

Application: A.23-06-XXX
Witness: James Lucas
Chapter: 2

**PREPARED DIRECT TESTIMONY OF JAMES LUCAS
ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY
(SELECTION OF PILOT PROJECT)**

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

June 30, 2023

TABLE OF CONTENTS

I. PURPOSE 1

II. BACKGROUND 2

III. OVERVIEW OF SB 1440 PILOT PROJECT SOLICITATION 3

 A. Background - SB 1383 Pilot Projects 3

 B. SB 1440 Pilot Project Qualifications 5

 C. Eligible SB 1440 Pilot Project Costs 7

 i. Background..... 7

 ii. SB 1440 Pipeline Infrastructure Eligible Costs 8

 D. SB 1440 Solicitation Timelines and Selection Criteria 10

 i. Timeline 10

 ii. Selection Process and Criteria 10

IV. OVERVIEW OF SELECTED SB 1440 PILOT PROJECT 11

 A. Overview..... 11

 B. Technology and Scalability..... 12

 C. Products from the Gasification Process 13

 D. Permitting..... 14

 E. Benefits 15

 i. Ratepayer and Environmental Benefits 15

 ii. Community Benefits 17

 F. Timeline 17

 G. SB 1440 Pipeline Infrastructure Costs..... 17

 i. SB 1440 Applicant-Owned Pipeline Infrastructure 18

 H. SB 1440 Pilot Project Agreements 18

V. PROGRAM REPORTING 19

VI. CONCLUSION..... 19

VII. QUALIFICATIONS 20

VIII. APPENDIX A: KEY TERMS AND DEFINITIONS..... A-1

1
2
3
4
**PREPARED DIRECT TESTIMONY OF
JAMES LUCAS
CHAPTER 2
(SELECTION OF PILOT PROJECT)**

5 **I. PURPOSE**

6 The purpose of my prepared direct testimony on behalf of Southern California Gas
7 Company (“SoCalGas”) is to provide the background and describe the process used to select one
8 Senate Bill (“SB”) 1440 gasification pilot project (“SB 1440 Pilot Project”) that intends to
9 interconnect to a SoCalGas pipeline. My testimony will provide an overview of the: (1) SB 1440
10 Pilot Project solicitation (“SB 1440 Solicitation”), and (2) SB 1440 Pilot Project’s (i) review and
11 selection process, (ii) anticipated benefits, (iii) ratepayer costs, and (iv) reporting requirements.
12 My testimony will also discuss the foundational building blocks used to develop the
13 requirements of the SB 1440 Solicitation, the use of an independent third party to assist with the
14 assessment and selection of the SB 1440 Pilot Project, and an overview of the selected SB 1440
15 Pilot Project. Such overview includes a project description, the estimated ratepayer and
16 environmental benefits, community benefits, timelines, and interconnection costs.

17 The purpose of the SB 1440 Pilot Project is to demonstrate the production of bio-
18 synthetic natural gas (“Bio-SNG”)^{1,2} from agricultural waste using gasification and methanation,
19 and its injection into the SoCalGas pipeline system. Through its application to the California
20 Public Utilities Commission (“Commission”) (“Application”), SoCalGas is proposing one
21 SB 1440 Pilot Project that appears financially sustainable in the long-term. SoCalGas recognizes
22 gasification projects involve nascent technology and will collaborate with the applicant of the
23 selected SB 1440 Pilot Project to support these investments with the goal of providing the
24 expected environmental benefits to ratepayers and California.

¹ D.22-02-025 at 2, fn. 1: “Bio-SNG derives from non-combustion thermal conversion, such as pyrolysis and gasification, of exclusively organic material. The feedstocks generally consist of woody biomass, such as forest waste, agricultural waste, and urban wood waste. Bio-SNG is defined in the R.13-02-008 Phase 4A Staff Proposal as follows: ‘A mixture composed primarily of methane, carbon dioxide, and water produced by chemical conversion (catalytic methanation) of purified and conditioned renewable syngas. Also contains low concentrations of carbon monoxide, hydrogen, and other minor constituents.’”

² For purposes of this Testimony, Bio-SNG and biomethane are considered the same.

1 **II. BACKGROUND**

2 On February 25, 2022, the Commission issued Decision (D.) 22-02-025³ establishing,
3 amongst other things, a framework directing SoCalGas and Pacific Gas and Electric Company
4 (“PG&E”) to submit an Application to the Commission by July 1, 2023 for at least one woody
5 biomass gasification/pyrolysis pilot project that should include procurement of Bio-SNG from
6 agricultural, forest, and/or urban wood waste using methanation, as determined by each utility.

7 D.22-02-025 also directs SoCalGas to collectively set aside \$19.704 million from its
8 2022 Cap-and-Trade Program allowance auction proceeds to support the costs of connecting one
9 or more gasification/pyrolysis SB 1440 Pilot Projects to the SoCalGas pipeline system.⁴ San
10 Diego Gas & Electric Company (“SDG&E”) and/or Southwest Gas Corporation (“SWG”), as
11 wholesale customers of SoCalGas, may direct their respective share of allowance proceeds
12 collected pursuant to D.22-02-025 to offset SB 1440 Pilot Project costs in SoCalGas’s service
13 territory, if SDG&E or SWG procure a portion of the biomethane produced from that project.⁵

14 On March 14, 2023, SoCalGas issued the SB 1440 Solicitation for at least one SB 1440
15 Pilot Project to connect to the SoCalGas pipeline system and provide Bio-SNG to SoCalGas for
16 use in accordance with the requirements of SB 1440 and D.22-02-025. The purpose of the SB
17 1440 Solicitation is to select at least one SB 1440 Pilot Project that appears technically sound
18 and financially sustainable in the long-term.

19 By its Application, SoCalGas proposes to connect a gasification project⁶ to its pipeline
20 system that will, among other things, (1) demonstrate the use of woody biomass to produce Bio-
21 SNG, (2) have the potential to utilize carbon dioxide (“CO₂”) in carbon capture, utilization, or
22 storage (“CCUS”) projects rather than venting to the atmosphere,⁷ (3) utilize up to \$19.704
23 million in Cap-and-Trade funding to support the SB 1440 Pilot Project to connect to the
24 SoCalGas pipeline system, and (4) provide significant emission reductions to the local
25 community and California.

³ Available at <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M454/K335/454335009.PDF>.

⁴ D.22-02-025, Ordering Paragraphs (“OP”) 43, 44 at 67-69.

⁵ *Id.*, OP 47 at 70.

