

Comprehensive Energy Projects (CEP) and Innovative Financing



June 21, 2011

Sonoma County – CPAP history



- **2001 Joined ICLEI – Cities for Climate Protection**
 - First Climate Pledge
- **2002 County GHG Assessment - Orrett**
 - Goals, targets, opportunities, cogeneration possible
- **2006 Climate Protection Action Plan – CPAP**
 1. Set Policy - BOS Resolution to exceed AB32
 2. Recommended Energy & Sustainability Manager/ Division
 3. Recommend hire Energy Services Company (ESCO)
 4. Recommended EEM's/ Comprehensive Energy Project (CEP)
 5. Set GHG target reduction of GHG by 8,454 tons:
 - Buildings - 6,348 tons, Fleet - 436 tons, Commute – 1,670 tons

Sonoma County – Policies



● 2006 BOS Resolution GHG Targets exceed AB32

- 20% below 2000 GHG by 2010
- 25% below 1990 GHG by 2015

● Permitting and Resource Management (PRMD)

- 2008: LEED certified for commercial and BIG for residential
- 2011: Currently adopted CALGreen Tier 1
- Next: International Green Construction Code (IGCC)

● 2010 – GS Green Building Policy County Facilities

- LEED certified <10,000 s.f.
- LEED Silver minimum goal >10,000 s.f.
- LEED Gold minimum goal >50,000 s.f.
- Maximize green, sustainable and energy efficiency



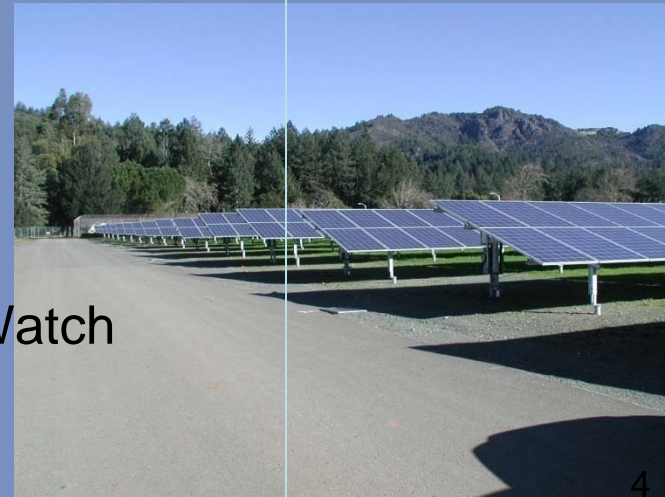
Sonoma County – Background



● Various 20th Century Efficiency Projects

● First decade 21st Century Projects:

- 5-6 MW Landfill Gas
- Local Government Electric Vehicle Partnership
 - County plus 9 J^x = 240 hybrids, plug-ins and EV's
- 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)
- Bloom box technology in consideration
- Off bill, ARRA, and QCEB funded projects
- 5 MW savings – Sonoma County Energy Watch (SCEW)



