Lakeside-02

Appendix A Supporting the Prepared Direct Testimony of Daryl Maas

(Pilot Project)

[PUBLIC VERSION VOLUME 1]

Appendix A – Supporting Materials

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PROJECT NARRATIVE
Lakeside Pipeline LLC

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1. Pilot Project Basics

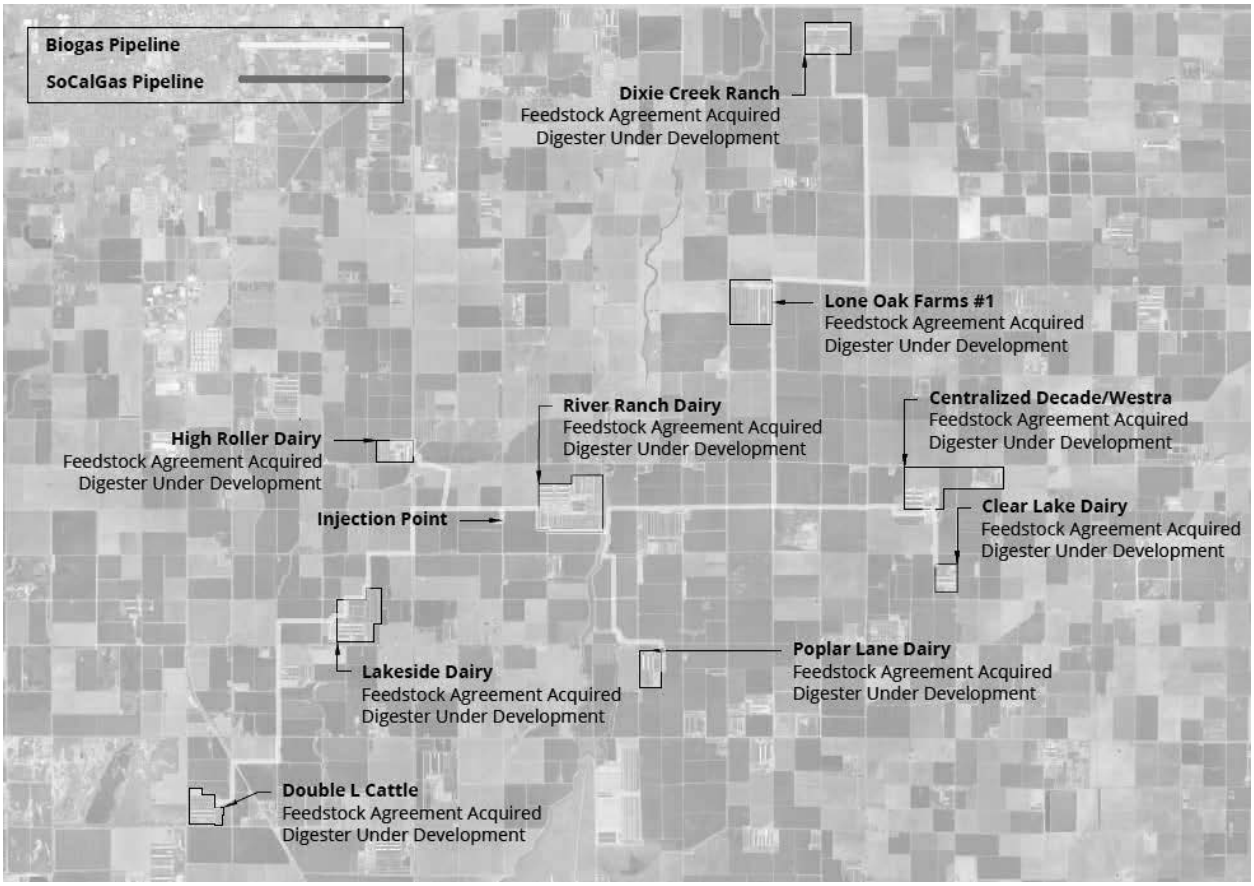
Pilot Project Name:	**Lakeside Pipeline CNG Cluster Project**
Applicant Entity:	**Lakeside Pipeline LLC**
Additional Pilot Project Partners:	**Daryl Maas, Co-Owner of Lakeside Pipeline LLC and owner of Maas Energy Works Inc** **Jack de Jong, Co-Owner of Lakeside Pipeline LLC and owner of River Ranch Farms LLC and High Roller Dairy** **Bernard te Velde, Co-Owner of Lakeside Pipeline LLC and owner of Lone Oak Farms #1 and Dixie Creek Dairy**
Dairy Cluster? (Y/N):	**Yes**
Dairy Locations – City, County	**Clear Lake Dairy – Tulare, Tulare County** **Decade Dairy – Tulare, Tulare County** **Richard Westra Dairy – Tulare, Tulare County** **Dixie Creek Dairy – Hanford, Kings County** **Double L Cattle – Hanford, Kings County** **High Roller Dairy – Hanford, Kings County** **Lakeside Dairy – Hanford, Kings County** **Lone Oak #1 Dairy – Hanford, Kings County** **Poplar Lane Dairy – Hanford, Kings County** **River Ranch Dairy – Hanford, Kings County**
Existing Digester(s)? (Y/N):	**No**
Existing or Anticipated Contract (s) for Electrical Generation? (Y/N):	**No**
Primary Contact Name:	**Daryl R Maas**
Primary Contact Email:	**daryl@maasenergy.com**
Primary Contact Phone:	**210-527-7631**
Executed Feedstock Agreement:	**Yes (10 Agreements)**
Existing Site Control Agreement:	**Yes**

2. Dairy Waste to Biomethane Business Model

2.1. Dairy Operations

The Lakeside Pipeline Dairy Digester Cluster project is being developed by Maas Energy Works Inc, California's largest and most reliable dairy digester developer. The biogas cleanup hub and common pipeline infrastructure will be owned by a new entity, Lakeside Pipeline LLC, which is owned by Daryl Maas (owner of Maas Energy Works) and two of the largest dairy farm participants: Jacob de Jong (owner of River Ranch and High Roller dairies), and Bernard te Velde (owner of Lone Oak #1 and Dixie Creek dairies). A designated parcel of land owned by Jacob de Jong will host the biogas cleanup hub and SoCal Gas injection point. A total of 10 dairies (9 future digesters) have signed agreements with Lakeside Pipeline LLC and Maas Energy Works to participate in this cluster as shown in Figure 1. The background and operations of each participating dairy is discussed in detail below.

Figure 1 - Lakeside Pipeline Dairy Digester Cluster project - Map of Participating Dairies



1) Provide the details of the history and background for each dairy operation for the Pilot Project.
a. Provide herd size and breed, including average number of lactating cows (in freestalls and in open lot corrals), dry cows, replacement calves, replacement heifers, and any other livestock for each dairy.
b. Explain the current management practices in detail, including a description of lagoon(s) size (depth and volume) if currently using lagoon storage, parlor water use, bedding type, method and frequency of manure collection including percent of manure collected from each production group (i.e., lactating cows, heifers etc.).

c. As Attachment 1, include a schematic diagram showing total solids flows into and lost from the manure treatment system.
d. Provide details of quantity, location, and source of manure and other materials (if any) digested and quantify minimum daily total solids loads needed for the system to operate optimally.
e. Explain if each facility will be able to guarantee the minimum feedstock needed for each digester, and how manure will be handled when the system is not operational.
2) For the Pilot Project, describe the phased-approach or the full cluster plan (e.g., construction, operation timeline, number of dairies in total cluster and amount of biomethane that will be generated in each phase of the cluster construction). The Selection Committee will only consider GHG emission reductions based on executed feedstock agreements in this scoring criteria. The Selection Committee may also review and consider future expected feedstock agreements, but these non-executed agreements will not be considered for methane destruction scoring purposes.
3) Explain in detail how current dairy manure management operations compare to the proposed pilot methane management operations.

Dairy Operations – Digester #1 – Decade Dairy / Richard Westra Dairy: The Westra family has been in the dairy business for multiple generations. Eric and Richard Westra, brothers, both worked with their father on Richard Westra Dairy growing up. Both brothers attended and graduated from Cal Poly with degrees in dairy science. In 2009, Eric and Richard built Decade Dairy and manage the daily operations of this new dairy and the nearby, original Richard Westra Dairy today. The digester project owner and applicant will be Decade Energy LLC, a special purpose entity that is wholly owned by Decade Dairy LLC and managed by Eric and Richard Westra. The host dairy will be Decade Dairy, located at 3313 Avenue 256, Tulare CA 93274, which is also wholly owned by Eric and Richard Westra. Richard Westra Dairy, located at 4070 Avenue 256, Tulare CA 93274 will supply its manure as additional feedstock via underground manure pipeline, creating a centralized digester as explicitly encouraged in the Water Board's Centralized Digester General Order. The existing, tier 1, lined pond at Decade Dairy is sufficiently sized to accommodate both dairy's manure and as such will make an ideal location to implement a centralized digester quickly and efficiently.

The Decade Dairy facility hosts an average of 3,000 milking cows in freestall barns with an additional 300 dry cows on open lots and 1,400 replacement heifers on open lots. The Richard Westra Dairy facility hosts 1,500 milking cows in freestall barns with an additional 250 milking cows on open lots. The Richard Westra facility also hosts 250 dry cows and 1,500 replacement heifers on open lots. All animals at both facilities are Holstein breed. Both dairies use industry standard manure flush manure management practices with a sand lane and weeping wall solids separation. An annotated drawing of the manure flows for including manure storage volumes is included in the Attachments for both dairies.[1] Note that Decade Dairy already hosts a lined, uncovered anaerobic manure digester pond, which was required for air permitting purposes. It is this uncovered pond that will now be covered to create the covered lagoon anaerobic digester. The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pumps are located in the main storage lagoons. The project team has determined that the volume of excreted manure, parlor water, freestall and feed lane flush results in an average fluid production of 110 gallons per milk cow per day between both dairies. Both dairies bed with composted manure. Decade Dairy has an existing weeping wall that captures manure solids and used as soil amendment. Richard Westra Dairy has no pre-pond solids separation occurring at the farm at present, so all collected solids go into anaerobic systems. The baseline section of the project's Mass Balance Table[2] shows the collection and disposition of manure volumes using its current manure management systems at

[1] Attachment 1.1 – Manure Treatment Diagram (pre-project) – Decade Centralized Digester
[2] Attachment 1.10 – Mass Balance Tables – Decade Centralized Digester

both dairies. Decade Dairy has 2 storage ponds with a combined volume of 54,689,328 gallons and 1 anaerobic treatment lagoon with a volume of 17,084,150 gallons.

Table 1 - Decade Dairy and Richard Westra Dairy Combined Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	4,500	Holstein	Freestall
Milking Cow	250	Holstein	Open Lot
Dry Cow	550	Holstein	Open Lot
Heifers (over 2 months)	2,900	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owners Eric and Richard Westra. If for any reason the digester system is not able to receive manure, the manure flow from the weeping walls can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection systems at both dairies in order to maximize GHG benefits and digester operations. All changes have been approved by the Host Dairies and will have minimal impact on dairy operations. The pre-existing flush manure systems at Decade Dairy and Richard Westra Dairy will remain the same. A new sand lane and vibrating screen separator will be added to Richard Westra Dairy to remove solids and then all fresh manure flow will be redirected via underground pipeline to the project's digester for processing, and then returned to Richard Westra Dairy by a parallel pipeline. These manure transfers for a centralized digester are specifically allowed and detailed in the Central Valley Regional Water Quality Control Board's Centralized Digester General Order. The weeping walls at Decade Dairy will remain in operation and manure flow out of the weeping walls will be redirected to the digester and thence to storage. The pre-existing Tier 1 double-lined pond to be converted to a digester at Decade Dairy has dimensions of 400' x 375' x 20' and a capacity of 17,084,150 gallons. Based on an average daily input of 110 gallons per milk cow per day from both dairies, this digester will operate with a hydraulic retention time of 33 days. The new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush through Decade Dairy. The rest of the digester outflow effluent will then flow into the dairy's main storage pond or pumped back to the Richard Westra Dairy's storage ponds and then eventually used for irrigation at both farms.

Dairy Operations – Digester #2 – Clear Lake Dairy: Eric Westra and Richard Westra have also recently purchased Clear Lake Dairy just south of Decade Dairy and Richard Westra Dairy. The Westras have decided to build a separate digester at this dairy as well, to participate in the ongoing Lakeside Cluster. The digester project owner and applicant will also be Decade Energy LLC, a special purpose entity that is wholly owned by Decade Dairy LLC and managed by Eric and Richard Westra. The host dairy will be Clear Lake Dairy, located at 24643 Road 36, Tulare CA 93274, which is also wholly owned by Eric Westra and Richard Westra.

The Clear Lake Dairy facility hosts an average of 2,050 milking cows in freestall barns with an additional 400 dry cows on open lots and 2,000 replacement heifers on open lots. All animals are Holstein breed. The

dairy uses industry standard manure flush manure management practices with stationary screen solid separation. An annotated drawing of the manure flows for the dairy including manure storage volumes is included in the Attachments.[3] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pumps are located in the main storage lagoons. The project team has determined that the volume of excreted manure, parlor water, freestall and feed lane flush results in an average fluid production of 130 gallons per milk cow per days. The dairy beds with composted manure. The baseline section of the project's Mass Balance Table[4] shows the collection and disposition of manure volumes using its current manure management systems. Clear Lake Dairy has 1 storage pond with a volume of 8,835,713 gallons.

Table 2 - Clear Lake Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	2,050	Holstein	Freestall
Dry Cow	400	Holstein	Open Lot
Heifers (over 2 months)	2,000	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owners Eric and Richard Westra. If for any reason the digester system is not able to receive manure, the manure flow from the weeping walls can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection system the dairy in order to maximize GHG benefits and digester operations. All changes have been approved by the Host Dairy and will have minimal impact on dairy operations. The pre-existing flush manure systems and mechanical solid separator at Clear Lake Dairy will remain the same. All manure flows will be redirected to the new digester. The new covered lagoon digester will have dimensions of 825' x 125' x 18' and a capacity of 8,835,713 gallons. Based on an average daily input of 130 gallons per day, this digester will operate with a hydraulic retention time of 33 days. The flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. Digester effluent will be land applied to fields and crops.

Dairy Operations – Digester #3 – Dixie Creek Dairy: The te Velde family has been in the dairy business for multiple generations. Bernard te Velde Jr, a graduate from UC Davis, joined the dairy business in partnership with his father in 1987. In 2004, he built his own dairy in Fresno, CA called Lone Oak Farms #2. In 2012, Bernard expanded and purchased Lone Oak Farms #1 from his father. In 2013, Bernard continued to expand his dairying enterprise by purchasing Dixie Creek Dairy in Hanford CA. He is still overseeing operations at all 3 dairies today making him one of the most experienced dairy operators in the State. Bernard also owns and farms an additional 8,000 acres, including 2,000 acres of fruit trees and nuts. The digester project owner and applicant will be Lone Oak Energy LLC, a special purpose entity that is wholly owned by Bernard te Velde Jr. The host dairy for this project will be Dixie Creek Dairy that is

[3] Attachment 1.2 – Manure Treatment Diagram (pre-project) – Clear Lake Dairy
[4] Attachment 1.11 – Mass Balance Tables – Clear Lake Dairy

located at 3601 CA-198 in Hanford CA which is also wholly owned by Bernard te Velde Jr and also his son Adam te Velde.

The Dixie Creek Dairy facility hosts an average of 4,600 milking cows in freestall barns and an additional 400 milking cows on open lots. The facility also hosts 750 dry cows on open lots and 500 replacement heifers on open lots. All animals are Holstein breed. The Dixie Creek Dairy facility uses industry standard manure flush manure management practices. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[5] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in an estimated total fluid production of 150 gallons per milk cow per day. Manure solids are separated using a mechanical screen separator, and then composted for use as bedding. The baseline section of the project's Mass Balance Table shows the collection and disposition of manure volumes using its current manure management systems. The dairy has 44,064,379 gallons of storage available in 5 ponds and then one additional pond with a volume of 21,099,514 gallons that is already permitted as an anaerobic digester.

Table 3 - Dixie Creek Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	4,600	Holstein	Freestall
Milking Cow	400	Holstein	Open Lot
Dry Cow	750	Holstein	Open Lot
Heifers (over 2 months)	500	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables.[6] Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner Bernard te Velde Jr. If for any reason the digester system is not able to receive manure, the manure flow from the existing stationary screen separator that can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection system at Dixie Creek Dairy in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system and stationary screen separator will remain the same. A new sand lane, process pit, and flush pump will be added to remove additional solids and increase water efficiency. All manure flows will be redirected from the new process pit and sand lane to the stationary screen separator and then to the new digester. The new digester will have dimensions of 600' x 300' x 25' and a capacity of 24,642,591 gallons. Based on an average daily input of 150 gallons per day, this digester will operate with a hydraulic retention time of 33 days. The new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage ponds on the south side of the facility.

[5] Attachment 1.3 – Manure Treatment Diagram (pre-project) – Dixie Creek Dairy
[6] Attachment 1.12 – Mass Balance Tables – Dixie Creek Dairy

Dairy Operations – Digester #4 – Double L Cattle: Tom Vander Duissen and his wife Laura started their first dairy in 2001. At the time they were leasing a facility from another dairy until they could grow the business. In 2006 they formed a partnership with Tom's brother in law Ron Vander Weerd and his wife Rose. Ron and Rose purchased a new dairy near Hanford, CA and together the families built a brand-new dairy—including a anaerobic digester pond and lined manure storage ponds. They began milking in September of 2006 and have built the dairy into a modern and successful facility, Double L Cattle. The Vander Weerds own the ground and lease it to Double L Cattle, which is operated by the Vander Duissens (both families have executed agreements with the project owner Maas Energy Works). Double L Cattle farms 465 acres in the Hanford area. The host dairy for this project will be Double L Cattle dairy facility located at 10234 Lansing Avenue in Hanford CA, which is wholly owned Ron and Rose Vander Weerd. The digester project owner and applicant will be Double L Dairy Biogas LLC, a special purpose entity that is wholly owned by Maas Energy Works Inc.

The Double L Cattle dairy facility hosts 2,590 milking cows in freestall barns and an additional 239 dry cows on open lots and 2,640 replacement heifers on open lots. All animals are Holstein breed. The facility uses industry standard manure flush manure management practices with mechanical solid separation and composted manure for bedding. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[7] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in an estimated total fluid production of 150 gallons per milk cow per day. The baseline section of the project's Mass Balance Table shows the collection and disposition of manure volumes using its current manure management systems. The dairy has 45,716,123 gallons of storage available in multiple ponds.

Table 4 - Double L Cattle - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	2,590	Holstein	Freestall
Dry Cow	239	Holstein	Open Lot
Heifers (over 2 months)	2,640	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. [8] Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owners, Ron and Rose Vander Weerd, under contract with Double L Dairy Biogas LLC. If for any reason the digester system is not able to receive manure, the manure flow from the stationary screen separators that will be added as part of this project can be easily diverted to the dairy's main storage ponds via existing infrastructure.

[7] Attachment 1.4 – Manure Treatment Diagram (pre-project) – Double L Cattle
[8] Attachment 1.13 – Mass Balance Tables – Double L Cattle

The project will make minimal changes to the existing manure collection systems at the dairy in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system at the Double L Cattle dairy facility will remain the same. All manure flows will be directed to the new covered lagoon digester. The digester will have dimensions of 500' x 400' x 18' and a capacity of 21,391,703 gallons. Based on an average daily input of 150 gallons per day, this digester will operate with a hydraulic retention time of 55 days. A new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage pond on the south side of the facility.

Dairy Operations – Digester #5 – High Roller Dairy: The De Jong family immigrated from Holland to southern California in the 1940's and then the family entered the dairy business in 1968 in Riverdale, CA. Jacob De Jong grew up on his father's dairy learning the business and then founded River Ranch Dairy as a partnership with his father in 1996. Jacob, together with his wife Nicole, took over full ownership of the dairy in 2006 as River Ranch Farms LLC. A few years later, Jacob and Nicole purchased another dairy up the road from River Ranch and named it High Roller Dairy. Between both of these dairies, the De Jong family own and manage almost 15,000 animals. The De Jong family is well known and respected within the industry. The host dairy for this project will be the High Roller Dairy facility located at 14782 8th Avenue, Hanford CA 93230 which is wholly owned by Jacob and Nicole De Jong. The project owner/applicant will be River Ranch Farms LLC, which is also wholly owned by Jacob and Nicole De Jong.

The High Roller Dairy facility hosts an average of 1,900 milking cows in freestall barns and an additional 265 dry cows on open lots and 1,975 replacement heifers on open lots. All animals are Jersey breed. High Roller Dairy uses industry standard manure flush manure management practices with an existing vibrating separator. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[9] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in total fluid production per cow of 120 gallons per milk cow per day. The dairy beds with sand, which is removed with two large sand lanes and re-used as bedding. Manure solids are captured in the weeping wall system and used as soil amendment. The baseline section of the project's Mass Balance Table[10] shows the collection and disposition of manure volumes using its current manure management systems. The facility has 3 main storage ponds with a combined volume of 23,415,608 gallons.

Table 5 - High Roller Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	1,900	Jersey	Freestall
Dry Cow	265	Jersey	Open Lot
Heifers (over 2 months)	1,975	Jersey	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load

[9] Attachment 1.5 – Manure Treatment Diagram (pre-project) – High Roller Dairy
[10] Attachment 1.14 – Mass Balance Tables – High Roller Dairy

needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner, River Ranch Farms LLC and Jacob and Nicole de Jong. If for any reason the digester system is not able to receive manure, the manure flow from the vibrating separator can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make minor upgrades to the existing manure collection system at High Roller Dairy in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system, sand lane, and weeping walls at High Roller Dairy will remain the same. The project will clean out the existing below-ground, earthen manure pond which will be double-lined with leak detection to Water Board Tier-1 standards. The presence of an existing pond, already permitted by the Air District as an anaerobic digester, greatly increases project implementation speed while also reducing cost. This pre-existing pond has dimensions of 320' x 240' x 20' and a capacity of 7,943,940 gallons. Based on an average daily input of 120 gallons per day, this digester will operate with a hydraulic retention time of 35 days. The new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage pond on the north side of the facility.

Dairy Operations – Digester #6 – Lakeside Dairy: The Monteiro family immigrated from Portugal three generations ago and since that time has been active in the Central Valley dairy industry with recent expansions into tree agriculture. Second generation dairy farmer Melvin Monteiro raised his four sons on the family's California dairy. Two of those sons, Michael and Manuel, struck out on their own to begin their own dairy. They eventually constructed at new, modern facility at Lakeside Dairy, in 2005 which the two brothers operate jointly. The host dairy for this project will be the Lakeside Dairy facility located at 8606 Kent Avenue, Hanford CA 93230 which is wholly owned by Michael and Manuel Monteiro. The project owner/applicant will be Lakeside Energy LLC, which is also wholly owned by Michael and Manuel Monteiro.

The Lakeside Dairy facility hosts an average of 3,965 milking cows in freestall barns and an additional 442 dry cows on open lots and 3,676 replacement heifers on open lots. All animals are Holstein breed. The Lakeside Dairy facility uses industry standard manure flush manure management practices. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[11] Note that this dairy was permitted with an uncovered anaerobic digester pond for air emission purposes. It is this uncovered anaerobic digester pond that will now be covered to create a covered lagoon digester. The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in an estimated total fluid production of 150 gallons per milk cow per day. No solid separation is occurring at the dairy today. The baseline section of the project's Mass Balance Table shows the collection and disposition of manure volumes using its current manure management systems. The dairy has approximately 115,000,000 gallons of storage available in multiple ponds.

[11] Attachment 1.6 – Manure Treatment Diagram (pre-project) – Lakeside Dairy

Table 6 - Lakeside Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	3,965	Holstein	Freestall
Dry Cow	442	Holstein	Open Lot
Heifers (over 2 months)	3,676	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables.[12] Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner Mike and Manuel Monteiro. If for any reason the digester system is not able to receive manure, the manure flow from the existing stationary screen separator can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection systems at Lakeside Dairy in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure systems at Lakeside Dairy will remain the same. All manure flows will be directed to the new covered lagoon digester. The digester will have dimensions of 535' x 440' x 16' and a capacity of 22,928,444 gallons. Based on an average daily input of 150 gallons per day, this digester will operate with a hydraulic retention time of 39 days. The flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage ponds on the north side of the facility.

Dairy Operations – Digester #7 – Lone Oak Farms #1: The te Velde family has been in the dairy business for multiple generations. Bernard te Velde, a graduate from UC Davis, joined the dairy business in partnership with his father in 1987. In 2004, he built his own dairy in Fresno, CA called Lone Oak Farms #2. In 2012, Bernard expanded and purchased Lone Oak Farms #1 from his father. In 2013, Bernard continued to expand his dairying enterprise by purchasing Dixie Creek Dairy in Hanford CA. He is still overseeing operations at all 3 dairies today making him one of the most experienced dairy operators in the State. Bernard also owns and farms an additional 8,000 acres, including 2,000 acres of fruit trees and nuts. The digester project owner and applicant will be Lone Oak Energy LLC, a special purpose entity that is wholly owned by Bernard te Velde. The host dairy for this project will be Lone Oak Farms #1 that is located at 13866 4th Ave in Hanford CA which is also wholly owned by Bernard te Velde.