⁶ At the time of this filing, there are no gasification or pyrolysis projects producing Bio-SNG and connected to the SoCalGas pipeline system.

⁷ See D.22-02-025 at 46.

1 **III. OVERVIEW OF SB 1440 PILOT PROJECT SOLICITATION**

2 On December 18, 2017, the Commission issued D.17-12-004 (“SB 1383 Decision”)⁸
3 which established the necessary framework to direct SoCalGas and PG&E to implement dairy
4 biomethane pilot projects (“SB 1383 Pilot Projects”). SoCalGas utilized this framework to
5 successfully connect four dairy pilot projects to the SoCalGas pipeline system between 2021 and
6 2022. Given the Commission-approved framework and process worked very well for the SB
7 1383 Pilot Projects, SoCalGas is utilizing a similar framework and process for the assessment
8 and selection of at least one SB 1440 Pilot Project.

9 **A. Background - SB 1383 Pilot Projects**

10 On September 19, 2016, Governor Brown signed SB 1383 into law. The bill requires the
11 California Air Resources Board (“CARB”) to approve and begin implementing a comprehensive
12 strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane
13 by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013
14 levels by 2030. One of the requirements of SB 1383 requires the Commission, in consultation
15 with CARB and the California Department of Food and Agriculture (“CDFA”), to direct utilities
16 to implement no less than five dairy biomethane pilot projects to demonstrate interconnection to
17 the common carrier pipeline system. SB 1383 also allows the utilities to seek cost recovery of
18 the reasonable cost of pipeline infrastructure developed pursuant to the pilot projects.⁹

19 The SB 1383 Decision approved the investor-owned utilities (“IOUs”) to recover in rates
20 the cost of pipeline infrastructure (“SB 1383 Pipeline Infrastructure”) for no less than five
21 statewide SB 1383 Pilot Projects. The SB 1383 Decision defines SB 1383 Pipeline
22 Infrastructure as follows (Figure 1):¹⁰

- 23 • Biogas collection lines and facilities for treatment, monitoring, metering, and
24 compression of biogas before it enters the collection lines (lane 2);
- 25 • The pipeline (“Pipeline Lateral”) and compression that delivers biomethane from a
26 biogas conditioning facility to the point of receipt (lane 4);
- 27 • Point of receipt, where the utility receives gas that has been upgraded at a
28 conditioning facility (lane 5); and

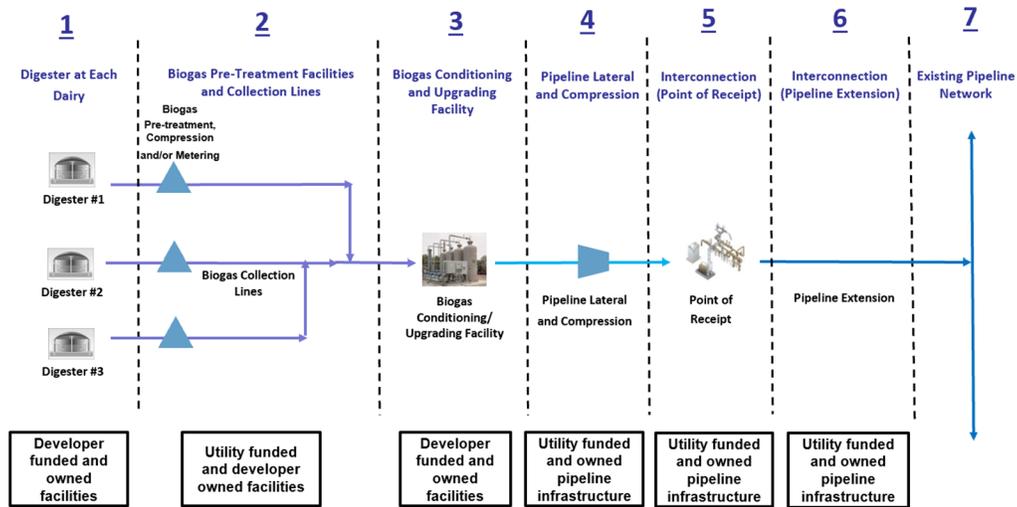
⁸ <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M201/K352/201352373.PDF>.

⁹ https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383.

¹⁰ SB 1383 Decision, Appendix A Dairy Biomethane Pilot Implementation Framework at 1.

- Pipeline extension that delivers biomethane from point of receipt to the utility's existing gas pipeline system (lane 6).

Figure 1



The SB 1383 Decision further created a committee comprised of the Commission as the lead agency, in consultation with the CARB and CDFA (“Selection Committee”), charged with issuing the final SB 1383 Dairy Pilot Solicitation (“SB 1383 Solicitation”).¹¹ On March 7, 2018, the Selection Committee issued the SB 1383 Solicitation,¹² and on December 3, 2018, it selected six SB 1383 Pilot Projects¹³, using the scoring criteria set forth in Table 1:

Table 1 (SB 1383 Pilot Project Scoring Criteria)¹⁴

Scoring Criteria	Maximum Points
Dairy Waste-to-Biomethane Business Model <ul style="list-style-type: none"> • Dairy Operation • Technology Plan • Marketing Plan • Scalability 	20
Financial Plan/Soundness	15
Greenhouse Gas Reduction and Cost Effectiveness	25
Environmental Benefits	15
Disadvantaged Communities	10
Project Readiness and Implementation	15

¹¹ D.17-12-004, Appendix A at 4.

¹² https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_website/content/utilities_and_industries/energy/energy_programs/gas/natural_gas_market/dairypilotssolicitation.pdf.

¹³ <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M246/K748/246748640.PDF>.

¹⁴ Solicitation for SB 1383 Dairy Pilot Projects at E-14; available at <https://www.cpuc.ca.gov/>

1 SoCalGas used the SB 1383 Solicitation as a general guide for preparing the SB 1440
2 Solicitation, including making modifications based on the different feedstocks used to produce
3 Bio-SNG. D.22-02-025 has several specific requirements for the SB 1440 Pilot Projects, and
4 these were included in the SB 1440 Solicitation.

