Calabasas Gas-To-Energy Facility

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1/20/2011
• Sanitation Districts
• Project Background
• Plant Design
• Project Timeline
• Operation and Lessons Learned
• Summary
Agenda

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- 23 independent districts
- Manages wastewater and solid wastes
- 1,400 miles of main trunk sewers
- 3 operating landfills
- 3 closed landfills
- 2 recycle centers
- 3 materials recovery/transfer facilities
- 2 refuse-to-energy facilities
- 7 landfill energy recovery facilities
Districts’ Industry Advances

- 1970’s: worked with EPA to develop gas collection system designs
- 1980’s: first gas-to-energy facilities, both landfill and digester gas
- 1990-2000’s: microturbine and fuel cell demonstration projects
- 2010: Calabasas GTE facility
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• Began operation in 1961
• 20 millions tons in place
• 505 acres
• 850 tons/day
• 30 more years
• 5600 SCFM
• 25-28% methane
• All that gas...going to waste
• Boiler/steam turbine not viable
• No other technology available
• Emissions regs too:
  – GT BACT: 25 ppm NOx, 130 ppm CO
  – Recips: bigger emissions problems
June 2004: approached Solar Turbines
Suggested modifying Mercury 50
Basis:
- Centaur 40 GT experience at Puente Hills
- Recuperated cycle: high efficiency
- Demonstrated low emissions (natural gas)
Convinced Solar to try
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• 3 turbines (one for growth)
• 3 fuel trains w/natural gas mixing
• 3 stages of compression
• Water removal
• Siloxane removal: passive silica gel towers
• CEMS for NOx
• Control room/maintenance building
• Gas turbines: Solar Turbines
• Compressors: Vilter
• Gas chilling and drying: Johnson Thermal
• CEMS: CISCO
• Engineering: Jacobs Carter & Burgess
• Construction: Hobbs Bannerman
Construction: The Beginning
Building the Base
Up And Running…
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Project Timeline

- 06/17/04: Ed Wheless’ suggestion to Solar
- 10/12/06: Biogas Mercury 50 released
- 01/23/07: Calabasas project kickoff
- 07/28/07: Engineering contract awarded
- 11/27/07: Final permits issued
- 01/07/09: Construction commenced
- 06/01/10: Start plant commissioning
- 07/12/10: Commercial operation
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• 2 of 3 turbines operate continuously

• Plant output: 9.5 MW gross, 7.6 MW net

• Emissions:
  – 7 ppm NOx (0.08 g/bhp-hr)
  – 3 ppm CO (0.02 g/bhp-hr)

• Fuel quality: ~260 Btu/ft³

• Plant availability to date: 95%

• Used 99% of available LFG last 3 months
Lessons Learned/Issues

- Equipment delivery issues
- Construction delays
- Design coordination
- Water ingestion in process piping
- Oil carryover from compressors
- Compressor motor bearing failure
- Failed wire nut in GT enclosure fan
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What Did Project Accomplish?

• It didn’t:
  • Invent the cell phone
  • Or the laser beam
  • Perfect open heart surgery
  • Or find the cure for the common cold
  • Reinvent the wheel
  • Leave the state-of-the-art untouched
What Calabasas Did Do…

And these breakthroughs were set with 260 Btu/ft³ fuel
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