Comprehensive Energy Projects (CEP) and Innovative Financing

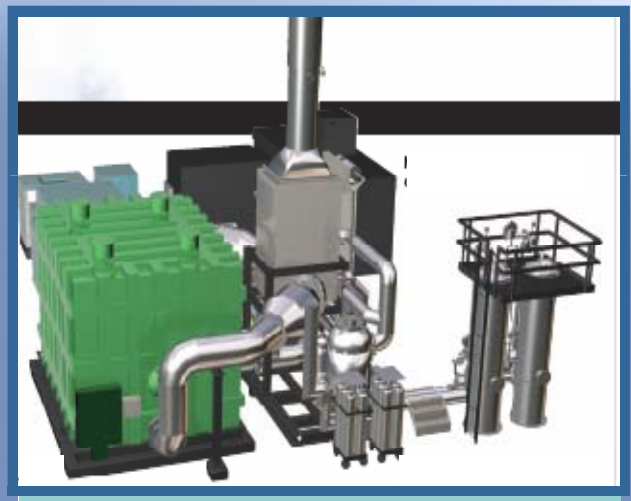
February 16, 2012

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

AIRCON ENERGY

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	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 + MADF)	$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



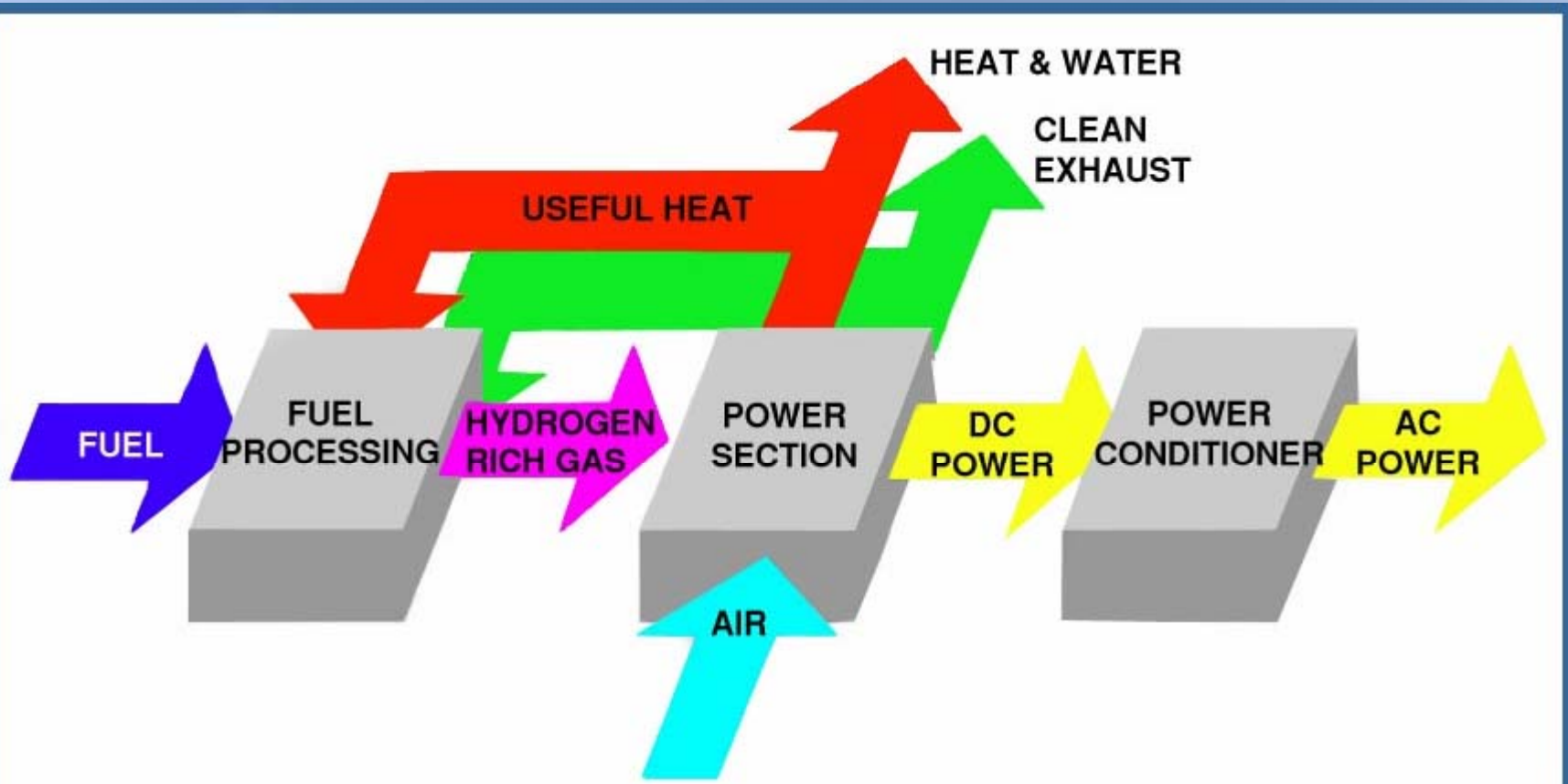

1.4 MW Fuel Cell Power Plant