The Lone Oak #1 facility hosts an average of 4,200 milking cows in freestall barns and an additional 700 dry cows on open lots and 4,500 replacement heifers on open lots. All animals are Holstein breed. The Lone Oak Farms #1 dairy facility uses industry standard manure flush manure management practices. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[13] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in an estimated total fluid production of 110 gallons per milk cow per day. No solid

[12] Attachment 1.15 – Mass Balance Tables – Lakeside Dairy
[13] Attachment 1.7 – Manure Treatment Diagram (pre-project) – Lone Oak Farms #1

separation is occurring at the dairy today. The baseline section of the project's Mass Balance Table shows the collection and disposition of manure volumes using its current manure management systems. The dairy has 67,601,454 gallons of storage available in multiple ponds.

Table 7 - Lone Oak Farms #1 - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	4,200	Holstein	Freestall
Dry Cow	700	Holstein	Open Lot
Heifers (over 2 months)	4,500	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. [14] Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner Bernard te Velde. If for any reason the digester system is not able to receive manure, the manure flow from the vibrating screen separators that will be added as part of this project can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection systems at the Lone Oak Farms #1 facility in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system at the Lone Oak Farms #1 dairy facility will remain the same. A new process pit, new flush pump, and two new vibrating screen separators will be added to remove solids and increase water efficiency. All manure flows will be redirected to the new process pit, separators, and then the new digester. The new digester will have dimensions of 534' x 200' x 35' and a capacity of 15,555,228 gallons. Based on an average daily input of 110 gallons per day, this digester will operate with a hydraulic retention time of 34 days. The flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage ponds at the center of the facility.

Dairy Operations – Digester #8 – Poplar Lane Dairy: The te Velde family has been in the dairy business for multiple generations. Bernard te Velde Sr is the father of project co-owner, Bernard te Velde Jr, and has been in the dairying business for nearly 50 years. Bernard te Velde Sr wholly owns the Poplar Lane Dairy facility located at 5387 Kent Ave in Hanford CA, which will be the host dairy for this digester project. The digester project owner and applicant will be Poplar Lane Dairy Biogas LLC, a special purpose entity that is wholly owned by Maas Energy Works Inc.

The Poplar Lane Dairy facility hosts 2,126 milking cows in freestall barns and an additional 284 dry cows and 2,115 replacement heifers on open lots. All animals are Holstein breed. The facility uses industry standard manure flush manure management practices with mechanical solid separation and composted manure for bedding. An annotated drawing of the manure flows including manure storage volumes is included in the Attachments.[15] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor

[14] Attachment 1.16 – Mass Balance Tables – Lone Oak Farms #1
[15] Attachment 1.8 – Manure Treatment Diagram (pre-project) – Poplar Lane Dairy

water, cooling water, and other sources, result in an estimated total fluid production of 135 gallons per milk cow per day. The baseline section of the project's Mass Balance Table shows the collection and disposition of manure volumes using its current manure management systems. The dairy has 52,092,331 gallons of storage available in 5 storage ponds.

Table 8 - Poplar Lane Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	2,126	Holstein	Freestall
Dry Cow	284	Holstein	Open Lot
Heifers (over 2 months)	2,115	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. [16] Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner, Bernard te Velde Sr, under contract with Poplar Lane Dairy Biogas LLC. If for any reason the digester system is not able to receive manure, the manure flow from the stationary screen separator can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make upgrades to the existing manure collection system at the Poplar Lane Dairy facility in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system and stationary screen separator will remain the same. A new sand lane and new flush pump will be added for additional solid removal and water efficiency. All manure flows will be directed to the new covered lagoon digester. The digester will have dimensions of 600' x 315' x 20' and a capacity of 21,804,429 gallons. Based on an average daily input of 135 gallons per day, this digester will operate with a hydraulic retention time of 76 days. This size greatly exceeds the necessary retention time, and for that reason the digester can also be used to meet the dairy's wintertime 120-day storage requirements while still acting as a "flex" digester. Consequently, the manure is effectively stored in the digester instead of a separate, uncovered effluent. Since the manure remains in the covered pond until it is used for irrigation, and there are no uncovered effluent storage pond GHG emissions. The new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush.

Dairy Operations – Digester #9 – River Ranch Dairy: The De Jong family immigrated from Holland to southern California in the 1940's and then the family entered the dairy business in 1968 in Riverdale, CA. Jacob De Jong grew up on his father's dairy learning the business and then founded River Ranch Dairy as a partnership with his father in 1996. Jacob, together with his wife Nicole, took over full ownership of the dairy in 2006 as River Ranch Farms LLC. In the following years, he expanded the original facility to its present size of over 10,000 animals, making it one of the largest dairies in the state. The River Ranch Farms dairy facility utilizes modern, industry-leading technologies including weeping walls, a rotary milking parlor, and robotic calf feeders. The De Jong family is well known and respected within the industry. The project applicant and host dairy will be the River Ranch Farms LLC dairy facility, located at 6127 Jackson Ave, Hanford CA 93230, which is wholly owned by Jacob and Nicole De Jong.

[16] Attachment 1.17 – Mass Balance Tables – Poplar Lane Dairy

The River Ranch Farms facility hosts an average of 5,258 milking cows in freestall barns and 278 milking cows on open lots. The facility also hosts an additional 548 dry cows on open lots and 5,787 replacement heifers on open lots. All animals are Holstein breed. River Ranch uses industry standard manure flush manure management practices with a sand lane and weeping wall solids separation. An annotated manure treatment diagram which includes manure storage volumes is included in the attachments.[17] The freestall barns and feed lanes are flushed three times per day using automated valves on timers—the most ideal design for a digester. The flush pump is currently located in the main storage lagoon. The project team has determined that the total volume of excreted manure, parlor water, cooling water, and other sources, result in total fluid production per cow of 150 gallons per milk cow per day. The dairy beds with sand, which is removed with two large sand lanes and re-used as bedding. Manure solids are captured in the weeping wall system and used as soil amendment. The baseline section of the project's Mass Balance Table[18] shows the collection and disposition of manure volumes using its current manure management systems. The facility has 4 storage ponds with a combined volume of 74,969,766 gallons and 1 anaerobic treatment lagoon with a volume of 39,103,525 gallons.

Table 9 - River Ranch Dairy - Herd Profile

Animal Type	Number of Animals	Breed	Manure Collection
Milking Cow	5,258	Holstein	Freestall
Milking Cow	278	Holstein	Open Lot
Dry Cow	548	Holstein	Open Lot
Heifers (over 2 months)	5,787	Holstein	Open Lot

The project's biogas production estimates were generated using the known amount of contracted, on-site manure available for digester input as shown in the Mass Balance Tables. Biogas production will fluctuate proportionately to the input quantity of volatile solids. Consequently, the project can operate at significantly higher or lower quantities of manure feedstock. There is not a specific minimum daily total solids load needed to operate. The digester design can process some non-manure waste, but the project does not intend to do so, and no non-manure wastes have been used in any calculations provided herein. The facility can guarantee the delivery of these manure volumes since the animals and manure collection system are already on site and owned by the digester owner Jack DeJong. If for any reason the digester system is not able to receive manure, the manure flow from the weeping walls can be easily diverted to the dairy's main storage ponds via existing infrastructure.

The project will make minor upgrades to the existing manure collection system at the River Ranch Dairy facility in order to maximize GHG benefits and digester operations. All changes have been approved by the host dairy and will have minimal impact on dairy operations. The pre-existing flush manure system, sand lane, and weeping walls will remain in operation. The project will clean out the existing below-ground, earthen manure pond which will be double-lined with leak detection to Water Board Tier-1 standards. The presence of an existing pond, already permitted by the Air District as an anaerobic digester, greatly increases project implementation speed while also reducing cost. This pre-existing pond has dimensions of 830' x 330' x 25' and a capacity of 39,103,525 gallons. Based on an average daily input of 150 gallons per day, this digester will operate with a hydraulic retention time of 47 days. The new flush pump will be located in a wet well adjacent to the digester to recirculate digestate as clean flush. The rest of the digester outflow effluent will then flow into the dairy's main storage pond on the south side of the facility.

[17] Attachment 1.9 – Manure Treatment Diagram (pre-project) – River Ranch Dairy
[18] Attachment 1.18 – Mass Balance Tables – River Ranch Dairy

2) For the Pilot Project, describe the phased-approach or the full cluster plan (e.g., construction, operation timeline, number of dairies in total cluster and amount of biomethane that will be generated in each phase of the cluster construction). The Selection Committee will only consider GHG emission reductions based on executed feedstock agreements in this scoring criteria. The Selection Committee may also review and consider future expected feedstock agreements, but these non-executed agreements will not be considered for methane destruction scoring purposes.

Pilot Project Cluster Plan: The Pilot Project Cluster plan involves building the initial cluster to the 10 dairies listed above with whom the project has already executed Feedstock Agreements. Later expansion dairies could be added thereafter. The timeline for this 10-dairy cluster construction is documented in the Project Schedule in Attachment 10. Most of these digesters are farmer-owned, although some will be financed and owned by Maas Energy Works. Our agreements with the farmers include pipeline easements so that all farms can be connected with the gathering lines. The Project Team found this approach to be highly successful in procuring over 20 miles of pipeline easements as part of the Calgren Dairy Fuels project, since every dairy family has an incentive to make sure the project is a success. Consequently, those dairies participating in the project have executed easements for pipelines to pass through their land. The project's utility pipeline capacity study confirms that sufficient pipeline offtake capacity is available for all these initial 10 dairies. The gas will be sold through the utility grid to existing CNG stations via the project's existing contract with Clean Energy Fuels. A small on-site CNG fueling station is later planned to encourage local adoption of CNG vehicles. All GHG reductions and emissions calculations herein have only included dairies with existing feedstock agreements.

Any additional expansion dairies will require additional Feedstock Agreements and pipeline easements. However, we have included all these routes in our current CEQA environmental studies so that the expansion pipelines can be built without another CEQA process. The expansion will also require additional compressors and CO-2 removal membranes at the project's Hub, and pipeline infrastructure improvements as are discussed later in this document.

Table 10 - Summary of Lakeside Pipeline Cluster's Biogas Production

Digester	Participating Dairies	Agreement Status	# of Animals	MMBTU / yr
Digester #1	Decade Dairy Richard Westra Dairy (Centralized)	Feedstock Signed	8,200	61,441
Digester #2	Clear Lake Dairy	Feedstock Signed	4,450	36,684
Digester #3	Dixie Creek Dairy	Feedstock Signed	6,250	67,188
Digester #4	Double L Cattle	Feedstock Signed	5,469	59,010
Digester #5	High Roller Dairy	Feedstock Signed	4,140	34,830
Digester #6	Lakeside Dairy	Feedstock Signed	8,083	69,565
Digester #7	Lone Oak Farms #1	Feedstock Signed	9,400	77,655
Digester #8	Poplar Lane Dairy	Feedstock Signed	4,525	48,582
Digester #9	River Ranch Farms	Feedstock Signed	11,593	78,733
		Total:	**62,110**	**533,688**

4) As Attachment 2, provide a map (as included in your Pipeline Infrastructure Scoping and Cost Estimation Request) that provides a project overview including:
a. The dairies where the developer has an agreement for the feedstock
b. The dairies where the developer does not have an agreement for the feedstock but could be added at a future time

c. Location of the biogas collection lines (along with diameter size) from each dairy to the central biogas upgrading facility
d. Location of the central biogas upgrading facility
e. Location of the utility point of receipt
f. Location of the utility pipeline extension
g. Identify public right-of-way and private right-of-way for each component

The project map is included as Attachment 2 with all elements requested above.

2.2. Technology Plan

1) Dairy Digesters

a) Describe the proposed digester technologies in sufficient detail to explain how it works and its technical feasibility and/or commercialization status

The Lakeside Pipeline Dairy Digester Cluster project will utilize covered lagoon digester technology. Nearly all successful digesters in California utilize this technology since it is ideal for the state's high ambient temperatures and flush manure management systems. The project team has built plug flow digesters, upright tank digesters, and covered lagoon digesters and this experience has shown that covered lagoons are the most cost-efficient to build and operate in California, with much higher reliability. There is a strong industrial base of providers that are able to install this equipment, without reliance upon patented designs, experimental technology, or unproven equipment. The Project Team has installed liners and covers with several major vendors including Environmental Fabrics (Gascon, SC), Industrial and Environmental Concepts (Lakeville, MN), and D&E Dairy Construction (Visalia, CA). All these contractors, and various engineers hired by the Project Team in the past including Hartman Engineering, 4Creeks, and Provost and Prichard have proven that covered lagoons are reliable and proven in the California Dairy market. The digester at each participating dairy will be created by first double-lining a new or existing storage pond at each dairy. All ponds will be double-lined to Tier 1 standards with leak detection to ensure water quality. The project will then cover the newly lined ponds with 80 mil flexible HDPE material to create the project's biogas collection systems. The lagoon cover will be welded to the liner ensuring a complete seal. A perforated pipe runs above the water line around the entire perimeter of the covered lagoon to ensure uninterrupted gas flow to the outlet. The cover will also include submersible mixers to agitate the manure which will minimize settling, reduce sludge in digester effluent, and increase biogas production. An HDPE baffle creates a pathway for manure to slowly flow through the digester-ensuring hydraulic retention time and eliminating dead spots. Finally, sludge draw-off pipes are commonly added as a final protection against sludge buildup. This type of covered lagoon technology is highly commercialized and represents 100% of the successful digesters installations in California since 2014.[19] Engineered Site plan and design drawings for each digester from the Lead Engineers, Craig Hartman with Hartman Engineering and Steve Bommelje with Provost & Pritchard, are attached.[20] Mass Balance Diagrams are also attached that depict the manure input rate, digestate outflow rate, and expected biogas flow with methane content at each digester[21] A

[19] One other digester was installed during this time period—a continuously stirred tank reactor (CSTR) at new Hope Dairy installed by ABEC New Hope, a joint venture between Germany-based MT Energie and local developer California Bioenergy (Calbio). That project went bankrupt and the digester has been abandoned by the original owners. Maas Energy Works has since taken over this project and will refit it with a covered lagoon, using the proven technology described in this application.
[20] Attachment 3.1 through 3.9 – Engineered Project Site Plans and Designs
[21] Attachment 3.10 through 3.18 – Mass Balance Diagrams (post-project)

summary of digester type, lead engineer, digester dimensions, and digester volume is also summarized in the table below.

Table 11 - Lakeside Pipeline Dairy Digester Cluster - Digester Technology Summary

Dairy Name	Digester Type	Lead Engineer	Digester Dimensions (ft)	Digester Volume (gal)
Clear Lake Dairy	Covered Lagoon	Hartman Engineering	800' x 125' x 18'	8,835,713
Decade / Richard Westra Dairy	Covered Lagoon	Hartman Engineering	400' x 375' x 20'	17,084,150
Dixie Creek Dairy	Covered Lagoon	Hartman Engineering	600' x 300' x 25'	24,642,591
Double L Cattle	Covered Lagoon	Hartman Engineering	500' x 400' x 18'	21,391,703
High Roller Dairy	Covered Lagoon	Hartman Engineering	320' x 240' x 20'	7,943,940
Lakeside Dairy	Covered Lagoon	Hartman Engineering	535' x 450' x 20'	28,747,939
Lone Oak #1 Dairy	Covered Lagoon	Hartman Engineering	534' x 200' x 35'	15,555,228
Poplar Lane Dairy	Covered Lagoon	Hartman Engineering	600' x 315' x 20'	21,804,429
River Ranch Dairy	Covered Lagoon	Provost & Pritchard	800' x 330' x 25'	39,103,525

A summary of the estimated biogas production resulting from all 10 dairies (9 digesters) with existing Feedstock Agreements is summarized in the table below:

Table 12 - Lakeside Pipeline Cluster - Summary of Biogas Production

Description	Amount
Annual Biogas Production (MMBTU/yr)	533,688
Average Daily Biogas Flow at 60% Methane (SCF/day)	2,436,932
Average Daily Biomethane Flow (SCF/day)	1,462,159
Average Hourly Biomethane Flow (SCF/hr)	60,923
Average Biomethane Injected into SoCalGas Pipeline (MCF/hr)	61*

*This is estimated average of biogas production with seasonal variations

b) Provide a clear description about what the Pilot Project is currently committed to accomplish and future plans.

Commitments: Lakeside Pipeline Dairy Digester Cluster project is committed to building 9 covered lagoon digesters and connecting gathering lines to all 9 digesters (on 10 dairies) listed above. Lakeside pipeline commits that the biogas from all 9 digesters will be delivered to the project's central biogas conditioning Hub. Lakeside Pipeline is committed to upgrading this gas to pipeline standards, injecting it into the utility pipeline, and then using 100% of it to create renewable transportation fuels. The company is also committed to establishing a small, on-site CNG station to encourage local adoption of CNG-fueled vehicles although the timing of this installation may slower than the main effort and so initially 100% of the biogas will be pipeline injected.

The applicant's future plans include expansions to up to 11 additional dairies (6 digesters) via extension of the gathering lines, as discussed in Section 2.4.2 below.

c) In Attachment 3, provide Project design documents, including schematics, figures, graphics and plans, must be submitted as part of the Application. Project designs must be approved by a licensed professional engineer. Details such as digester volume, solids and hydraulic retention times and mass balance through the digester must be included. Mass balance must be illustrated in an annotated diagram with the following

components clearly indicated: Manure input rate (mass or gallons with estimated total solids); Digestate outflow rate (mass or volume with estimated total solids); and Expected bio-gas flow with methane content estimate.

Craig Hartman with Hartman Engineering has provided detailed design documentation for each digester site which is included with this application.[22] Mass Balance Diagrams for each digester have also been provided depicting the manure input rate, digestate outflow rate, and expected biogas flow.[23]

2) Biogas Collection Lines

a) Describe how biogas collection lines will be maintained in accordance with city, state and local codes, and any other codes and regulations that are applicable.

The project falls primarily under local (King's County) jurisdiction. King's County lacks specific guidance for low pressure biogas pipelines, however the project will comply with applicable guidance contained in the following regulations and publications:

- The Gas Processors Suppliers Association (GPSA) - *GPSA Engineering Data book*
- American National Standards Institute (ANSI) ANSI GPTC Z380.1 – Guide for Gas Transmission,
- Distribution, and Gathering Piping Systems - *ANSI Z223.1/NFPA 54 – National Fuel Gas Code* and *ANSI/CSA B149.6-15 Code for digester gas, landfill gas, and biogas generation and utilization.*
- American Society of Mechanical Engineers (ASME) - *ASME B31.8 – Gas Transmission and Distribution Piping Systems*
- National Fire Protection Association (NFPA) - *NFPA 55 – Compressed Gasses and Cryogenic Fluids Code* and *NFPA 67 – Guide on Explosion Protection for Gaseous Mixtures in Pipe Systems*
- American Petroleum Institute (API) - *6D – Specification for Pipeline and Piping Valves*
- United States Department of Transportation (DOT) - *DOT 49 CFR Part 192 – Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards*

As the Project Team has successfully done for over 7 miles of completed pipeline in adjacent Tulare County, the Project Team will procure conditional use permits, building permits, encroachment permits, and all other county or regulatory authorizations. Installation of pipeline within the county Right of Way will also require a maintenance agreement and appropriate insurance coverage, which the project team will ensure. See section d), e) and f) below for more on permitting and compliance.

b) Describe any additional measures, beyond what is required in code, that will be taken to ensure the safe installation (e.g., installation depth, utility clearance, safety tape/mesh).

See sections e) and f) below

c) Describe any additional measures, beyond what is required in code, that will be taken to ensure the ongoing safety performance with operation and maintenance of the pipelines (e.g., leak survey, valve installation).

[22] Attachment 3.1 through 3.9 – Engineered Digester Site Plans and Designs
[23] Attachment 3.10 through 3.18 – Mass Balance Diagrams (post-project)

See sections e) and f) below

d) Describe any permits required for the installation and maintenance of the biogas collection lines and the status of each permit.

The project will require a Conditional Use Permit (including CEQA) from King's County prior to any construction permits. The project has already applied for this Conditional Use Permit in 2017 and the initial study and various environmental reviews are well under way. We estimate this permit will be secured by October of 2018. Thereafter, the pipeline requires a building permit and encroachment permits, for each crossing of county roads. These permits will take another two months to procure, being received by December of 2018. A small portion of the project lies within Tulare County, but no further CEQA actions are necessary since shorter pipelines in Tulare County are statutorily exempt from CEQA. The project will also need to apply for encroachment permits to cross Tulare County roads, which are expected to also be received by December of 2018. [24]

e) Describe how to manage any condensates in the lines and monitoring of integrity.

Condensate is primarily managed via moisture removal at each dairy, and further checked by relative humidity sensors at the outlet of each dairy's gas handling equipment.[25] However, the gas gathering pipelines are further protected from moisture using moisture condensate traps at the outlet of each dairy, and at low points along the pipeline route.[26] These moisture traps include a visual indicator when they are approximately half full. These traps will be checked weekly as part of standard operating procedures, and more often whenever the project's control system indicates high moisture gas may have been delivered by one or more dairy digesters.

Pipeline integrity is monitored via several methods. First, the project's control system monitors outgoing and incoming pressures at various points along the line. The system automatically generates alarms and shuts down when extreme failures are indicated by rapid loss of pressure/increase of flow. Additionally, the total gas volume delivered and received is metered and will be tracked over time via trend analysis. This analysis can indicate any gradual loss of integrity due to mismatched delivery/receipts indicating missing gas or other anomalies. Finally, the pipeline will be walked at least once per year with handheld gas detection equipment to search for very small methane leaks. Remote sensing of such leaks via drone-mounted sensors may also be employed if such techniques are approved by regulatory authorities.

f) As Attachment 4 provide a diagram or a drawing showing the expected pressures and temperatures at various points in the biogas collection lines. Provide the type(s) of materials used to create the biogas collection lines.

See Attachment 4 for a diagram showing the expected pressures and temperatures at various points in the biogas collection lines. The project will install HDPE biogas collection lines between the hub and the individual digesters. All the necessary land is controlled by dairy farms and so no third party or public easements are required to complete the pipeline, except where crossing county roads. The pipeline will be

[24] This exemption expired January 1, 2018, but the project was proposed prior to expiration. If Tulare County decides not to include this pipeline in the exemption, an extension of the exemption bill is pending in the state legislature. If no exemption whatsoever is available, then the project will conduct a separate CEQA on the Tulare County portion of the pipeline, which will likely result in a Negative Declaration based on conversations with Tulare County senior environmental staff.
[25] Attachment 4.1 – Electric Innovations – Biogas Handling Equipment – Initial Design Docs (At Dairy)
[26] Attachment 4.2 – Real Environmental Products - Moisture Trap Diagram

constructed of SDR 17 and SDR 21 High Density Polyethylene, which does not corrode when exposed to biogas (even if wet) and has excellent wall strength for this application. The pipeline will be operated at between 3 and 15 pounds per square inch. This very low pressure has several advantages. First, it requires much less electricity than higher pressure gas lines. Second, the biogas compression equipment installed at the farms is limited to single stage rotary lobe blowers, which are easy to repair and maintain in a farm environment. Finally, the safety risks of all equipment and pipelines are greatly attenuated by operating them at lower pressures.

The project pipelines will maintain minimum vertical and horizontal utility clearances during installation. Since the project is not building in public Rights of Way except where the pipeline crosses county roads, there is very little interaction with existing buried utilities. The pipeline minimum depth will be 36" although in nearly all locations it will be significantly deeper due to engineering requirements such as channel crossings and line sloping. The line will be sloped toward designed low points with moisture removal traps to enable draining, testing, and maintenance. The project requires one crossing of the California High Speed Rail project, just west of River Ranch. Crossing of this land has already been approved and noted on the drawings approved between the High-Speed Rail Authority and the landowner, Jacob DeJong. No other High-Speed Rail crossings are required for any initial or future digesters.

The project's design and operation will comply with all county code requirements and any applicable portions of the federal Pipeline and Hazardous Materials Safety Administration. Whether or not these agencies require them, the project will install tracer wires and marker tapes on all gas gathering pipelines. The pipeline will be hydrotested prior to first use. Isolation valves will be installed at each dairy, and at the hub, to allow disconnection of biogas for equipment repair and maintenance.

3) Biogas Conditioning and Upgrading Facility

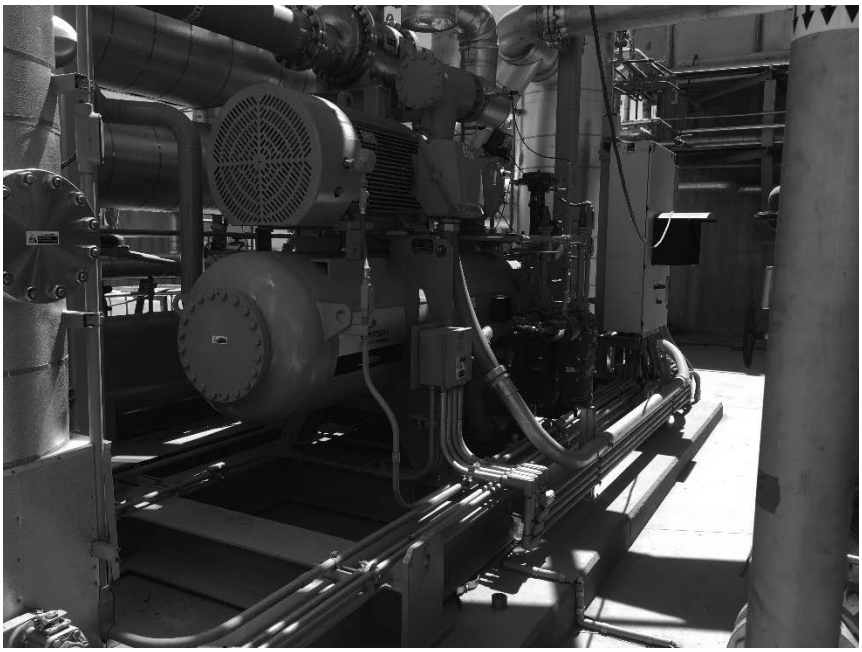
a) Describe the proposed biogas conditioning/upgrading technologies in sufficient detail to explain how it works and its technical feasibility and/or commercialization status.