5 **B. SB 1440 Pilot Project Qualifications**

6 To develop the SB 1440 Pilot Project minimum qualifications, SoCalGas utilized the
7 requirements as stated in D.22-02-025 and several of the minimum (or slightly modified)
8 qualifications used in the SB 1383 Solicitation. Respondents to the SB 1440 Solicitation
9 (“Applicants”) were required to demonstrate their project proposal complies with the following:

- 10 1) The SB 1440 Pilot Project must result in permanent, annual, and quantifiable
11 Greenhouse Gas (“GHG”) emission reductions and criteria air pollutant emission
12 reductions. Applicant proposals must quantify expected GHG emissions reductions
13 resulting from the SB 1440 Pilot Project. The SB 1440 Pilot Project must also study
14 and report fugitive methane, pollutant, and particulate matter emissions and emissions
15 reduction or elimination methods in the gasification or pyrolysis project process, the
16 methanation process, and pipeline facilities.¹⁵
- 17 2) The SB 1440 Pilot Project must utilize forest, agricultural, and/or urban wood waste
18 biomass to convert to biomethane through pyrolysis and/or gasification processes
19 using methanation and inject into the SoCalGas pipeline.¹⁶
- 20 3) Applicants must submit a safety action plan for the SB 1440 Pilot Project with initial
21 processes and procedures drafted that indicate potential hazards and preliminary
22 processes and procedures delineated to respond to each.¹⁷
- 23 4) Applicants must demonstrate compliance with California Environmental Quality Act
24 (“CEQA”) and any permit requirements.¹⁸
- 25 5) Applicants must provide one or more written commitments from woody biomass
26 feedstock producers in the form of feedstock supply agreements or preliminary

[/media/cpuc-
website/files/uploadedfiles/cpuc_website/content/utilities_and_industries/energy/energy_programs/ga
s/natural_gas_market/dairypilotssolicitation.pdf.](#)

15 D.22-02-025, OP 43 at 68.

16 *Id.*, OP 43 at 67

17 *See* Solicitation for SB 1383 Dairy Pilot Projects at E-6.

18 *Id.* at E-7.

- 1 agreements, such as a letter of intent or memorandum of understanding, for feedstock
2 necessary to supply the requirements of the SB 1440 Pilot Project.¹⁹
- 3 6) Applicants must use the quantification methodology utilizing the Greenhouse gases,
4 Regulated Emissions, and Energy use in Technologies (“GREET”) model.²⁰
- 5 7) The biomethane produced by the SB 1440 Pilot Project should be consumed in
6 California.²¹
- 7 8) Applicants must agree to report specific parameters and participate in evaluations.²²
- 8 9) The SB 1440 Pilot Project must comply with additionality, verifiability, certification,
9 compliance with Public Utilities Code § 651(b)(3), environmental assessment, and
10 social justice impacts.
- 11 10) The SB 1440 Pilot Project must agree to sell at least a portion of the biomethane from
12 forest, agricultural, and/or urban wood waste feedstocks utilizing pyrolysis and/or
13 gasification using methanation to SoCalGas.²³
- 14 11) The SB 1440 Pilot Project should test technologies that are capable of expansion and
15 that have significant potential to increase biomethane production in the long term.²⁴
- 16 12) Applicants must contractually agree that any Class 8 trucks purchased or leased for
17 use in the production of biomethane after February 25, 2022 (the D.22-02-025
18 effective date) shall be near-zero emissions (“NZE”) or zero emissions (“ZE”)
19 vehicles. Any production facility supplying biomethane to an IOU shall be required
20 to agree to such terms, disclose all Class 8 trucks currently used in its operations, and
21 inform the utility it contracts with whenever a new vehicle is purchased or leased for
22 use at the facility from which the biomethane is being procured.²⁵
- 23 13) Applicants should propose methods for using CO₂ in CCUS projects rather than
24 venting to the atmosphere.^{26,27}

¹⁹ *Id.* at E-6.

²⁰ D.22-02-025 at 36.

²¹ *See* Solicitation for SB 1383 Dairy Pilot Projects at E-7.

²² *Id.* at E-15.

²³ *Id.*, OP 43 at 67.

²⁴ *Id.*, OP 43 at 68.

²⁵ *Id.*, OP 38 at 66.

²⁶ *Id.*, OP 43 at 68.

²⁷ D.22-02-025 at 44 states, “Permissible uses of CO₂ that effectively prevent it from entering the

1 The target date for a selected SB 1440 Pilot Project to be connected to the SoCalGas
2 pipeline and flowing biomethane is five years after the Applicant has received notification by
3 SoCalGas of a successful Application. If an SB 1440 Pilot Project is not reasonably expected to
4 be online within five years from the date of selection, the Applicant is required to submit an
5 extension request to SoCalGas no later than 12 months before such 5-year anniversary,
6 delineating project steps and expected online date.

7 C. Eligible SB 1440 Pilot Project Costs

8 i. Background

9 D.22-02-025 directs California’s four large gas IOUs, *i.e.*, SoCalGas, PG&E, SDG&E,
10 and SWG (the “Joint Utilities”) to collectively set aside \$40 million from their 2022 Cap-and-
11 Trade allocated allowance auction proceeds so that additional funding is available to offset
12 pipeline build-out costs and related expenses associated with the pilot projects.²⁸ To assist with
13 determining the types of expenses to be eligible to offset pipeline build-out (“SB 1440 Pipeline
14 Infrastructure”), SoCalGas considered two prior Commission-approved programs that utilize
15 ratepayer funding to help off-set biomethane interconnection costs. Those programs are as
16 follows:

17 Biomethane Monetary Incentive Program

18 In 2015, the Commission issued D.15-06-029 which, among other things, created a \$40
19 million monetary incentive program for biomethane projects that successfully connect with an
20 IOU-operated gas pipeline. Assembly Bill (“AB”) 2313 (Williams, 2016) subsequently required
21 the Commission to increase the program’s monetary incentive from \$1 million to \$3 million for
22 individual biomethane projects and from \$3 million to \$5 million for dairy cluster biomethane
23 projects.²⁹

24 In D.20-12-031, the Commission acknowledged that the \$40 million funding approved in
25 D.15-06-029 was fully subscribed along with a waitlist for an additional \$38.5 million worth of

atmosphere include, but are not limited to, carbon mineralization, geologic storage, methanation,
biofuel production, and industrial or manufacturing applications.”

²⁸ *Id.* at 46.

²⁹ A “dairy cluster biomethane project” is defined in Public Utilities Code Section 399.19 as “a
biomethane project of three or more dairies in close proximity to one another employing multiple
facilities for the capture of biogas that is transported by multiple gathering lines to a centralized
processing facility where the biogas is processed to meet the biomethane standards adopted by the
commission pursuant to subdivisions (c) and (d) of Section 25421 of the Health and Safety Code and
injected into the pipeline of the gas corporation through a single interconnection.”

