

Interconnecting to the SoCalGas Pipeline

Subgroup #2: Fostering Markets for Digester Projects

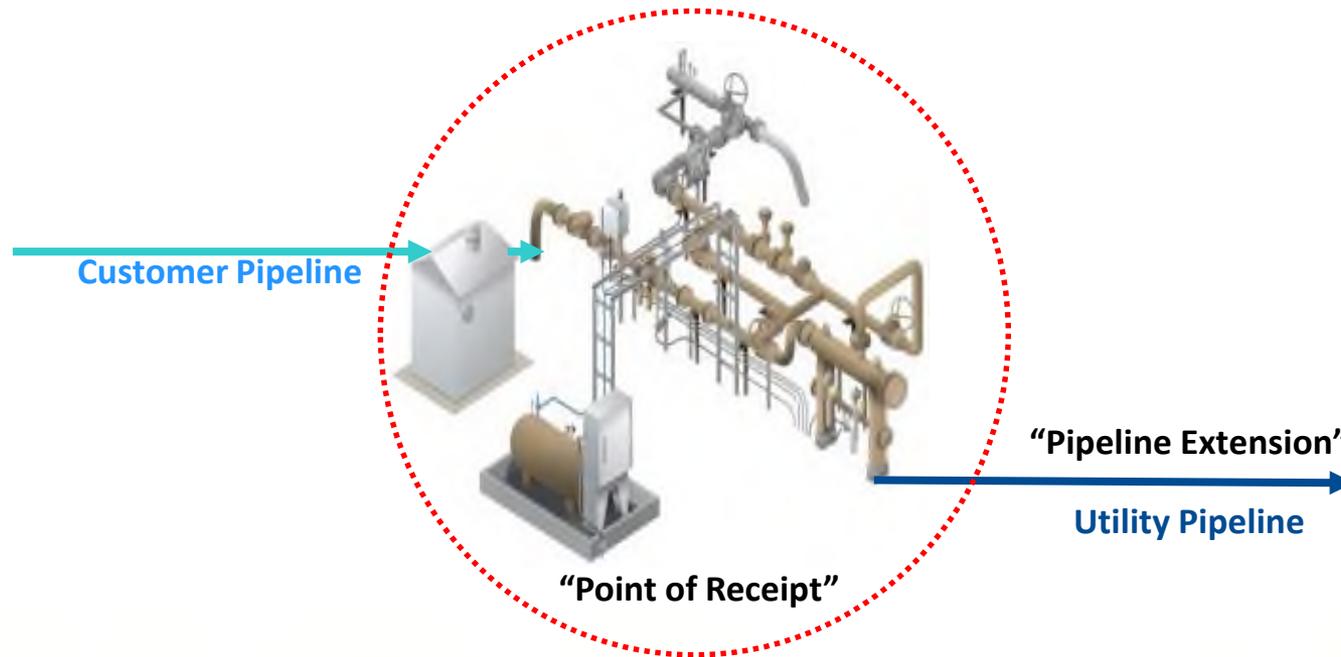
08/10/2017



A  Sempra Energy utility

Interconnection: Overview of Components and Costs

Two Primary Components of the Term “Interconnection”



“Interconnection” = “Point of Receipt” + “Pipeline Extension”

What is the “Point of Receipt” Component of the Interconnection?



Primary Function of Point of Receipt

1. **Monitor gas quality** to ensure it meets SoCalGas Rule 30 Gas Quality Specifications (e.g. CO₂, O₂, total inerts, heating value, H₂S)
2. **Prevent non-compliant gas** from entering the utility pipeline network should the monitored Rule 30 parameters not be met
3. **Meter and odorize** the volume of RNG put into the utility pipeline network

