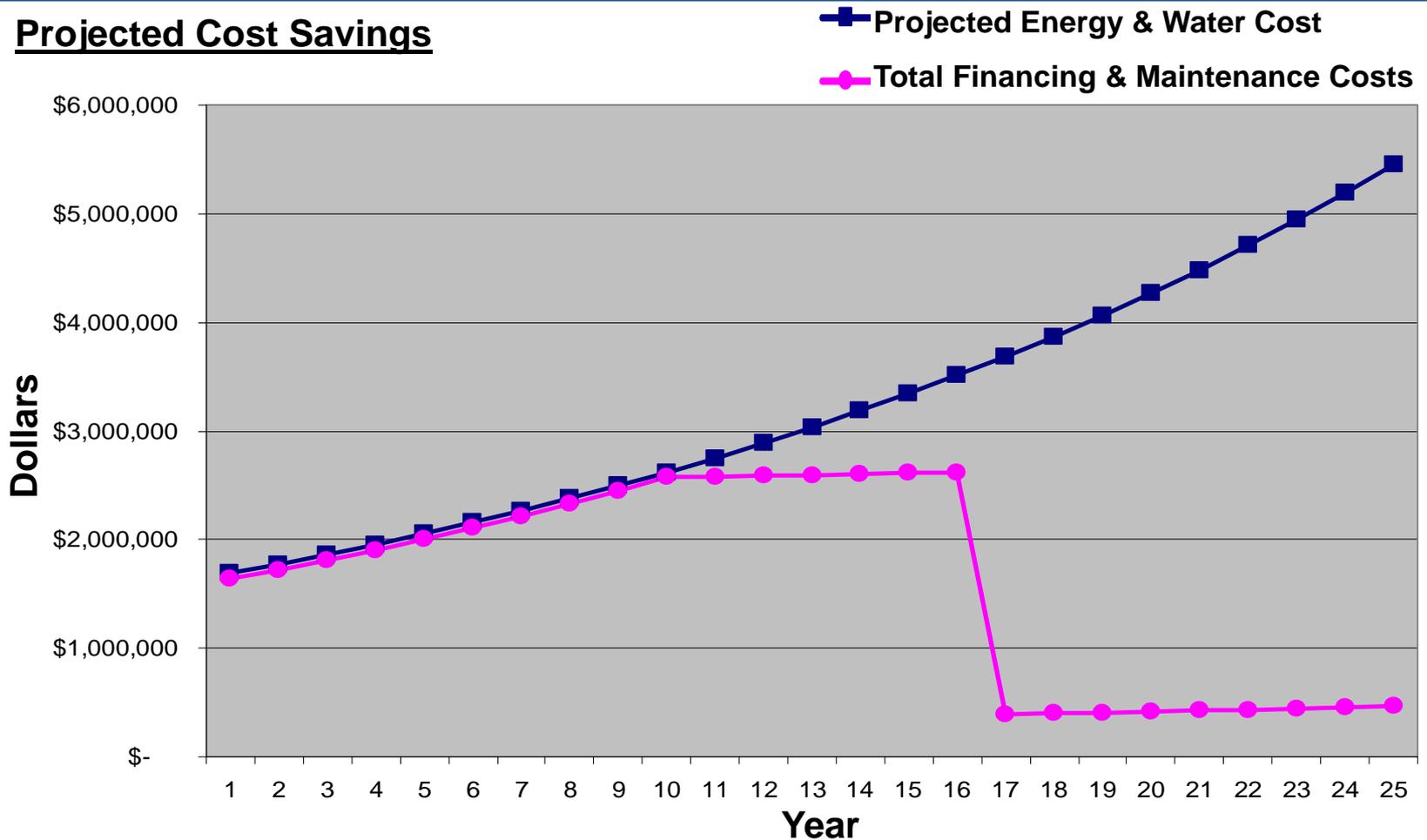


Rebates played a big part in our total financial package.

Cost Savings



Projected Cost Savings



CEP Results



CEP Objectives Met ?

1. **GHG reduction 6,135 tons***

- Electricity reduction 13,365,226 kWh
- Water savings = 19,138,260 gallons
- Utility savings = \$1,689,316

2. **Saving \$\$\$, No General fund impact**

3. **Replaced old worn out equipment**

Now in 1 year Measurement and Verification

Created jobs, collaboration, other benefits

Challenges



Interconnection

- Fuel cell needs to operate continuously
- PG&E unwilling to take excess electricity at first

AB 1613

- Should provide a tariff for excess electricity
- PG&E says no b/c our SGIP was in 2010 budget, although our incentive was paid in 2011

Technical issues

- Water filtration and consumption



Thank you

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