1 project funding.³⁰ After weighing the benefit of increased biomethane capture and use against
2 the modest reduction in the California Climate Credit necessary to fully fund all existing
3 biomethane projects, including those on the waitlist, the Commission found it appropriate to
4 provide an additional \$40 million in funding from Cap-and-Trade allowance proceeds for the
5 monetary incentive program to fund the biomethane projects currently on the waitlist, bringing
6 total funding to \$80 million.³¹

7 Furthermore, SoCalGas Rule 45 states the monetary incentive is limited to eligible
8 interconnection costs that include:³²

- 9 • Engineering costs (Interconnect Screening, Preliminary Engineering Study, and
10 Detailed Engineering Study costs).
- 11 • Costs associated with facilities downstream of the biomethane interconnector’s
12 processing plants used for delivering biomethane into the utility or third-party
13 pipeline system.
- 14 • Total installed costs of receipt point facilities. These facilities include, but are not
15 limited to meters, regulators, appurtenant facilities, quality measurement, odorization
16 facilities, and auxiliary facilities.
- 17 • Facility enhancement costs. These enhancements include, but are not limited to,
18 enhancements to gas pipelines and other related system upgrades that are required to
19 enable continued safe and reliable operation of utility’s system due to the addition of
20 each biomethane interconnection.
- 21 • For dairy cluster biomethane interconnection, costs incurred for biogas gathering
22 lines to help reduce emissions of short-lived climate pollutants (“SLCP”) pursuant to
23 Section 39730 of the Health and Safety Code shall be considered eligible costs.

24 **ii. SB 1440 Pipeline Infrastructure Eligible Costs**

25 A gasification or pyrolysis project consists of stages and components similar to those in a
26 SB 1383 Pilot Project. For example, dairy projects require digester(s) to produce biogas from the
27 manure. The biogas is then cleaned and processed to produce pipeline quality biomethane. For a

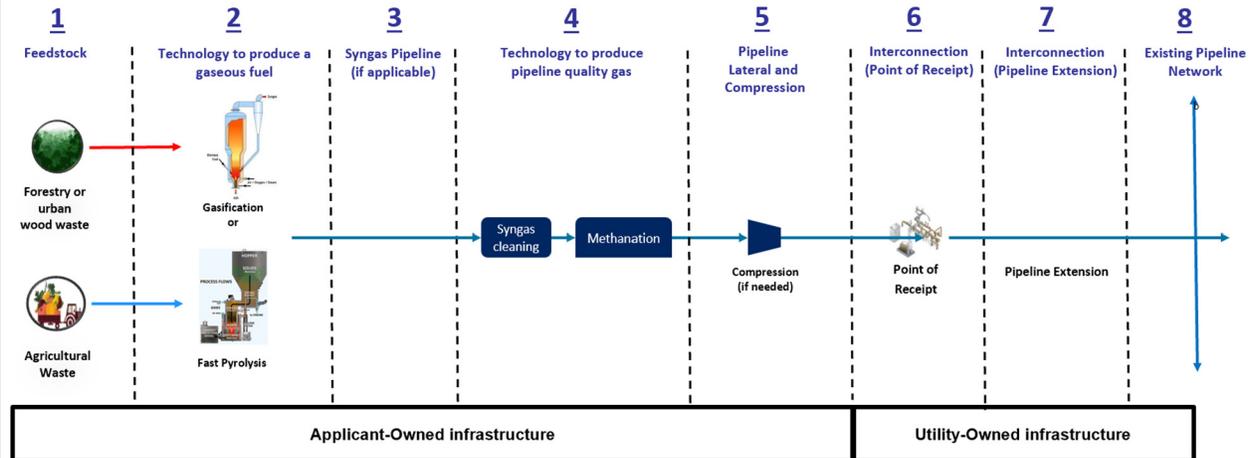
³⁰ D.20-12-031 at 11.

³¹ *Id.* at 14-15 (noting, “This is an appropriate use of gas utility Cap-and-Trade allowance proceeds since every unit of biomethane injected into gas utility pipelines displaces a unit of fossil fuel that would otherwise disperse GHG emissions into the atmosphere”).

³² https://tariff.socalgas.com/regulatory/tariffs/tm2/pdf/tariffs/GAS_G-RULES_45.pdf, at Sheet 22.

1 SB 1440 Pilot Project, gasification or pyrolysis equipment produces syngas from woody
 2 biomass. The syngas is then cleaned and methanized to produce pipeline quality Bio-SNG.
 3 Figure 2 illustrates and defines the high-level components of a SB 1440 Pilot Project to produce
 4 Bio-SNG and connect to a utility pipeline.

5 **Figure 2: Woody Biomass Pilot Primary Components**



6
 7 After consideration of the existing Commission programs which provide ratepayer
 8 funding to offset the cost of biomethane interconnections, SoCalGas proposes the following
 9 facilities be considered eligible costs for the SB 1440 Pilot Project:

10 **SB 1440 Utility-Owned Pipeline Infrastructure**

- 11 • Point-of-receipt owned and operated by SoCalGas, where SoCalGas receives gas that
 12 has been upgraded at a Syngas Conditioning, Upgrading, and Methanation Facility
 13 (lane 6 of Figure 2); and
- 14 • Pipeline extension owned and operated by SoCalGas that delivers biomethane to the
 15 SoCalGas existing gas pipeline system (lane 7 of Figure 2).

16 **SB 1440 Applicant-Owned Pipeline Infrastructure**

- 17 • If there is Cap-and-Trade program funding remaining after funding lanes 6 and 7,
 18 SoCalGas is proposing to use Cap-and-Trade program funding to offset selected SB
 19 1440 Pilot Project costs in lane 5 of Figure 2. Taking this approach follows existing
 20 Commission policy as lane 5 infrastructure components are eligible costs under the
 21 biomethane monetary incentive program, and the SB 1383 Pilot Projects.