Biogas Conditioning and Upgrading Facility: Upon arriving at the Hub, the biogas is first metered for flow, constituents, temperature, moisture and pressure. This information is key to coordinating with the overall controls systems network on the various dairies so as to properly regulate flow, match deliveries to the cleanup equipment, and check for leaks or gas quality issues at the dairies.

After the incoming gas is metered, it enters the Hydrogen Sulfide removal system. Initially, the biogas is treated to remove hydrogen sulfide at the dairies as discussed in Section 2.4.3b. However, an additional hydrogen sulfide adsorption vessel will treat all incoming gas to ensure it meets pipeline quality standards. This vessel is designed to contain solid granular media which can include either Sulfasorb active carbon media or Sulfatreat iron oxide granules, as project operations dictate. Both these media systems are highly commercialized with thousands of installations worldwide. Their dry granular media makes absorption vessels easy to install and operate in a dairy environment. Unlike some systems, the design avoids enclosed spaces for operators, corrosive chemicals, or unstable treatment protocols. We have selected these common media types systems due to their high reliability versus regenerative media or biological scrubbers. We declined the industry standard caustic scrubber technology due to very high capital expense, heavy equipment to maintain, and since it requires a consistently high flow of sulfur in order to operate properly. We plan to remove the sulfur at the dairies before the biogas arrives at the Hub so a caustic scrubber would not have sufficient sulfur input to function as a reliable backup. The absorptive properties provide a better safeguard for any situation where high sulfur gas reaches the Hub.

After passing through the Hydrogen Sulfide Removal system at the hub, the gas runs through one more chilling and reheating system to ensure any remaining moisture is captured and the gas is dry enough to meet pipeline quality standards.[27] Thereafter, the gas is drawn via a Vilter compressor to provide operating pressure for the CO_2 removal membranes (see example photo below).[28] To remove CO_2, the project will use an Air Liquide Advanced Separations CO_2 membrane removal system (see example photo below).[29] After passing through the membranes, the purified gas is monitored in a project-owned gas chromatograph for gas quality. If the gas does not meet pipeline quality standards, it is recirculated through the gas conditioning process and new deliveries of raw gas from the digesters are reduced or paused. The project will have an emergency-only flare for any safety related situations where gas must be removed from the system. Once the biogas meets pipeline quality standards and pressure, the biogas will be delivered to the utility's Meter Set Assembly.

Figure 2 - Vilter Compressor Installed at Project Team's Calgren Dairy Fuels Biogas Conditioning Hub



[27] Attachment 4.3 – Xchanger - Heat Exchanger Design
[28] Attachment 4.4 - Vilter Compressor Systems Information
[29] Attachment 4.5 - Air Liquide CO_2 Membrane Removal System

Figure 3 - Air Liquide CO2 Membrane at Project Team's Calgren Dairy Fuels Biogas Conditioning Hub

The tables below show the maximum and minimum raw biogas inlet constituents, power requirements, heat and material balance, and flow capacities.

Table 13 - Lakeside Pipeline Cluster - Gas Quality and Flow

Description	Max Raw Biogas (Worse Case)	Expected Raw Biogas (Feed Gas)	Biomethane (Product Gas)	Vent Gas
Standard Cubic Ft / Hr	118,333	109,231	50,000 (Min.) 61,000 (Avg.) 71,000 (Max.)	38,231
PSIG	2	4	240 (Min.) 290 (Avg.) 298 (Max.)	1
Temperature	120 F	70-110 F	50-105 F	70-110 F
BTU/SCF	550.00	650.00	>990.00	35.00
Methane	60.00%	65.00%	98.5000%	3.5000%
Carbon Dioxide	38.61%	34.40%	<0.2%	96.5000%
Oxygen	0.70%	0.10%	<0.2%	0.1000%
Nitrogen	0.69%	0.50%	1.1000%	0.1000%
H2S	0.0004%	0.0001%	<0.0004%	0.0004%
Water Vapor (Lbs/MMSCF)	50-350	50-200	7	7

***** Product gas based on methane required to make 990 BTU. Water Vapor, Temp, H2S, and O2 limits as required by SCG Rule 30. CO2 limit reduced from 3% to .2% in order to make room for more N2. N2 calculated by remaining percentage.

Table 14 - Lakeside Pipeline Cluster - Material Balance Table

Material Balance Table	
H2S Media Consumption (Lbs/Day)	200
Compressor Oil Consumption (Gal/Day)	5
Total Installed HP	1,750
Max Steady State Power Consumption (kW)	1,150

b) Describe any gas processing of the biogas at each dairy prior to the biogas entering collection lines.

Each dairy will process gas internally at the digester via Maas Energy Work's proprietary biological fixation system, which is capable of reducing Hydrogen Sulfide to undetectable levels in most covered lagoon digesters. The system will be operated using an oxygen generator to avoid injecting any nitrogen into the biogas collection system. The amount of oxygen injected is minimal, and all oxygen is consumed by the hydrogen sulfide fixation process, as demonstrated in multiple existing Maas Energy Works systems. Since so little oxygen is used, some H2S usually remains in the biogas afterwards. That is, the system is designed to allow some H2S to remain, since pursuing complete H2S reduction would risk introducing too much oxygen into the biogas and thus making it harder to achieve pipeline purity standards. Consequently, this system is backed up by an on-dairy H2S absorption vessel, constructed by Electric Innovations, that is filled with Sulfasorb active carbon media or similar sulfur removal media.[30] This two-stage system is common on all Project Team digesters as it reduces the operating cost of the absorption media, while providing failsafe design for H2S removal. Together, these two systems will lower H2S to less than 4 ppm before the biogas enters the collection lines.

In addition to H2S removal, the biogas will be cooled to condense water vapor out of the gas. This system includes an Xchanger brand heat exchanger and associated chiller that will drop the gas to approximately 35F and then re-heat it to at least 60F at each dairy. This system assures that not only will nearly all moisture be removed, but also that the gas will not drop below its dewpoint while travelling in the gathering lines.

c) Describe any gas compression of the biogas to be done at each dairy prior to the biogas entering the collection lines.

The biogas will be slightly compressed to 3-15 PSI (depending on the site's location in the gathering lines) using a single stage rotary lobe blower, for transport down the gathering lines to the Hub. The map in Attachment 4 shows pressures at various points throughout the gathering line system.

d) In Attachment 5 provide the following:
- Process flow diagrams for the central biogas conditioning and upgrading facility, include expected pressure of the biogas entering the central biogas conditioning and upgrading facility.
- Describe the design parameters for the biogas upgrading facility:
o Flow capacity
o Gas composition of feed gas
o Gas composition of product gas
o Heat and Material Balance
o Preliminary calculations
o Equipment data sheets

[30] Attachment 4.6 - Electric Innovations - Hydrogen Sulfide Removal System Design

o Utility requirements

See Attachment 5. The project will require a peak electrical load of 1,750 kW, mostly for compression of biogas during the CO-2 removal and pipeline injection processes. The project hub site already hosts a three-phase electrical service, which will be expanded to accommodate the additional load. Additionally, the project requires approximately 1,000 gallons per day of process water. This water will be obtained from the existing well at the project hub.

e) Chemicals used (provide Safety Data Sheets)

The biogas conditioning equipment uses standard equipment lubricating oils and sulfur absorption media. Material Safety Data Sheets have been included in the attachments.[31] [32]

f) Describe the nitrogen and oxygen removal capabilities (include maximum levels). If so, what are the maximum levels of nitrogen and oxygen while still able to meet the utility pipeline quality specifications.

The system's maximum acceptable levels of nitrogen and oxygen in the untreated biogas are shown in Table 13 above. The CO-2 membranes have a limited ability to remove oxygen and nitrogen, making it essential to avoid introducing air into the system in the first place. The project biogas conditioning engineer SCS has designed some additional measures available to maximize gas BTU value, including adding additional membranes for a slight increase in oxygen and nitrogen removal (and corresponding increase in BTU value) or else spiking with propane, which will also increase BTU content. However, at present we do not anticipate such measures will be necessary and the project can meet pipeline quality standards without them.

g) Describe any performance guarantees provided by the biogas upgrading system vendors.

Project biogas conditioning engineer SCS, under their turn-key, design-build contract provides a guarantee that the gas will meet pipeline quality standards.[33] The major vendor of gas condition membranes, Air Liquide, provides a further performance guarantee regarding CO-2 removal as it relates to pipeline quality standards.[34]

h) Should the renewable natural gas not meet pipeline quality specifications and the Utility does not accept the gas into the common carrier pipeline, explain how the applicant will remedy this situation, including description of how any non-compliant gas and upstream gas production will be managed through this process.

Prior to final compression and delivery to the utility Meter Set Assembly (MSA), the purified gas is monitored in a project-owned gas chromatograph. If the gas does not meet pipeline quality standards, it is recirculated through the gas conditioning process again and new deliveries of raw gas from the digesters are reduced or paused. The digesters themselves can hold 2-3 days' worth of gas in their flexible membrane covers, and thereafter are equipped with emergency vents to relieve pressure. At the Hub, the off-spec gas will be reprocessed to achieve pipeline quality standards. If the gas cannot meet pipeline quality standards even when recirculated, there is likely a major equipment failure. The gas will be flared in the on-site emergency-only flare to reduce any safety risks and the isolation valve on the incoming line from the

[31] Attachment 5.1 - Material Safety Data Sheet – Compressor Oil
[32] Attachment 5.2 - Material Safety Data Sheet – Sulfur Absorption Media
[33] Attachment 5.3 - SCS Engineering – Commitment Letter and Hub Performance Guarantee
[34] Attachment 5.4 - Air Liquide – Compressor Performance Guarantee and Support Letter

digesters will be closed. Then, with all gas pressure removed from the system, the equipment will be serviced while the digesters hold back their gas.

i) Describe how the biogas upgrading facility will be installed in accordance with city, state and local codes, and any other codes and regulations that are applicable.

Applicable codes have already been listed in section 1.2 2) a). City permits are discussed in section k) below. In addition to complying with all such applicable codes. The Project Team is already 90% complete with the installation of the state's only dairy biogas pipeline upgrading facility at Calgren Dairy Fuels and will implement lessons learned and best management practices from that effort.

j) Describe any additional measures, beyond what is required in code, that will be taken to ensure safe installation

The project will comply with voluntary industry guidance contained in ASME Section VIII Division 1 – Boiler and Pressure Vessel Code.

k) Describe any additional measures, beyond what is required in code, that will be taken to ensure the ongoing safety performance with operation and maintenance of the biogas upgrading facility

All personnel working at the Hub site or on gas handling equipment at the various digesters will be equipped with personnel Lowest Explosive Limit (LEL) indicators and H2S detectors. Whenever gas handling equipment is to be serviced, at least two personnel shall be present at all times. All buildings that contain gas-handling equipment are also equipped with interior LEL gas detection systems that generate a remote alarm and a red light at all entrances. A similar system is already in place at many sites developed by the Project Team including Pixley Biogas (see Figure 2 below). In the operation of maintenance of all gas handling equipment associated with the project, personnel will comply with the Safety Action Plan described in 7 f).

l) Describe any permits required for the installation and maintenance of the biogas upgrading facility and the status of each permit

As described in the preceding section on biogas gathering lines, the project will require a Conditional Use Permit (including CEQA) from King's County prior to any construction permits. The project has already applied for this Conditional Use Permit in 2017 and the initial study and various environmental reviews are well under way. We estimate this permit will be secured by October of 2018. The project also requires a building permit for the gas conditioning system at the Hub. This permit will take approximately 4 months from the completion of the Conditional Use Permit and should be received by February of 2019. The Hub gas conditioning equipment does not emit any Criteria Air Pollutants or other Toxic Air Pollutants, but the CO-2 membrane discharge gas and emergency onsite flare will still require an Authority to Construct from the Air District. The project will apply for this permit in August of 2018 and expects to receive it by January of 2019. Also, each new dairy digester requires a Site Plan Review from King's County. This Site Plan Review (SPR) is a streamlined dairy use permit that is approved administratively and with much less process delays than a CUP. Some of the dairies such as River Ranch have already completed their SPR. The others will apply after the project is awarded Pilot Project status in October of 2018 and expect to be completed by January 2019. Finally, each digester will require a Regional Water Quality Control Board pond liner approval and updates to the dairy's Waste Management Plan and Nutrient Management Plan. River Ranch, Decade Dairy, Richard Westra, and Dixie Creek have completed their updated Waste Management Plan and Nutrient Management Plans updates while Clear Lake, Lakeside, Double L, High

Roller, and Lone Oak #1 will complete these documents by November of 2018. The pond liners approvals will be completed by December of 2018.

m) Describe expected amount of tail gas flaring, including methane content and expected combustion emissions.

There will be no tail gas flaring. As described above, the project will have an emergency-only flare as a last resort for maximum project safety. However, since the project is utilizing covered lagoon digester technology that can store excess biogas for up to 2 days, the project team does not expect that the emergency flare will ever be utilized and so no emissions are expected to occur.

4) Pipeline Lateral and Compression:

a) Provide the distance from the biogas conditioning and upgrading facility to the point of receipt.

The project Hub is across the street from a large, existing, SoCalGas distribution line. The lateral required is 430 feet. The pipelines maximum operating pressure is 285 psig, which is significantly lower than most mainline pipes and will result in electrical savings due to lower compression requirements.

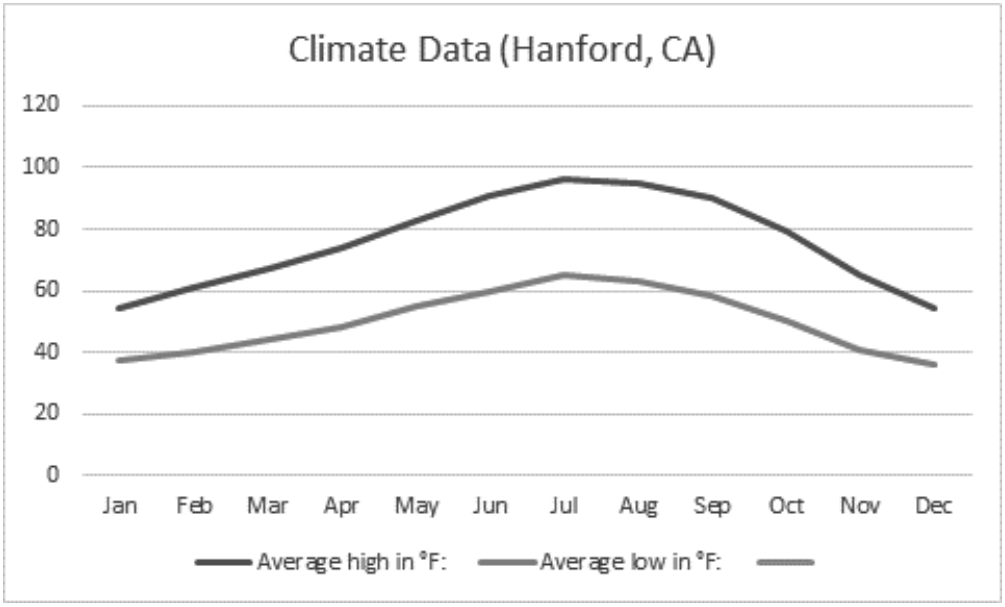
b) Provide the expected pressure (minimum, average and maximum in psig), temperature, gas composition, and volumes (minimum, expected average and maximum in standard cubic feet per hour) of the renewable natural gas leaving the biogas conditioning and upgrading facility and entering the pipeline lateral.

See table 13 above for requested information.

c) Provide site conditions including ambient temperatures, elevation and available utilities.

The gas conditioning hub already has an onsite domestic well and is served by three phase electrical power from Pacific Gas and Electric. This service amperage will be upgraded to accommodate the project. Project site elevation is 235’ above sea level and climate data is shown in the figure below.

Figure 4 - Climate Data - Hanford, CA



5) Complete End-to-End Technology Solution (Digester to Central Conditioning / Upgrading Facility):

a) Describe how proposed technologies and processes contribute to the facility's/project's ability to compete in the commercial California marketplace. Provide assumptions and sources of relevant data.

As described in section 2.3, the key to competing in the commercial California marketplace is securing access to the highest value end use for dairy biogas. This access is obtained by generating, gathering, and conditioning biogas to pipeline quality standards and delivering it into the common carrier pipeline. So, working forwards from initial biogas generation toward the end goal of pipeline injection, the end-to-end processes that will contribute to the project's success are as follows.

Generation: As described elsewhere, the project will used highly proven covered lagoon technology the Project Team has already installed 8 of these covered lagoons in California. All digesters ever installed by Maas Energy Works remain in operation. Maas Energy Works has even taken over digester projects abandoned, bankrupted, or shut down by other developers including California Bioenergy (Calbio, includes New Hope Digester), RCM (now Martin Construction Resource includes Van Warmerdam Dairy) and Bioenergy Solutions (now defunct, includes Open Sky Ranch, formerly Vintage Dairy). The Project Team's proven record and proven technology will ensure the biogas is produced at the dairies as planned and the projects remain in safe, consist operation.

Collection: Once the biogas is produced, it must be gathered. The Project Team has designed the gathering system using and simple low-pressure HDPE biogas gathering pipelines. This technology is easy to install, resists crushing and corroding, and is a proven material for gas pipelines in the petro-chemical industry. The Project Team has already installed 8 of these digesters and over 7 miles of this pipe at the Calgren

Dairy Fuels project and has completed pressure testing, gas purging and other processes to a degree no other California developer has before. Provost and Prichard, the same engineering firm that designed the Calgren Dairy Fuels project, will design the pipeline for this project.

Conditioning: After the biogas has been collected via the gathering lines, it must be upgraded to pipeline quality. This step is the most difficult and most expensive part of the entire project. To ensure performance in this area, Lakeside Pipeline LLC has contracted SCS Engineering which has one of the most experienced and qualified biogas injection design teams in the United States. SCS Engineering has worked with the project team before as the lead engineer for the biogas conditioning facility for the Calgren Dairy Fuels project—the only dairy biogas cleanup skid currently in existence in California (see Figure on right). SCS will provide full turn key, design build services to ensure the project's gas conditioning skid meets all pipeline requirements (see Attachment 5.3). The individual vendors have furthermore provided their own performance guarantees (see Attachment 5.4). The project's equipment vendors are all international industry leaders, as described in 1.2 3) a).

Figure 5 - Calgren Dairy Fuels - Biogas Conditioning Facility Under Construction

Monetization: Once the gas is in the pipeline, dairy biomethane is in high demand and relatively easy to market and sell. Taking nothing for granted, the project has already procured long-term access to the necessary CNG stations via Clean Energy Fuels[35], although other markets are also available. The project can deliver gas to CNG stations, ethanol facilities, biodiesel refineries, hydrogen reformers, petroleum refiners, and all other grid-connected users. (See marketing section 1.3).

Performance: From end to end, the proposed project is relying upon the most proven technologies and best personnel in the industry. Not only that, but the Project Team has repeatedly shown the ability to deliver on the projects it has announced. No other developer in California can claim so many operation projects, nor can any developer claim that 100% of its projects remain in operation. It is this dedication to performance that will ensure the proposed project competes in the marketplace.

b) Identify and document the role of technology partners, including the legal or contractual relationship and obligations between partners.

The project CO-2 removal membranes will be supplied by Air Liquide, which is the worldwide leader in CO-2 membrane technology, and also the provider on the Project Team's Calgren Dairy Fuels cluster. There is no exclusive contractual relationship but rather the equipment is procured through a purchase order, which will be executed approximately October of 2018. A service agreement will be executed for post commissioning support.

[35] Attachment 5.5 - Clean Energy Fuels – Biogas Offtake Agreement

The project biogas compressors will be supplied by Vilter Compressor, a wordwide leader in gas compression and also the provider on the Project Team's Calgren Dairy Fuels cluster. There is no exclusive contractual relationship but rather the equipment is procured through a purchase order, which will be executed approximately October of 2018. A service agreement will be executed for post commissioning support.

SoCalGas will provide interconnection services and indeed has already completed a Capacity Study and initiated a Detailed Engineering Study process.

Electrical Innovations is a specialized electrical and controls contractor that has developed biogas pre-treatment equipment and controls for dairy pipelines, beginning with the Calgren Dairy Fuels cluster. They are a member of the Project Team.

As described in 2.3 below, the project has a biogas offtake contract with Clean Energy Fuels for the delivery of biogas to CNG fueling stations and monetization of renewable credits.

c) If applicable, discuss how the proposed technology is a transformative approach to tackling a critical technology issue or market barrier.

The project's technology is, for the most part, standard. The compressors, CO-2 removal membranes, pipelines, covered lagoon digesters, and CNG dispensing stations are all mature and well-proven technologies. The main transformative impact of the proposed project is the efficient and rapid combination of these technologies into a viable digester cluster. The project team's highly efficient approach to project design and development are what makes this project transformative. The Project Team has designed and fabricated much of their gas processing systems, controls, and other critical elements that must be seamlessly integrated. The combined package is what makes the projects move forward and keeps the projects running. All 13 Maas Energy Works digesters constructed to date are still in operation, whereas many new and novel digesters built by other companies have been shut down. Digesters clusters in California have been publicly announced many times by companies such as Bioenergy Solutions, UC Davis, Microgy Inc, and California Bioenergy. Years later, none of these clusters has yet been built. To date, only Maas Energy Works has actually executed on a digester cluster: laid the necessary miles of biogas gathering pipeline, installed dairy biogas cleanup equipment, and the other critical steps to getting over the market barriers that have so far prevented installation of dairy clusters. The Project Team has demonstrated its ability to deliver results instead of merely accumulate publicity and public funding. We ask the selection committee to consider the performance record of the Project Team and allocate Pilot Project designations based on a company's proven ability to deliver. This proven performance is the most important "transformative approach" more than any novel new design or concept.

2.3. Marketing Plan

1) Identify credible target markets for biomethane, market drivers, and anticipated market growth.

Target Markets: The largest and most available market for biomethane is electric power generation, since nearly any natural-gas power generation plant connected to a pipeline can receive biomethane. However, this market does not maximize the environmental or financial benefits of biomethane, and so we have not targeted it.

The next largest and most available market for biomethane is compressed natural gas (CNG) fueling of motor vehicles using existing vehicles and fueling infrastructure. This market is reached by injecting biogas

into a utility pipeline and then displacing biogas consumption elsewhere at CNG stations, thus enabling the CNG stations to claim the renewable attributes of the biogas generated by the dairy digester cluster. California currently consumes approximately 171.7 million Gallons Gasoline Equivalent (GGE) per year of CNG.[36] Thus the proposed pilot project will supply approximately 2.5% of the state's average annual demand. A major market already exists whereby major distributors of natural gas procure renewable natural gas (mostly from out of state) and deliver it to CNG fueling stations. These distributors are discussed in subsection 3) below. The market has major economic diversity since use of biomethane as CNG for vehicle transport enables the project to receive maximum value for both California Low Carbon Fuels Standard (LCFS) credits and federal D3 (cellulosic ethanol) Renewable Information Numbers (RINs). The market depth greatly exceeds the amount required to absorb the biomethane from the Lakeside Pipeline cluster—and in fact from many such clusters. As such, CNG is the best available market for biomethane. The US Energy Information Administration's "Annual Energy Outlook 2018" published February 6, 2018 currently estimates that the CNG market will grow at 7.2%.[37]

A smaller, but still important secondary market is the development of new CNG stations and/or new CNG vehicle fleets. The Project Team is already building a new CNG fueling station at California's first dairy digester cluster, Calgren Dairy Fuels near Pixley, California. That station will fuel new vehicles operated by businesses including J. D. Heiskell's feed trucks, milk tankers serving California Dairies Inc, and Flyers Energy ethanol tankers. This same business model, including some of the same partners, will be expanded to the Lakeside Pipeline cluster. The location is less prime for long haul highway trucking, but there is still significant milk transport traffic that could use a minority of the project's biogas.

Finally, RNG can be delivered into other, less developed bulk markets for biofuels and petroleum production. For example, producers of ethanol and biodiesel consume significant volumes of natural gas. These bio-refineries could instead use biomethane from the pipeline and gain a much lower Carbon Intensity (CI) score under the LCFS. The Project Team has active relationships with Crimson Biodiesel in Bakersfield, Aemetis (ethanol) in Keyes, and Pacific Ethanol in Madera and Goshen. These biofuel producers have a very large appetite for RNG as an input to lower the carbon intensity of their fuels However, this use would not normally allow the producer to claim any marginal D3 RIN benefit, and as such this market is economically less lucrative than CNG. In a similar way, the biomethane can be sold to conventional petroleum refineries for use in creating hydrogen, which would also yield a large CI benefit to those producers, but no current RIN benefit. The project may consider selling a portion of its biogas into these markets depending on future pricing and demand information.

2) Identify market barriers to the development of dairy biomethane, including existing or potential competitions, and how the Pilot Project will overcome them.

