TAO Advisory Group Retreat

Stationary – NOx and PM Controls

February 3, 2010

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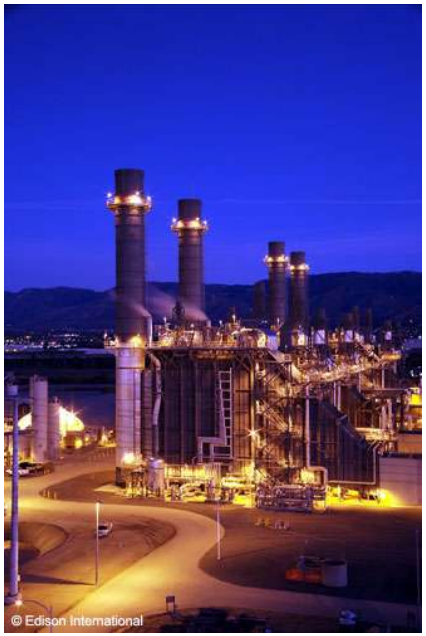
South Coast Air Quality Management District

Stationary NOx and PM Emission Reduction Projects

- Biogas Power Plants NOx - Update
- New Power Plants PM - Update
- Residential Furnaces NOx - New



Power from Biogas

- Most large landfills and water treatment plants in SCAQMD convert the landfill or digester gas (biogas) to electricity
  - Income for municipalities and encouraged by state programs,
  - 50 I.C. engines, 2200 avg. hp, 84 MW total capacity.

Background

- Biogas engines have been allowed higher NOx than natural gas engines because NOx reduction catalysts could not be applied
  - contaminants in biogas rapidly fouled catalysts.

Rule 1110.2 Amendment – 2008

- Biogas engines must reduce NOx to 11 ppm by 7/1/2012.
  - *subject to a technology assessment by 7/1/2010 finding that adequate technology exists.*

Orange County Sanitation District Project

- October 2009 Governing Board approved funding
- Demonstration to retrofit digester gas engine at OCSD's Fountain Valley plant with:
  - Digester gas carbon adsorption cleaning system
  - SCR NOx control system and oxidation catalyst

Funding

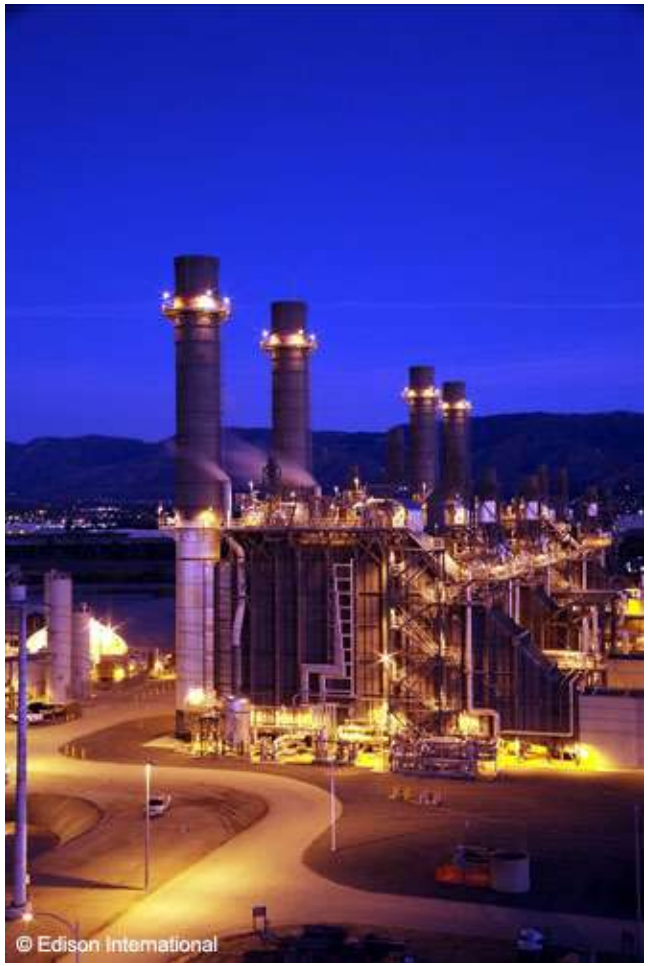
Partners	Funding	Percent
OCSD	$2,212,000	91
AQMD	$200,000	9

OCSD Project Plan and Status

- Plan:
  - Six month demonstration and data collection
  - Report
- Status
  - Equipment installation nearly complete
  - Expect engine re-start early March
  - Expect normal operation mid-March

New Natural Gas Power Plants (FERCO)

- Southern California needs more power.
- New base-load and peaker plants use natural gas fueled gas turbines.
- Need PM offset credits.
- Low availability and high price of offsets may restrict siting of new plants.



