

TAO Advisory Group Retreat

Stationary – Power Generation

September 3, 2009



Howard Lange, Air Quality Engineer II

South Coast Air Quality Management District

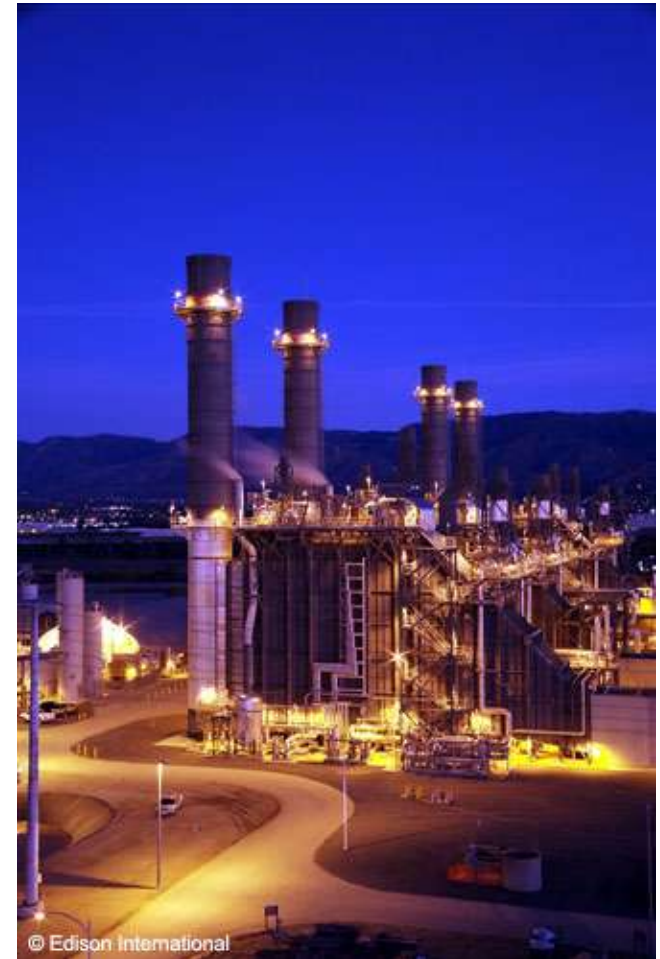
Power Generation Pollutant Issues

- New Natural Gas Power – PM
- Power from Biogas – NO_x



New Natural Gas Power Plants

- Southern California needs more power.
- New base-load and peaker plants use natural gas fueled gas turbines.
- Eight proposed new gas turbine projects in AQMD; 4,569 total MWs.
- Need 4,162 lbs/day of PM offset credits.



Cost of PM Offsets for Typical New Power Plant

	Combined Cycle	Simple Cycle
MW	573	500
Max. lbs/day PM	462	463
Cost of PM Offsets from Priority Reserve	\$51,005,000	\$51,115,000

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.
- February 2009--Contract awarded to Fossil Energy Research Corp. (FERCO).
- April 2009--Contract Signed.

Project Plan and Budget

Phase I	Evaluate Technologies	3 mo.	\$220,000
	TAO decide which, if any, technologies to be tested		
Phase II	<ul style="list-style-type: none">■ Test Technologies on gas turbines or slip streams■ Analyze results■ Report	18 mo.	Up to \$3,270,000

FERCO Team

- FERCO: Technical assessments, R&D and emission testing supervision
- 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

Elements of Phase 1

- Gas turbine technologies
- Nature of PM_{2.5} from gas turbines
- PM_{2.5} measurement methods
- PM reduction technologies – fabric filter, ESP, agglomeration, sorbents, wet ESP, scrubbers, EMx, fuel sulfur removal

Status

- Task 1 is complete, and a report has been submitted.
- TAO is evaluating the recommendations.



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

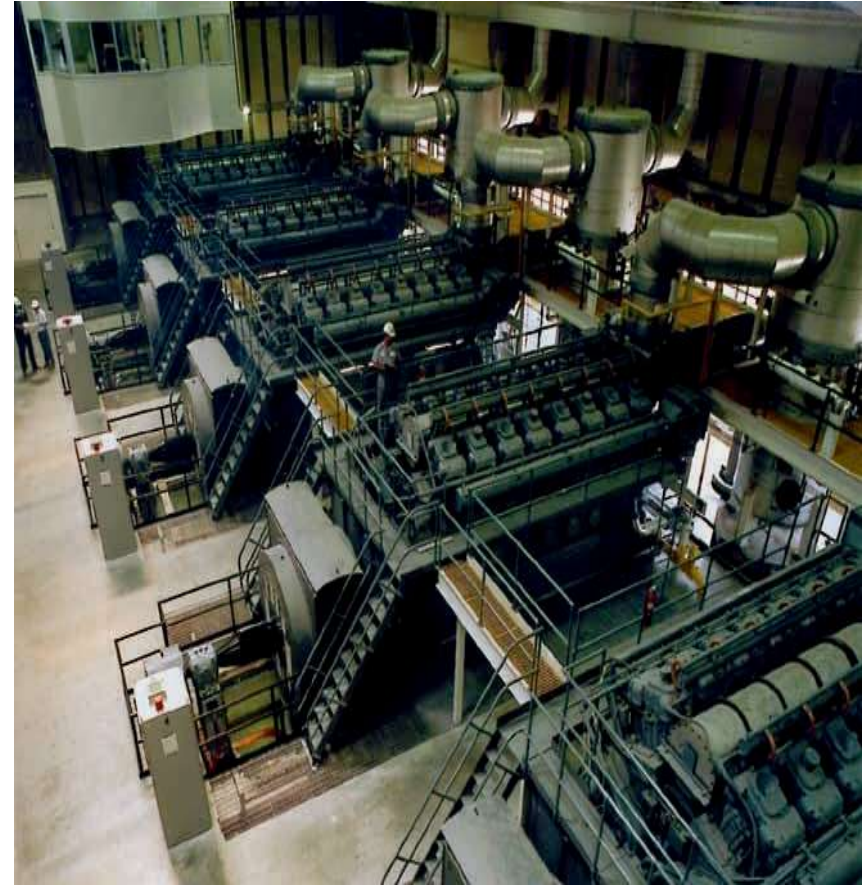
- Biogas engines have been allowed higher NO_x than natural gas engines because NO_x reduction catalysts could not be applied
 - contaminants in biogas rapidly fouled catalysts.

Rule 1110.2 Amendment – 2008

- Staff determined that retrofitable technologies now exist to enable biogas engines to meet 9 ppm NOx (same as natural gas engines).
- Biogas engines must reduce NOx to 9 ppm by 7/1/2012.
 - *subject to a technology assessment by 7/1/2010 finding that adequate technology exists.*

Orange County Sanitation District Project

- Demonstration to retrofit digester gas engine at OCSD's Fountain Valley plant with:
 - Digester gas carbon adsorption cleaning system
 - Urea tank & injection system
 - SCR catalyst system
 - Catalytic oxidizer



Project Plan

- Six month demonstration and data collection
- Prepare report for AQMD review
- Project Team
 - OCSD; Malcolm Pirnie, Inc.; Johnson Matthey

Funding

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

Status and Schedule

- Equipment has been ordered.
- Installation scheduled for October-December.
- Startup January-February
- Interim report to TAO in June.
- TAO biogas technology assessment report to Board in July.

