

Resource Recovery Program and Biogas Turbine Renewable Energy Project

California Energy Commission
CHP Workshop
February 16, 2012

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Presentation Outline



- Resource Recovery Program: an opportunity
- Biogas Turbine Project description and benefits
- Challenges
- Recommendations



Resource Recovery Program: An Opportunity



- Using ~60 mgd of 120 mgd secondary treatment capacity
- Unused anaerobic digester capacity
- Loss of food processor sewer discharges in late 90's/early 00's
- Feeling pressure on water/sewer rates
- Opportunity to accept high-strength wastes into digesters (trucked) for revenue enhancement

Resource Recovery (R2) Program



- Accepting septage in 2000
- Poultry blood in 2002
- Solid food waste in 2004
- Receiving a wide variety of other wastes as well: from cheesemakers, wineries, soft drinks, etc.
- Always considering other possibilities

Solid/Liquid Waste Receiving Facility



CA WWTP CHP Potential



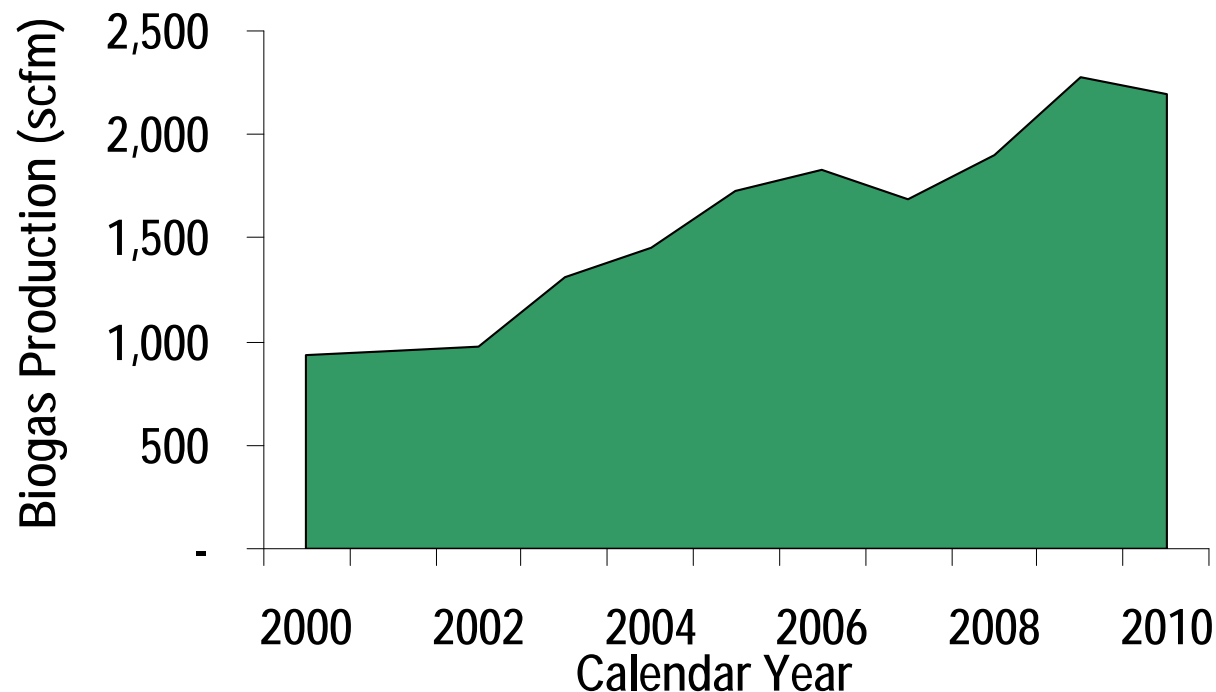
- 2009 IEPR
- Final Staff Paper
- CHP Potential at California's Wastewater Treatment Plants
- CEC-200-2009-014-SF