The largest market barriers to dairy biomethane or the capital and technical challenges of producing a commercially-viable volume of pipeline-quality biomethane. Such facilities are very rare in North American, and none are currently operational in California. The technical challenges of producing pipeline quality gas are manageable using industry standard biogas conditioning technologies supplied by major market providers—but at a significant cost. To afford such systems, a project must be very large and well capitalized. Consequently, dairy biomethane projects must overcome several barriers including:

[36] https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm Note that some CEC or ARB sources use lower numbers, but are not published with the regulatory or uniformity of the USEIA numbers. If a lower number of 100,000,000 GGE is used, then the project will still deliver less than 5% of the total statewide CNG demand.
[37] https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf

- Digester Development Acumen: The project team must be able to implement the proposed number of digesters on time and on budget. Development capability is key because cluster projects require the resources and know-how to build many projects, all at once. This project team has already developed 13 new digesters and retrofit several others, install more digesters than all other competitors in the state for many years. Out of nearly 20 digesters awarded CDFA grants in 2017, this Project Team has already begun construction on five digesters while no other CDFA award recipients have begun construction anywhere. The Project Team will apply its experience and very large digester development personnel resources (several times that of the next largest active California developer) to deliver the cluster as proposed. Not only have these 10 digesters executed agreements to deliver their pipeline gas, but all of them have also signed agreements to have Maas Energy Works develop the digester for them—whether farmer owned or owned by Maas Energy Works.[38] This unity of development effort will increase efficiency and reliability.

- Digester Operational Acumen: California digesters other than those installed by Maas Energy Works have a historical failure rate of over 50%. The industry simply has not built up a strong ability to maintain and operate digesters and many projects fail for lack of proper maintenance. The Project Team includes the state's largest group of trained digester operational personnel, who has successfully kept 100% of their 13 digesters in. The project team will hire and train additional personnel as needed during operations, and will use our existing remote management and maintenance software for 24x7 control of the facilities. The project will also make use of its experienced engineers and major equipment vendors for post-commissioning operations support. All projects have executed 10-year Operations and Maintenance agreements with Maas Energy Works to ensure that the digesters remain in reliable operation.

- Dairy Feedstock Access (Scale) – A major market barrier to cluster projects is procuring enough contracted feedstock to be able to build to the scale necessary for biomethane injection. In general, 15,000 milk cows or more are required to justify the major expenses of biogas conditioning and pipeline injection. A company must have built up very good relationships with a large number of dairies to be able to supply this much manure. The Project Team has built up this relationship with the dairy community over the years, and that trust is evidenced by the very large number dairies that have contracted with the team—10 Dairies with about 30,000 milk cows, and another 11 more potential expansion dairies. Two of the largest dairy owners have also chosen to partner as owners, making the supply of their feedstock even more dedicated.

- Pipeline Access: A major stumbling block for dairy biomethane projects has been the inability to obtain pipeline access. Many dairies are located too far away from utility pipelines, or nearby pipelines do not have the capacity to absorb injected biogas. Thankfully this cluster's hub, at the center of a very large group of dairies, is located directly on the SoCalGas pipeline with no new extensions required. The utility has already determined that the pipeline can receive the requested volume in its present state and can be upgraded (at a cost) to receive the expansion dairies in the future.[39]

- Capital Access: Another major market barrier is securing the necessary capital to invest in dairy biomethane—which cannot easily be sold on profitable, long term contracts. Many projects go through multiple rounds of attempted financing which fall through. This project has overcome that barrier by procuring the necessary financing directly from dairy producers who are also owners of the project. As documented in Attachments 7.2 through 7.8, Jacob DeJong and Bernard TeVelde

[38] Attachment 6.1 through 6.9 - Feedstock Agreements
[39] Attachment 5.6 - SoCal Gas Company - Lakeside Pipeline Cluster - PISCE Analysis

have already secured adequate resources to fund the project and no further outside capital is required in order to move forward.

Finally, the application question asks whether competitors represent a significant barrier to the development of dairy biomethane. It is true that other suppliers of RNG, such as wastewater treatment plans and landfill gas, compete for access to California CNG filling stations and in fact supply the majority of RNG consumed in the state. However, these fuels have CI scores in the range of 20 to 50, while dairy biomethane has CI scores in the range of -200 to -400. Consequently, dairy biomethane produces far more revenue when supplied to a California CNG station. This much greater revenue per MMBTU of gas makes dairy biomethane much more competitive than other forms of renewable natural gas and enables dairy projects to outprice landfill gas in terms of compensation to CNG dispensing stations. As described in the following section, biomethane providers face some competition in how well they compensate the CNG stations, but ultimately the value of the dairy biomethane ensures that the first several dozen dairy clusters will have no problem accessing CNG dispensing capability. Since there are no other dairy digester clusters in the state, and only one known out of state dairy project currently delivering biomethane to California, the supply of competitive dairy biogas remains very low. The project will in any event secure long-term offtake agreements to ensure access to the CNG market, as described below.

3) Describe and document the role of strategic marketing partners, customers, and other partners in ensuring Pilot Project success, including fuel and co-product off-take agreements (existing or conditional agreements).

The project has executed a Clean Energy Fuels North American Energy Standards Board Base Contract for Sale of Natural Gas, together with a Term Sheet allocating renewable attributes.[40] Clean Energy Fuels is the largest operator of CNG fueling stations in both the United States and in California. Clean Energy Fuels has supplied terms that guarantee the project access to California fueling stations for all of the biomethane produced by the project. Clean Energy Fuels (CEF) will supply the project's biomethane to its own CNG stations, or to stations that CES operates for others. CEF will monetize the LCFS and RIN benefits and return the contracted share of those revenues to the project. CEF and the Applicant have analyzed the market situation and designed an agreement that will allow the dairy biogas to price out any existing RNG in CEF's stations. No company has more experience in or access to the CNG market than CEF.

4) Submit preliminary draft 1-page summary showcasing the benefits of the project. Please include information for public consumption including: costs, benefits, uses of new technology, partnerships, community benefits, any other information that could be provided to the public to explain why the project is of benefit to the State of California.

The Lakeside Pipeline dairy digester cluster is a group of nine family-owned dairy farms that are working together to capture energy made from dairy manure. Manure storage ponds naturally create methane gas, which normally escapes into the atmosphere, creating odors and greenhouse gas emissions. By installing large covers over manure ponds to create "manure digesters", these dairies will capture these bio-methane emissions and the energy they contain. These dairies will be connected with pipelines to gather renewable bio-methane from manure digesters installed at each dairy. The captured "biogas" will be cleaned for use as compressed natural gas vehicle fuel. The dairy farms involved will soon be producing both food and energy, while also reducing environmental impacts.

California currently hosts nearly 20 dairy digesters. This project is located in an a large concentration of dairies in Kings and Tulare County, where there are significant benefits from combining many dairies. The

[40] Attachment 5.7 - Clean Energy Fuels – Term Sheet

project will use proven covered lagoon dairy digester technologies, which are ideally suited for California's climate and dairy management practices. Expansion of the digester industry is important in meeting the state's greenhouse gas reduction goals, which seek to reduce dairy methane emissions by 40%. This project will reduce total greenhouse gas emissions by 1,539,156 tons per year—an amount equivalent to removing 334,599 cars from the road. The positive response of so many dairies, hosting 62,110 animals, shows the successful collaboration between the state, utilities, and the dairy industry to make California dairies clean and financially stable.

The project will use biomethane cleanup technologies that are common in the landfill gas and wastewater treatment gas industries. These technologies include reciprocating compressors, gas-treatment membranes, and activated carbon gas polishing. By improving manure management at partner dairies, as well as supplying clean, natural gas fuel to replace diesel emissions, the project will create significant reductions in air pollutants, including annual reductions of 162,023 tons of NOx (smog), 129,465 tons of sulfur dioxide (acid rain), 62,198 tons of Volatile Organic Compounds, and 27,907 tons of Carbon Monoxide. Up to 11 more dairies may later join the project, further increasing cumulative benefits.

The total cost of gas cleanup equipment, utility connections, and gathering pipelines is $22,357,165, plus another $27,729,994 for the construction of digesters on the dairies for a total of $50,087,159. Of this total, approximately $14,162,860 will be supplied by SoCal Gas as part of the state's Pilot Project program to encourage injection of biogas into the pipeline system. The project has entered into a community benefits agreement with King County Economic Development Corporation to ensure local hiring and other local economic benefits. Approximately 546 jobs will be created during construction, and another 20 jobs in long term operation of the facility. Additionally, the project supports the existing 298 jobs on the partner dairy farms, who will receive significant revenue shares and infrastructure improvements. Dairy digesters enable farmers to continue farming here in California, while complying with the state's environmental goals. See Table 23 in the Community Benefits section for job creation calculations.

Lakeside Pipeline has partnered with Clean Energy Fuels, the nation's largest owner and operator of compressed natural gas fueling stations. Lakeside Pipeline will deliver its biomethane (via the SoCal Gas utility pipeline) to California CNG fueling stations operated by Clean Energy Fuels. The CNG will be dispensed to vehicles throughout the state, including to new local new milk, grain, and fuel hauling vehicles that will switch from diesel to clean, renewable CNG as part of the project's fleet outreach.

2.4 Scalability

1) Discuss the replicability of the proposed digester and conditioning technologies and the long-term viability of scaling up capacity.

Digesters: The individual digesters have been sized to accommodate the full current size of the dairy herds plus all likely expansions of those dairies. Expansion of a dairy herd significantly beyond current expectations would require additional covered digester ponds, at a cost proportional to the initial installation. However, the gathering lines would already be in place and so the project would realize some economies of scale from replication. More importantly, the project area includes 11 potential expansion digesters, not counting nearby clusters proposed by other developers. The proximity of these digesters to the proposed initial gathering line infrastructure means new dairy digesters can be added with increasing economies of scale.

Gathering Lines: The gathering lines pipeline system (described above) uses very large pipes operating at low pressure of 5-15 psi. This means that with modest equipment upgrades at the various digesters, the same pipeline operating at moderate pressures (20-40 psi) can handle double or even triple the original

biogas flow. Consequently, the main biogas gathering pipelines can handle up to 213 MCFH, triple original gas flow of biomethane per year.

H2S Removal: The H2S Removal System at the Hub is essentially a backup system for the H2S removal at any new dairies that would be added to the cluster. If necessary, more H2S removal vessels could easily be added to handle the additional gas flow.

CO-2 removal and Conditioning: The CO-2 removal membranes are modular in nature. Additional membranes can be added in proportion to the amount of additional gas to be treated.
Compression: The original compressors have 10-20% excess capacity in their design. Beyond that, additional compressors would need to be added for process pressure and pipeline injection pressure.

2) Describe how feasible it is for the interconnect location to accept biomethane from potential additional digesters.

SoCalGas has confirmed that the utility pipeline can receive 71 MCFH of biogas. As described elsewhere, this offtake capacity is sufficient for 100% of the biogas generated by the digesters proposed in this application. Additional biomethane could be accepted via several different improvements:

First, and as discussed elsewhere, the project intends to later install an on-site CNG fueling station to assist in our ongoing efforts to convert local hauling fleets to renewable CNG. We estimate based on the expected fleet demand that this CNG station could supply an average of 7.5 MCFH of on-site CNG, which would increase the Hubs capacity to receive biogas from additional digesters.

A second, transitional option is to create a virtual pipeline to haul excess biomethane via tube trailers to the first project developed by the Project Team: the Calgren Dairy Fuels facility. That project will have an active SoCalGas injection site by the end of 2018, already has a CNG offloading location, and can use the biogas in the ethanol plant or for pipeline injection. This virtual pipeline would require a new CNG compressor and loadout and is likely not an ideal long-term solution for major volumes of gas. However, as the project injection increases to near the capacity of its current pipeline injection site, this option could be highly useful in smoothing out the peaks and troughs of biogas generation. That is, if the project adds more digesters in the future, then depending on the seasons it may be possible to inject all the gas at some times, but not at other times. The CNG hauling could serve to ensure this excess gas can be stored in the covered lagoons and then exported via virtual pipeline to beneficial use at Calgren Dairy Fuels only 31 road miles away. In that way, 100% of the biogas would be beneficially used during any transitional period while the project worked to increase its pipeline injection takeaway capacity.

Finally, SoCalGas has confirmed that the project can deliver 71 MCFH into the pipeline at a cost of $4,835,565 which includes lateral line, extension, compression equipment, and injection skid with associated materials. Expansion above this amount would require infrastructure upgrades that SoCalGas has already identified as feasible on the attached capacity study report, included in Attachment 5.6 SoCal Gas Company – Lakeside Pipeline Cluster - PISCE Analysis.

For all such expansions, the project's CO_2 removal membranes are design in a modular fashion and so gas conditioning throughput could be expanded simply by adding modules. The compressor is designed with approximately 20% excess capacity and so could handle more gas without upgrades. Larger expansions of gas supply would require an additional compressor. H2S removal is large accomplished at the dairies and so the on-site H2S removal system can accept very large volume increases of 50% or more before a new vessel would need to be added.

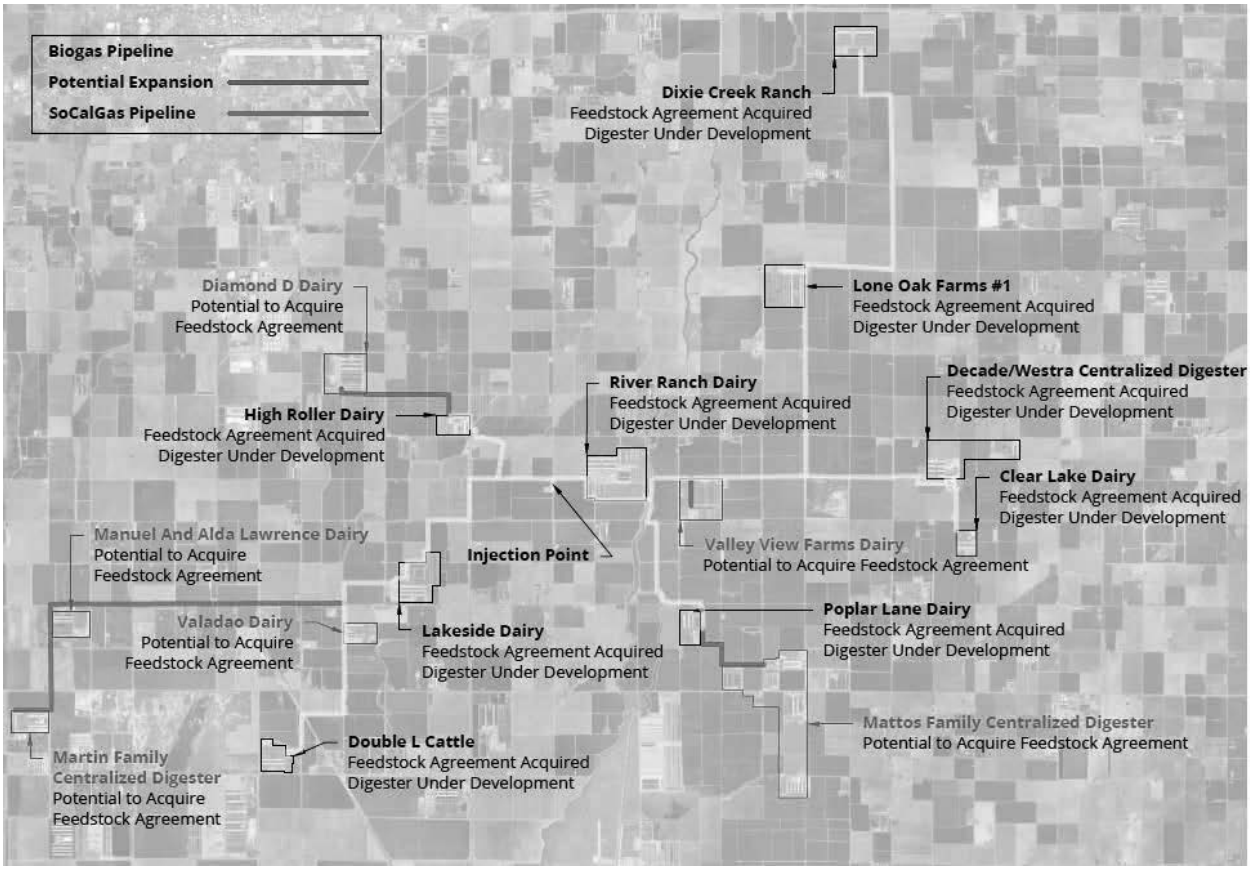
3) Describe the potential for future expected feedstock agreements and the expected timing for such agreements and the inclusion of such feedstock in proposed Pipeline Infrastructure.

The project team is already in discussions with the owners of 11 additional dairies in the area regarding joining the Lakeside Pipeline Cluster. The list includes the following dairies.

- Diamond D Dairy
- Valadao Dairy
- Manuel and Alda Lawrence Dairy
- Martin Family Centralized Digester (3 dairies that would serve a centralized digester)
- ValleyView Farms Dairy
- Mattos Family Centralized Digester (4 dairies that would serve a centralized digester)

The locations of these dairies and potential pipeline additions are shown in the figure below.

Figure 6 - Lakeside Pipeline Cluster Map - Including Potential Expansion Dairies



In many cases the dairies have already stated their verbal willingness to join the cluster, but we could not obtain documents in time for this submission due to various complications including multi-family ownership, agreements with other digesters developers, and legal reviews. Consequently, the pipeline and equipment to connect to these not-contracted dairies has NOT been included in the proposed Pipeline Infrastructure. However, to enable maximum growth, the project's CEQA application has already been submitted for the pipeline routes necessary to connect to all expansion dairies, so that the project has already

screened for any additional environmental roadblocks from expanding the collection lines. None have been found. The pipelines have been sized to be able to receive the additional volume from future pipeline expansions, as well.

Regarding timing of the 11 dairies listed above: five are under standstill agreements with other developers that are not currently moving forward (a common problem in this industry). We expect these agreements to expire by early 2019 and we could then begin negotiating with them for construction, likely beginning spring of 2020. The other six dairies are interested but would like to wait longer and see the project make positive forward progress. Likely these dairies will be willing to sign once the first gas is delivered into the pipeline in 2020, which means the digesters would be constructed in 2021. It would also likely take until 2021 to expand the SoCalGas injection point takeaway capacity (see previous section). So, by the end of 2021, we believe this project could be injecting at the full potential of approximately 21 dairies.

We should note that this project is located near two smaller clusters proposed by California Bioenergy—one to the south at the DeJong Dairies (Cloverdale/Wreden/Hollandia) and one to the east at the Moon/Scheenstra/Hamstra dairies. We have met with California Bioenergy about whether it would be possible to merge our efforts to combine one or two of their smaller clusters with our cluster, to create a single cluster injecting gas at one location. California Bioenergy was not interested in this approach and so the clusters are proceeding separately. Due to the close proximity of these clusters, we are more than willing to entertain the possibility that Calbio's projects or dairies could someday delivery biogas via our gathering lines and injection point if that would be more efficient. And we are open to any conversations with the selection committee if there are ways to achieve our mutual objectives more efficiently.

2.5 Project Team Qualifications

1) Provide a list of team members along with a short description of their qualifications, experience, technical expertise, capabilities, and credentials (e.g., a professional resume). This must include at a minimum, project developers, project manager, and participating dairy farmer(s). Applicant must identify why this particular team composition and representation will enable successful implementation of the proposed work plan. Collaboration is encouraged.

Team Members: The project team is the most experienced and successful in the industry with 15 new or retrofitted digesters on the west coast, including commissioning 8 of the last 13 new digesters in California and are actively constructing 4 additional California digesters with dozens more planned. Key members are listed below, and all resumes and statement of qualifications are attached. Four of the core team members (Maas Energy Works, Craig Hartman, Electric Innovations, and EFI) have worked together, with nearly identical roles, on all 8 digester projects completed by Maas Energy Works in California. The team has a familiar, collaborative working relationship that is unequaled in the industry, enabling the project to move rapidly, avoid unnecessary costs, and provide a high quality and reliable outcome. Statement of Qualifications for the Project Developer, Lead Engineers, and Major Contractors are included in the attachments.[41] A complete list of the major team members are listed in the Table below:

Table 15 - Lakeside Pipeline Dairy Digester Cluster - List of Team Members

Entity	Title	Entity Owner	Type
Lakeside Pipeline LLC	Project Owner (Applicant)	**Daryl Maas** (Maas Energy Works) **Jacob de Jong**	Hub

[41] Attachment 6.19 through 6.24 – Statements of Qualifications for Project Team Members

		(River Ranch Farms and High Roller Dairy) **Bernard te Velde** (Lone Oak Farms #1 and Dixie Creek Dairy)	
Decade Energy LLC	Digester #1 Owner – Decade Dairy Digester #2 Owner – Clear Lake Dairy	Eric & Clarinda Westra	Digester
Lone Oak Energy LLC	Digester #3 Owner – Dixie Creek Dairy Digester #7 Owner – Lone Oak Farms #1	Bernard te Velde Jr	Digester
Double L Dairy Biogas LLC	Digester #4 Owner – Double L Cattle	Maas Energy Works Inc	Digester
River Ranch Farms LLC	Digester #5 Owner – High Roller Dairy Digester #9 Owner – River Ranch Dairy Land Owner for Hub Project Site	Jacob de Jong	Digester / Hub Host
Lakeside Dairy	Digester #6 Owner – Lakeside Dairy	Mike Monteiro	Digester
Poplar Lane Dairy Biogas LLC	Digester #8 Owner – Poplar Lane Dairy	Maas Energy Works Inc	Digester
Decade Dairy	Digester #1 Host	Eric & Clarinda Westra	Host
Richard Westra Dairy	Digester #1 Feedstock	Richard Westra	Feedstock
Clear Lake Dairy	Digester #2 Host	Eric & Clarinda Westra	Host / Feedstock
Dixie Creek Dairy	Digester #3 Host	Bernard te Velde Jr	Host / Feedstock
Double L Cattle	Digester #4 Host	Ron & Rose Vander Weerd	Host / Feedstock
High Roller Dairy	Digester #5 Host	River Ranch Farms LLC	Host / Feedstock
Lakeside Dairy	Digester #6 Host	Mike Monteiro	Host / Feedstock
Lone Oak Farms #1	Digester #7 Host	Bernard te Velde Jr	Host / Feedstock
Poplar Lane Dairy	Digester #8 Host	Bernard te Velde Sr	Host / Feedstock
River Ranch Dairy	Digester #9 Host	River Ranch Farms LLC	Host / Feedstock
Clean Energy Fuels	CNG Station Installer	Clean Energy Fuels	Contractor
Hartman Engineering	Lead Engineer	Craig Hartman, P.E.	Contractor

Provost & Pritchard	Lead Engineer	Ken Shuy, P.E. Steve Bommelje, P.E.	Contractor
SCS Engineering	Lead Engineer	Jeffrey Pierce, P.E.	Contractor
Maas Energy Works Inc	Project Developer / Manager	Daryl Maas	Contractor
Environmental Fabrics	Digester Contractor	Dennis Shanklin	Contractor
Electric Innovations	General/Electrical Contractor	Theodore Thompson	Contractor

The Solicitation Instructions required all owners of digesters, dairies, and contracts to be listed as members of the project team. Complying with this instruction requires a fairly long list, which is included in the table above. A brief description of each Team Member's roles is described below. For more detail on the business arrangement between Lakeside Pipeline and the various dairies and digester companies, see section 3 a. 7) on Financial Plan / Economic Viability.

- Project Owner (Applicant) – Biogas Conditioning/Upgrading Facility – The Project Owner for the biogas conditioning and upgrade facility is Lakeside Pipeline LLC, a new special purpose entity owned by Daryl Maas (Maas Energy Works Inc), Jack de Jong (owner of River Ranch Farms LLC and High Roller Dairy), and Bernard te Velde (owner of Lone Oak Farms #1 and Dixie Creek Dairy).

- Digester #1 and #2 Owner – Decade Energy LLC: The owner for the Clear Lake Digester and also the Decade Centralized Digester that includes the feedstock from Decade Dairy and Richard Westra Dairy is Decade Energy LLC, an entity owned by Eric and Clarinda Westra. The contractors, suppliers, and host dairy will execute contracts with owner Decade Energy LLC, which will pay for all digester expenses and invoices. As the project manager, all other digester development and operations tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination.

- Digester #3 and #7 Owner – Lone Oak Energy LLC: The owner for the Dixie Creek Dairy Digester and the Lone Oak #1 Dairy Digester is Lone Oak Energy LLC, an entity owned by Bernard te Velde Jr. The contractors, suppliers, and host dairy will execute contracts with Lone Oak Energy LLC, which will pay expenses and invoices. All other management tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination.

- Digester #4 Owner – Double L Cattle: The owner for the Double L Cattle Dairy Digester is Double L Dairy Biogas LLC an entity owned by Maas Energy Works Inc. The contractors, suppliers, and host dairy will execute contracts with Double L Dairy Biogas LLC, which will pay expenses and invoices. As the project manager, all other digester development and operations tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination.

- Digester #5 and #9 Owner – River Ranch Farms LLC: The owner for the High Roller Dairy Digester and the River Ranch Dairy Digester is River Ranch Farms LLC, an entity owned by Jacob and Nicole De Jong. The contractors, suppliers, and host dairy will execute contracts with owner River Ranch Farms LLC, which will pay expenses and invoices. As the project manager, all other digester development and operations tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination.

- Digester #6 Owner – Lakeside Energy LLC: The owner for the Lakeside Dairy Digester is Lakeside Energy LLC, an entity owned by Mike and Manuel Monteiro. The contractors, suppliers, and host dairy will execute contracts with Lakeside Energy LLC, which will pay expenses and invoices. As the project manager, all other digester development and operations tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination. Maas Energy Works may also fund the project if the current owners would prefer to change the existing contract.