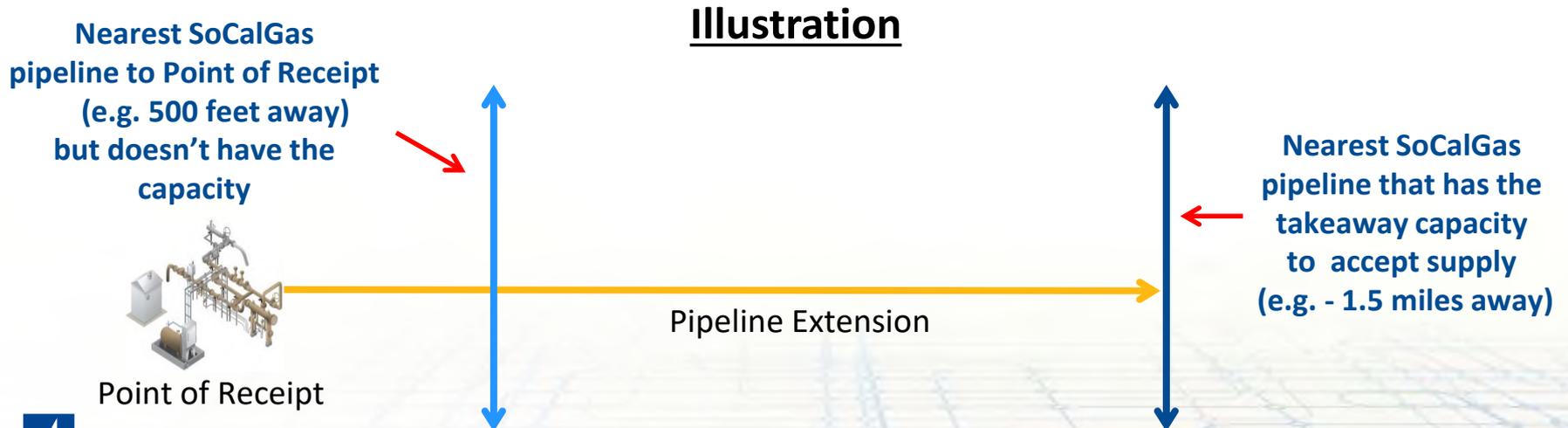
Estimated Cost for Point of Receipt

- Estimated at ~\$1.1 to 1.7 million (for delivery volumes ranging from 1 MMscfd to 10 MMscfd)*

- Point of Receipt cost includes 22% Income Tax Component of Contributions and Advances (ITCCA). ITCCA Increases to 24% in 2018, 27% in 2019 and 35% starting in 2020 - pursuant to the Protecting Americans from Tax Hikes Act of 2015

What is the “Pipeline Extension” Component of the Interconnection?

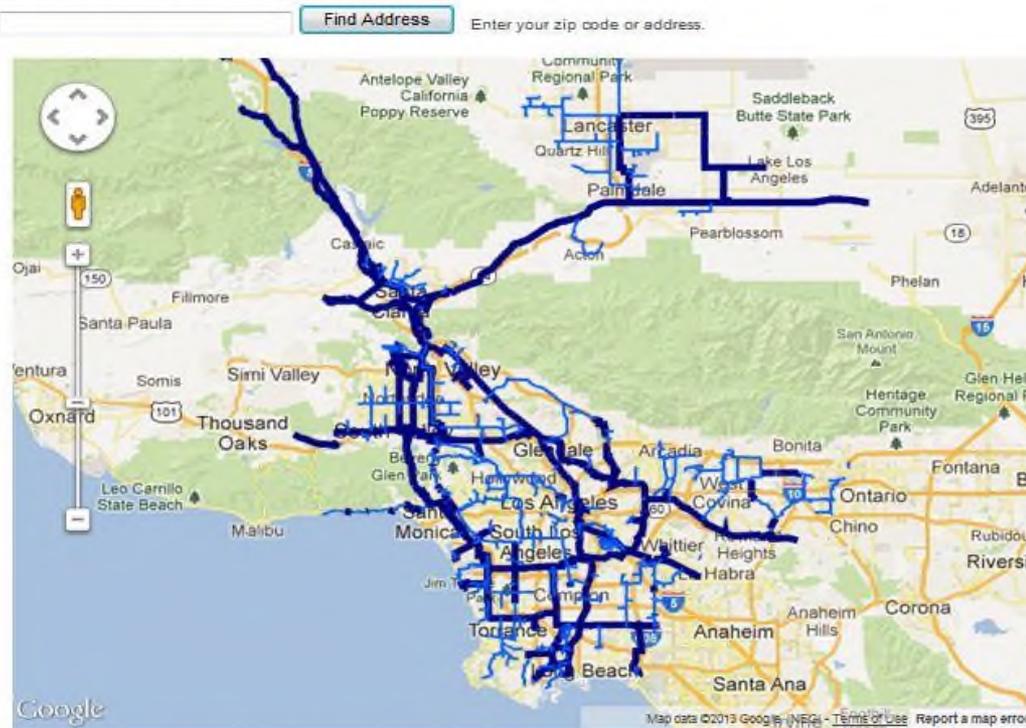
- » **Pipeline extension** is the pipe installed from the outlet of the Point of Receipt to the nearest utility pipeline having the capacity to accept the interconnector volume of RNG
- » Majority of the pipelines in streets are **distribution lines with limited takeaway capability to accept interconnector gas** during summer months (particularly in the early a.m. hours)
 - May result in high pipeline extension costs because the nearest pipeline having the capacity is miles away