R2 Program Results



- Generates tip fee revenues
- Significantly increased biogas production
- Increased renewable energy generation
- Diverted wastes from landfills



Turbine Project Benefits



- Supports District's strategic goal of maximizing renewable energy sources and reducing greenhouse gas emissions
 - Utilize excess biogas and eliminate flaring
 - Become net energy producer + sell excess green energy
- Increases electrical power reliability

Turbine Project Summary



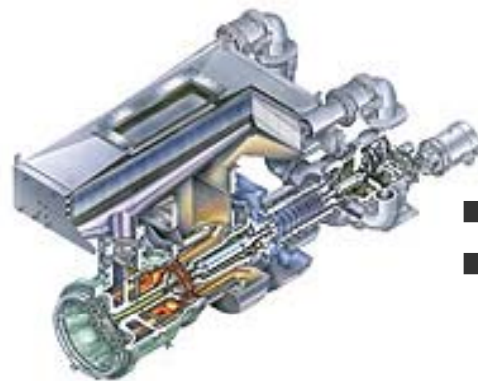
Existing

Three 2.1 MW Engines



New

Add 4.6 MW Turbine



+

=

11 MW

- Engines operational since 1986
- Turbine operational in late 2011

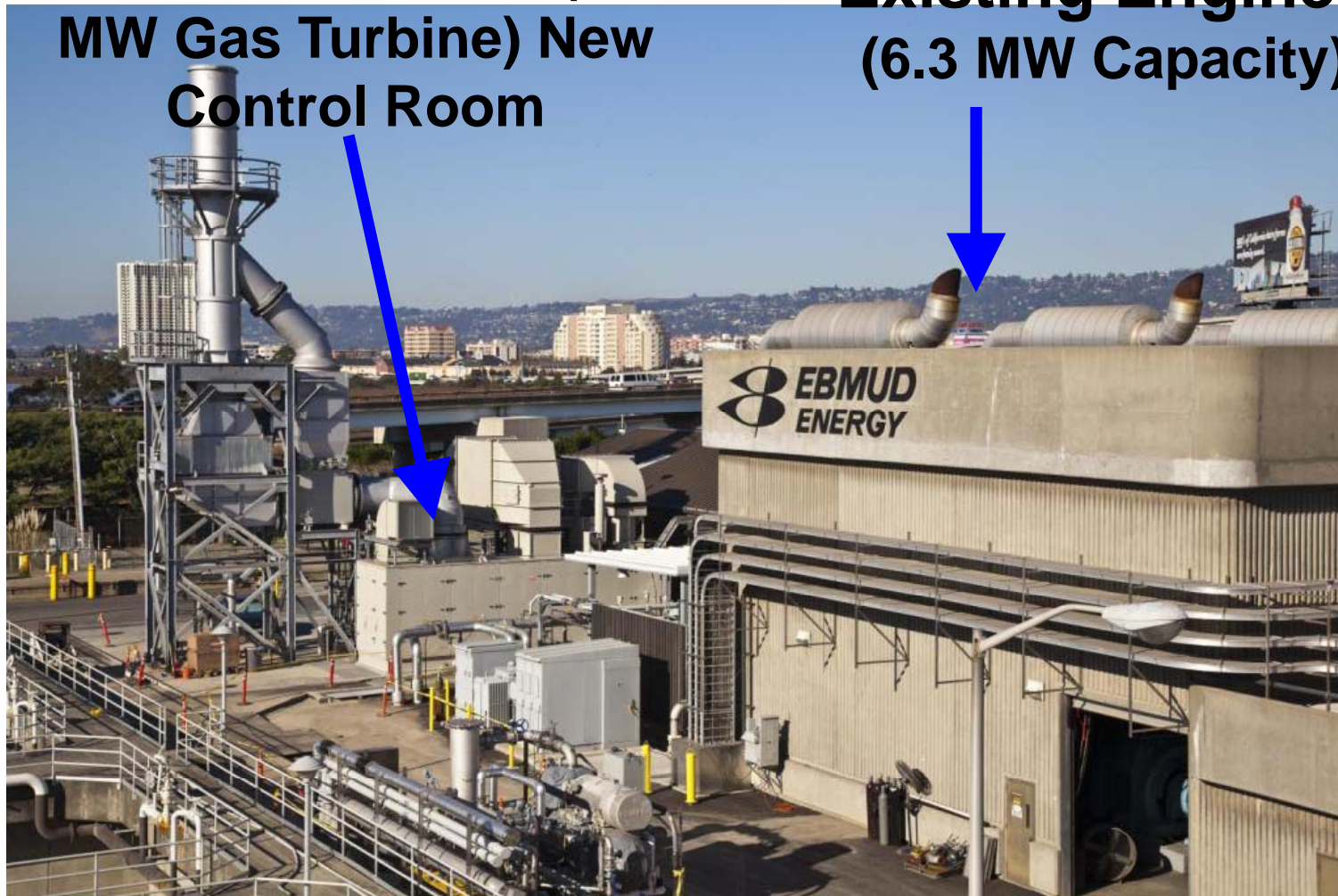
Facility Description

Power Generation Station (PGS)



New Turbine Plant (4.6-MW Gas Turbine) New Control Room

Existing Engines (6.3 MW Capacity)