- Digester #8 Owner – Poplar Lane Dairy Biogas LLC: The owner for the Poplar Lane Dairy Digester is Poplar Lane Dairy Biogas LLC an entity owned by Maas Energy Works Inc. The contractors, suppliers, and host dairy will execute contracts with Poplar Lane Dairy Biogas LLC, which will pay expenses and invoices. As the project manager, all other digester development and operations tasks will be delegated to Maas Energy Works Inc for managing schedules, design, permits, grants, utilities, and team coordination.

- Host Dairy #1 – Decade Dairy – The Decade Dairy facility and Richard Westra Dairy are owned by Eric & Clarinda Westra and Richard Westra. As Host Dairies, they will supply manure to the project's Digester #1 and the necessary project site for the digester, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #1 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #2 – Clear Lake Dairy – The Clear Lake Dairy facility is also owned by Eric & Clarinda Westra. As a Host Dairy, they will supply manure to the project's Digester #2 and the necessary project site for the digester, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #2 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #3 – Dixie Creek Dairy: The Dixie Creek Dairy facility is owned by Bernard te Velde Jr and his son Adam te Velde. As a Host Dairy, they will supply manure to the project's Digester #3 and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #4 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #4 – Double L Cattle: The Double L Cattle dairy facility is owned by Ron and Rose Vander Weerd. As a Host Dairy, they will supply manure to the project's Digester #4 and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy will be paid on a per cow basis under a 20-year manure supply agreement with High Roller Dairy Biogas LLC. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #5 – High Roller Dairy: The High Roller Dairy facility is owned by River Ranch Farms LLC and Jacob and Nicole De Jong. As a Host Dairy, they will supply manure to the project's Digester #5 and the necessary project site to the project, including easement for the project's

pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owner as the Digester Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #6 – Lakeside Dairy: Lakeside Dairy is owned by Mike and Manuel Monteiro. As a Host Dairy, they will supply manure to the project's Digester #6 and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #6 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #7 – Lone Oak Farms #1: The Lone Oak Farms #1 dairy facility is owned by Bernard te Velde. As a Host Dairy, they will supply manure to the project's Digester #7 and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #7 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #8 – Poplar Lane Dairy: The Poplar Lane Dairy facility is owned by Bernard te Velde Sr. As a Host Dairy, he will supply manure to the project's Digester #8 and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy will be paid on a per cow basis under a 20-year manure supply agreement with Poplar Lane Dairy Biogas LLC. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Host Dairy #9 – River Ranch Dairy: The River Ranch Farms LLC dairy facility is owned by Jack de Jong. As the Host Dairy, they will supply manure to the project's digester and the necessary project site to the project, including easement for the project's pipeline route back to the Hanford-Lakeside Hub. The Host Dairy shares the same owners as the Digester #9 Owner and thus shares in its resultant revenues providing an incentive for continued project support and environmental compliance. The Host Dairy also receives significant upgrades to its manure handling system, to enable its supply of manure.

- Biogas Conditioning/Upgrading Hub Host: The land that will be the host for the biogas conditioning/upgrading facility and also the interconnection point with SoCalGas is owned by Jack de Jong of River Ranch Farms and High Roller Dairy.

- Project Manager/Project Developer: The Project Manager is Daryl Maas of Maas Energy Works. Daryl Maas has personally served as lead developer on 13 completed new dairy digester facilities that currently process manure from 24 farms making him the most experienced and successful developer of dairy digesters on the west coast. Today, he supports operations at all 13 operating digesters and maintains direct ownership in 7 of those sites. This gives Daryl a unique perspective as not just a developer, but also an owner and operator. As Project Manager, Daryl will coordinate the project team, while making recommendations for equipment, contractors, and design elements to the Project Owner.

- CNG Station Installer: Clean Energy Fuels, the largest operator of CNG stations in the United States, will install the on-site CNG fueling station, and provide post installation service and support

- Biogas Conditioning Engineer: SCS Engineering will provide turn key engineering design, purchasing, installation, and commissioning of the biogas conditioning system. SCS has completed the design and construction of over 20 biogas conditioning facilities in the United States with 12 more currently in process. SCS Engineering is currently serving a similar role in the Calgren Dairy Fuels Project. SCS has provided the project team with a guarantee that the project will operate in compliance with SoCalGas Rule 30 and will remain available for post-startup support of the equipment and will coordinate with major equipment vendors for materials and technician support where needed—including Vilter Compressors and Air Liquide CO-2 removal membranes.

- Lead Engineer #1 (Digesters): The lead engineer for the majority of the digesters will be Craig Hartman of Hartman Engineering. Craig has over a decade of experience in civil and environmental engineering. Among his qualifications are a certificate in air quality management, digester design, waste management planning, and pond lining. Craig has worked with Maas Energy Works to develop eight digesters that are currently operating and will review the overall design of this project for suitability, safety and engineering regulatory compliance.

- Digester Lead Engineer #2 (Pipeline): The lead engineer for the biogas pipeline will be Ken Shuy of Provost and Pritchard who has over 35 years of civil and agricultural engineering experience. Ken has engineered the development of multiple pipeline projects as outlined in his statement of qualifications. Ken is also already working this project team to construct the Calgren Dairy Fuels dairy biogas pipeline and will use this additional experience to perfect the final designs for this project. Ken and his team will prepare the project's final construction drawings, oversee construction of the pipeline, and serve as engineer of record for safety and regulatory compliance.

- Digester Contractor: The covered lagoon digester supplier and installer is Environmental Fabrics Inc (EFI). EFI specializes in geosynthetics and has developed strong expertise in hundreds of covered lagoon digesters around the world. EFI has installed a majority of California's existing manure digester covers. EFI will provide the digester materials, installation, and startup assistance under a fixed-price contract and covered under 5-year and 10-year materials and installation warranties–the longest in the industry.

- General and Electrical Contractor: The project's general contractor, Electric Innovations, is highly specialized, with extensive experience in biogas handling equipment design, installation, and operation. Electric Innovations has previously served as a prime contractor on 8 completed (and 4 under construction) Maas Energy Works Inc dairy digesters in California making it the leading service provider in the industry.

Table 16 - Project Team Collaboration History in California

Project	Status	Project Manager and Developer	Project Engineer	General and/or Electrical Contractor	Covered Lagoon and Liner Contractor
Van Warmerdam Dairy Digester	Online May, 2013	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics

Pacific Rim Dairy Digester	Online Oct, 2014	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Pixley Biogas Dairy Digester	Online Sep, 2014	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Van Steyn Dairy Digester	Online Oct, 2015	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Open Sky Dairy Digester	Online Aug, 2016	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Verwey-Hanford Dairy Digester	Online Oct, 2016	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Verwey-Madera Dairy Digester	Online May, 2017	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
GJ TeVelde Ranch Dairy Digester	Online Jun, 2017	Daryl Maas Maas Energy Works	Craig Hartman PE 4Creeks Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Van Beek Brothers Dairy Digester	Under Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Robert Vander Eyk Dairy	Under Construction	Daryl Maas Maas Energy Works	John Schaap PE Provost & Pritchard	Ted Thompson Electric Innovations	Industrial Environmental Concepts
Circle A Dairy Digester	Under Construction	Daryl Maas Maas Energy Works	John Schaap PE Provost & Pritchard	Ted Thompson Electric Innovations	Industrial Environmental Concepts
Legacy Ranch Dairy Digester	Under Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
K&M Visser Dairy Digester	Under Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Pixley Dairy Digester	Pre-Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
Williams Family Dairy Digester	Pre-Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics
New Hope Dairy Digester	Pre-Construction	Daryl Maas Maas Energy Works	Craig Hartman PE Hartman Engineering	Ted Thompson Electric Innovations	Dennis Shanklin Environmental Fabrics

2) If a Pilot Project is being submitted by a project developer, a contractual agreement documenting project support from the dairy producer(s) must be included as Attachment 6. Letters of commitment from team members demonstrating understanding of their participation and specific role(s) in the Pilot Project must also be included.

Letters of Commitment: The Project has obtained Feedstock Agreements from each Dairy Farmer[42] and Letters of Commitment for all other team members[43] listed in the section above and have been included in the attachments.

3) Provide an explanation of how various tasks will be managed and coordinated and how the Pilot Project manager's technical expertise will help achieve the goals of the project. Describe previous experience of the Pilot Project team with dairy digester projects in California or other parts of the United States.

Task Management: Tasks will be coordinated as follows:

1. Maas Energy Works (Project Manager/Project Developer) establishes the Project Objectives in consultation with all Dairy Farmers and co-owners of Lakeside Pipeline LLC, Jack de Jong and Bernard te Velde.
2. Project Manager works with lead engineers from Hartman Engineering, Provost & Pritchard, and SCS Engineering to finalize all digester designs and gas condition system design, in consultation with all 9 host dairies and with SoCalGas.
3. Project Manager solicits bids and presents each digester owner and Lakeside Pipeline LLC with a final project cost.
4. Project Engineers drafts engineering drawings and assists in permitting and bidding
5. Project Owners and Dairy Farmers execute bids
6. The Project Manager directs the efforts of the individual contractors, to achieve work within their scope via phone, email, meetings, and site visits. The Project Manager reviews the work being accomplished to ensure quality and coordination and recommends invoices to be paid by the Project Owner and Dairy Farmers
7. The Project Manager, assisted by the Project Engineers and Electrical Contractor, evaluates the completed project, secures final permits and authorizations, and directly oversees the Project's startup.
8. The Project Manager then transitions into a full-time operations and maintenance role for the project, supported by the Biogas Conditioning contractor and Host Dairies.

The Project Team has developed 13 new dairy digesters and upgraded or restarted two more at existing facilities. All 15 of these projects are still in operation. No other digester developer active in California can claim a 100% success rate in continued digester operations and viability. In fact, Maas Energy Works has repeatedly been called upon to take over failed or incomplete digesters developed by other companies including RCM (now Martin Construction Resource), Bioenergy Solutions (now defunct), and California Bioenergy (whose joint venture with MT Energie ended in the shutdown and abandonment of the New Hope Dairy Digester project). Our Project Team has a history of building digesters and ensuring they perform for the long term. The Project Team has five more digesters under active construction—four of which are likely the only 2017 CDFA grant awardees that have actually started construction. The Project Team is also expanding power generation on three previously constructed digesters, adding 3.6 MW of new generation to take advantage of excess flared gas. If the Pilot Project program's goal is to demonstrate deliver of biomethane into the pipeline, this Project Team is the one that gets true results and will deliver the demonstrated injections desired.

Perhaps the Project Team's most relevant experience is the Calgren Dairy Fuels project, the only California dairy digester cluster project under actual pipeline construction. Despite many other pipeline injection dairy projects being proposed over the years, SoCalGas has confirmed that Calgren Dairy Fuels will be the first to actually inject gas into the pipeline.[44] The project is scheduled to begin delivering gas to the Calgren

[42] Attachment 6.1 through 6.9 – Feedstock Agreements
[43] Attachment 6.10 through 6.18 – Team Commitment Letters
[44] Attachment 6.25 - SoCalGas Letter to CPUC Regarding First CA Dairy Cluster To Be Online

ethanol refinery in July of 2018 and to begin injecting biogas to the SoCalGas pipeline in January of 2019. As of the date of this application, 7.5 miles of the pipeline has been laid, connecting several dairies in the CDF cluster. Nearly all of the project's biogas conditioning equipment has been installed, including many of the same equipment proposed for this project (Vilter Compressors, Air Liquide CO_2 removal membranes, etc). Other active roles by the Project Team on the Calgren Dairy Fuels project include:

- SCS Engineering has overseen the design of all biogas conditioning equipment for Calgren Dairy Fuels, which is over 75% installed.
- Electric Innovations has fabricated equipment and controls for on-farm biogas pre-conditioning a and pipeline management;
- Provost and Prichard Engineering has engineered and overseen installation of the biogas pipeline
- Maas Energy Works has executed digester installation agreements with 12 dairies and is actively overseeing permitting and design on all 12 and overseeing construction on 5 sites as of the date of this application;
- Hartman Engineering has the lead role in digester engineering for 9 digesters in the Calgren Dairy Fuels cluster.

4) List past successful digester projects developed by the Pilot Project team, including digesters implemented in California and their operational status.

See Table below for complete list of digester projects by project developer, Maas Energy Works.

Table 17 - Maas Energy Works - Development Experience – List of Projects and Operational Status

MEW Role	Project	Location	Project Cost	Online Since	Status	Digester Technology
Developer, Operator, Owner	Farm Power Rexville	Skagit County Washington	$3,500,000	Aug, 2009	Operational	Mixed Plug Flow
Developer, Operator, Owner	Farm Power Lynden	Whatcom County Washington	$4,200,000	Dec, 2010	Operational	Mixed Plug Flow
Developer, Operator, Owner	Farm Power Tillamook	Tillamook County Oregon	$4,100,000	Apr, 2012	Operational	Mixed Plug Flow
Developer, Operator, Owner	Rainier Biogas	King County Washington	$4,400,000	Dec, 2012	Operational	Mixed Plug Flow
Developer, Operator, Owner	Farm Power Misty Meadow	Tillamook County Oregon	$5,000,000	Mar, 2013	Operational	Mixed Plug Flow & Covered Tank
Developer, Operator, Owner	Van Warmerdam Digester	Sacramento County California	$1,700,000	May, 2013	Operational	Covered Lagoon
Developer, Operator	Pixley Biogas Digester	Tulare County California	$9,300,000	Sept, 2014	Operational	Mixed Plug Flow

Developer, Operator	Pacific Rim Digester	Tulare County California	$2,500,000	Nov, 2014	Operational	Covered Lagoon
Developer, Operator, Owner	Van Steyn Digester	Sacramento County California	$1,400,000	Sep, 2015	Operational	Covered Lagoon
Developer, Operator	Point Reyes Cheese Farm Digester	Marin County, California	$250,000	Jul, 2016	Operational	Engine Retrofit
Developer, Operator	Open Sky Digester*	Fresno County California	$4,000,000	Aug, 2016	Operational	Covered Lagoon
Developer, Operator	Verwey Hanford Digester*	Kings County California	$8,000,000	Sep, 2016	Operational	Covered Lagoon
Developer, Operator	Verwey Madera Digester*	Madera County California	$5,500,000	May, 2017	Operational	Covered Lagoon
Developer, Operator	Tevelde Tipton Digester	Tulare County California	$1,900,000	Jun, 2017	Operational	Covered Lagoon
Developer, Operator	Joseph Gallo Farms	Merced County, California	$1,600,000	Jun, 2017	Operational	Energy Capture Upgrade
Developer, Operator	Farm Power Wilson River	Tillamook County Oregon	$350,000	Apr, 2018	Operational	Upright Tank
Developer, Operator	Circle A Digester	Tulare County California	$2,500,000	Estimated Jul, 2018	Under Construction	Covered Lagoon
Developer, Operator	Vander Eyk Digester	Tulare County California	$3,000,000	Estimated Jul, 2018	Under Construction	Covered Lagoon
Developer, Operator	Legacy Ranch Digester	Tulare County California	$3,500,000	Estimated Aug, 2018	Under Construction	Covered Lagoon
Developer, Operator	Van Beek Brothers Dairy Digester	Tulare County California	$3,500,000	Estimated Oct, 2018	Under Construction	Covered Lagoon
Developer, Operator	K&M Visser Dairy Digester Pipeline	Tulare County California	$3,326,975	Estimated Oct, 2018	Under Construction	Covered Lagoon
Developer, Operator	Williams Family Dairy Digester	Tulare County California	$4,025,000	Estimated Dec, 2018	Under Development	Covered Lagoon
Developer, Operator	Pixley Dairy Digester Pipeline Project	Tulare County California	$3,480,236	Estimated Dec, 2018	Under Development	Covered Lagoon
Developer, Operator	New Hope Dairy Digester	Sacramento County California	$1,100,000	Estimated Dec, 2018	Under Development	Refurbish Defunct Digester

Developer, Operator	Hilarides Dairy Digester	Tulare County California	$1,200,000	Estimated Jan, 2019	Procurement	Engine Replacement

* Expansion in Progress

2.6 Long Term Viability of Project

1) Demonstrate how the operations and maintenance costs of the Pilot Project will be sustained for the life of the Pilot Project. Explain all ongoing funding sources for the Pilot Project. List personnel positions assigned to carry out operations and maintenance through the life of the Pilot Project.

Operations and Maintenance Viability: Maas Energy Works will provide 24x7 operations support, remote monitoring, gas delivery scheduling, inventory management, air permit compliance, carbon credit monitoring, preventative maintenance, and day-day facility operations of the digesters and pipeline network. On-site facility operations include checks of equipment, greasing equipment, changing filters, taking measurements, adding fluids, and adjustments according to periodic maintenance checklists. For the Lakeside Pipeline Biogas Conditioning/Upgrading Facility, Maas Energy Works will also provide daily service and 24x7 on call support but will rely extensively on an O&M contract with SCS Engineers, one of the leading design-build gas conditioning contractors in the county. SCS will provide direct support to MEW personnel who will operate the facility and call in vendor support for specific pieces of equipment where necessary. Ongoing funding will include the revenue from the project's CNG station, LCFS credits, and RINs as discussed in detail in the Economic Viability section below and further detailed in the project pro-forma financial projections.[45]

Operations Positions: The project will require the following positions, to be filled by direct employees of Lakeside Pipeline or by contract labor supplied via Maas Energy Works, SCS Engineering, and specialty equipment providers.

1. Digester Technician: Three employees (2 full time equivalent) to perform daily checklists at each digester site, periodic maintenance, inspections, trouble shooting, and repairs.

2. Pipeline and Gas Conditioning Technician: Two employees and two specialty contractors (1-2 full time equivalent) to perform scheduled inspections and maintenance of the pipeline. Troubleshooting and repairs.

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3. Operations Management Staff: Five employees (2-3 full time equivalent) to remote-monitor digesters, pipeline, and gas cleanup equipment, direct on-site technicians, order parts, track maintenance trends, coordinate with vendors, ensure compliance with air permits and other regulatory requirements, collect and verify carbon credit information.

4. Financial Management: Two employees (1 full time equivalent) to track expenses, pay invoices, monetize biogas, LCFS credits, and RINs, make payments to digester entities, and comply with tax, utility, and grant financial obligations.

2) Examine, compare and describe the availability of required replacement parts and qualified service personnel to keep the system operating as effectively as possible with a minimum amount of downtime for repairs or maintenance. Provide information regarding availability of replacement parts and qualified

[45] Attachment 8.1 through 8.12 – Project Pro Forma Financial Projections

service technicians, the cost of commonly replaced parts/services, and the availability of included maintenance packages.

Digester maintenance requirements at the dairies include greasing and parts replacement on chillers, blowers, and mixers. The digester cover itself needs little maintenance but shall be checked for leaks, over-inflation, and gas quality. A variety of sensors enable remote detection of operational problems. The majority of the maintenance will be performed at the Lakeside Pipeline biogas conditioning and upgrading hub where the majority of the gas conditioning and compression equipment will be located. Most supplies and parts will be stocked at the hub. Since the compressors are the most failure-prone elements of the hub, the project has been designed with duplicate main compressors to allow for continuous operation during scheduled and unscheduled compressor maintenance. The major consumables required for the facility are refrigerant ($20 per lb), glycol ($12 per gal), lubrication oils ($15 per gal) and caustic soda ($300 per ton). These consumables are readily available from automotive, refrigeration, and industrial chemical companies. Daily maintenance of digesters will take approximately 2 hours on site with another 2 hours of remote management. The Lakeside Pipeline hub will require approximately 16 hours per day (2 full-time equivalents) of on-site technicians plus 8 hours per day of remote management and administration (1 full-time equivalent). Most components and fluids necessary for facility operations and hub operations are available within 1-5 business days. Longer lead time items such as spare scrubber media, membranes, and compressor motors will be stocked as spares to ensure minimal downtime. SoCalGas will own and maintain the pipeline injection MSA and will operate a 24x7 service capability.

The project engineers have developed comprehensive guidelines for safety precautions and maintenance procedures for the project's biogas pipeline which will be implemented as part of this project. Routine and non-routine maintenance services and major replacement parts are readily available from each equipment supplier chosen. The biogas upgrading facility will use the same major and minor equipment suppliers, and to the extent practical, the same size equipment as other local biogas conditioning clusters (like Calgren Dairy Fuels). This arrangement will assist the project team in developing a cost-effective yet comprehensive, well stocked spare parts inventory, and routine maintenance and repair practices. SCS Energy will recommend the inventory that should be established, based on SCS Energy's many years of experience on contract maintenance for digesters and biogas conditioning facilities. Lakeside Pipeline LLC will contract with SCS Engineering and Maas Energy Works for 24x7 operations and maintenance services ensuring maximum up-time.

3 Financial Plan/Soundness

3.1 Economic Viability

1) Demonstrate economic viability of the proposed Pilot Project by providing the following financial documentation (with assumptions listed) over the duration of the proposed Pilot Project.
2) In **Attachment 7** provide balance sheet and cash flow statements for the past three (3) year for Applicant's firm and any other partners that have a substantial stake in the Pilot Projects, if available. Documents must be audited and certified by a Certified Public Accountant (CPA). If audited financial statements are not available by submission date, then financial statements certified by a CPA are acceptable.
3) In **Attachment 8** provide five-year pro forma financial statements for Applicant's firm and any other partners that have a substantial stake in Pilot Project, including projected balance sheet, income statement, cash flow statement, and debt service schedule for existing and planned long-term debt, if any. List assumptions, including but not limited to, market supply and demand conditions of the industry, market fluctuations, and monthly or quarterly fixed costs and variable costs.
4) In **Attachment 9** (the Project Scoping and Cost Estimation) provide Applicant's estimated costs should include the following: Pipeline Infrastructure (include all Applicant and Utility owned infrastructure costs,

biogas treatment facilities and collection lines and compression, point of receipt, pipeline lateral and Utility-owned compression, pipeline extension, etc.), equipment (e.g., valves, meters, and protection devices), digester, conditioning facility, design, engineering, and installation costs. Within each job activity, cost should be broken down by labor, operation and maintenance, and each installed piece of equipment. At least two references to actual historical or current competitive cost data for similar work must be included to justify the cost for biogas collection line, conditioning equipment to remove hydrogen sulfide and water from the raw biogas, pipeline lateral, point of receipt, and pipeline extension. CPUC has the discretion to modify the cost estimation. An Applicant pursuing a phased approach to its project should include anticipated costs of all phases of the Pilot Project. The phased-approached cluster Pilot Project must include a signed lease and a feedstock agreement, not just a letter of interest or future addition. Include all Utility supporting documentation, reports, studies, etc. used to calculate Utility owned infrastructure costs.

For Section 3.1.1 through 3.1.4, see Attachment 7, Attachment 8, and Attachment 9.

5) Identify applicant's sources of funding for the Pilot Project, such as grants, loans and equity contributions, and types, terms, and conditions of match agreements. If funding is from a public funding source, identify what project components will be paid for by the public funding source. Project funding should be described by both financial resources and percentage of total equity. Provide contact information for each match source.

Hub and Pipeline Funding: For the Lakeside Pipeline Cluster's biogas conditioning and upgrading facility, the project will be financed by cash on hand and financing available to Lakeside Pipeline LLC's three owners: Bernard te Velde (owner of Lone Oak Farms), Jacob de Jong (owner of River Ranch Farms LLC), and Daryl Maas' (owner of Maas Energy Works Inc). Detailed historical financials have been included for all three entities[46] and further bank documentation is attached demonstrating $35,000,000 in immediately available funds ready to build the cluster.[47] To be more clear, the project will be funded by loans to Lakeside Pipeline from the banks of Jacob De Jong (50%) and Bernard Tevelde (50%), who have provided the attached documentation that they have already secured the necessary borrowing capacity. Maas Energy Works has provided limited startup funding to date but will not itself finance capital construction. No public funding sources are required to build the pipeline and hub infrastructure. Some of the individual digester projects have applied for public (CDFA) funding and those amounts will pay for the digesters and their own connections to the main trunk pipeline.

Digester Funding: The digesters themselves are not necessarily part of the "Pilot Project" infrastructure, but to show the economic viability of the project we have included the table below to demonstrate the financial resources in place to fund all digesters in the cluster. Most of the digesters will be funded and owned by the dairymen themselves. However, some facilities will be funded and owned by Maas Energy Works and its financial partner Generate Capital. Several of the project's dairies are seeking CDFA grants, but the digesters will be constructed with other documented funds (and with some changes in design) if these grants are not received. Detailed financing plans for each digester project and proof of financing capability are included in the attachments.[48]

[46] Attachment 7.1 through 7.7- Financial Documentation
[47] Attachment 7.8 - Bank Documentation of Financing Available
[48] Attachment 7.9 through 7.18 - Digester Financing Plan Letters and Proof of Financing Capability

Table 18 - Lakeside Pipeline Cluster - Digester Financing and Budget

Digester	Host Dairy	Digester Entity	Financed by	Budget	Financial Documentation
Digester #1	Decade Dairy	Decade Energy LLC	Eric & Clarinda Westra; Decade Dairy LLC	$2,955,735	Attachment 7.10
Digester #2	Clear Lake Dairy	Clear Lake Dairy	Eric & Clarinda Westra; Decade Dairy LLC	$2,200,948	Attachment 7.11
Digester #3	Dixie Creek Dairy	Lone Oak Energy LLC	Bernard te Velde; Lone Oak Dairies	$3,499,550	Attachment 7.12
Digester #4	Double L Cattle	Double L Dairy Biogas LLC	Maas Energy Works; Generate Capital	$2,459,227	Attachment 7.13
Digester #5	High Roller Dairy	River Ranch Farms LLC	Jacob de Jong; River Ranch Farms LLC	$3,219,616	Attachment 7.14
Digester #6	Lakeside Dairy	Lakeside Energy LLC	Maas Energy Works; Generate Capital	$3,267,915	Attachment 7.15
Digester #7	Lone Oak Farms #1	Lone Oak Energy LLC	Bernard te Velde; Lone Oak Farms	$3,066,475	Attachment 7.16
Digester #8	Poplar Lane Dairy	Poplar Lane Dairy Biogas LLC	Maas Energy Works; Generate Capital	$3,463,398	Attachment 7.17
Digester #9	River Ranch Farms	River Ranch Farms LLC	Jacob de Jong; River Ranch Farms LLC	$3,597,130	Attachment 7.18

6) Identify the financial risks to the proposed Pilot Project and describe the methods the Applicant will use to effectively manage and mitigate those risks. At a minimum, Applicant should address risks associated with construction, cost overruns, operation, maintenance, technology, regulations, and economic conditions.