Five Step Approach to Interconnecting to the SoCalGas Pipeline System

Step 1: High Level Utility Pipeline Assessment

Gas Transmission and High Pressure Distribution Pipeline Interactive Map - LA



- SoCalGas has an interactive webpage where the user can type in an address and it will show the nearest high pressure pipeline(s). **The map does not show all high-pressure pipelines.**

<http://www.socalgas.com/safety/pipeline-maps/>

- There is also a “National Pipeline Mapping System” that shows high pressure pipelines across the United States

<https://www.npms.phmsa.dot.gov/>

- Contact the SoCalGas Market Development Team

Email: jlucas@semprautilities.com

Reminder: Existence of a gas line does not mean it has the necessary capacity!

Step 2: SoCalGas Rule 39 Interconnection “Capacity Study” (Funded by Interconnector)

Interconnection Capacity Study - determines SoCalGas’ takeaway capability to accept interconnector gas (and estimated cost to expand if necessary)

Keep in mind:

- Detail is important (e.g. – precise project location, volumes are critical)
- Adjacent line to project doesn’t guarantee injection acceptance
- It is **very costly** to install pipelines in the public right of way



Biogas Producer

Location = X

Biomethane Volume = Y

Pipeline Extension

The Capacity Study provides:

- 1) approximate pipeline extension length and very high level cost to install
- 2) location of the pipeline having take away capacity

Nearest SoCalGas pipeline that has the takeaway capacity to accept supply

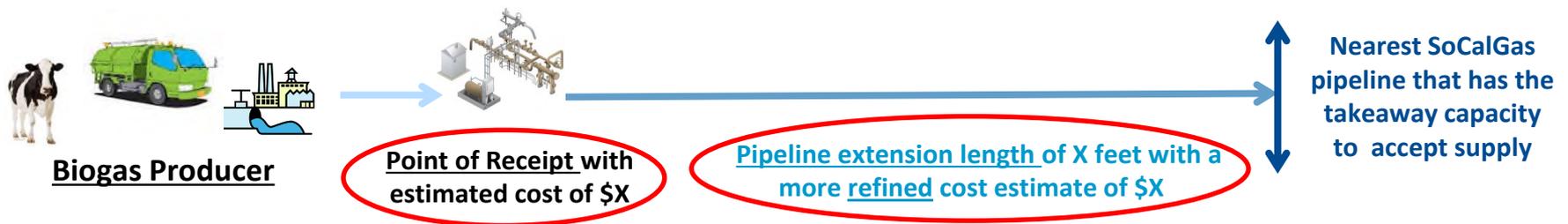
Based on the high level results of Capacity Study, is it economically viable to inject RNG into the utility pipeline?

Go

Stop

Steps 3 & 4: SoCalGas Rule 39 Interconnection “Engineering Studies” (Funded by Interconnector)

Step 3: Preliminary Engineering Study (PES) - more detailed study which includes cost estimate for Gas Quality Monitoring and Measurement Facilities (Point of Receipt)



Based on the results of Step 3, is it economically viable to inject RNG into the utility pipeline?