- All lane 5 infrastructure components will be owned and operated by the SB 1440 Pilot Project, with SoCalGas reimbursing the Applicant for eligible costs.³³

D. SB 1440 Solicitation Timelines and Selection Criteria

The following provides a high-level overview of the timeline contained in the SB 1440 Solicitation, and the process and criteria used for the SB 1440 Pilot Project selection process.

i. Timeline

- On March 14, 2023, SoCalGas issued the SB 1440 Solicitation seeking proposals from Applicants (“Applicant Proposals”) for the conversion of woody biomass utilizing gasification or pyrolysis technology and methanation to produce Bio-SNG.
- On March 23, 2023, SoCalGas held an Applicant webinar to explain the SB 1440 Solicitation process, gather inputs, and answer high-level questions.
- On or before March 27, 2023, Applicants submitted a request for SoCalGas to perform a SB 1440 woody biomass pilot-specific screening study (“SB 1440 Screening Study”). As part of this SB 1440 Screening Study, SoCalGas performed the initial desktop engineering studies necessary to assess common-carrier natural gas pipeline off-take capacity for Applicant provided location(s).
- On or before March 29, 2023, Applicants submitted any questions to SoCalGas, and SoCalGas responded by April 4, 2023.
- On or before May 1, 2023, Applicants were required to electronically submit their proposal to SoCalGas.

ii. Selection Process and Criteria

SoCalGas retained an independent third party to assist in evaluating, scoring, and selecting any Applicant Proposals, and received a single Applicant Proposal. The scoring criteria (Table 2) used by SoCalGas to assess and award the SB 1440 Pilot Project consists of: 1) the SB 1383 Pilot Project Scoring Criteria (bold), and 2) three common criteria used by SoCalGas when scoring proposals.

³³ SoCalGas will utilize the same process and procedure used to reimburse SB 1383 Pilot Project lane 2 costs.

1

Table 2 (SB 1440 Pilot Project Scoring Criteria)

Scoring Criteria
Woody Biomass-to-Biomethane Business Model
Financial Plan/Soundness
Greenhouse Gas Reduction and Cost Effectiveness
Direct or Indirect Environmental Benefits
Direct or Indirect Benefits to Disadvantaged Communities
Project Readiness and Implementation
Safety record (OSHA recordables) and ISNetworld rating
DBE Subcontracting
Completeness of proposal documents

2

3 **IV. OVERVIEW OF SELECTED SB 1440 PILOT PROJECT**

4 **A. Overview**

5 SoCalGas selected San Joaquin Renewables LLC (“SJR”), the sole Applicant whose
6 proposal met the requirements under D.22-02-025, to build, own, and operate a gasification
7 facility (“SJR Facility”) in McFarland, California, that will convert agricultural waste biomass
8 into biomethane and several other end-use products. Upon reaching the pipeline interconnection
9 point, the biomethane will be transported by the SoCalGas pipelines and can be used or sold for a
10 variety of end uses, *e.g.*, vehicle fuel, utility biomethane procurement, etc. Feedstock used in the
11 plant will consist of agricultural wood waste, pistachio shells, walnut shells, and almond shells
12 generated in Kern, Kings, and Tulare Counties.

13 The SJR Facility plans to process up to 1,500 bone dry tons (“BDT”) per day of
14 agricultural waste biomass into approximately 12.5 million standard cubic feet per day of

1 biomethane.³⁴ SJR plans to own and operate a fleet of low-NOx natural gas-powered trucks,
2 using biomethane produced by the SJR Facility, to truck feedstock to and products from the
3 facility site. The SJR Facility plans to include a compressed natural gas fueling station for truck
4 refueling and a power generation facility that will produce electricity to power the SJR Facility.

5 **B. Technology and Scalability**

6 The SJR Facility will utilize Frontline BioEnergy's BING™ process that includes
7 patented gasification technology and proprietary methanation catalyst. The following provides a
8 description of the primary equipment used to produce Bio-SNG from woody biomass.

9 **Gasification Facility**

10 Frontline's TarFreeGas® biomass gasification process technology can convert various
11 solid carbonaceous feedstocks such as wood chips and nutshells into biochar and synthesis gas
12 ("syngas") at elevated pressure and temperature. Virtually any combustible biomass feedstock
13 source that meets the specifications for feedstock in the process technology license from
14 Frontline is suitable.

15 The TarFreeGas® gasifier is a complex converter that makes use of a multi-modal
16 fluidized bed. The gasifier functions primarily as a bubbling fluidized bed using oxygen and
17 steam as blast, but has multiple zones of fluidization due to the presence of various solids
18 including 'dense phase' bed media and a substantial accumulation of biochar, which also forms
19 its own bubbling fluid bed in the riser. In the gasifier riser extensive gas-solids contacting
20 provides an environment where the biochar acts as a catalytic converter to reduce tar
21 concentration and effectively defunctionalize tar.

22 **Syngas Cleaning Facility**

23 Syngas is a mixture of hydrogen, carbon monoxide, CO₂, methane, water vapor, and
24 traces of other light hydrocarbons. It is a combustible gas and can be burned, but it can also be
25 cleaned and upgraded by Frontline's PMFreeGas® high efficiency continuous filtration process
26 technology to be used (as the name implies) for a variety of synthesis processes including
27 biomethane production.

28 Prior to synthesis into methane, the syngas must be cleaned to remove contaminants
29 including particular matter, sulfur and nitrogen compounds, and residual non-methane

³⁴ The SJR Facility plans to process approximately 400,000 to 500,000 BDT per year of agricultural waste biomass.

1 hydrocarbons. Frontline’s clean-up process starts with a high efficiency filter that removes alkali
2 and biochar particulate. Subsequent fixed bed converters filled with catalysts and sorbents
3 remove sulfur compounds, reform non-methane hydrocarbons into additional syngas, and adjust
4 the hydrogen to carbon monoxide ratio in preparation for methanation. A water quench cools the
5 syngas and removes ammonia prior to the syngas compression and methanation.

6 **Methanation Facility**

7 After clean-up and conditioning, syngas is compressed to methanation conditions and is
8 catalytically converted into methane in additional fixed bed converters. A gas mixture leaving
9 the methanation converters is cooled to remove water and scrubbed to remove CO₂. The product
10 gas methane content now exceeds 97% (vol. basis) and meets pipeline specifications.

11 **Scalability**

12 Frontline’s BING™ process is scalable. The SJR Facility plans to employ three
13 gasification trains and the resulting syngas from all gasifier trains is combined for further
14 processing in a single gas conditioning and methane synthesis train. The scalability of
15 Frontline’s gasification technology means the limiting factor for deployment is the availability of
16 biomass or waste feedstock and the demand for biomethane. SJR estimates there are enough
17 biomass and waste resources in California, which includes all agricultural, residues, forest
18 management material, and diverted organic waste to support the construction of another 50 SJR
19 scale projects. The construction of 50 BING™ projects could provide in excess of 200 billion
20 cubic feet of biomethane annually.³⁵

21 **C. Products from the Gasification Process**

22 The SJR Facility gasification process plans to produce biomethane and several
23 coproducts including biochar, argon and liquid nitrogen, heat, CO₂, and ammonium sulfate.

