Renewable Natural Gas: Pipeline Biomethane for California

Southern California Alliance of Publicly Owned Treatment Works
City of Escondido, Hale Avenue Resource Recovery Facility
July 27, 2011

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Southern California Gas Company
AGENDA

• Southern California Gas Company Overview
• Biogas vs. Biomethane
• Renewable Natural Gas
  ➢ Drivers
  ➢ Advantages
  ➢ Challenges
• Gas Quality and Interconnection Requirements
• Gas Conditioning Economics
• SCG Focus
• Proposed Biogas Programs and Services
• Questions
Southern California Gas Company Overview

- Southern California Gas Company (SoCalGas)
  - A regulated public utility that provides safe and reliable natural gas service to 20.9 million consumers
  - Nation’s largest natural gas distribution utility with 5.8 million meters
Renewable Natural Gas Market: Biogas vs. Biomethane

Onsite Use

Remove Trace Constituents H₂S, Siloxanes, etc.

“Treated” Biogas

Natural Gas Equipment

Power Generation

Biogas Conditioning Facility

Biogas

Offsite Use

Onsite Use

Power Generation

Pipeline Injection

Biomethane

Biogas
## Renewable Natural Gas Market: Biogas vs. Biomethane

<table>
<thead>
<tr>
<th></th>
<th>Typical Biogas</th>
<th>Biogas</th>
<th>&quot;Treated&quot; Biogas</th>
<th>Biomethane</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Composition and Heating Value</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH4</td>
<td>62.0%</td>
<td>62.0%</td>
<td></td>
<td>98.5%</td>
</tr>
<tr>
<td>CO2</td>
<td>37.6%</td>
<td>37.6%</td>
<td></td>
<td>0.8%</td>
</tr>
<tr>
<td>O2, H2, N2, Others</td>
<td>0.4%</td>
<td>0.4%</td>
<td></td>
<td>0.7%</td>
</tr>
<tr>
<td>Heating Value (btu/scf)</td>
<td>625</td>
<td>625</td>
<td></td>
<td>990+</td>
</tr>
<tr>
<td><strong>Two of the Key Trace Constituents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2S</td>
<td>300 ppm</td>
<td>1 ppm</td>
<td></td>
<td>1 ppm</td>
</tr>
<tr>
<td>Siloxanes</td>
<td>4,000 ppb</td>
<td>70 ppb</td>
<td></td>
<td>Non-detectable</td>
</tr>
</tbody>
</table>
Drivers to Produce/Utilize Biogas/Biomethane

• California Regulatory Policies
  - Assembly Bill 32: Reduce GHG’s back to 1990 levels by 2020
    • Biogas/biomethane projects can create carbon offset credits to help project economics (cap and trade)
  - Renewable Portfolio Standard (RPS): 20% by 2010, potentially 33% by 2020
    • Biogas/biomethane can be used to help achieve RPS goals
  - Low Carbon Fuel Standard: reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020
    • Biogas/biomethane can be used by natural gas vehicles, resulting in the lowest carbon intensity value of any transportation fuel source*

• Availability of feedstock
  - Wastewater, Food Waste, Dairy, and Biomass
  - Could potentially provide ~16% of California’s natural gas usage

* CARB Staff Report: Initial Statement of Reasons Proposed Regulation to Implement the Low Carbon Fuel Standard, Volume 1 March 5, 2009
Advantages of Biomethane

• Interchangeable, Storable, and Dispatchable

• Maximizes Existing Infrastructure
  ➢ Gas Pipeline Network
  ➢ Natural Gas Storage Fields
  ➢ Electric Power Plants
  ➢ Some Existing Digestion Infrastructure
  ➢ New Conditioning and Some Additional Digestion Infrastructure Required

• Assignable to Highest Value Use
  ➢ Renewable Electric Generation
  ➢ Transportation Sector
  ➢ End Use
Challenges to Produce/Condition Biomethane

• Investor Confidence and Perceived Technology Risk
  ➢ No current pipeline injection projects in CA - Difficult to gain investor confidence in technology
  ➢ SoCalGas Rule 30 and PG&E Rule 21 Gas Quality Specifications (for pipeline injection)