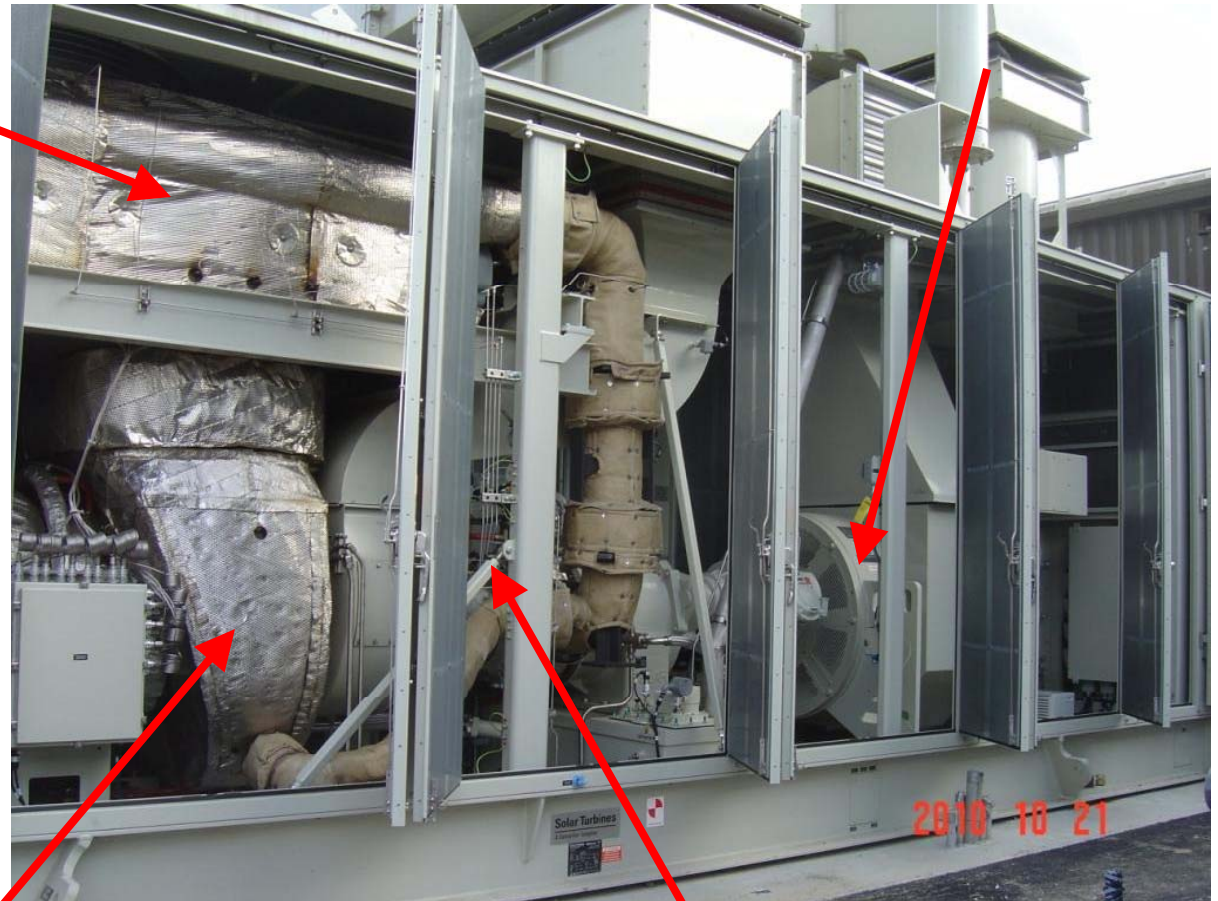
Facility Description Installed Turbine



Generator

Recuperator

- Solar Turbines
Mercury 50
Recuperated
Gas Turbine