- 24 • Biochar: The plant will produce biochar, which will be sold as an agricultural lime
25 substitute, fertilizer, or fertilizer ingredient that improves water and nutrient retention
26 for enhanced crop growth.
- 27 • Argon and Liquid Nitrogen: Additional products which can be sold for industrial use.
- 28 • Heat: Waste process heat will be used to generate steam and electricity to reduce the
29 plant’s utility usage.

³⁵ SJR proposal to SB 1440 Solicitation.

- 1 • Ammonium sulfate fertilizer product will be shipped from the facility by truck and
- 2 sold as fertilizer.
- 3 • CO₂ product will be:
 - 4 ○ Sold to a third party who would make dry ice or liquify the CO₂ for beverage
 - 5 carbonation, food cooling, or other common uses, and/or
 - 6 ○ Utilized in CCUS, and/or
 - 7 ○ Vented to the atmosphere

8 **D. Permitting**

9 The SJR project team is working to obtain the required permits, the two most significant
10 at this stage of the project being the air permit and conditional use permit (“CUP”). The SJR
11 project team submitted their application to the San Joaquin Valley Air Pollution Control District
12 (“SJVAPCD”) and it is under review. The CUP will be issued at the successful completion of
13 the CEQA process. The City of McFarland is the lead agency for the CEQA process and they
14 have engaged firms to perform the initial studies and complete the environmental impact report.
15 The SJR project team anticipates successful completion of the air permit review and CEQA
16 process by the first quarter of 2024.

17 For the project’s CCUS component, SJR has submitted a Class VI sequestration well
18 permit to the U.S. EPA.³⁶ The permit application was deemed administratively complete in
19 January of 2021. SJR is actively responding to questions and data requests from the EPA as they
20 conduct their review. The EPA continues to signal that they should complete their review by the
21 end of 2023, at which time SJR expects the EPA to approve the application. EPA issuance of a
22 Class VI well permit is necessary to enable geologic sequestration of CO₂ in California.

23 Furthermore, CARB released its CCS Protocol³⁷ in 2018 providing guidance on geologic
24 sequestration wells in the state. Requirements imposed on the well operator include ownership
25 or control of 100% of the mineral and porosity rights within the sequestration zone (the area
26 where injected CO₂ will exist after the permitted amount of CO₂ is injected). SB 905³⁸ provided
27 some helpful clarifications regarding porosity rights residing with surface owners and also
28 provided for unitization of rights, meaning once the well operator obtained 75% of the required

³⁶ <https://www.epa.gov/uic/class-vi-wells-permitted-epa>.

³⁷ <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>.

³⁸ <https://legiscan.com/CA/bill/SB905/2021>.

rights, the other 25% of the rights holders would be pulled along to enable the well operator to represent 100% ownership or control. While helpful, the SB 905 legislation left a few legal gaps that will need to be resolved. Nonetheless, because SJR has not yet obtained ownership or control of 75% of the rights, it does not yet have a clear path to geologic sequestration using its own well.³⁹

E. Benefits

i. Ratepayer and Environmental Benefits

Ratepayers will benefit from the SB 1440 Pilot Project because the SJR Facility is expected to provide significant emission reductions from the decrease of pile burning of orchards and the use of biomethane for various end uses. Based on the open-burn permits issued by the SJVAPCD during the time prior to the beginning of the whole-orchard-recycling program, SJR has estimated that approximately 25-30% of the wood feedstock that will be supplied to the SJR Facility may have otherwise been burned in piles in the orchards.

Pile burning emissions have been estimated by the U.S. Forestry Service⁴⁰ and others as a serious source of PM, NOx, CO, and VOC in the San Joaquin Valley. Table 3 provides a comparison of SJR’s estimated emissions between open pile burning for wood feedstock being 80% of SJR’s annual biomass consumption and SJR’s annual biomethane production.⁴¹

Table 3

Pollutant	Estimated lbs pollutant/dry ton biomass from pile burning*	Estimated tons pollutant/year from pile burning	Estimated SJR RNG production maximum tons pollutant/year	Estimated Reduction of tons pollutant/year	Minimum Emission Reduction using biomass to produce RNG
PM _{2.5}	10.5	1,670	10	1,660	99%
NOX	3.9	624	10	614	98%
CO	132.6	21,004	100	20,904	99.5%
NM-VOC ₂	3.0	469	10	459	98%
CH ₄	10.0	1,584	-	1,584	100%

*. Pollutant estimate from U.S. Forest Service - see Footnote 10

For a variety of reliability, timing, and economic issues, the SJR Facility is unable to secure satisfactory electrical supplies from the local electrical grid, so the project does not plan to

³⁹ SJR proposal to SB 1440 Solicitation.

⁴⁰ Baker S, Lincoln E, Richardson M. Tracking the Economic Costs and Air Emissions of Forest Biomass Diversion and Allocating the Air Emissions Credits Generated – Emissions Sampling and Determination of Emission Factors. 2014. Missoula, MT: USDA Forest Service, RMRS, Fire Sciences Laboratory. March 5, 2014; available at <https://www.placerair.org/DocumentCenter/View/2106/Air-Pollution-Measurements-from-a-Forest-Slash-Open-Pile-Burn-PDF>.

⁴¹ Assumes a wood feedstock pile burn rate of 37%.

1 be grid connected and will rely on a stand-alone “power island” to provide the entirety of the
 2 SJR Facility electrical needs. The power island design contemplates a mix of generation
 3 resources, including combustion turbines, internal combustion engines, organic Rankine cycle
 4 heat recovery generators, solar panels and batteries, and fuel cells. In all events, the CI score of
 5 SJR Facility’s biomethane output is expected to remain zero or less (as determined under
 6 California’s GREET model) even after including the carbon emissions of all combustion based-
 7 resources that are used to meet the project’s electrical demands. The emission reduction
 8 estimates in Table 3 include the estimated emissions from the power island.

9 One of the end uses of the SJR Facility-produced biomethane will be to fuel heavy-duty
 10 compressed natural gas (“CNG”) powered trucks, eliminating diesel fuel emissions that would
 11 otherwise be generated by traditional diesel trucks. The biomethane produced is considered a
 12 renewable cellulosic biofuel because it is produced from woody biomass. Because the
 13 biomethane is renewable and used for transportation, SJR plans to participate in both the US
 14 EPA’s Renewable Fuel Standard and California’s Low Carbon Fuel Standard. The U.S. EPA
 15 approved SJR’s D3-RIN pathway petition in May 2020.⁴² SJR has engaged two different firms
 16 to perform independent life cycle analysis of the BING™ process. Using the CA-GREET
 17 model, the carbon intensity (“CI”) for RNG produced at the facility is expected to be as high as
 18 zero gCO₂e/MJ and as low as -135 gCO₂e/MJ.

