BioFuels Market Development Roadmap

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Discussion Topics

- Company Overview
- Drivers of Biomethane Production
- Sempra Energy Utilities Involvement with Existing Biogas Projects
- The Challenges of Pipeline Quality Biomethane
- Renewable Technology “Cost to Generate” Comparison
- Biogas Conditioning Economics
- Sempra Energy Utilities Proposed Biogas Programs/Services
- Questions

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Company Overview

- Southern California Gas Company (SoCalGas) has been delivering clean, safe and reliable natural gas to its customers for more than 140 years
- Nation's largest natural gas distribution utility
  - 20.9 million consumers
  - 5.8 million meters
  - Serving more than 500 communities
- The company's service territory encompasses approximately 20,000 square miles

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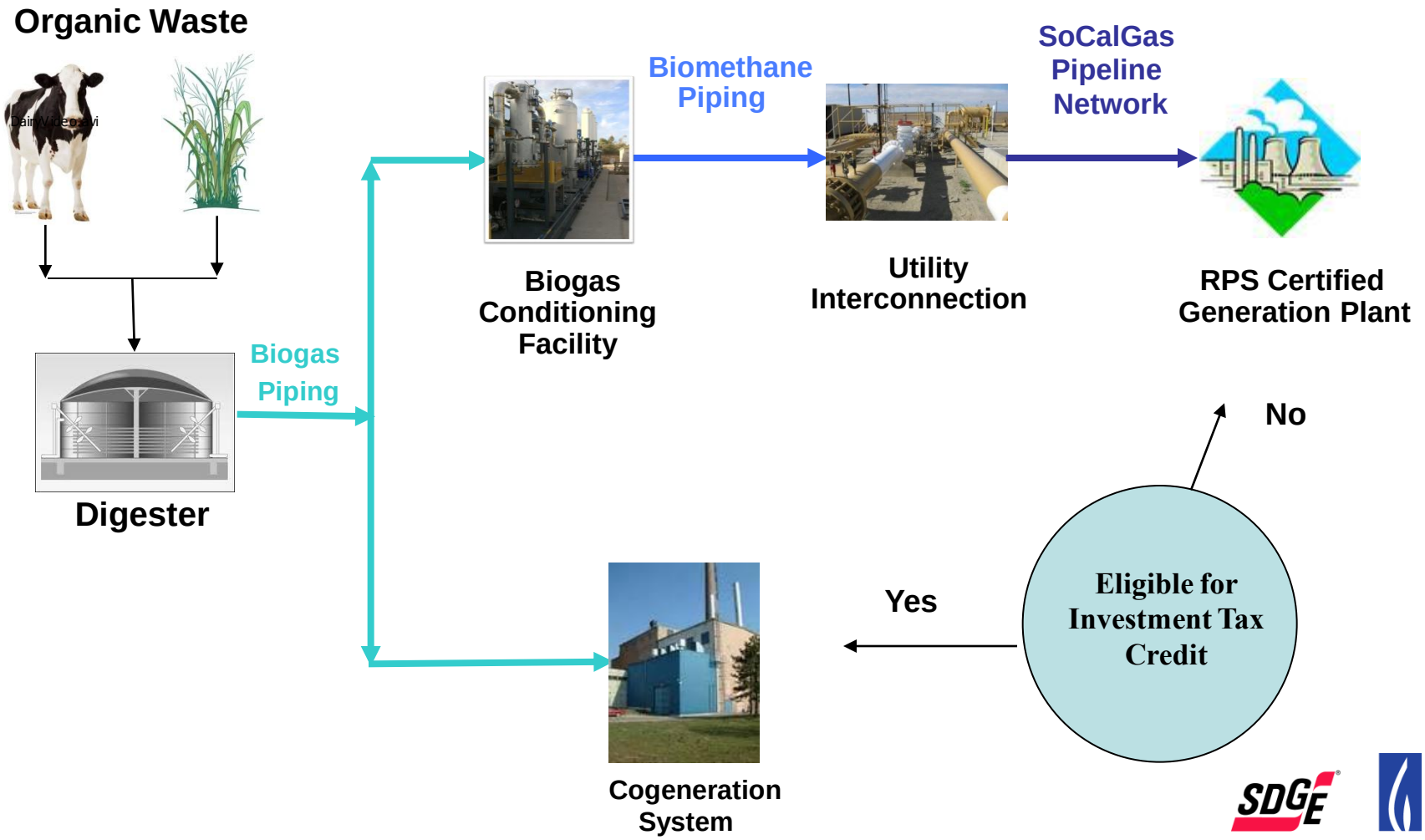
The Lifecycle of Pipeline Quality Biomethane