Construction and Cost Overrun Risks: Cost overruns are a risk in every large construction. These risks are minimized by narrowing the number of variables down to as few as possible, and then binding each individual contractor to fixed price agreements. This bid items of the contract will include pond excavation, liner and cover installation, pipeline installation, mechanical equipment, and gas conditioning. The project team will also do extensive pre-bid geotechnical surveys to ensure soil suitability and eliminate other risks to construction costs. The turn-key SCS Engineering contract includes a maximum price which ensures the most expensive portion of the project (gas conditioning) will not overrun. The pipeline will also be bid out on a fixed price basis, as the project team has already done for the majority of the pipeline at Calgren Dairy Fuels. A major uncertainty of pipeline projects in this area of the Central Valley is the crossing of the high-speed rail. However, the project team has already mitigated this risk since the land owner Jacob De Jong has already procured a contract from the High-Speed Rail authority guarantying him crossings easements in the area indicated on the project pipeline map. The Project Team will work with the high-speed rail authority to ensure the design and operation of the crossing pipe meets all relevant standards. The project, including all expansions, requires only one crossing of the High Speed Rail. The Project Team has a strong history of building small projects at a much lower cost that comparable projects. A review of recent 2017 CDFA applications shows Maas Energy Works average project cost is 44% less than the average of all other developers. Not only that, but the Project Team routinely brings in projects under budget. For

example, the Verwey-Hanford Digester project, awarded a CDFA grant in the 2015 round, was proposed at $7,000,000 and brought online for an actual cost of only $6,000,000—this at the largest single dairy farm in the entire state, with 10,000 milk cows.

Operation and Maintenance Risk: Information on how the project has been designed to overcome operations and maintenance risks can be found in section 5 a) and 7 f). In terms of this section 6., we have been asked to describe the financial risk stemming from operations and maintenance and how those items could lead to unexpected costs that could threaten the economic viability of the project. To this more specific question, we offer the following analysis by major systems:

Covered Lagoons: these systems are remarkably simple to operate and very cheap to maintain. For example, the HDPE plastic can be patched and welded easily. The few moving parts, such as mixers, cost only a few thousand dollars each and can be replaced easily. The lagoons are designed with pressure reliefs to avoid over-pressuring. The main way a cover lagoon can fail is if it is allowed to fill up with sand or other non-digestible solids. The project design prevents this by installing sand separation systems prior to every digester, installing mixers, sludge draw off pipes, and implementing a program of sediment monitoring as is common at all Maas Energy Works Sites.

On-Dairy Gas Conditioning: The project performs minimal handling of biogas at the dairies. We run our pipeline at very low pressures (under 15 psi) to reduce the maintenance costs and increases the tolerances of the on-dairy compressors. We build our own proven gas handling equipment using proven equipment such as condensers and blowers that are already common on our many California projects. As described elsewhere, the on-dairy H2S removal system uses a simple dry media that is cheap to maintain.

Pipelines: The pipelines require no direct maintenance, but they must be monitored continuously for buildup of water or leaks, as described elsewhere. The pipeline will be equipped with sectionalizing valves to enable rapid isolation and repair of any issues.

Hub Gas Conditioning: The most likely place for major O&M cost overruns to occur is at the project hub's gas conditioning equipment. These costs could occur in one of several ways. First, the CO-2 removal membranes are sensitive to H2S and other impurities in the gas. For that reason, we have installed a two-tiered H2S removal system at the dairies (oxygen injection coupled with media absorption) and have additionally install H2S removal vessels at the hub as a backup. Gas leaving this system will be continuously monitored for suitability before introducing it into the CO-2 membrane. So, protected, the CO-2 membranes have no moving parts and require very little cost to maintain. The other maintenance expense at the project hub comes from the large compressors needed to process and then inject the biogas. Project biogas conditioning engineer has designed these systems with excess capacity so that they are not working at the outside edge of their performance. Additionally, SCS will provide post-startup support to monitor this equipment for proper maintenance intervals and signs of wear. The project team is already installing Vilter compressors at the Calgren Dairy Fuels project and will have many months of experience in maintaining this equipment prior to startup at the Lakeside project. Finally, Vilter technicians will perform annual maintenance to ensure the equipment is being operated and maintained properly.

Technology Risks: The technology risks to the project include digester technology, gas pipelines, and gas conditioning. In every case, the project has mitigated risks by using simple and proven technology. The covered lagoons are a well-established technology that will be installed by the most experienced digester project development team in California. The biogas gathering lines will be run with simple plastic pipe and low pressures to minimize control and regulation issues. For the more complex gas conditioning facility,

the project team has retained SCS engineering using a complete design-build contract for gas conditioning. SCS Engineering's design will use proven brand-name equipment including Air Liquide membrane technology and Vilter Compressor technology. More information on how the project has been designed to overcome technology risks can be found in section 5 a).

Regulatory Risk: The largest regulatory risk comes not from a government agency but from the current standards for injecting into the SoCalGas utility pipeline. These standards are very strict and failure to meet them could cause the project to lose essentially all of its revenue. The project has mitigated this risk by securing performance guarantees from the design-build engineer, SCS Engineering. Additionally, regulatory risk comes from water board requirements for pond liners, for which the Project Team is highly experienced in compliance. Water Board risk is controlled by submitted fully compliant Tier 1 lagoon plans to the water board prior to construction. In some cases, such as Decade Dairy and River Ranch, this is already complete. The other projects will be permitted in the same manner. Finally, a single air permit is required, which presents a small risk. The project will mitigate this risk by obtaining an Authority to Construct from the San Joaquin Valley Air Pollution Control District in advance of construction.

Economic Risk: Economic conditions present a risk almost entirely in terms of the value of the LCFS and RIN credits. Natural Gas is the smallest component of revenue and its price is already near historical lows. The LCFS and RIN credits on the other hand, could fall in price drastically. See section 7) and 9) below for more information on how the project team has mitigated these economic risks.

7) Demonstrate the economic viability of the long-term plan following Pilot Project completion.

As detailed in Section 2.3.1 above, the project has access to several markets. Currently the most lucrative market is secured by delivering dairy biomethane to CNG stations for vehicle fueling. The project has correspondingly executed offtake agreements with the largest CNG provider in North America, to secure access to this market. However, should the CNG market somehow change due to loss of demand or oversupply, the project's access to the utility pipe allows the biomethane to be sold to other users of natural gas such as hydrogen production at petroleum refineries, or direct combustion for process fuel at biodiesel, or ethanol refineries.

As evidenced by the project Pro Forma Financials, the project can withstand very large decreases in the value of LCFS credits or RINs. AB-1383 called for a Pilot Financial Stabilization Mechanism which may further decrease the risk of these prices changing. But even without such stabilization, the project is well capitalized and is far less costly on a per-cow basis than many similar proposals. Simply by avoiding excessive costs and high interest rate debt (since the farmers are borrowing against land assets, which makes debt service much cheaper than unsecured loans), the project greatly increases long term viability. Furthermore, the Project Team has a track record of ensuring its digesters remain viable for the long term. The Project Team has developed 13 digesters and helped in the retrofit of 2 more. All fifteen are still operating as designed, and many are being expanded--a record unequalled in California or nearly anywhere else.

The project pro forma financial statements have been based on capital and operational costs provided by SCS Engineering, and other contractors with experience maintain this equipment. Sinking funds have been included for equipment that requires periodic replacement (such as compressors) and other elements such as CO-2 removal membranes are very low maintenance—and all maintenance has been conservatively budgeted.

The project gains further viability from the fact that Lakeside Pipeline LLC is two-thirds owned by dairymen, who themselves own four of the contributing dairy digesters. This situation ensures that the feedstock providers are highly invested in the long-term success of the venture.

Financial Arrangements Between Pipeline and Digester Entities: Finally, it is worth detailing the financial arrangements between Lakeside Pipeline and the dairy digester entities. The project will be implemented with two types of business entities:

1. One pipeline company (Lakeside Pipeline LLC) owns the pipeline and gas conditioning infrastructure

2. Several dairy digester companies (whether owned by farmers or investors) will own the digesters.

First, Lakeside Pipeline will own the gathering pipelines, gas conditional facility, and pipeline injection facility. Lakeside Pipeline will own the injected RNG and execute sales agreements with buyers to monetize the gas. Once Lakeside Pipeline receives the revenues, it has contractual arrangements describing how revenues shall be returned to the dairy digester entities. Lakeside Pipeline retains earnings to pay its own operating costs and debt service. Of the remaining free cash flow, Lakeside Pipeline returns 80% to the various digester companies, while retaining 20% for itself as profits. These calculations can be seen on the Lakeside Pipeline pro forma financial projections.[49] The digester entities, which own the individual dairy digesters, are in some cases owned by Maas Energy Works and in other cases owned by the farmers themselves but operated for them by Maas Energy Works on a 10-year O&M agreement (see Table 21 above).

Regardless of whether the digester entities are "farmer-owned" or "investor-owned", they are all developed and operated by Maas Energy Works and they all receive the same 80% of free cash flow attributable to the biogas produced from their digester. The value of the biogas produced from an individual digester is calculated based on metered gas production, plus verified ARB Livestock Protocol methane reduction emissions on that dairy.

In the case of farmer-owned digesters, the farmer provides their own capital to finance the project. This model incentivizes the farmer to maximize the gas production and environmental compliance so as to maximize revenues attributable to their digester and their resulting revenues. The farmer-owned digester entity then uses the revenues generated by its share of Pipeline revenue to pay operating costs, debt service, and retain profits. The majority of digester entities participating in this project are farmer-owned and their pro-forma financial projections can be found in Attachments 8.4 through 8.12. The high level of farmer-ownership in this project shows the great confidence that these dairy families have in the Project Team and the financial model proposed hereunder. These farmer-owned projects can be relied upon to maximize both gas production and verified greenhouse gas reductions on their facilities.

In the case of investor-owned digester entities, the dairy family does not make a direct investment in the digester and instead the funds come from Maas Energy Works' investor Generate Capital (see documentation of funds availability in Attachment 7.9). The dairy is compensated by receiving half of the operating free cash flow, after that individual digester company has paid its own debt service and operating expenses. The farmers are also guaranteed a minimum payment per cow (usually $50 per year) if the free cash flow formula would otherwise have paid out less than the minimum amount per cow. In this way, the farm is still incentivized to see the digester remain in successful operation with the maximum amount of

[49] Attachment 8.1 through 8.12 – Project Pro Forma Financial Projections

verified greenhouse gas reductions. Pro forma financial projections for investor-owned projects can also be found in Attachments 8.4 through 8.12.

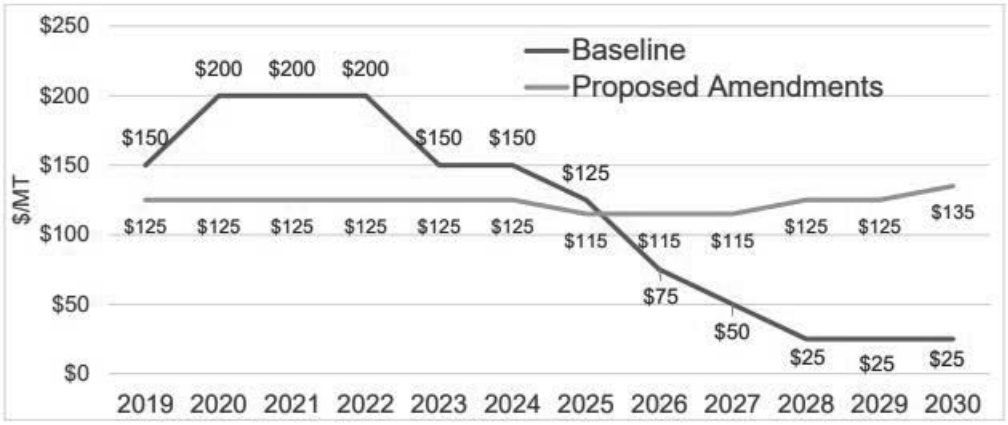
8) Identify and demonstrate how co-products or other revenue streams contribute to the business plan. Discuss assumptions about expected income from all revenue sources. Discuss how much Pilot Project viability depends on co-product revenues.

The project economic model does not rely upon any co-products or non-standard revenue sources. It is true that the project will create some higher value wastewaters on the dairy which will improve nutrient management and irrigation practices and may create opportunities to sell fertilizer or processed manure. However, in our experience dairy digesters projects rarely, if ever, achieve the "co-product" revenue claimed by their proponents. These revenue sources are too unreliable for the Project Team's approach to digester finance. Consequently, the only revenue sources considered by the Project Team when calculating the project's economic feasibility and pro forma financial projections are natural gas sales, and the associated LCFS and RIN environmental benefits of that gas. No co-product revenues are considered or necessary.

9) Discuss estimated values and planned disposition of any potential Low Carbon Fuel Standard credits, Renewable Fuel Standard Program credits (RINs), and/or carbon cap-and-trade credits.

As described in section 2.3 and elsewhere in this application, the project has executed a contract with Clean Energy Fuels where CEF will deliver the project's biogas to CNG fueling stations, monetize the LCFS credits and RINS therefore, and return a contractual percentage of the revenue to the project. As detailed in the projects Pro Forma Financials, the project's financial model estimates were based on LCFS and RIN prices at a fraction of current amounts ($120 for LCFS and $1.50 for RINs). These much lower modeled prices provide security against drops in the historically high prices for these credits. Nonetheless, the project is able to pay all operating costs and still comfortably service its debts at the prices shown. The Air Resources Board recently released the graph below predicting that the long-term price of LCFS credits over the next 10 years will average $120 / ton until the year 2030.

Figure 7 – California Air Resources Board's Estimated LCFS Prices with new Amendments



The project does not anticipate selling AB-32 Cap and Trade Carbon credits. The Pro Forma Financial Projections use current values for fossil natural gas of $3.00 per mmBTU.

10) List any pending or filed litigation in which Applicant is a party, and explain the extent of Applicant's liability coverage, if any. **Please list only litigation that pertains to or impacts the Pilot Project's**

execution. Explain how the pending or filed litigation affects the applicant's ability to complete and/or operate the Pilot Project.

Litigation: Lakeside Pipeline LLC is not party to any active litigation proceedings, nor is Maas Energy Works. Lakeside Pipeline does not currently carry liability coverage since it does not yet conduct operations, but it will procure all required coverages when required. The various project team members including Maas Energy Works, all contractors, engineers, and dairies maintain their own liability coverages from $2,000,000 to $10,000,000. Copies of insurance documentation are available upon request.

11) Will any of the biogas flowing through the collection lines not be injected into the utility pipeline system? If yes, please provide: 1) the expected total volume (standard cubic feet per day) of biogas flowing through the collection lines and 2) the volume of biogas flowing through the collection lines that will not be injected into the pipeline and the end-use equipment for this biogas.

The Lakeside Pipeline Dairy Digester Cluster plans to inject 100% of its biogas into the utility pipeline system. The expected average volume flowing through biogas lines and injected is 58 MCFH with seasonal variations. As discussed throughout this narrative, the project team is working with local truck fleets to encourage conversion of diesel vehicles to CNG. This may later result in the project installing an on-site CNG fueling station, but we expect by that time the project will have grown past its original, contracted 10 diaries and as such there will be no decrease from the full 100% amount of biogas injected into the pipeline as calculated hereunder.

12) In **Attachment 10** provide the Applicant's proposed schedule. The schedule should include the tasks identified in Attachment 9, the Project Scoping and Cost Estimation. CPUC has the discretion to modify the project schedule. An Applicant pursuing a phased approach to its project should include anticipated schedule of all phases and major milestones of the Pilot Project. Include the permitting schedule (as described in Chapter 2, Section 7.1).

The requested project schedule is included as Attachment 10. Note that the initial construction of all contracted dairies is the primary, known phase. The expansion to other dairies that are not yet contracted is the second phase, which is less certain due to contracts, financing, etc. However, our experience with the Calgren Dairy Fuels project shows that once the pipeline and digesters become a reality, neighboring dairies are eager to participate.

4 GHG Reduction and Cost Effectiveness

4.1 Greenhouse Gas Reduction

Explain how the proposed Pilot Project will result in reduction of metric tonnes of GHG emission annually compared to existing practices for the dairy. Provide the estimated GHG emission reduction resulting from the proposed Pilot Project(s) based on executed feedstock agreements. The Selection Committee will not consider GHG emission reductions that are based on future expected feedstock agreements in this scoring criteria.

The ARB GHG reduction tools for all (and only) contracted dairies are attached and summarized in the table below.[50] Note that the calculations have been provided, in excel format per June 15, 2018 guidance by CPUC, using proven and permitted manure management practices, and not gimmicks such as daily, year-round manure spreading through an "effluent buffering system" used to claim there is no uncovered effluent pond in the ARB tool. We have seen these practices claimed on other ARB GHG tools prepared by competitors, but these practices are not recognized by the Water Board as legal and appear to be an effort to increase scoring in the ARB GHG tool by claiming practices that will not in fact occur. We encourage the selection committee to not honor any ARB GHG tools that select "No" in the "uncovered effluent pond?" cell, unless that applicant can point to a physically covered effluent pond or a physical aerobic manure transfer system (such as irrigation canals) capable of holding the Water Board's required 120 days of storage without irrigating. Simply claiming that manure will be spread every day all year and thus never stored in an uncovered effluent pond is not realistic, nor permissible under water board requirements.

Table 19 - Lakeside Pipeline Cluster - GHG Reductions by Dairy over 10 yrs

Digester	Host Dairy	GHG Reductions over 10 Years (MTCO2e)
Digester #1	Decade Dairy w/ Richard Westra	192,558
Digester #2	Clear Lake Dairy	109,303
Digester #3	Dixie Creek Dairy	228,242
Digester #4	Double L Cattle	136,148
Digester #5	High Roller Dairy	103,130
Digester #6	Lakeside Dairy	207,619
Digester #7	Lone Oak Farms #1	247,703
Digester #8	Poplar Lane Dairy	126,569
Digester #9	River Ranch Farms	187,884
	Total GHG Reductions	**1,539,156**

4.2 Cost-Effectiveness

A higher score will be given to Pilot Projects providing the greatest GHG emissions reductions per dollar invested (cost-effectiveness). Provide a description and relevant documentations of the cost effectiveness of the proposed Pilot Project, measured according to a standard cost-effectiveness metric. A standard cost-effectiveness methodology is dividing the amount of estimated methane emission reductions, based on executed feedstock agreements, over 10 years based on the California Air Resources Board's "Dairy Digester GHG Emission Reduction Calculator" by the total cost of the project based on the Pipeline Infrastructure costs which includes utility reimbursement for biogas collection line(s) and the utility's "Project Scoping and Cost Estimation," (Attachment 9) which includes construction, maintenance and operation cost for pipeline lateral, compression, point of receipt, and pipeline extension. The Selection Committee will not consider GHG emissions reductions that are based on future expected feedstock agreements in this scoring criteria.

[50] GHG Calculators for each Dairy and the Cluster, in Excel Format, are submitted as separate excel files in conjunction with this narrative and attachment submission.

Please indicate in cost estimates what costs are related to safety as these costs are necessary components of the dairy pilots.

See Attachment 9. The Project Scoping and Cost Estimation (Attachment 9) demonstrates that the Pilot Project Infrastructure Costs are equal to $14,162,860. Approximately $3,725,305 of this amount are safety related, and these costs include H2S removal equipment, explosion proof motors for classified areas, ventilation, personal and structural gas detection devices, automated or isolation valves, pipeline tracer wires, flares, and some communications and controls gear. The attached ARB Dairy Digester GHG Emissions Reductions Calculators show the 10-year reduction in methane emissions will be equal to 1,539,156. Consequently, the project will create 0.11 MTCO2e GHG per dollar of Pilot Project funded Pipeline Infrastructure Costs.

1,539,156 Tons GHG / $14,162,860 Total Pipeline Infrastructure Costs = 0.11 MTCO2e per dollar

4.3 Justification and Reference Requirement

Inputs to the applicant's GHG emission reduction and the cost estimation may be added or modified if the Selection Committee finds it inadequate. Justification must be made if there are changes to the default setting in the GHG emission calculation tools. At least two references are required to support the cost estimation. References should include historical or current competitive cost date for similar work.

Explanations for all entries on the GHG emissions calculations tools are included in the Attachments.[51]

Cost estimates are provided in Project Cost Estimation and Scoping attachment 5.9. Cost references are also included in the attachments.[52]

5 Environmental Benefits

5.1 NOx and Criteria Pollutants

1) Priority will be given to projects based on the criteria pollution benefits achieved by the project. Describe the Pilot Project's impact on NOx, other criteria pollutants, toxic air contaminants and hazardous air pollutants. Include all potential emission sources and how emissions would change before and after implementation of project. In Attachment 11 provide supporting documents to support written explanation. Examples of options that can reduce or minimize generation of air pollutants mentioned above include, but are not limited to, upgrading biogas to biomethane for vehicle fuel production (either onsite or through injection into a common Carrier Pipeline), Microturbine Installation (onsite Electrical Generation), Fuel Cell Installation (Onsite Electrical Generation), Natural Gas Process Fuel Replacement, Agricultural Pump Electrification.

2) A higher score will be given to Pilot Projects that minimize criteria pollutant and Toxic Air Contaminant (TAC) emissions and maximize net criteria pollutant reductions.

[51] Attachments 17.1 through 17.10 – Explanation of GHG Inputs and Assumptions
[52] Attachments 9.1 through 9.10 – Cost Estimation - References

Relevant Criteria Pollutants, Toxic Air Contaminants and Hazardous Air Pollutants

This Section lists the criteria pollutants (CP), toxic air contaminants (TACs) and hazardous air pollutants (HAPs) of concern to regulatory agencies that are most likely to be impacted by digester projects.

Table 20 - Summary of Pollutants of Concern and Sources (CPs, TACs, and pre-cursors)

Carbon Monoxide (CO)	CP	Combustion exhaust
Particulate Matter (PM)	CP	Combustion exhaust
Nitrogen Dioxide (NOx)	CP	Combustion exhaust
Sulfur Dioxide (SO2)	CP	Combustion exhaust
Particulate Emissions from Diesel-Fueled Engines	TAC	Diesel engine exhaust
Volatile Organic Compounds (VOC)	HAP	Manure storage & diesel engine exhaust
Ammonia (NH3)	Precursor	Manure storage
Hydrogen Sulfide (H2S)	Precursor	Manure storage

Criteria Pollutants: EPA established national ambient air quality standards (NAAQS) for six of the most common air pollutants, known as "criteria" air pollutants: carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide and sulfur dioxide. The project impacts the following criteria pollutants:

- Carbon Monoxide (CO)
- Particulate Matter (PM, including both PM10 and PM2.5)
- Nitrogen Dioxide (NO2, alternatively represented as NOx below)
- Sulfur Dioxide (SO2, alternatively represented as SOx below)

TACs: Under Title 17, CCR, § 93000 CARB lists "Substances Identified as Toxic Air Contaminants" as defined in Health and Safety Code section 39655. On the CARB website CARB identifies 21 substances as TACs. Other than the criteria pollutants identified above, the project impacts the following TAC:

- Particulate Emissions from Diesel-Fueled Engines

HAPs: Under the Clean Air Act, EPA lists 187 hazardous air pollutants. In addition to the Criteria Pollutants and TACS above, the project will have impacts on volatile organic compounds (VOCs), specifically Methanol, Toluene, Cresols, Phenols, and Polycyclic Hydrocarbons. Collectively, these will be quantified herein as VOCs.

Other Precursors: Dairies and dairy digesters also have documented impacts on other pollutant precursors, which the project will impact, specifically:

- Hydrogen Sulfide (H2S)
- Ammonia (NH3)

Project Impacts: The project has secured commitments to employ 100% of its biomethane as R-CNG vehicle fuel with no transitional electrical generation or flaring. The biogas will first be injected into the utility pipeline for use at CNG stations as described in the narrative and contracts.[53] The project will prioritize pipeline deliveries to local CNG fueling stations, thereby displacing diesel combustion. The project has documented the installation of new stations and conversions of fleets away from diesel to instead

[53] Attachments 6.1 through 6.9 – Dairy Feedstock Agreements

use the project's R-CNG fuel. The project will later build an on-site CNG station at the Lakeside Pipeline LLC Hub to fuel local agricultural and freight vehicles as described in the Narrative. These vehicles will all be new CNG vehicles replacing diesel vehicles. In addition to R-CNG benefits, the project will create net emissions reductions across all the listed Criteria Pollutants, TACs, HAPs, and precursors through the covered lagoon's capture or elimination of on-site emissions at the host dairies, as well as other manure handling improvements that reduce emissions.