• Project Scale
  ➢ Small to medium scale biogas production facilities are not economical
  ➢ Minimum threshold is approximately 1,000 standard cubic feet per minute (scfm) for favorable economics

• Incentives – Uneven for biogas production/conditioning
Gas Quality and Risk Considerations

• SoCalGas develop testing and monitoring
  ➢ Based on internal studies and Gas Technology Institute (GTI)
  ➢ Ensures compliance with existing gas quality standards (SCG Rule 30)

• Technologies available to process biogas
  ➢ Pressure Swing Adsorption (PSA)
  ➢ Amine Scrubbing

• Additional Studies being performed
  ➢ Digester Risk Assessment
  ➢ Feedstock Availability and Consistency
  ➢ Central Valley Opportunities

NOTE: Tariff currently prohibits introduction of landfill gas on our system
Interconnection to SoCalGas Pipelines

- Pipeline interconnection pursuant to Rule 39 and Biogas Guidelines
- Generally 18-24 month process
- Minimum construction time is about 9 months
- Rule 39 requires upfront payment
- Staged studies provide increasing levels of detail and accuracy
- Interconnection costs can be highly site specific
- Interconnection is independent of any other SCG business arrangements

[Links]
www.socalgas.com/business/suppliers
Cost to Conditioning to Pipeline Quality

- Small/medium WWTFs: more economic to flare/vent than capture methane, 3 large WWTF in SoCalGas territory
- 850 dairies in SoCalGas/SDG&E territory, 5 dairies in SoCalGas territory 8,000+ cows
- Need to “cluster” numerous dairies to achieve the necessary herd size
- Potential issues with obtaining rights-of-way for clustering
Renewable “Cost to Generate” Comparison

Cost to Generate Ranges
All Ranges, Except for Biomethane, Taken from RETI Phase 2B Report

- Wind: $0 - $60 - $116
- Geothermal: $0 - $65 - $140
- Biomethane: $91 - $112
- Biomass: $100 - $151
- PV Track: $135 - $214
- PV Thin Film: $138 - $206
- Solar Thermal: $195 - $226

Levelized Cost of Generation ($/MWh)

* Ranges include applicable incentives such as ITC’s and PTC’s
SoCalGas Focus

• SoCalGas is focused on transporting biomethane
  ➢ Fund, Build, Own, Operate a Biomethane Conditioning System

• Pursuing potential projects with wastewater treatment facilities
  ➢ Escondido Hale Avenue Resource Recovery Facility
  ➢ Sustainable SoCal

• Also targeting dairies, food processors, and municipal solid waste
  ➢ Feedstock Agreements
  ➢ Digestion Facilities

• Potential Market for Biomethane
  ➢ Electric Generators
  ➢ Transportation
  ➢ SGIP Fuel Cells
Sempra Energy Utilities Proposed Biogas Services

CPUC Advice Letter filing seeking authority to offer biogas services*

• Biogas Conditioning Services
  ➢ SEU to design, install, own, operate & maintain biogas conditioning equipment
  ➢ Provides owners of biogas additional options to produce biomethane from their biogas while limiting upfront capital and risk
  ➢ SEU will charge the customer a negotiated fee for the service under a long-term contract
  ➢ Services fully funded by SoCalGas or SDGE shareholders

* Requires CPUC Approval
Sempra Energy Utilities **Proposed Biogas Services**

CPUC Advice Letter filing seeking authority to offer biogas services*

- **Bioenergy Production Facilities Services**
  - SEU to design, install, own, operate & maintain facilities/equipment required to produce biogas
  - Provides owners of biogas **additional options** to produce biogas from their biogas organic waste
  - SEU will charge the customer a negotiated fee for the service(s) under a long-term contract
  - Services fully funded by SoCalGas or SDGE shareholders

* Requires CPUC Approval
SoCalGas Proposed "Sustainable SoCal Program"

2012 SoCalGas General Rate Case (GRC) Proposal*

- Target Customer for "Sustainable SoCal Program"
  - Small to mid size WWTF’s (200 to 600 scfm)
  - Have a digester onsite and seeking for a better solution for their biogas
- Biomethane to be used for SoCalGas facility and fleet vehicle use
- Biomethane used in place of natural gas will result in avoided costs for carbon offset needs
- Cost recovery in rate base

* Requires CPUC Approval
Questions

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