Go

Stop

Step 4: Detailed Engineering Study (DES) - describes all costs of construction, develop complete engineering construction drawings, and prepare all permit applications

Step 5: SoCalGas Interconnection Authorization, Funding and Construction

- **Authorization and Funding of interconnection work**
- **CPUC Biomethane Monetary Incentive**
 - Interconnector to work with utility and follow program guidelines
- **Construction and Reconciliation of Cost**
 - Interconnector is responsible for 100% of actual costs

A Few Keys to Ensure a Smooth Process

- Involve SoCalGas as early as possible, generally at least 18-24 months in advance of desired in service date
- Recommend reviewing various Rule 39 Agreements (available on socalgas.com) early on in the process
- Be ready to fund invoices for various Rule 39 Agreements

Biomethane Interconnection Incentive

Statewide Program Cap of \$40 million, Ending on 12/31/21

Interconnection project with 3 or more dairies in close proximity

Incentive of 50% of eligible costs with

\$5 Million Cap

Eligible costs include

Biogas collection lines

Compression equipment for product gas

Utility Point of Receipt

Utility Pipeline Extension

All other interconnection projects (e.g. landfill, wastewater, landfill diverted organics, 1-2 dairies)

Incentive of 50% of eligible costs with

\$3 Million Cap

Eligible costs include

Compression equipment for product gas

Utility Point of Receipt

Utility Pipeline Extension

RNG Toolkit

(Available at socialgas.com/rg)



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BIOGAS CONDITIONING/UPGRADING SERVICES TARIFF

The Biogas Conditioning/Upgrading Services Tariff is a fully elective, optional, nondiscriminatory tariff service for customers that allows SoCalGas to plan, design, procure, construct, own, operate, and maintain biogas conditioning and upgrading equipment on customer premises. The biogas will be conditioned/upgraded to the gas quality specifications as requested by the customer and agreed to by SoCalGas.

KEY ELEMENTS

- The Biogas Conditioning/Upgrading Services Tariff is a fully compensatory service paid by participating customers. Monthly tariff services arising will vary based on the size, scope and location of each project.
- The Biogas Conditioning/Upgrading Services Tariff will be provided through a long-term Service Agreement, typically 10 to 15 years. At the end of the contract term, customer may request to extend the term of the agreement or ask SoCalGas to remove the equipment.
- The tariff service is neither tied to any other tariff or non-tariff services that the customer may receive from SoCalGas nor will it change the manner in which these services are delivered.

Non-utility service providers may offer services that are the same or similar to the Biogas Conditioning/Upgrading Services Tariff and customers are encouraged to explore these options.

To learn more, visit socialgas.com/rg.

FREQUENTLY ASKED QUESTIONS
What are the benefits of RNG?
How is RNG produced?
What are the challenges of RNG?

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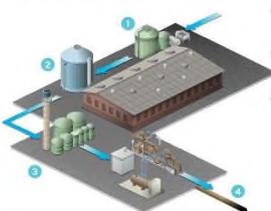
RENEWABLE NATURAL GAS PART OF CALIFORNIA'S RENEWABLE ENERGY FUTURE

WHAT IS RENEWABLE NATURAL GAS?

Traditionally, pipeline natural gas comes from deep underground wells and is often associated with petroleum production. On the other hand, renewable natural gas (RNG) is natural gas derived from organic waste material found on the surface of the earth. In California, and throughout the United States, there are a variety of sources of this organic waste, which we see in daily life. These include food waste, garden and lawn clippings, animal and plant-based material as well as degradable carbon sources such as paper, cardboard and wood. The abundance of this material can allow for production of biogas in significant quantities.

The most common source of biogas is the naturally-occurring biological breakdown of organic waste at facilities such as wastewater treatment plants and landfills. Biogas typically consists of methane and carbon dioxide, with traces of other elements. Biogas is cleaned and conditioned to remove or reduce non-methane elements in order to produce RNG. The converted RNG is then put into the utility pipeline as a replacement for traditional natural gas. This process helps promote the safe and reliable operation of the natural gas pipeline distribution network as well as the natural gas equipment and appliances used by customers.