Figure 8 - Baseline and Project Emissions with Reduction Summary[54]

Baseline Process	VOCs	CO	NOx	PM	SOx	H2S	NH3
Waste Collection							
Uncovered Lagoon Emissions	7,250	25,732	41,071	1,267	37	3,112	33,692
Off-Road Equipment Operation	89,901	25	41	1	0	65,610	525,382
Waste Digestion							
Waste Mgmt Electricity Demand	20	267	307	66	287	0	0
Diesel Use							
ULSD Refining Emissions	935	3,655	5,368	998	1,590	0	0
ULSD T&D Emissions	51	187	470	26	82	0	0
Diesel Tailpipe Emissions	5,973	24,334	141,327	9,223	343	0	0
Total Baseline Emissions	104,130	54,200	188,585	11,581	2,338	68,722	559,075

Project Process	VOCs	CO	NOx	PM	SOx	H2S	NH3
Waste Collection							
Covered Lagoon Emissions	2,677	6,433	10,268	317	9	1,245	13,477
Off-Road Equipment Operation	35,960	5	8	0	0	26,244	210,153
Waste Digestion							
Digester Electricity Demand	25	267	382	82	358	0	0
Biogas Transport and Upgrading							
Gathering Compr. Elect. Demand	8	105	121	16	9	0	0
Upgrading Electricity Demand	77	1,044	1,198	163	94	0	0
Sales Gas Compr. Elect. Demand	6	77	89	12	7	0	0
CNG Use							
NG Transportation and Delivery	1,604	8,244	9,758	44	163	0	0
CNG Fueling Station Compression	225	1,379	1,917	329	1,428	0	0
CNG Tailpipe Emissions	1,351	8,739	2,822	3,980	0	0	0
Total Project Emissions	41,932	26,294	26,561	4,942	2,069	27,489	223,630

Emissions Summary	VOCs	CO	NOx	PM	SOx	H2S	NH3
Baseline Process	104,130	54,200	188,585	11,581	2,338	68,722	559,075
Project Process	41,932	26,294	26,561	4,942	2,069	27,489	223,630

Project Emissions Impact	**-62,198**	**-27,907**	**-162,023**	**-6,638**	**-269**	**-41,233**	**-335,445**
Project Emissions Impact (including Precursor Impacts)	-62,198	-27,907	-162,023	-147,564	-129,465	-41,233	-335,445

Local Emissions Impact (including Precursor Impacts)	**-58,990**	**-22,073**	**-33,010**	**-142,529**	**-129,462**	**-41,233**	**-335,445**

**All figures given in kg/yr*

5.2 Mitigate Emissions On-Site

Explain how the proposed Pilot Project will incorporate feasible mitigation measures, in accordance with the California Environmental Quality Act, to mitigate to a level that is less than significant, any potential adverse impact on local air quality from project specific criteria pollutants and TAC emissions from all

[54] Full Calculations, Emissions Factors and References Found in Attachment 11.1

aspects related to the project, including emissions resulting from construction, operation of the project, and resultant increases in vehicle miles travelled to and from the project site. Emissions not associated with the operation of the pilot project (e.g., agriculture pumps, normal farm vehicle operation, etc.) do not require mitigation. Any offsite mitigation of project's criteria pollutant and TAC emissions must occur in the same air basin as the project site.

Describe related on-dairy heavy-duty vehicle fleets (milk hauling, feed delivery) that could potentially be converted to low-NOx natural gas power.

The predominant emissions reductions at the project site are associated with the capture of biogas using a covered anaerobic lagoon, providing substantial control of localized H2S, VOC, NH3 emissions. The biogas capture system also provides 7,483 gallons per year in reduced diesel-fueled off-road equipment to manage and maintain the lagoon and irrigation systems (further detailed below in 5.4) These reductions in diesel use result in reduced NOx, PM, CO, SOx, and VOC emissions. Furthermore, the use of renewable natural gas in heavy-duty on road equipment displaces emissions from the diesel fleet in California and provides additional reductions in NOx, PM, CO, SOx, and VOC emissions.

While increased use of electricity at the project site results in modest increases in emissions associated with the California average grid mix, these emissions increases are more than offset by reductions from other pathway components. The net result is an overall emissions reduction from the baseline.

Additional Precursor Impacts: The Project Emissions Impact is summarized on the corresponding row in Figure 8 above. In addition to these direct impacts, the project will reduce Criteria Pollutants via reductions in certain precursors. The project generates substantial reductions in H2S emissions via improved manure management and emission capture. In the atmosphere, the primary fate of H2S is oxidation to SO2 and conversion occurs relatively rapidly; on the order of hours rather than days[55]. Therefore, reductions in H2S emissions produce a secondary reduction in SO2 emissions at the local and regional level. Additionally, because SO2 participates in PM formation in the atmosphere, SO2 reductions provide an additional PM reduction benefit. Precursor-originated PM reductions are calculated from SO2 reductions using the factors provided by SJVAPCD in its PM2.5 modeling guidance document[56]. NOx emissions also participate in secondary PM formation and changes in NOx emissions are translated into PM impacts using the appropriate factors provided in the PM2.5 modeling guidance. The "Including Precursor Impacts" row in the table above adds in the benefits of these secondary impacts.

Localized Emissions Impacts: The rows representing Project Emissions Impact in Figure 8 above include non-local emissions from grid electricity generation, natural gas vehicle operations, and offsets from reduced use of ultralow sulfur diesel (ULSD) in on-road vehicles. While these emissions benefits are real, they are dispersed throughout the state and cannot be all guaranteed to all occur in the immediate project vicinity. Consequently, an additional row has been added to the table above to show the impacts occurring physically at the project site. The impacts shown in this Local Emissions Impact row are attributable only to the On-Site Waste Management System (including capture of existing fugitive emissions from lagoons) and thus will happen in the most immediate project area. A final row has been added to show the project's total localized benefits after adding in precursor impacts (which also occur in the project locality as discussed above) and the reduced diesel use impacts from providing R-CNG fueling at the project site and regional stations. For calculating localized impacts, we have assumed that 15% of the benefits from RCNG fueling accrues to the local area. The actual amount varies depending on vehicle fueling location and service

[55] Seinfeld, J. (1975). Air Pollution: Physical and Chemical Fundamentals. McGraw-Hill, Inc
[56] Attachment 11.2 - PM2.5 Modeling Procedures 2-28-13

territory. But based on our conversations with local fleets and fuelers, we believe this 15% estimate to be conservative.

Secondary Emissions from Construction & Increased Traffic: When accounting for temporary increases in emissions from construction and increased emissions from additional traffic to and from the site, we determined that the increase would be minor when compared to the emissions that are being offset at each site, as shown in Table 22. [57] Construction emissions would be offset by the reductions generated during the first 6 months of operation. Once the project is online, the emissions from traffic to and from the project sites accounts for roughly 0.04% of the emissions reductions. The Table below details the temporary increase in emissions from construction and the increase in emissions from additional traffic.

Table 21 - Secondary Emissions Summary

Pollutant	Temporary Construction Emissions (kg/year)	Additional Traffic Emissions (kg/year)
NOx	26,320.62	12.47
VOC	953.5	1.13
PM	811.02	0.07
CO	20,084.36	1,455.72
SOx	28.73	2.12

As described in 5.3 below, the project team has created various initiatives to convert local fleets to CNG. The instructions above focus specifically on the on-dairy fleets including milk hauling and feed hauling. A major partner in the Project Team's CNG vehicle outreach is Tulare County's largest feed hauler JD Heiskell, which has committed to a demonstration of 4 trucks and has a total of 30 trucks that could be converted.[58] Additionally, the Project Team has partner with California Dairies Inc to encourage milk hauling fleets to convert, fueled by a CNG fueling networking starting at Calgren Dairy Fuels near the California Dairies Tipton facility. Finally, another agricultural project is ethanol, which the Project Team has arrange to be hauled by Flyer's energy in converted CNG vehicles as well.[59]

5.3 Mitigate Emissions Off-Site

1)Explain how the proposed pilot project reduces net criteria pollutant emissions.

The quantification of the project's net criteria pollutant emissions reductions is shown in Figure 8 above.

2) Provide information and description of the project's proximity to transportation corridors.

Transportation Corridors: The projects location in a cluster of agricultural producers just south of the major state highway 198 thoroughfare is a good location for implementing RCNG technology. The immediate area hosts not only a major concentration of milk producers (who require milk and feed transport) but also several major agricultural processors (such as Leprino and freight distributors). None of the local processors or farms currently operate CNG vehicles but are in active plans with the project team and others to develop a network of stations and fleets. The new RCNG station will create a new, 24x7 CNG

[57] Attachment 11.1 – Environmental Impacts - Supporting Notes and Calculations
[58] Attachment 13.1 - CNG Letter from JD Heiskill
[59] Attachment 13.2 - CNG Letter from Flyers Energy

supply exactly where it is needed for growth within the industry. The project will enable the replacement of up to 40 existing diesel vehicles with new, CNG vehicles supplied with RCNG at the Hub fueling station.

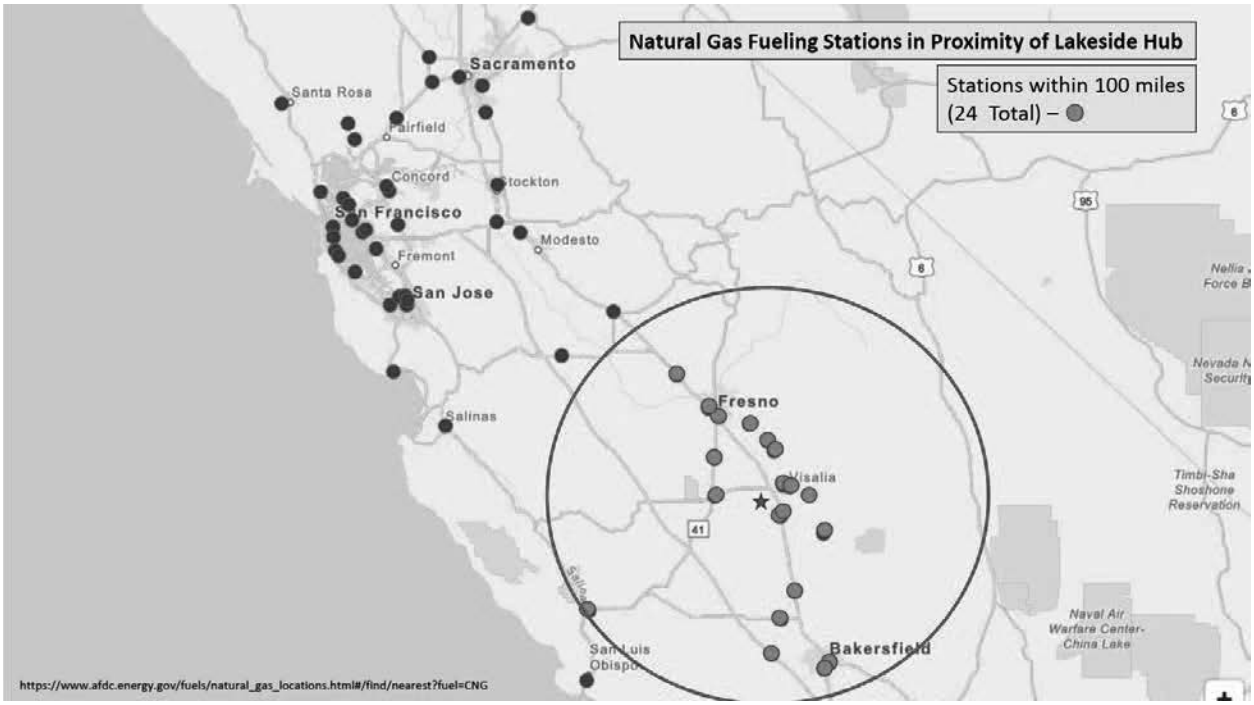
The project sits just one mile east of California State Route 43. A 2015 Transportation Concept Report described this corridor as, *"…primarily a rural agricultural route that connects small cities that are located in the center of the Central Valley. The route serves the farm to market/processors realm. Truck traffic ranges from 9 to 25 percent of traffic on the route.[60]"* They go on to say that, *"State Route 43 is evolving from primarily a rural route to a more urbanized route with increased development occurring in the cities served by the route. This is especially true in the Hanford area.[61]"*. Seeing as the project is so closely located to this transportation corridor, there are a vast amount of opportunities in the future to continue to reduce emissions up and down the Route.

3) In Attachment 12 provide documents that support vehicle fuel sold to and utilized by freight transport vehicles along the State's major freight and transportation corridors (e.g., Interstate 5, State Route 99) or other locations.

Using the Alternative Fuels Data Center website, we were able to conclude that there are 51 CNG fueling stations directly accessible along Interstate 5 between Oregon and Mexico and 14 CNG fueling stations directly accessible along State Route 99[62]. Based on information gathered via the California Energy Commission's CEC-A15 Report[63], we are able to determine that each station in California provides roughly 275,366 gasoline gallon equivalent (GGE) annually. It should be noted that stations directly accessible from major transportation corridors like Interstate 5 and State Route 99 have a significantly higher volume of retail fuel sold than the outliers. Based on interactions with dozens of stations, we estimate that average major freight transportation corridor CNG fueling station to deliver 1.5 times the average amount. Therefore we estimate that the total amount of CNG delivered on the states major highways is 257,366 times 1.5 times 65 stations equals 25,093,185 GGE per year. Additionally, the Lakeside Pipeline Cluster project has 24 CNG stations located within 100 miles of the Hub as shown below. Using the statewide per-station average, these local stations are estimated to deliver 6,176,784 GGE per year.

[60] Attachment 11.3 – State 43 Transportation Concept Report (page 39)
[61] Attachment 11.3 – State 43 Transportation Concept Report (page 55)
[62] Attachment 12.1 – Lakeside CNG Map
[63] Attachment 12.2 – California Retail Fuel Outlet Annual Reporting (CEC-A15) Results

Figure 9 Lakeside Pipeline, Proximity to Existing CNG Stations



4) In Attachment 13 provide documents that verify any partnership with local delivery fleets (e.g. milk hauling, feed delivery) to convert diesel freight vehicles to natural gas vehicles and supply them with renewable compressed natural gas from a pilot injection project. These conversions will reduce NOx and diesel particulate matter of existing fleets.

As mentioned above, the use of renewable natural gas in heavy-duty on road equipment displaces emissions from the diesel fleet in California and provides additional reductions in NOx, PM, CO, SOx, and VOC emissions. The Project Team has secured agreements with Flyers Energy, JD Heiskell to pilot CNG replacement of their existing freight vehicles.[64] The original demonstration site is at Calgren Dairy Fuels near Pixley, CA. As the Lakeside Pipeline project comes online, these companies will seek to expand their fleets of CNG vehicles to take advantage of the expanding network of RCNG fueling stations. A larger, multi-facility conversation is underway between the Project Team and Ruan Trucking regarding Ruan trucks delivering to multiple California Dairies facilities that could switch to CNG as the dairy fueling network is built out. Ruan is already operating a significant fleet of milk trucks on renewable CNG at the Fair Oaks, Indiana digester facility and has the expertise to expand their fleet as the fuel becomes available—first at the Project Team's Calgren Dairy Fuels site, and then at new stations as they come online.

5) In Attachment 14 provide documents that verify contracts for the use of pipeline-injected renewable natural gas in electricity generation.

[64] Attachment 13.1 – CNG Letter from JD Heiskill and Flyers Energy

Not Applicable. This project will not inject RNG for electrical generation uses.

5.4 Project Co-Benefits

Describe any additional environmental co-benefits the project will have beyond methane reductions and mitigation of NOx and other criteria pollutants, toxic air contaminants and hazardous air pollutants. Provide an explanation of additional co-benefits provided by the Pilot Project by written explanation, supporting documentation and citations from published literature. Examples of additional co-benefits that can potentially increase the project ranking include, but not limited to: clustering of projects; water conservation measures; water quality improvements; development of value-added post-methane production products such as fertilizers and soil amendments; utilization of waste heat; and expanding RCNG vehicle fuel network and on-farm equipment or transportation fleet conversion from fossil fuel use to electricity, RCNG or CNG.

Cluster Economics and GHG Benefits**:** This project will create a new dairy digester cluster project in a very dense and bellwether dairy region. The Hanford area has been the proposed home of multiple dairy clusters in the past by Microgy, Bioenergy Solutions, and other developers. By partnering with host dairies, River Ranch and Lone Oak Farms, as 100% owners of their digesters and partners in the cluster, the Hanford-Lakeside cluster has gained tremendous buy-in from the farmers participating in it. Instead of the history of abandoned, developer-owned projects, this cluster is hosted by dairymen who own their own digesters, with a developer working in partnership to build a cluster and pipeline. Funding this project will show the high speed and low cost at which new digesters can be added to a cluster once it is in motion—demonstrating the core model upon which nearly all future proposed digesters depend. The Lakeside Pipeline Cluster includes up to 15 dairy digesters, including 9 dairy digesters in this 2018 round of the Pilot Project Solicitation. According to calculations performed by the Project Team on the Calgren Dairy fuels cluster currently under construction, the marginal cost of adding digesters drop by as much as 40% as more digesters are added to the cluster. SoCalGas has confirmed the proposed point of receipt for the Lakeside Pipeline project has sufficient capacity to the receive the projects contracted production estimate of 71 MCFH Biomethane. The Hub is located not only in an ideal location for gas injection, but also at the center of one of the largest dairy concentrations in the state. The project developer Maas Energy Works has already built and operates the Verwey-Hanford digester nearby—funded with 2015 DDRDP funds and establishing the industry in this area.

Cluster Small and Centralized Dairies: The Hanford-Lakeside cluster will include small, 2,000 cow dairies such as Poplar Lane and Clearlake. These smaller facilities would otherwise not have the opportunity to participate in a digester or cluster. The Hanford-Lakeside Cluster is proposing to immediately build on these dairies: not waiting to do so until future rounds only when the larger, more profitable dairies are completed. The Hanford-Lakeside Cluster is also combining some small dairies (such as Decade and Richard Westra Dairy) into centralized digesters to enable them to participate.

Strategic Position for Expanding the Conversion of Truck Fleets to R-CNG / NZE: In partnership with the cluster owner, Lakeside Pipeline LLC, the project team is working directly with truck fleet owners to convert from diesel to the new Near Zero Emissions (NZE) Cummins Westport natural gas engines. This includes fleets hauling agricultural commodities, fuels, and freight, almost entirely within the non-attainment area of the San Joaquin Air District. These fleet owners include River Ranch, Flyers Energy, Calgren Renewable Fuels, JD Heiskell, Ruan, and others. The team is also working with BP, SoCalGas, CALSTART, California Energy Commission, Renewable Natural Gas Coalition, Agricultural Energy Consumers Association, Bioenergy Association of California, California Dairies Inc, and others to address CNG fleet conversion and NZE targets. Note that regarding offsite usage, Clean Energy Fuels has

documented that even when combined with all other Hanford-Lakeside Cluster applications submitted herein, Clean Energy Fuels has sufficient CNG station capacity, to use 100% of the project's gas in Renewable CNG vehicles, which substitute for diesel vehicles.

On Farm Equipment Use Reduction: On-farm diesel powered equipment at these dairies have diesel emissions per gallon far exceeding on-road truck fleet emissions. The proposed digester designs reduce the use of this farm equipment used for the handling of manure solids and water. These savings are accounted for in the environmental and GHG calculations. In addition, equipment use reduction is anticipated in the farming side of the operation. Significant diesel hours each year are required to apply manure, disc it into soil, and prepare fields (especially dairy feeds such as corn) to ensure the applied manure solids are properly incorporated. The reduced solids and more consistent and available nutrient content of the digester effluent is anticipated to reduce diesel used for this manure handling. Based on an industry examination of a 6,500-cow dairy saving 1,500 diesel hours, we have assumed 7,483 combined diesel hours saved for all the dairies participating (see supporting notes and calculations in Attachment 11.1).

Improved Wastewater Handling: Waste management operations at the dairies will be improved to remove sand/trash—especially where mechanical separators are installed. Every dairy that has signed Offtake Agreements with the Hanford-Lakeside cluster currently employs mechanical separators or will do as a part of the digester project. This equipment prevents unwanted material from entering the lagoon digester or irrigation system, preventing costly maintenance, clogged pipelines and broken pumps, with the resultant spills and water wastage.

Water Conservation: Current designs show that all of the participating dairies will cover existing storage ponds at the dairy, thus preventing the current evaporation of stored wastewater from open storage. Consequently, the cover will increase the availability of irrigation water for the farming operation above the current situation, and thus reduce the need to pump additional groundwater out of irrigation wells. Calculations to quantify evaporation from uncovered ponds of similar size demonstrate combined annual water savings of 62.9 million gallons (see supporting notes and calculations in Attachment 11.1).

Reduced Ground Water Contamination: The project includes multiple Tier 1 Pond Designs, per Dairy General Order recommendations and includes ongoing monitoring for leakage. Detailed engineering analysis performed for the Central Valley Water Board has determined that unlined earthen lagoons allow manure to seep into the soil at an average rate of 1.1 millimeters per day and further concluded the average subsurface nitrogen loading from unlined lagoons was 1,045 pounds nitrogen and 10,886 pounds total dissolved solids per acre per year.[65] Current designs show that all of the participating dairies' digester ponds will replace existing, unlined ponds currently in active use. Calculations to quantify seepage from unlined ponds of similar size demonstrate a combined annual prevention of 14.6 million gallons of manure seeping into the soil. Calculations to quantify the subsurface loading from unlined ponds of similar size demonstrate a combined annual prevention of 35,594 pounds of nitrogen and 370,787 pounds of TDS (see supporting notes and calculations in Attachment 11.1).

Odor Reduction: Digestion of cow manure reduces odor-causing compounds by up to 87.8%.[66] The EPA recognizes this study and further supports claims that anaerobic digestion reduces odors.[67] The dairies participating in the project are treating 100% of the existing manure, and not importing any new odor-causing compounds to the project site.

[65] Attachment 11.4 - Evaluation of Earthen Liquid Dairy Manure Lagoons in the Central Valley (pg. 23, 27)
[66] Attachment 11.5 – A Comparison of Dairy Cattle Manure Management
[67] Attachment 11.6 - EPA Manure Digester Systems and Odor Control

Irrigation Efficiency/Increased Yields: Digested manure retains the fertilizer nutrients present in raw manure—with digestion creating an increase of 25-28% in terms of plant-available nitrogen[68]. As a result, the manure is consumed more readily by crops, and there is less risk of raw manure running off into surface waters during rain events. Anaerobic digestion has also been shown to denature weed seeds[69] and significantly reduce, if not eliminate, their ability to germinate.[70] The result is a nutrient rich, readily absorbed fertilizer with low risk of invasive plant propagation. In this industry many companies are working on demonstrating delivery of digester effluent through a subsurface drip irrigation system. The thin, consistent material from the digester substantially reduces the pre-treatment needed to inject effluent into a subsurface irrigation system without nozzle plugging. Netafim, a provider of drip tape has completed an initial study on a California dairy farm and successfully documented that the practice may increase yields 20% to 30%.

Soil Amendments: The digester projects maximize the benefit of manure solids byproducts such as cow bedding and soil amendments use on croplands. The project team's experience is that other "higher value" uses of separated manure solids are highly speculative and do not live up to the projections of value added. These digester projects are designed to reduce the operational and financial uncertainty of such practices and to focus on reliability. The projects do not import materials, which could jeopardize a soil amendment value.

6 Disadvantaged Communities

6.1 Community Impacts and Mitigation

A proposed Pilot Project that thoroughly explains, discusses, quantifies, and mitigates impacts and demonstrates outreach and engagement efforts will receive higher scores (*e.g.*, a community benefit agreement will receive a higher score compared to community meeting summary).

1) Provide information and describe the project's proximity to disadvantaged communities.

The project's central hub located at 6127 Jackson Ave, Hanford, California 93230, is 1.84 miles[1] from the boundaries of a disadvantaged community. Several of the project's digesters will be constructed inside the disadvantaged community boundaries. Additionally, the actual residences of the affected communities and workers impacted by this project are nearly all in nearby disadvantaged communities.