Sonoma County – Other Agencies



● **Sonoma County Water Agency (SCWA)**

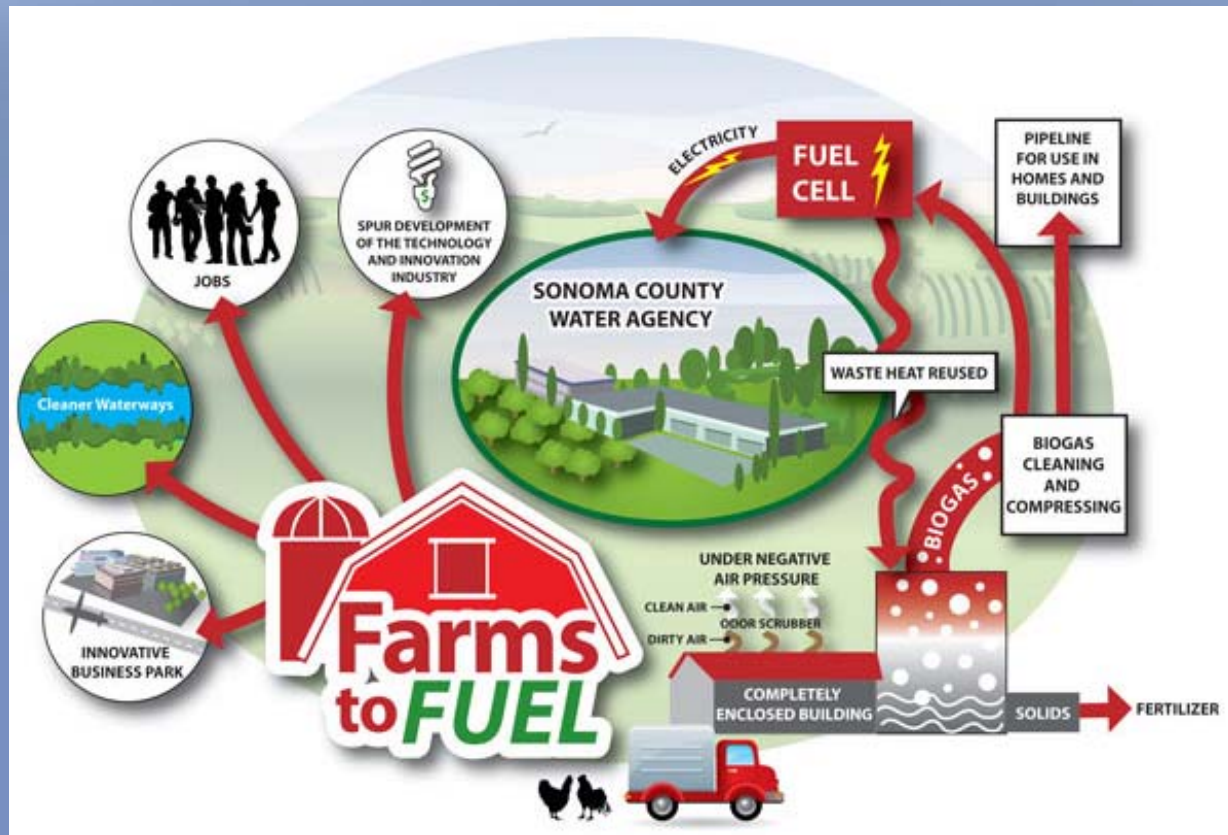
- Goal of carbon free water delivery by 2015
- 22.4MW in development including CCA feasibility
- 2.2 MW Solar 3 projects – \$15.5M, projects received \$4.49M in PG&E rebates
- 2.64 MW Hydro
- 32 hybrids and plug-in hybrids
- Wave power feasibility study – 2 to 5 MW at each of 3 locations, potential expansion 40 MW.
- Geothermal project in development

● **Sonoma County Fair and Exposition**

- 1.36 MW Photovoltaic, State grant funding

Sonoma County – Other Agencies

- **Sonoma County Water Agency (SCWA)**
 - 5.6 MW Biomass – 1.4 MW Fuel Cell project in development



Sonoma County – CEP history



● 2006-2008 – Develop CEP (Phase I)

- RFP to select Energy Services Company (1 year)
- Complete Inventory Grade Energy Audit (1 year)



● 2008-2010 – Execute CEP (Phase II)

- CEP Objectives:
 1. GHG reduction
 2. Positive Financial Impact
 3. Infrastructure Renewal