19 The SJR Facility plans to produce enough biomethane to fuel up to 2,750 trucks year-
 20 round.⁴³ Table 4 compares SJR’s estimates of the tailpipe emissions from biomethane fueled
 21 vehicles (biomethane provided from the SJR Facility) and the equivalent diesel-fueled vehicles.
 22

Table 4

Pollutant	Estimated lbs pollutant/truck*year from Diesel Tailpipe Emissions	Estimated emissions from 2,750 trucks ⁶ ton/year	Estimated lbs pollutant/truck*year from CNG Tailpipe Emissions	Estimated reduction of emissions ton/year	Tailpipe Emission Reduction Replacing Diesel with RNG
PM _{2.5}	50.1	69	0.5	68.3	99%
NOX	3,751.0	5,158	375	4,642.4	90%
CO	3,205.4	4,407	160	4,187.0	95%
NM-VOC ₂	96.8	133	24	100.0	75%

⁴² <https://www.epa.gov/sites/default/files/2020-05/documents/san-joaquin-deter-ltr-2020-05-11.pdf>.

⁴³ It is estimated that the nameplate fuel production from SJR will fuel 2,750 CNG trucks annually. This estimate assumes class 8 diesel trucks driving 68,155 miles/year using 6.346 mpg according to the U.S. Dept of Energy Alternative Fuel Data Center: <https://afdc.energy.gov/data/10309> and <https://afdc.energy.gov/data/widgets/10308>.

1 **ii. Community Benefits**

2 SJR estimates the SJR Facility will provide substantial local employment opportunities.
3 The plant will normally operate 24 hours per day, 7 days per week, except for planned
4 maintenance, outages, and any unplanned shutdowns. SJR anticipates several hundred
5 construction workers will be needed during approximately two years of construction. The SJR
6 Facility will employ an estimated 150 permanent staff for many types of positions including
7 management administrative, engineering, operations, maintenance, security, traders, and truck
8 drivers. Many of these staff will reside in and around McFarland.

9 As provided in the previous section, the SJR Facility will provide significant criteria
10 pollutant reductions for the local community.

11 **F. Timeline**

12 The SJR Facility plans to start construction in late 2024 and will take approximately two
13 years to complete after construction begins. The start date is contingent on a variety of factors
14 (e.g., permitting, contract execution, etc.). SoCalGas will work closely with the SJR project
15 team to develop the schedule for the design, procurement, construction, and commissioning of
16 SB 1440 Utility-Owned Pipeline Infrastructure. SoCalGas estimates it will take approximately
17 18 months from the start of the detailed engineering study to commission the SB 1440 Utility-
18 Owned Pipeline Infrastructure.

19 **G. SB 1440 Pipeline Infrastructure Costs**

20 SoCalGas is estimating a cost of \$13.4 million for the SJR Facility’s interconnection, and
21 pipeline lateral and compression (lanes 5 -7 of Figure 2).^{44,45} For the remaining Cap-and-Trade
22 funding, SoCalGas proposes the following options for the Commission’s consideration:

- 23 1) **Option 1:** Utilize the remaining funding to support the development and potential
24 implementation of SJR’s Class VI sequestration well and/or other CCUS solutions.
25 2) **Option 2:** Issue a follow-up SB 1440 Solicitation in mid-2025 to potentially select
26 another SB 1440 Pilot Project. The additional two years will allow the
27 gasification/pyrolysis industry and potential projects to further mature and develop.

28 So that enough Cap-and-Trade funding will be available to support a potential second

⁴⁴ The final cost is subject to change as the SB 1440 Utility-Owned Pipeline Infrastructure will not be procured and constructed until 2025/2026.

⁴⁵ Lanes 6 and 7 cost estimates are not escalated (in June 2023 dollars) and excludes allowance for funds used during construction (“AFUDC”) and Ad Valorem tax.

1 SB 1440 Pilot Project, SoCalGas proposes a \$5 million cost cap for the pipeline
2 lateral and compression (lane 5) for the SJR Facility.

3 While both options have merit, SoCalGas recommends Option 1 because it supports the
4 Commission’s directive that pilots should propose methods of using CO₂ in CCUS projects
5 rather than venting to the atmosphere.⁴⁶

6 Pursuant to Ordering Paragraph (OP) 46 of D.22-02-025, \$19.704 million of Cap-and-
7 Trade allowance proceeds were set aside to fund the SB 1440 Pilot Project costs. There is no
8 anticipated revenue requirement that is being proposed for recovery from ratepayers associated
9 with the Utility-Owned Pipeline Infrastructure presented herein.

10 **i. SB 1440 Applicant-Owned Pipeline Infrastructure**

11 SoCalGas is proposing to utilize Cap-and-Trade program funding to reimburse SJR for
12 eligible SB 1440 Applicant-Owned Pipeline Infrastructure costs described in Section III(C)(ii)
13 above. The invoicing and payment requirements for eligible costs are described in the SB 1440
14 Gasification/Pyrolysis Pilot Project Funding Agreement, Schedule C.

15 **H. SB 1440 Pilot Project Agreements**

16 There are three SB 1440 Pilot Project agreements to be executed by SoCalGas and SJR
17 pertaining to pipeline interconnection, and the reimbursement of SB 1440 Applicant-Owned
18 Pipeline Infrastructure. SJR will have 120 calendar days from a Commission decision approving
19 the Application and SB 1440 Pilot Project to execute the relevant agreements. The three
20 agreements are as follows:

- 21 1) Standard Renewable Gas Interconnection Agreement (“SRGIA”), which has been
22 slightly modified to account for the Cap-and-Trade allowance proceeds. The
23 modified SRGIA is included as Attachment A of the Application.
- 24 2) California Producer Operational Balancing Agreement (“CPOBA”).⁴⁷
- 25 3) SB 1440 Gasification/Pyrolysis Pilot Project Funding Agreement (see
26 Attachment B of the Application).