HOW ORGANIC WASTE IS CONVERTED INTO RNG



- Waste products, such as sludge, food waste or manure are processed in a biogas digester.
- The biogas digester breaks down the organic material to create biogas – a mixture of methane and other elements.
- The biogas can then be processed and conditioned leaving behind RNG, which can be used interchangeably with traditional natural gas.
- This RNG can be used where it is produced for things like generating electricity or fueling vehicles, or it can be injected into a utility pipeline for transportation to other customers.



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BIOGAS SUPPLIER LIST

NORTH AMERICA

UNITED STATES

Aerian Technologies www.aeriantech.com	7777 Exchange Street, Suite 5 Cleveland, OH 44124	314-669-2642
Aspen Energy www.aspenenergy.com	8413 Excelsior Drive, Suite 160 Madison, WI 53711	
Baygas www.baygas.com/company/	30 Lakewood Circle N Greenwich, CT 06830	
Baygas www.baygas.com/company/	4675 MacArthur Court, Suite 80 Newport Beach, CA 92660	
CalGas www.calgas.com	5070 N. 35th Street Milwaukee, WI 53209	
Energy Partners www.energypartners.com	4940 Campus Drive, Suite C Newport Beach, CA 92660	
IBiogas www.ibiogas.com/	PO Box 4120, Suite 5888B Portland, OR 97208	
Midwest www.midwest.com	1215 S Eads Street Arlington, VA 22202	
Northwest www.northwest.com	150 East Dartmore Drive Crystal Lake, IL 60014	



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RENEWABLE NATURAL GAS (RNG) GAS QUALITY STANDARDS

THE SOCIALGAS® GAS QUALITY STANDARDS

SoCalGas® Rule 30 describes the requirements for gas to be injected into the utility pipeline. These requirements reflect the first and foremost priority of SoCalGas to protect its customers, employees, and pipeline system. The standards cover two major aspects: gas constituent limits (composition-based specifications) and gas interchangeability specifications (performance-based quality specifications). Gas constituent limits restrict the

performance, ensuring safe and proper combustion for customers.

SoCalGas Rule 30, Section 1.5, provides interconnectors with the option to request specific deviations from meeting the delivery gas quality specifications in Section 1.3. If SoCalGas determines such gas will not negatively impact system operations, SoCalGas is then required to file an Advice Letter for California Public Utilities Commission (CPUC) approval before the gas is permitted to flow into the utility pipeline system.

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RENEWABLE NATURAL GAS TOOL KIT



CPUC Information Interchange

CONSTITUENTS

Hydrogen Sulfide	99%
Methane	99%
Carbon Dioxide	96%
Water Vapor	97%
Other Gases	100%
Other Elements	96%
Other Compounds	95%
Other Solids	99%

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CPUC Information Interchange



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RENEWABLE NATURAL GAS INTERCONNECTION PROCESS

garies and wastewater treatment plants. This raw biogas is made up of mainly methane and carbon dioxide, with traces of other elements such as water, hydrogen sulfide, siloxanes, nitrogen, and oxygen. Prior to injection into the pipeline, biogas must be conditioned and upgraded to remove or reduce non-methane elements to promote the safe and reliable operation of the pipeline network and end-use natural gas equipment.

BIOGAS PROCESSING TECHNOLOGIES

There are several methods and technologies available to condition biogas. Technology selection can be based on many criteria, including biogas and product gas makeup and site and operating conditions. Some examples of technologies used in biogas conditioning:

- High-selectivity membranes
- Pressure swing adsorption systems
- Water scrubbing systems
- Solid scavenging media
- Regenerative or non-regenerative adsorbent media
- Catalytic O₂ removal

It is common to find a combination of these technologies working in conjunction to meet a set of specification.

BIOMETHANE INJECTION PROCESS

SoCalGas Rule No. 39, "Access to the SoCalGas Pipeline System," provides detailed information on the requirements to interconnect and inject natural gas into utility pipelines. The section below describes the three basic steps of the interconnection process.



Thank You

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