Comprehensive Energy Project



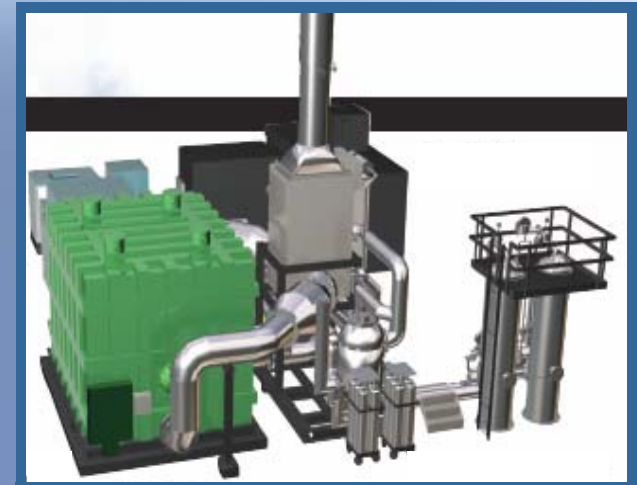
CEP Process

– 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

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

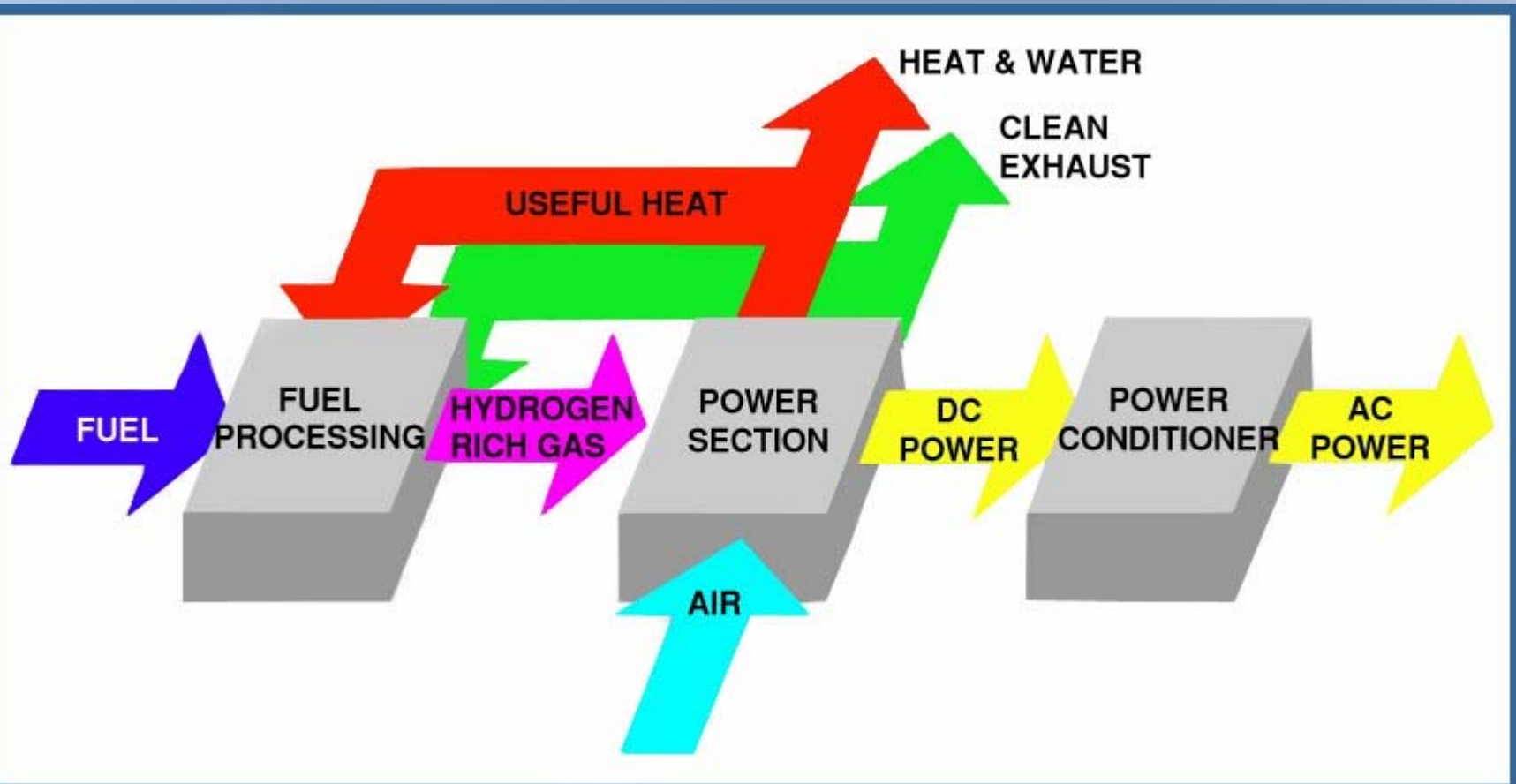
- Generates 10,693,216 kWh/year
- Produces 45 billion BTUs year
- Produces virtually no NO_x or SO_x pollutants
- Reduce GHG emissions by 69% versus grid power
- Designated “Ultra-Clean” by CARB
- Categorically exempt from CEQA