27 SJR will be responsible for ensuring its own compliance with all of its obligations arising
28 out of or in connection with Rule 45 and the SB 1440 Pilot Project. More specifically, SJR must
29 enter into all requisite agreements to enable SoCalGas to proceed with full project

⁴⁶ D.22-02-025 at 46.

⁴⁷ https://tariff.socalgas.com/regulatory/tariffs/tm2/pdf/tariffs/GAS_G-SAMPLES_CPOBA.pdf.

1 implementation. The target date for the SJR Facility to be connected to the SoCalGas pipeline
2 and flowing biomethane is five years after SJR has received notification by SoCalGas that the
3 Commission granted the Application.

4 **V. PROGRAM REPORTING**

5 The SB 1440 Pilot Project is required to participate in data reporting and evaluations
6 which shall be submitted to the Commission, its constituent agencies or SoCalGas upon request.
7 The SB 1440 Pilot Project must also agree to allow these agencies to monitor and evaluate these
8 data. Commercially sensitive data may be submitted to the Commission with a request for limits
9 on disclosure pursuant to D.21-09-020's processes and Commission General Order 66-D's
10 additional requirements. SoCalGas will work with the Commission and/or other state agencies
11 to develop a reporting template for the SB 1440 Pilot Project.

12 **VI. CONCLUSION**

13 Biomethane is poised to play an important role in decarbonizing California's economy in
14 the years ahead.⁴⁸ Since 2015, the Commission has approved and/or implemented several
15 programs utilizing ratepayer funding to help offset the cost for developers to successfully
16 develop their projects and connect to the utility pipeline. The recent SB 1383 Pilot Projects
17 demonstrate how state agencies, IOUs, and project developers can actively work together to
18 successfully implement projects, achieve significant emission reductions to California, and
19 provide benefits to the local community.

20 Similar to the SB 1383 Pilot Projects, the SJR project proposes to provide significant
21 emission reduction benefits for ratepayers, the state, and local community, and create
22 approximately 150 full time jobs within the local community. SoCalGas is looking forward to
23 working closely with the Commission and SJR project team to connect the first woody biomass
24 project to the SoCalGas pipeline system.

25 This concludes my prepared direct testimony.

⁴⁸ Rulemaking at 65.

1 **VII. QUALIFICATIONS**

2 My name is James Lucas. My business address is 555 West Fifth Street, Los Angeles, in
3 California. I am currently employed by SoCalGas as a Manager, Commercial Development.
4 Since starting with SoCalGas over 27 years ago, I have held various positions in the areas of
5 Product Development, Project Management, Program Management, Energy Efficiency, Financial
6 Analysis, Pipeline Operations, and Engineering. I hold a Bachelor of Science degree in
7 Mechanical Engineering from the University of California Santa Barbara and a Master of
8 Business Administration from California State University Fullerton. I am a registered
9 Professional Mechanical Engineer in the State of California.

10 I have not previously testified before the Commission.

APPENDIX A
KEY TERMS AND DEFINITIONS

VIII. APPENDIX A: KEY TERMS AND DEFINITIONS

Word/Term	Definition
Applicant(s)	The respondent(s) to this Solicitation.
Applicant Proposal	Applicant submittal to SoCalGas for the SB 1440 Woody Biomass Pilot Project solicitation.
Application	SoCalGas’s submittal to the California Public Utilities Commission to seek approval of at least one gasification/pyrolysis SB 1440 Pilot Project.
Bio-SNG	Bio-synthetic natural gas (“Bio-SNG”) is defined in the R.13-02-008 Phase 4A Staff Proposal as follows: ‘A mixture composed primarily of methane, carbon dioxide, and water produced by chemical conversion (catalytic methanation) of purified and conditioned renewable syngas. Also contains low concentrations of carbon monoxide, hydrogen, and other minor constituents.’
Greenhouse Gas (GHG) Emissions Reduction	A calculated decrease in GHG emissions relative to a project baseline scenario over a specified period of time.
Investor-owned Utilities (IOUs)	Includes: Pacific Gas and Electric Company, San Diego Gas & Electric, Southern California Gas Company, and Southwest Gas Corporation
Pipeline Lateral	The pipeline located between the Applicant owned Syngas Conditioning, Upgrading and Methanation Facility and SoCalGas’s point of receipt.

Rulemaking	Commission Rulemaking 13-02-008 titled, “Order Instituting Rulemaking to Adopt Biomethane Standards and Requirements, Pipeline Open Access Rules, and Related Enforcement Provisions.”
SB 1383 Decision	Decision D.17-12-004 which established the necessary framework to direct PG&E and SoCalGas to implement dairy biomethane pilot projects
SB1383 Pilot Projects	Dairy biomethane pilot projects that demonstrate interconnection to the common carrier pipeline system pursuant to D.17-12-004.
SB 1383 Pipeline Infrastructure	Pipeline facilities as shown in lanes 2, 4, 5, and 6 of Figure 1 (refer to Chapter III, Section A)
SB 1383 Solicitation	On March 7, 2018, the Selection Committee (Commission, CARB and CDFA) issued the Dairy Pilot Solicitation to connect no less than five dairy biomethane pilot projects to the common carrier pipeline system
SB 1440 Applicant-Owned Pipeline Infrastructure	Applicant shall own and operate the facilities identified in Lanes 1-5 (refer to Chapter III, Section C(ii))
SB 1440 Pilot Project	Woody biomass pilot projects that propose to demonstrate interconnection to the common carrier pipeline system pursuant to D.22-02-025.
SB 1440 Screening Study	An initial desktop engineering study that SoCalGas will perform and is necessary to assess common-carrier natural gas pipeline offtake capacity for Applicant provided location(s)

<p>SB 1440 Solicitation</p>	<p>On March 14, 2023, SoCalGas issued the SB1440 Woody Biomass Pilot Project Request for Proposal for at least one SB 1440 Pilot Project to connect to the SoCalGas pipeline system and provide Bio-SNG to SoCalGas for use in accordance with the requirements of SB 1440 (2018, Hueso), and D.22-02-025</p>
<p>SB 1440 Utility-Owned Pipeline Infrastructure</p>	<p>Utility owned and operated interconnection point-of-receipt, and interconnection pipeline extension (refer to Chapter III, Section C(ii))</p>
<p>Syngas Conditioning, Upgrading, and Methanation Facility</p>	<p>The facility that takes the syngas from the gasification or pyrolysis process and converts it into Bio-SNG/biomethane</p>
<p>Syngas Pipeline</p>	<p>The pipeline located between the gasification or pyrolysis facility and the syngas conditioning, upgrading, and methanation facility</p>