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

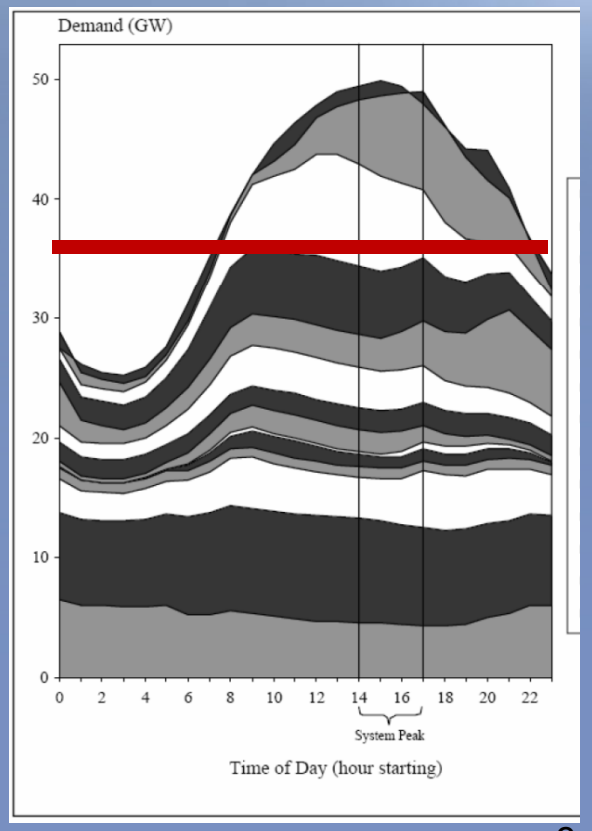
County Utility Costs –

- 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

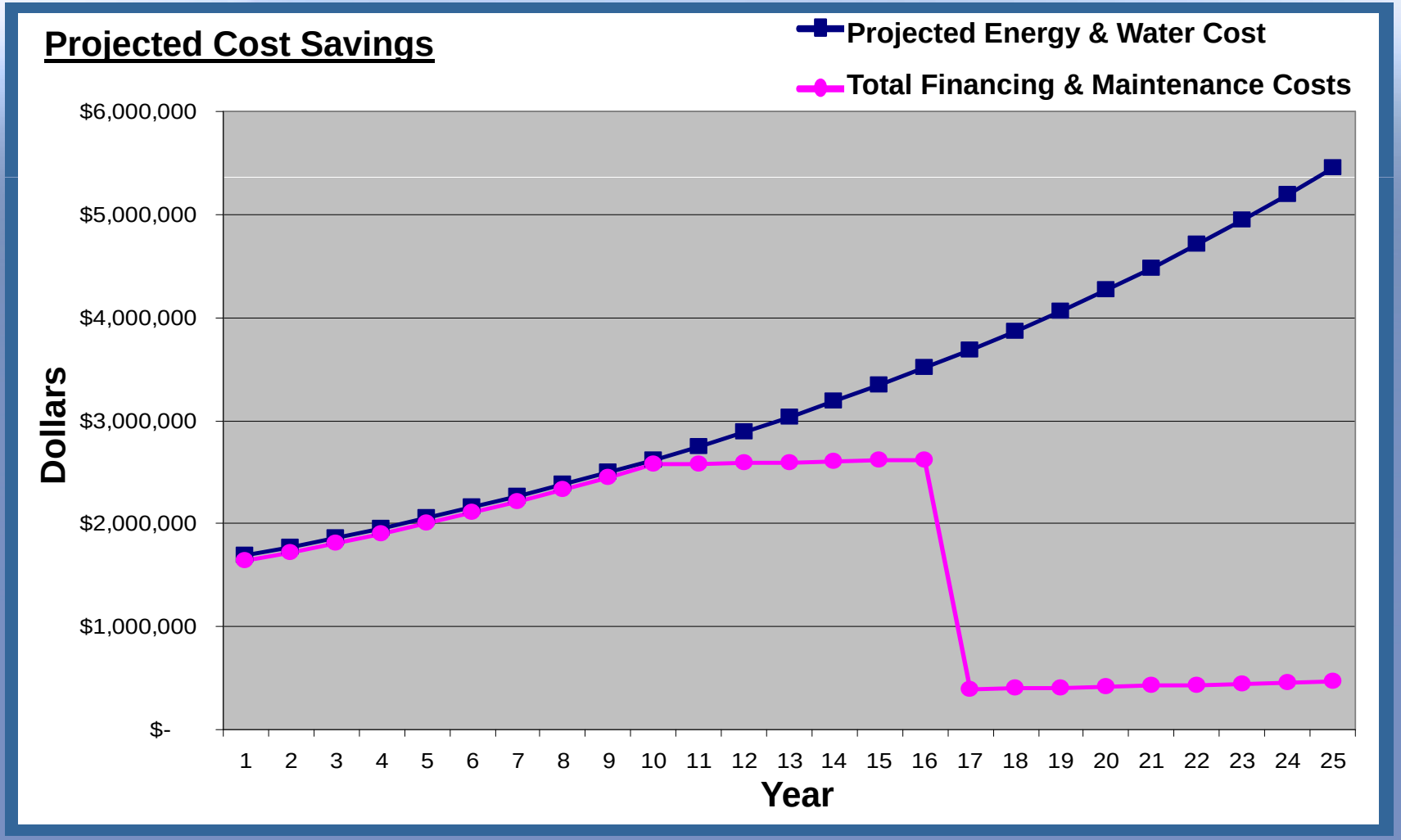
Financing Plan	
Project Cost	$22,272,029
Incentives, Grants, and Rebates	($3,941,226)
Financed Amount	$18,730,803
Estimated Interest Rate*	4.98%
Repayment Term	16 years
Assumed Closing/Funding Date	1/1/09
Assumed Annual Energy Cost Escalation*	5%
First year of positive cash flow	Year 12
Total payments	$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

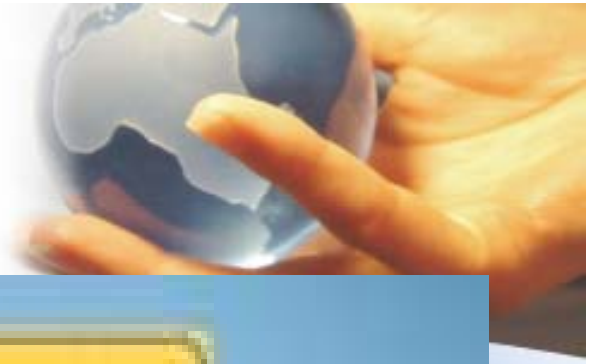
Rebates

Rebates played a big part in our total financial package.

Cost Savings



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

Sonoma County energy watch

A POWERFUL WAY TO SAVE ENERGY

Thank you

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