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Drivers of Biomethane Production

- California Regulatory Environment
  - Renewable Portfolio Standard (RPS): 20% by 2010, and 33% by 2020
  - Assembly Bill 32: Reduce GHG's back to 1990 levels by 2020
  - Low Carbon Fuel Standard: reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020
  - Governor's Executive Order S-06-06**:** instate production of biofuels - 20% by 2010, 40% by 2020, 75% by 2050
- Availability of feedstock and capturing methane for its full potential
  - Wastewater, food waste, dairy, biomass = potential 16% of CA daily natural gas consumption

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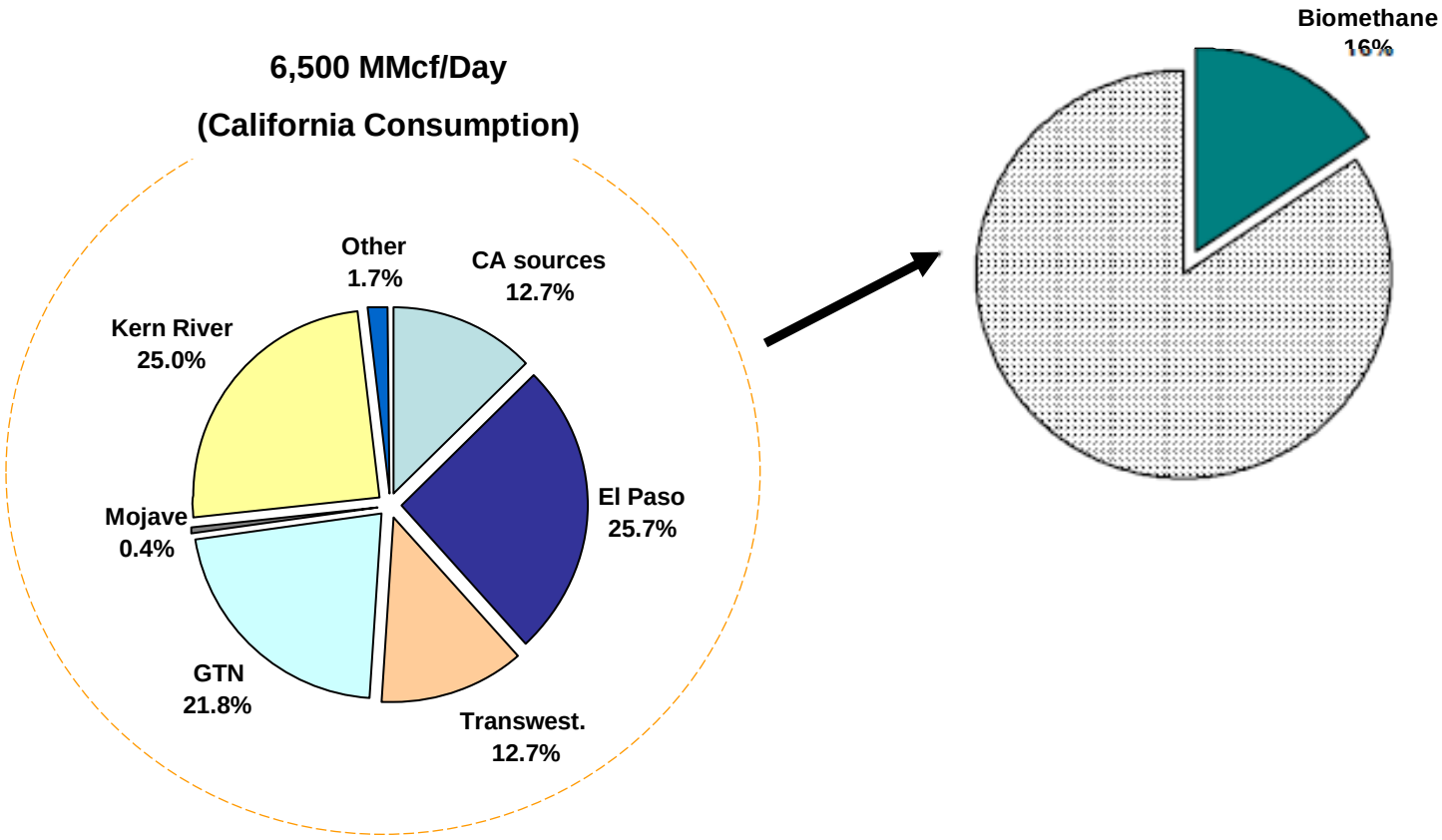
The Resource Potential is Significant