Cost of PM Offsets for Typical New Power Plant

- 573 MW, Baseload, Combined Cycle
- Max. PM = 462 lb/day
- Cost of PM Offsets = $51,005,000

PM Reduction Project

- August 2007--the Board amended Rule 1309.1 and set aside $4 million from emission mitigation fees to identify and demonstrate control technologies to reduce PM2.5 emissions from natural gas-fired power plants.
- November 2007--RFP released.
- April 2009--Contract Signed with Fossil Energy Research Corp. (FERCO).

FERCO Team

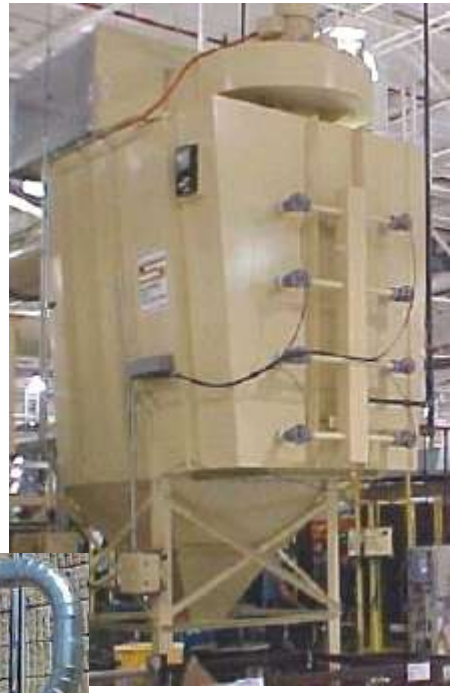
FERCO	Technical assessments, R&D and emission testing supervision, project management
UC Irvine	Gas turbine expertise, Combustion Lab, host site
UC Riverside CE-CERT	PM measurement expertise
Environ	PM Expertise and Air Quality Permits
Delta Air Quality Services	Field support--testing and measurements

Project Plan and Budget

Phase I	Evaluate Technologies	3 mo.	$220,000
	TAO decide which, if any, technologies to be tested		
Phase II	▪Test Technologies on gas turbines or slip streams ▪Analyze results ▪Report	18 mo.	Up to $3,270,000

Technologies Considered in Phase 1

- Fabric filter
- ESP
- Agglomeration
- Sorbents
- Wet ESP
- Scrubbers
- EMx
- Fuel sulfur removal



Project Status

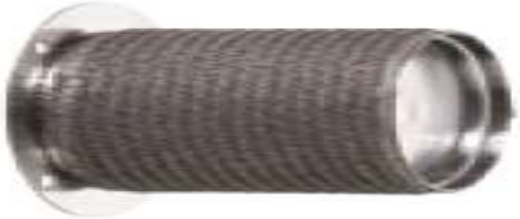
- Phase I report and recommendations submitted by contractor
- Reviewed by staff and panel of experts
- Two technologies selected for testing:
  - Fuel sulfur removal (lab scale)
  - EMx (full scale)
- Contractor preparing test plan and cost estimate.

Rule 1111 Reduced NOx Residential Furnaces

- Approximately 8 TPD NOx
- CMB-03: reduce NOx 50-75%
- Amended Rule 1111 reduces NOx from 40 to 14 ng/J starting October 2014
  - Subject to technology assessment ending July 2012
  - $1 million dedicated to assist development

Rule 1111 RFP # P2010-17

- Total funds $1 million
- Up to four contracts
  - Develop prototype passing Rule 1111 NOx certification and applicable safety standards
- Bidder can be OEM or team including OEM



Schedule

• RFP approval by Board and release	February 5, 2010
• Optional Bidders Conference	February 26, 2010
• Closing Date	March 23, 2010
• Recommendations to Board	May 7, 2010
• Contracts approved by Board	June 4, 2010
• Projects completed	April 30, 2012