1.4 MW Fuel Cell Power Plant



Fuel Cell Energy Production



1.4 MW Fuel Cell Power Plant



Fuel Cell Installations in California:

- City of Santa Barbara, 500KW
- Sierra Nevada Brewing Co., Chico, CA 1MW
- Sheraton Hotel, San Diego 1MW
- Westin Hotel, San Francisco Airport, 600KW
- California State Univ. at Northridge, 1MW
- City of Riverside 1MW
- County of Alameda, 1MW
- Turlock Irrigation District, 1.2 MW
- City of Tulare, 900KW
- Dublin San Ramon Service District, 600KW
- Cache Creek Casino, 750 KW
- Santa Clara 1996 – 4@500MW



FuelCell Energy

Ultra-Clean, Efficient, Reliable Power



1.4 MW Fuel Cell Power Plant



Sonoma County Fuel Cell Power Plant



- Largest fuel cell in California - First article 1.4MW
- 1.4 MW Distributed Generation (DG) creates more reliable power for County Center in brown out situation.
- 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.
 - Shopping for renewable gas supply
- SGIP incentive of \$3,000,000 from PGE toward the \$9,763,271 cost

1.4 MW Fuel Cell Power Plant



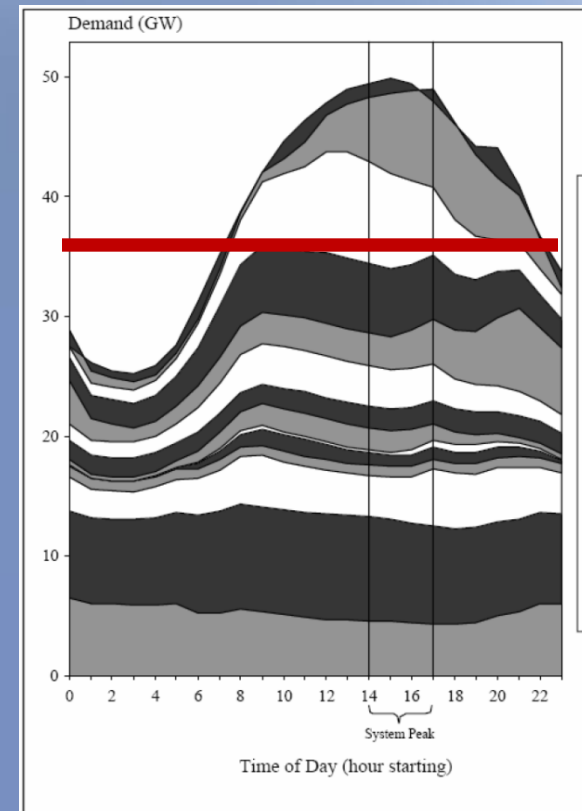
County Utility Costs –

- Prior County electric bill \$1.5M annually
- New County power costs \$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 – 8-900 kW due to detention 24/7
- Demand summer peak – 2,500kW or more
- Supply constant 1.4MW (Part Peak Load match)
- AB1613 Feed in Tariff (FIT) desired.
- Looking at additional load shifting opportunities

Fuel Cell Payback is Seven Years!