Source: California Bioenergy Working Group

Sempra Energy Utilities Involvement with Existing Biogas Projects and Initiatives

- Sempra Utilities have contributed to several different biogas projects
  - Gills Onions: Onion waste to biogas for SGIP qualified fuel cells - Not interconnected
  - Enertech – Biosludge from wastewater plants is moved through a centrifuge to create biopellets for rotary kilns at a cement company - Not interconnected
  - Escondido – RD&D Project to validate SoCalGas testing methods and prove viability of conditioning technology - Interconnect under consideration
  - Point Loma WWTF - Plans to condition raw biogas for pipeline injection – SDG&E involved with the Interconnection process
- Pipeline biomethane injection readiness
  - Rule 30 Biogas Guidance Document released September 2009
    http://www.socalgas.com/documents/business/Rule30_BiomethaneGuidance.pdf
  - Participating in Gas Technology Institute (GTI) studies - dairy biogas, landfill gas

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The Challenges of Pipeline Quality Biomethane

- Current Situation in California
  - Biomethane is not currently being injected locally ‘yet’
  - Permitting challenges
  - Perceived Technology Risk
    - SoCalGas Rule 30 and PG&E Rule 21 gas quality specifications
    - Limited demonstration projects for the financial community
- Economic range for biogas conditioning is approximately 1,000 standard cubic feet per minute (scfm) or greater of raw biogas
  - Small to medium scale biogas production facilities are not economical
  - Uneven biogas incentives

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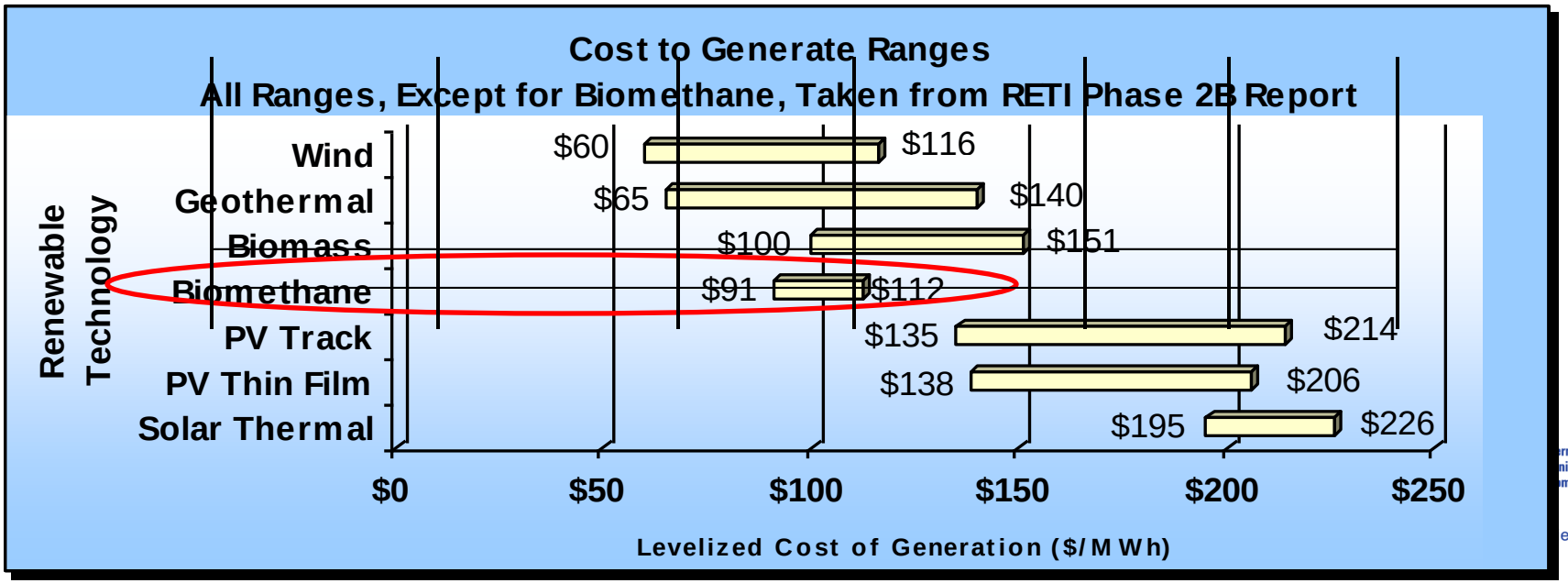
Renewable Technology "Cost to Generate" Comparison