Turbine/Combustor

Compressor

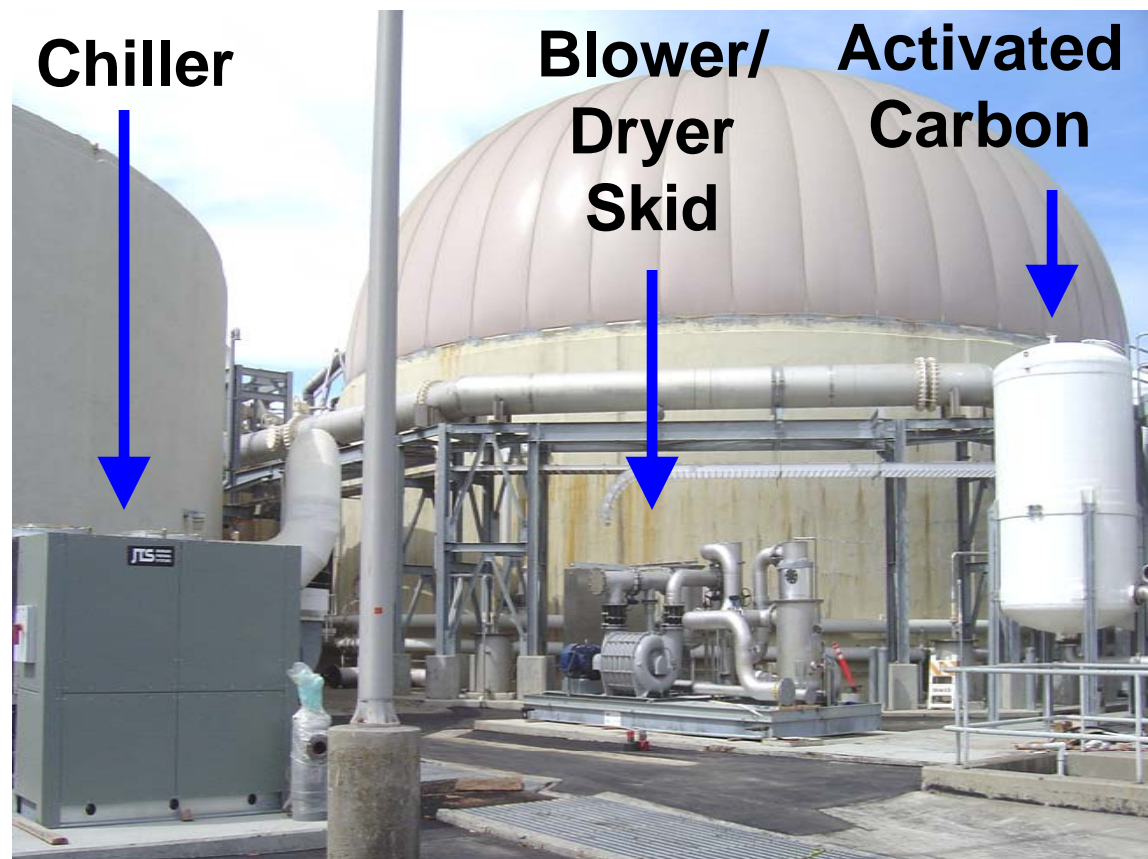
Facility Description

Gas Conditioning System



System is designed to reduce or remove:

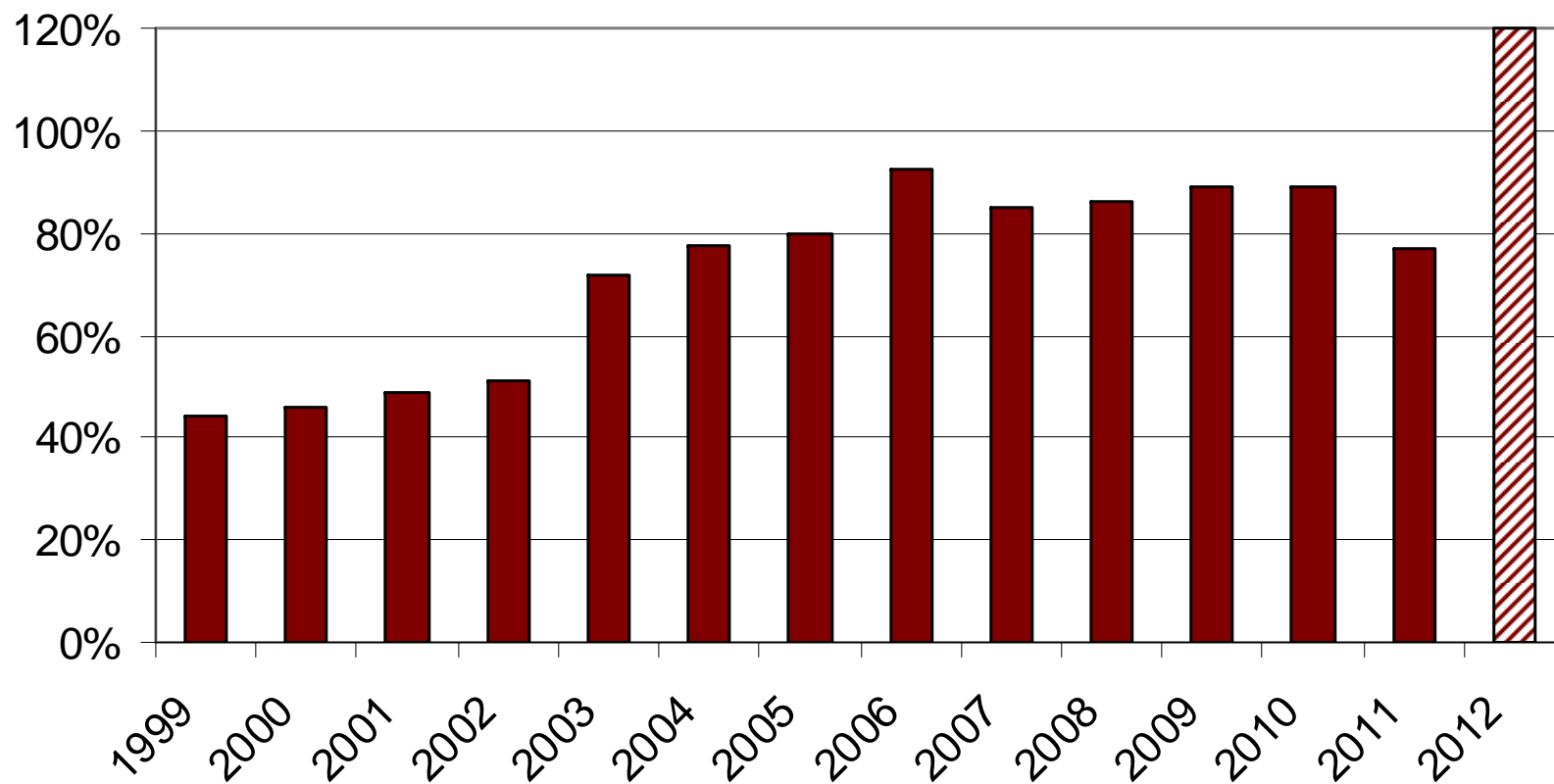
- Siloxanes
- Water vapor



Becoming a Net Energy Producer



**Percent of Plant Power Demand
Met by Onsite Generation**



R2 Program and Turbine Project Challenges



- Process Impacts (e.g., toxicity, stability)
- Regulatory – meeting discharge permit, jurisdictional (e.g., solid waste)
- Contaminants (damage to equipment)
- Odors and gas conditioning
- Feedstock losses to “competitors”
- Capital funding; defer other capital projects
- Utility Interconnection improvements
- Decline in expected revenue for energy
- Transaction costs
- **R2 is not “business as usual” for a wastewater utility**

Capital Funding and Grant Support



- 2002 – Award of SB 5X Incentive funding (Peak Load Reduction/Energy Efficiency Program for Water/WW facilities) from CEC for EBMUD Solid/Liquid Waste Receiving Facility
- 2004 – Completed construction of \$4.1 million facility with \$0.5 million CEC grant contribution
- Grant was a contributing factor in moving forward with project
- SGIP not available for combustion technology (e.g., turbine) at the time of design or construction

Utility Interconnection Process



- Started in 2007 with design, ends with completion of construction in 2012
- Review of: design and drawings, relay settings and tests
- 6 pre-parallel inspections for generators (4) and interconnections (2)
- Install direct transfer trip with leased AT&T communication line (6-12 months)
- PG&E project manager was knowledgeable and helpful

Interconnection Challenges



- Costly - ~\$1.3 million for this project vs. \$23k in 1986 for engines
- Lengthy – 5 years; design through construction
- Coordination and scheduling of utility inspections during construction can create delays
- Many PG&E groups to coordinate with: planning, engineering, telecom, project mgmt, and station test: up to 15 PG&E staff at job site meetings!