1.4 MW Fuel Cell Power Plant



SPECIAL ISSUES:

- **Interconnection to utility was difficult**
 - Fuel cell module on-site August 2010
 - Turned “on” in December 2010
- **Digital Metering desired per building–**
 - First meter \$25k with software
 - Subsequent meters \$15k
- **Metering Load –**
 - Net generation output meter at the fuel cell
 - No meter at the connection of 12kV loop to PGE
- **Maintenance –**
 - No problems yet with seamless electric supply
 - Demand charges are severe when FC drops out



Financing



Directive: Make CEP Expense Neutral Day 1 →

- California Government Code §4217.10 finance based on savings
- Obtained Private Loan Financing – Bank 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

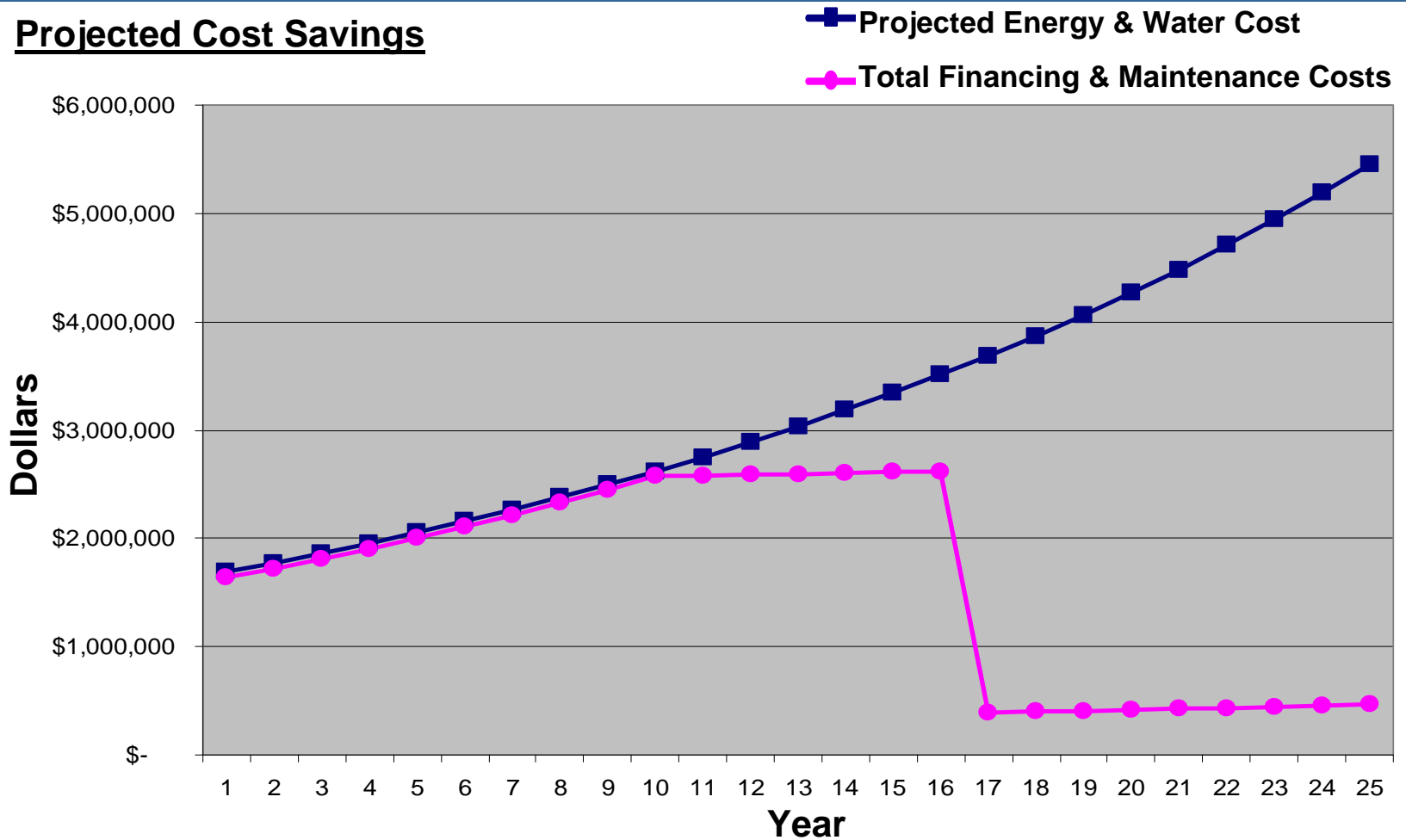


Rebates played a big part in our total financial package.