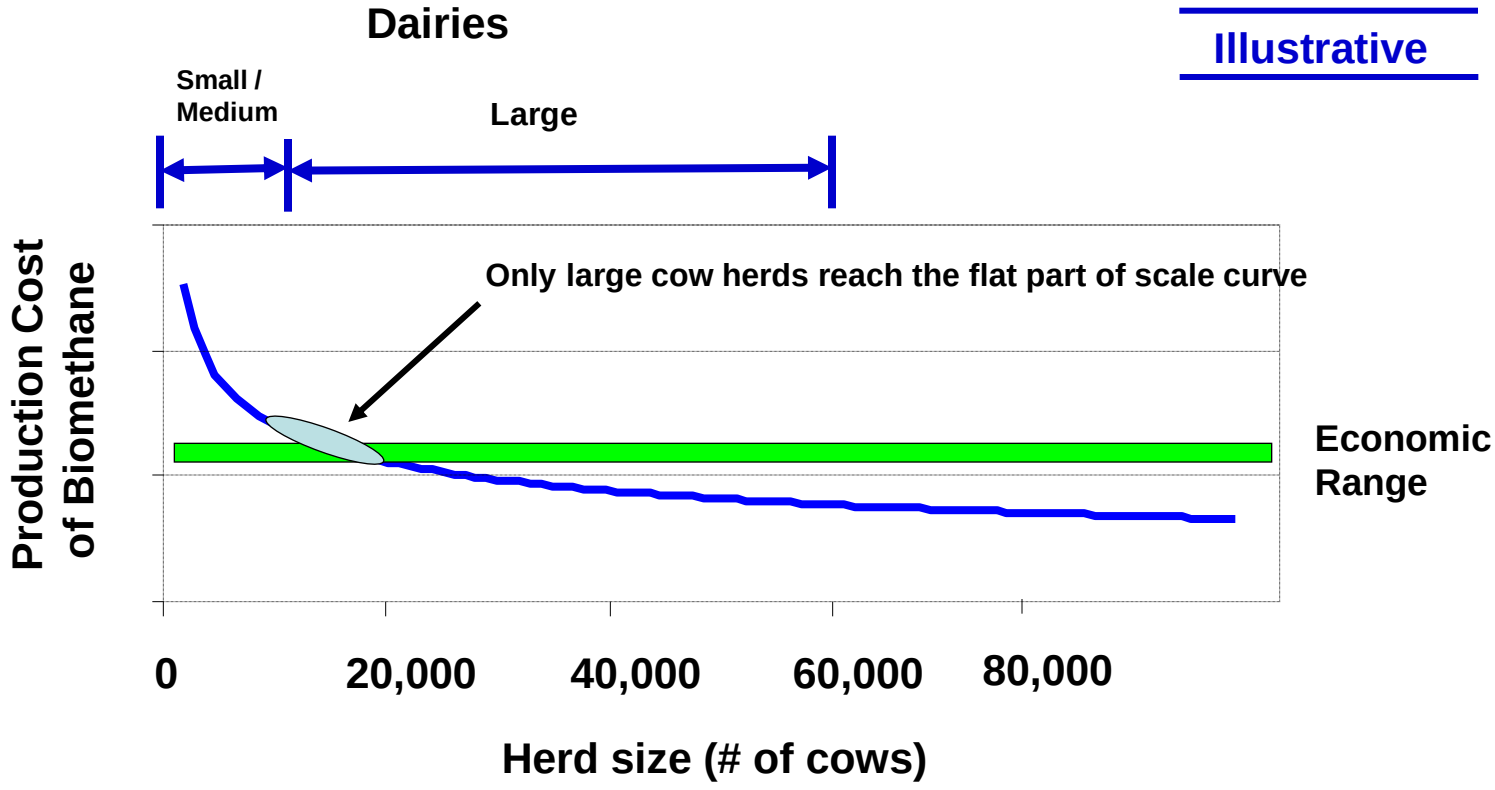
	(a)	(b)	(c)	(d)	(e)	(f)	
	Conditioned Biogas* ($/MMBtu)	Transportation ($/MMBtu)	Total Fuel Cost ($/MMBtu) (a) + (b)	Total Fuel Cost ($/MWh) [(c) x (g)]/1,000	CCPP Variable O&M ($/MWh)	CCPP Fixed Costs ($/MWh)	Cost to Generate RPS Energy ($/MWh) (d)+(e)+(f)
Biomethane - High	$ 12.0	$ 0.27	$ 12.27	$ 85.0	$ 6.54	$ 20.49	$ 112
Biomethane - Low	$ 9.0	$ 0.27	$ 9.27	$ 64.2	$ 6.54	$ 20.49	$ 91