- End user needs strong and capable representatives on both sides

Energy Revenue Decline



- General decline in wholesale power prices over last several years
- CPUC categorizes all unbundled RECs in Category 3, greatly reducing value of RECs associated with on-site generation – these may not count toward RPS
- FiT not tiered to account for higher value of renewable energy
- Increased project payback period compared to what was estimated in 2007 when “go” decision was made

Transaction Costs Surplus Power Sales



- 1986 QF PPA with PG&E (SO1) for sale of as-available surplus power
- Sought amendment to include turbine – denied because of new agreements to emerge from QF settlement
- Forced to evaluate alternatives for turbine generation
- Unfamiliarity with CAISO and SC requirements

Recommendations



Policy Goals: capital funding assistance, process streamlining, revenue stabilization

1. Continue grant funding (e.g., incentives and SGIP)
2. Streamline interconnection process
3. Categorize unbundled RECs from facilities meeting Category 1 criteria in Category 1
4. Tiered FiT for renewables

Biogas Incubation Program



- Biogas is a proven renewable energy resource that provides baseload power (or stored for peaking) while utilizing methane, a potent GHG, for power generation
- Propose a biogas program analogous to CSI as incubator of solar generation in California
- Develop a biogas-specific energy procurement mechanism/market, with dedicated funding for up-front financial incentives

Wastewater Biogas Turbine Renewable Energy Project

Questions?

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- **BACKUP SLIDES**

Project Start-up/Schedule Exhaust Emission Test Results



Compound	BAAQMD Permit Limit (ppm)	Emissions Test Result (ppm)
NO _x	23	5.2
CO	100	6.2
SO ₂	150	2.5