Cost Savings



Projected Cost Savings



CEP Results



CEP Objectives Met ?

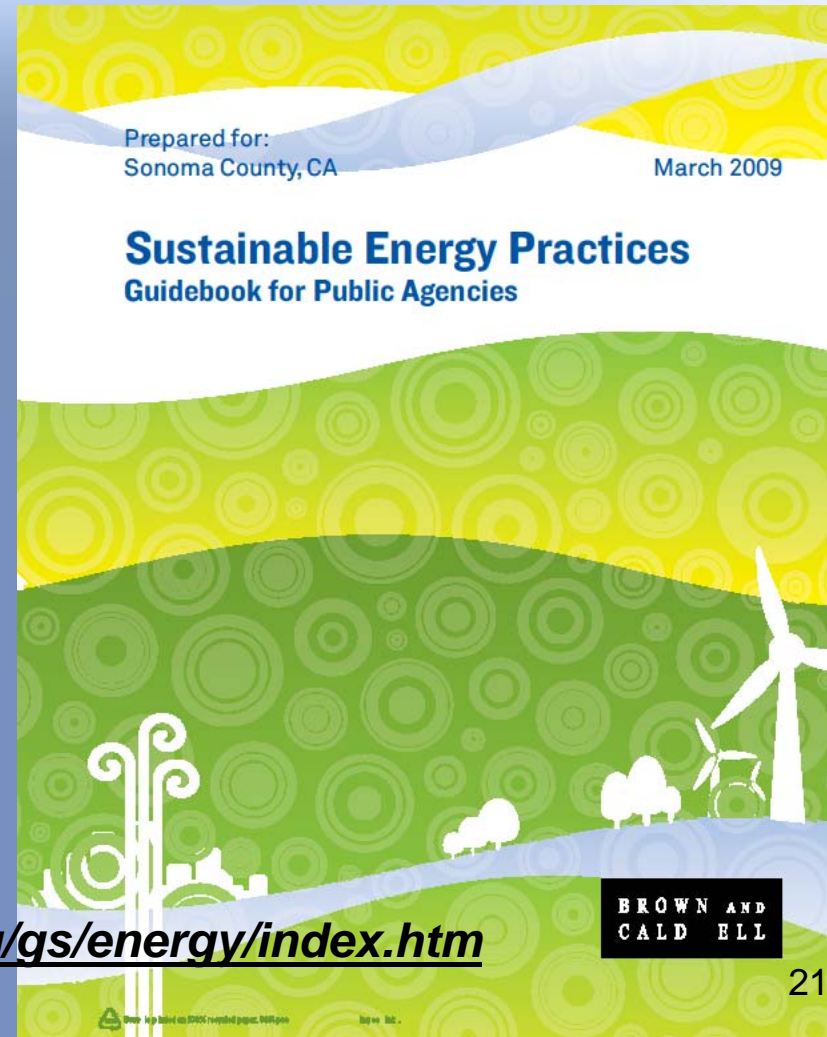
- 1. GHG reduction 6,135 tons***
 - Electricity reduction 13,365,226 kWh
 - Water savings = 19,138,260 gallons
 - Utility savings = \$1,689,316
 - 2. Saving \$\$\$, No General fund impact**
 - 3. Replaced old worn out equipment**
- * Now in 1 year Measurement and Verification**
- + Created jobs, collaboration, other benefits**



Additional Projects



- LED Parking lot retrofit with On Bill Financing
- Sustainable Energy Practices Guidebook



www.sonoma-county.org/gs/energy/index.htm

BROWN AND
CALD ELL

State of California Trending



Governor Jerry Brown Goals Distributed Generation Renewable



- 1.3 Million MW feasible CA
- Increase RPS 20% to 33%
- 20,000 MW Distributed Generation – Renewable
 - 8,000 MW utility scale
 - 12,000 MW small projects
 - 2,500 MW state facilities
- By 2020 (9 years)



Thank you



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