*Conditioned Biogas ($/MMBtu): Estimated market price of biomethane at the point of injection

Combined Cycle Power Production (CCPP) Assumptions			
Heat Rate (g)	6,924	Btu/kWh	From 2009 MPR Model: Average CCPP Heat Rate over life of plant
Variable O&M	6.543	$/MWh	From 2009 MPR Model: 2010 average of variable cost component
Fixed Costs	20.49	$/MWh	From 2009 MPR Model: 2010 average of fixed cost component
Transportation Cost	0.27	$/MMBtu	~ SCG transportation rate for electric generation



Biogas Conditioning Economics: Dairy Biogas Upgrading to Pipeline Quality



- **Scale economies: 850 dairies in SoCalGas/SDG&E territory, 5 dairies in SoCalGas territory 8,000+ cows**
- **Availability and cost of capital**
- **Availability of monetized GHG credits**
- **Clustering and rights-of-way**

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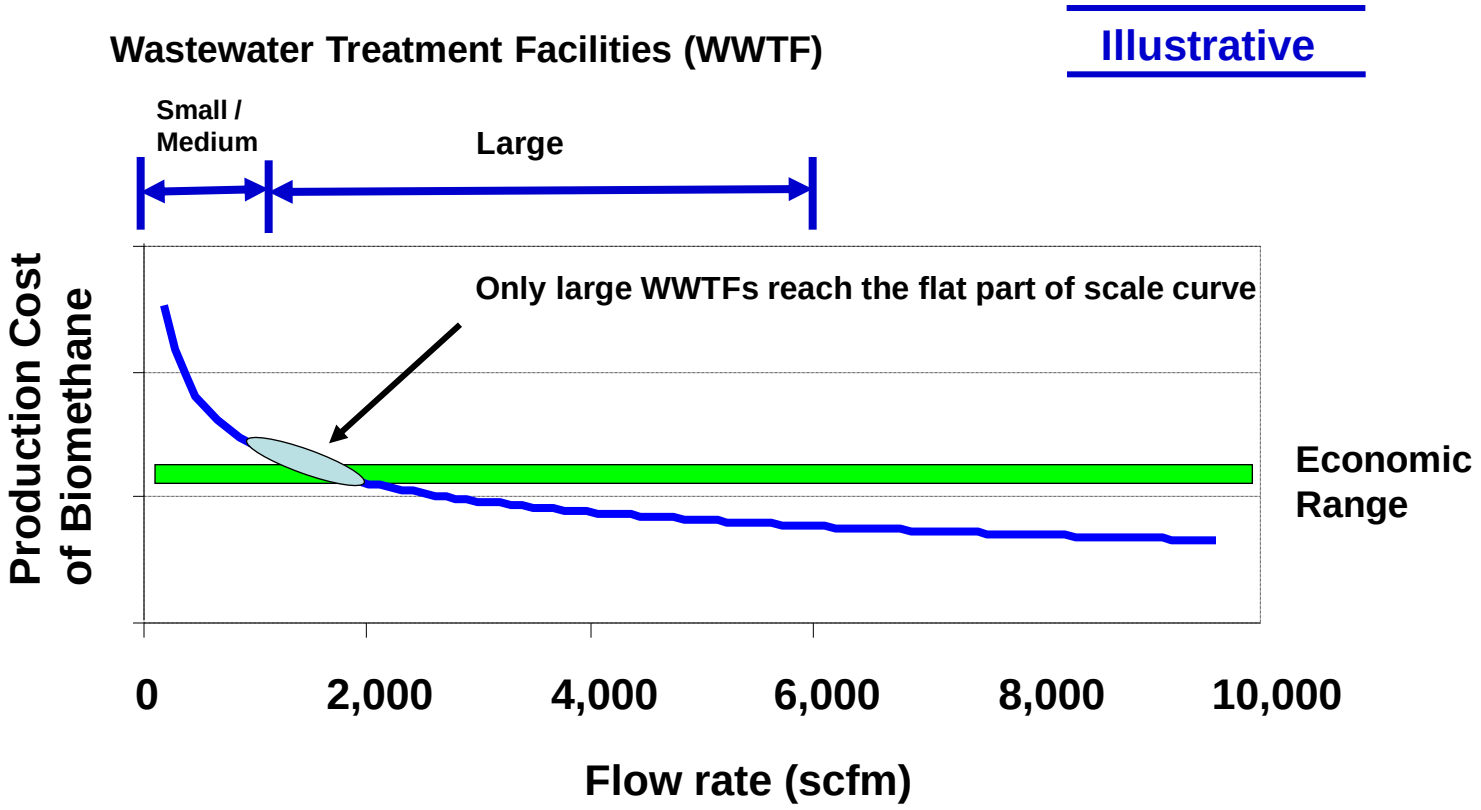
Biogas Conditioning Economics: WWTF Biogas Upgrading to Pipeline Quality



- Scale economies: 4 large WWTFs (1,100+ scfm), 3 (500-1,000 scfm), 9 (300-499 scfm), 5 WWTFs (200-299 scfm), 19 (100-199 scfm) in SoCalGas/SDG&E territory
- Small WWTFs: more economic to flare than capture methane.
- Availability and cost of capital
- Availability of monetized GHG credits

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Biogas Conditioning
PSA Example

- Commercially proven equipment for oil field applications and a few biogas installations
- Modular
- Need reference installations in California

Product Compression
(if required)

Feed
Compression

Pressure Swing Adsorption
(PSA) Unit

Tail Gas To Flare

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Our Focus is Pipeline Biomethane – Renewable, Dispatchable, Leverages Infrastructure

- Renewable
- Interchangeable, storable, and dispatchable
- Maximizes existing infrastructure
  - Gas pipelines
  - Gas storage fields
  - Electric power plants
  - Existing digestion infrastructure
  - Requires new conditioning – relatively small footprint
- Requires less new infrastructure than other renewables

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Sempra Energy Utilities Proposed Biogas Programs/Services

- Advice Letter filing (11/22/10) with the CPUC seeking authority to offer two biogas services*
  1) Biogas Conditioning Services – SoCalGas to design, install, own, operate and maintain biogas conditioning equipment
  2) Bioenergy Production Facilities Services – SoCalGas to design, install, own, operate and maintain facilities and equipment required to produce biogas
  - For both proposed services:
    - SoCalGas will charge the customer a negotiated fee for the service(s) under a long-term contract
    - Customer owns the organic waste, raw biogas and/or conditioned biomethane

- 2012 SoCalGas General Rate Case (GRC) Proposal*
  - $22.4 million to install four biogas conditioning systems ($5.6M each)
  - Targeting small to mid size WWTF's (200 to 600 scfm)
  - Biomethane used for SoCalGas facility and fleet vehicle use
  - Biomethane used in place of natural gas will result in avoided costs for GHG credits
  - Where production cost is greater than levelized natural gas forecast between 2012-2026, seeking ratepayer subsidy as with other subsidized renewable resources

* Requires CPUC Approval

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Thank You

Ron Goodman

Manager of BioFuels Market Development

rgoodman@semprautilities.com

213.244.5814