[68] Attachment 11.7 – WSU – Evaluation of Commercial Digester
[69] Attachment 11.8 – Competition from Energy Uses of Manure
[70] Attachment 11.9 – Weed Seed Survival in Anaerobic Digesters

Figure 10 - AB1550 Information - Lakeside Pipeline's Biogas Conditioning Facility Location

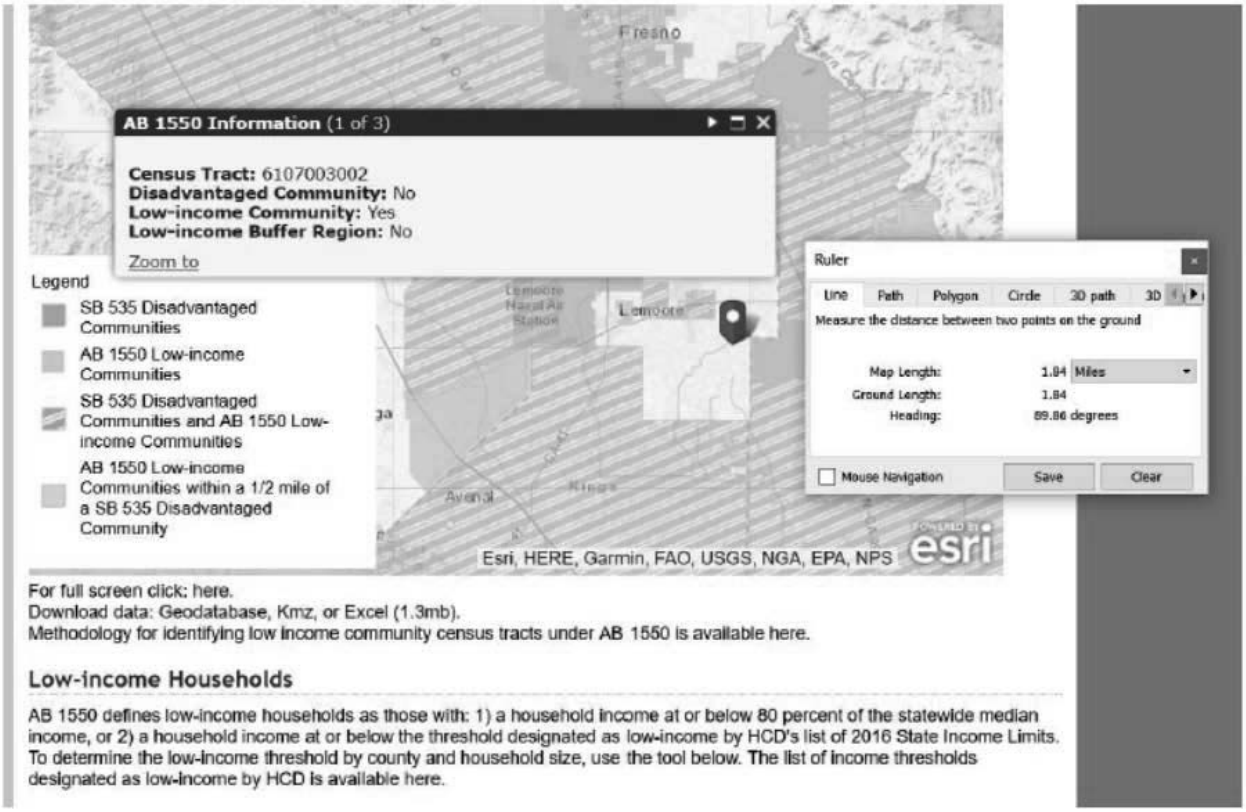
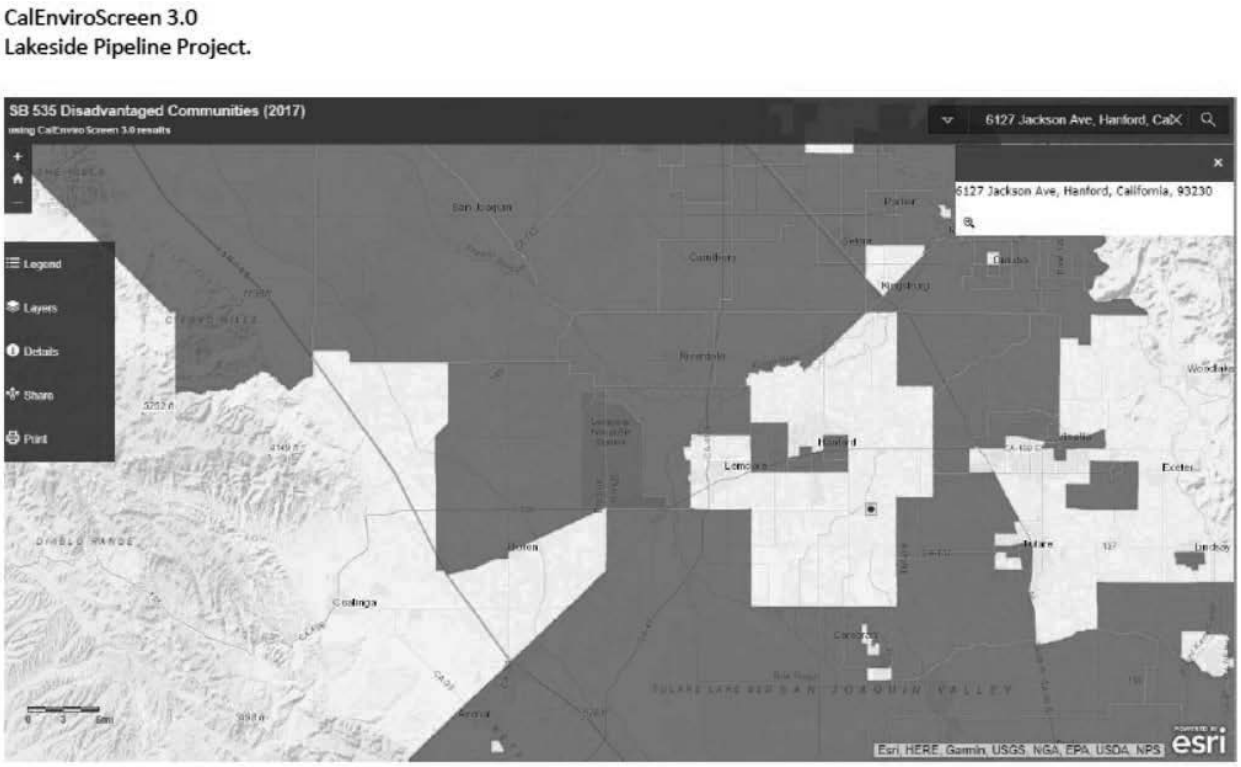


Figure 11 - CalEnviroScreen 3.0 - Map of Lakeside Pipeline's Biogas Conditioning Facility Location



2) Discuss and quantify the potential impacts (positive or negative) of the proposed Pilot Project on disadvantaged communities within California (within the top 25 percent of disadvantaged communities as defined by CalEnviroScreen 3.0)

The communities around the Pilot Project are within the top 25% highest scoring disadvantaged communities as documented on the CalEnviroScreen website. As shown on the CalEnviroScreen website, the four elements below are listed as some of the most impairing to the community. The project has been designed to maximize local impacts by reducing each of these factors.

- **Ozone 91**
- **Particulate Matter 99**
- **Groundwater Threats 95**
- **Asthma 94**

Individual potential negative impacts are listed in the response to questions number 3 along with the mitigation effort the project has implemented. Economic impacts in the community are listed in section 6.2 below. Environmental Benefits created by the project are explained in detail in section 5 Environmental Benefits.

The project has taken specific steps to reduced local and regional air pollutants, incentive local economy and provide jobs and training to residents of low income household. Project Development Team is working with Proteus Inc since 2017 to connect projects with low income and disadvantaged communities surrounding the dairies. The organization specializes in providing, training, work skills, mentoring, and career advancement classes and for residents from unprivileged communities and low-income household individuals. The Project has included specific contracting policies that require each contractor to meet with Proteus Inc to review the available hiring programs and candidates that Proteus has targeted from

disadvantaged communities. At the same time a Community Benefits Agreement the Kings Economic Development Office will deliver hiring, training, local contracting, investment, and environmental benefits to the community under a highly transparent and verifiable agreement.

3) Describe in detail specific mitigation measures that will be included in the Pilot Project, including but not limited to, methods to mitigate impacts such as toxic air contaminants, hazardous air pollutants, criteria pollutants, groundwater and surface water impacts, truck traffic, and odor.

The Lakeside Pipeline project team has a mitigation plan in effect that will result in zero negative impacts to disadvantaged communities. All emissions or other impacts have been mitigated to a level of insignificance. In fact, as documented in Section 5 above, the project results in a decrease in local criteria pollutants. Further discussion of each mitigation plan is as follows:

Air Emissions Mitigation (air contaminants, hazardous air pollutants, and criteria pollutants): The project has been designed to ensure 100% of the biogas is used as vehicle fuel, thus resulting in no net criteria pollutant emissions. The project has also gone beyond the "no net criteria pollutant emissions" goal by expanding the RCNG fleet in the local area and thus converting local heavy-duty diesel vehicles to clean burning CNG, further reducing criteria pollutants in AB1550 low income communities and SB 535 disadvantaged communities. The project will also install comprehensive remote monitoring hardware and software to give 24x7 access to all major system components.

Groundwater and Surface Water Quality Mitigation: No non-manure feedstocks will be imported into the digester system for disposal on surrounding farmlands. The project will implement professional Construction Quality Assurance to Water Board standards to ensure the liner is installed to Tier 1 standards. The pond liner will be electronically leak tested after construction to confirm tightness of seals. The project will be entered into the current Dairy Digester General Order, which requires additional reporting, sampling, and design protection considerations over and above those currently required of the host dairy. The project will install Tier 1 double liners with leak detection on pond are that is currently unlined, dirt pond storage.

CEQA Mitigation The application for the Conditional Use Permit has been submitted, initial county review is complete, and we are now preparing the CEQA Initial Study. CEQA approval will be processed concurrently with the Conditional Use Permit.

Truck Traffic Mitigation: The project uses 100% pipeline transportation for its biogas delivery, so no additional truck traffic is involved beyond routine personnel visits and deliveries. These vehicle trips cannot be entirely eliminated, but whenever possible the project will use remote management capabilities to monitor and control operations and reduce on site activities. To the extend the project encourages conversion of truck fleets from diesel to CNG the emission of local truck vehicles will be substantially reduced. See quantification of localized air impacts in the Environmental Benefits Section 5.

Odor Mitigation: Dairy digesters reduce odor-causing compounds by significant amounts (see Environmental Benefits, Section 5 above for more information) due to fugitive emissions captured and improved manure handling characteristics. Furthermore, the project gas conditioning equipment is equipped with activated carbon filtration to scrub any vent gas for volatile organic compounds or other odor agents.

Other Mitigation The interior of the projects' mechanical buildings will be insulated to contain noise from compressors housed inside. The project will not import material into the site and as such creates no new traffic other than basic maintenance. Whenever possible, project operation will be accomplished remotely to reduce area traffic. The project will install security cameras to aid in site safety and maintenance.

Construction will be performed in such way that no roads will be closed during project implementation. The project will employ a regenerative bioreactor to minimize chemical use in biogas treatment. Sulfur extracted from the biogas will be produced in non-hazardous, elemental form.

4) Describe how the Pilot Project proponent(s) engaged the community. Did community-based non-profit organization(s) involved in potentially impacted communities provide assistance in engagement efforts? Did discussion include potential adverse impacts of proposed Pilot Project(s), including a net increase in criteria pollutants, toxic air contaminants, hazardous air pollutants, groundwater and surface water impacts, and truck traffic, and odor?

Targeted Outreach: The Project Team conducted extensive community outreach to representatives of the community regarding the project's design, impacts, mitigation, and implementation. The list below outlines the names of some of the targeted individuals and organizations that the Project Team contacted. All contacts listed in Table 23 below involved person to person contact whether on the phone, via direct email, and/or in-person meetings. Each listed community representative received detail, written information on the project location, objectives, design, potential impacts, and mitigation measures. All listed persons were asked for feedback and provided with multiple avenues for feedback including phone, email, in person meetings, social media, and via online. A copy of the information sent to each person and what was also presented at the community engagement meetings is attached in supporting materials.[71]

Outreach Partners: A major partner in community outreach was Proteus Inc Employment Community Services, a non-profit job placement and training organization with special emphasis on Central Valley disadvantaged populations. Proteus conducted outreach by letters, flyers handed out in the community, emails and reaching out to their contact database in Kings County: Hanford, Lemoore, and surrounding areas. Proteus further extended the outreach through their partner organizations that have connections to local disadvantaged communities, such as the American Job Center, Americas Workforce Network, and the National Council on Aging. The invitation to the event was also posted at Proteus community centers.

Topics of Discussion and Community Involvement: Discussion with Community Leaders listed in Table 23 below and local community meetings included a detailed analysis of potential negative impacts. Topics of discussion included traffic, construction noise and dust, and other impacts as dictated by audience comments. Ground water impacts were discussed, as well as potential odor decrease, and the type of feedstocks being processed. Mitigation plans were discussed by the Project Team (see mitigation section below) and feedback was solicited. No concerns were raised by attendees regarding these potential negative impacts, Earlier proposals for cluster digesters in this area region had included plans to truck manure between dairies, and some participants expressed relief that this project would not include trucking, with its impacts to traffic, air pollution, and roadway damage. There was positive feedback about the project's capacity to reduce air emissions as well as methane surrounding the farms.

Comments were made, primarily by attendees from disadvantaged communities, about the potential positive impact in odor reduction that the projects can bring to the areas near by the dairies. Many attendees were surprised that only a small percentage of dairy farms in the valley have covered lagoons- digesters on site. Attendees asked what is needed for the state to incentivize and require the use covered lagoons by Dairy farms. Other questioners asked about the project's timeline of implementation, the role of grants in making the projects viable, and the likelihood of new digesters being built in the area as well as how to seek employment on the proposed projects. A final topic of conversation brought up by attendees was how to encourage more digester construction in the local area.

[71] Attachment 17.11 – Lakeside Project - Kings County Community Engagement Presentation

5) List the public, community organizations and/or government stakeholders involved.

Table 22 - List of Public, Community Organizations, and Government Stakeholders Contacted

Name	Title	Organization
Jeff Monaco	Executive Director	Kings Waste and Recycling Authority
Parker Sever	Police Chief	Police Department
Christopher Ekk	Fire Chief	Fire Department
Gary Brahm	Chancellor	Brandman University
David Ayers	Mayor	City of Hanford
Jeff Taber	Deputy Director	Environmental Health
Jennifer Lytle	Administrative Assistant	Hanford Chamber of Commerce
Martin Devine	Council Member District	Hanford City Council
Javier Espindola	Principal	Jefferson Charter Academy
Jason Strickland	Principal	John F. Kennedy Jr High
Bill Gundancker	President	Kings County Office of Education
Kevin R. Day	County Director	Kings County UC Cooperative
Amy Ward	Interim Chief Executive Officer	Lemoore Chamber of Commerce
Christine Baca	Water Conservation Technician	Public Works - Utility Division
Anthony Carrillo	Director	Roosevelt Elementary School

In addition to the entities involved in the project's outreach program listed in the table above, the project has also proceeded with a community benefits agreement with the Kings County Economic Development Corporation as described in the response to question 8 below. The project is also collaborating with Proteus, a non-profit job placement and training organization with special emphasis on Central Valley disadvantaged populations. Finally, a variety of regulatory agencies are involved as described in the permitting portions of this application. Other public agencies or officials that have written letters or support or hosted events are the Pixley town council, the Resource Management Agency and the Economic Development Agency of Kings County.

6) Provide details of community meetings, including but not limited to method of notification, attendance, location, date/time, translation services provided, childcare provided, meals provided.

Public Meeting: The project team hosted the public, community meeting on January 22nd at the Proteus Community Center in the City of Hanford located at 216 W 7th St, Hanford, CA 93230. People attending the meeting were mostly residents from disadvantaged communities looking for potential employment. Food was provided. Spanish language translation services were available live from native speakers.

General Outreach: In addition to specific outreach to offices and organizations, the Project Team conducted more generalized outreach to the broader community. This outreach advertised the project's description and directed the public to in-person meetings or to contact us online for those who could not attend in

person. Both interactions provided an opportunity to review information, submit questions, and provide feedback. This outreach was accomplished in multiple media formats. As described above, Proteus and other local partners used email mailing lists, posters, and handbills to advertise. The Project Team informed the community of the project and community meetings in both English and Spanish, using different outreach outlets that included social media, newspaper and radio.[72] Adds were run in the Visalia Times Delta newspaper, which serves the areas of Tulare County, California. Delivery area includes the towns of Visalia, Tulare, Exeter, Farmersville, Lindsay, Porterville, Goshen, Three Rivers, Woodlake, Strathmore, Hanford, Dinuba, Lemon Cove and Orosi, Pixley and Tipton. Radio advertising was run through radio KALZ-FM, with an estimated of 46,700 impressions on an audience of 5,600 people.

Additional Media Outreach: The project team advertised the public event and project in Facebook reaching a total of 4902 local residents from the communities near the project. It included targeted advertising to people with interest in environment, environmental health, agriculture, dairy industry, and renewable energy. The Facebook (https://www.facebook.com/events/159380634839534/) included a link to additional event details, and a link to Maas Energy's info for additional comments (www.maasenergy.com/2018events). Links to Maas Energy Works' website and Facebook page were also provided for more information on the company and past work (www.maasenergy.com and www.facebook.com/maasenergyworks/).

7) In Attachment 15 provide support letters from community members and/or leaders demonstrating that outreach was conducted (at least 3).

Support Letters are attached as Attachment 15.1 through Attachment 15.3 including letters from Assemblyman Rudy Salas, the Hanford Economic Development Agency, and Proteus Employment and Community Services. The project also received several letters[73] from various community members stating their interest and support to the projects.

8) Describe any community benefits agreement with local communities that describes the intentions for developing mutually beneficial outreach and requirements for each group.

Community Benefits Agreement: The Community Impacts and Localized Economic Benefits described above will be monitored via a Community Benefits Agreement between[74] the applicant and the King's County Economic Development Corporation (EDC). The EDC executive board, along with its affiliate American Job Center of California have reviewed and accepted a Community Benefits Agreement whereby the applicant will deliver hiring, training, local contracting, investment, and environmental benefits to the community under a highly transparent and verifiable, 3-year long agreement. The Kings County Economic Development Corporation is a nonprofit organization that seeks to establish Kings County as a location for business prosperity. They facilitate site selection for new businesses within Kings County and assist in the growth and expansion of existing businesses in the area. The Kings EDC is also involved in facilitating workforce development through the Kings County One-Stop Job Center. Additionally, the project team has a second community benefits agreement to work with Proteus Employment Services to assist with local hiring and training for the jobs being created by this project.[75]

[72] Attachment 17.12 – Visalia Times Delta Bilingual Advertisement for Community Engagement Meeting
[73] Attachment 15.1 through 15.8 – Letters of Support from Members of the Community
[74] Attachment 17.13 – Community Benefits Agreement #1 – Kings County Economic Development Corp
[75] Attachment 17.13b – Community Benefits Agreement #2 – Proteus Employment Services

6.2 Localized Economic Benefits

Applicants must explain economic benefits that will be provided to the community (or communities) where the Pilot Project is located. If your project will create temporary construction and/or permanent jobs in the community, indicate how many jobs, total project work hours, job classification/trade, approximate salaries and benefits for each job classification and trade, how long these jobs will last, and how they compare to current unemployment rates. Please be consistent with project work plan and the budget.

The largest volume of questions at the public meetings regarding this project revolved around improving the quality of air as well as economic impact such as capital investment and jobs. On December 2017, Kings County had an 8.4% unemployment rate, well above the state and national averages.[76] The percentage of individuals living below the poverty level is 21.6%.[77] Consequently, employment is a major focus of the project's efforts.

The Project Team has elected to work with Proteus Inc. to benefit disadvantaged and low-income communities. For 50 years, Proteus has been providing job training, education, and community services to agricultural communities in the San Joaquin Valley and have developed programs specific to renewable energy training and employment to advance greenhouse gas emissions reduction goals in California (www.proteusinc.org). Many attendees at the public meetings wanted to know how to find employment with project contractors. The project team directed them to give their information to Proteus, who have a registered database of at least 75 employees available specifically for the work proposed herein.

The project team will require every project construction contractor to have a labor resources meeting with Proteus prior to starting work in order to establish their hiring needs and identify local hires from Proteus's pool. Additionally, every contractor on the project will have a local hiring requirement, with the percentage set based on the type of work and scale. Initial piping contracts in progress include an 85% local hiring requirement since this type of workforce can and should be procured near the project site. An example of the binding, contracted terms is attached.[78] The Project Team has determined that Proteus is best equipped to localize the potential local hires coming from disadvantaged communities, to publicize the project's employment opportunities, and to leverage their existing affiliations with American's Workforce Network and the Western Association of Schools and Colleges.

The total number of jobs created by the project have been calculated using the study "Stimulus Calculations Tool—Statewide Economic Impacts of Construction Spending in California" by the Sacramento Regional Research Institute (SRRI) an economic research and consulting group affiliated with the Sacramento Area commerce and Trade Organization.[79] This document provided the best research on Central Valley spending impacts, with specific detail on types of spending. According to SRRI study, every new $1,000,000 in "Infrastructure and Public Works" spending supports 6.7 direct jobs plus another 4.2 jobs through indirect and induced activities, for a total of 10.9 jobs per $1,000,000 of construction spending. SRRI specifically includes "power plants" in its analyzed definition of Infrastructure and Public Works. The study further concludes that in addition to employment gains, each $1,000,000 in such spending creates an additional $825,858 of output through indirect and induced activities. The total employment and other economic impacts directly resulting from the project are summarized in the table below.

[76] Attachment 17.14 – US Bureau of Labor Statistics, for Kings County
[77] Attachment 17.15 – US Census Bureau - Individuals Below Poverty Kings County
[78] Attachment 17.16 – Example Contract with Local Hiring Requirements
[79] Attachment 17.17 – Sacramento Regional Research Institute – Stimulus Calculation Tool

The SRRI study did not describe the estimated wages from these jobs, so we have estimated the wages based on Project Team experience with the various contractors, bids, and specialties as outlined in the table. For most of the hourly positions shown, benefits include paid vacation, paid sick vacation, the opportunity to purchase some medical insurance through company plans, and a limited retirement savings match.

In addition to construction, the project will create additional permanent jobs in facility operations, as further indicated in the table below. Wages shown below include all benefits. The location of employment varies, with most of construction and operation jobs taking place at the site, while other jobs will be in nearby commercial and retail districts, such as Hanford, Pixley, Tulare, Porterville, and Visalia.

As demonstrated in the SRRI table, the project will create a total of 348 direct jobs, and 218 indirect jobs, for a total of 566 jobs. The Construction jobs will last for 12 months or less. Specific hours for individual contractors are shown in the Project Work Plan. The permanent jobs will last for the life of the project, which is at least 10 years and more likely 20 years.

Another economic benefit is not just the number of jobs, but the type of jobs the Project offers. In Kings County, most employment opportunities for unskilled or disadvantaged workers are in the agricultural sector. Many of these jobs, such as milking cows or harvesting crops, offer very little opportunity for gaining higher level skills or career advancement.

Table 23 - Job Creation and Economic Activity Calculations

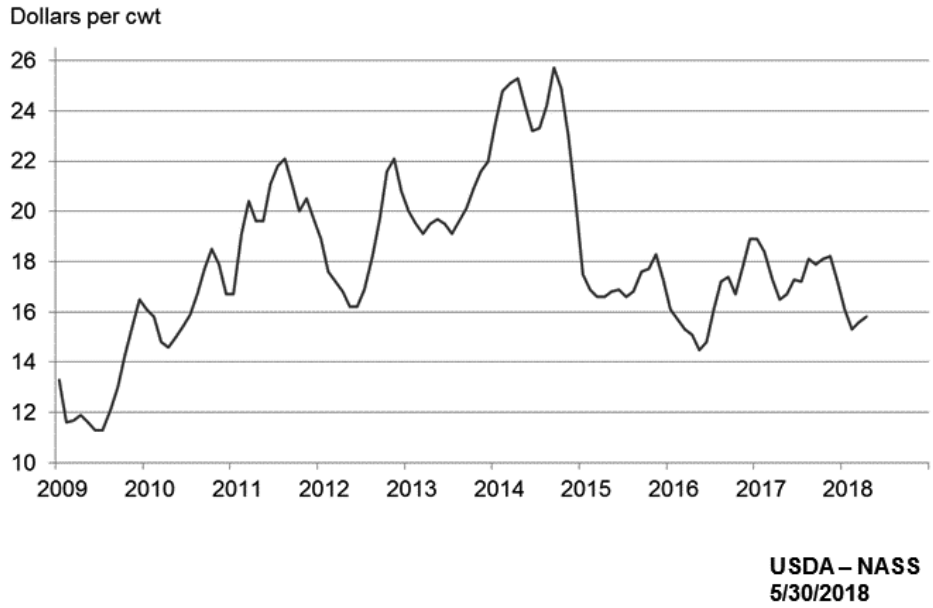
Job Creation and Economic Activity Calculations					
Per Sacramento Regional Research Institute Stimulus Calculation Tool					
Total Capital Cost - Lakeside Pipeline Cluster:	**$**	**50,087,159.00**			
	Direct	**Indirect**	**Total**	**Wage/hr**	**Total Wages**
- Laborer/Apprentice	328.6			$18	$ 11,829,023
- Craftsman	6.0			$65	$ 780,000
- Technician	0.5			$125	$ 125,000
- Manager	0.5			$50	$ 50,000
- Lodging, M&E		2.0		$15	$ 60,000
- Parts and Supplies		208		$20	$ 8,334,643
Total Construction Jobs	335.6	210.37	**546.0**		$ 21,178,665
- Laborer/Apprentice per dairy	0.4			$18	$ 14,400
- Mechanic per dairy	0.4			$30	$ 24,000
- Technician per dairy	0.1			$125	$ 25,000
- Manager per dairy	0.5			$50	$ 50,000
- Lodging, M&E		0.25		$15	$ 7,500
- Parts and Supplies		7.65		$20	$ 305,940
- Total number of dairies	9				
Total Permanent Jobs (1 Year)	12.6	7.90	**20.50**		$ 426,840
Total Constr & Permanent Jobs	348.18	218.26	**566.45**		
Total Wages (Construction Plus 10 years)				**$**	**25,447,068.45**
Additional Economic Output Through Induced & Indirect Activities				**$**	**41,364,880.96**
Total Economic Impact from Construction and 10 Years' Operations				**$**	**66,811,949.41**

Construction workers on the proposed projects will be able to gain several valuable certifications and training. The largest number of hours on the project are in High Density Polyethylene pond liners and pipe. Workers on this specialty will be trained towards Certified Welder Technician status with the Internal National Association of Geosynthetic Installers, as committed by the major contractor (see EFI Commitment Letter in Attachment 6.17). Likewise, the project's Electrical Contractor has agreed to employ 5-6 Electrician Trainees that will gain hours towards Electrical Journeyman certification with the California Department of Industrial Relations (see Electric Innovations Commitment Letter in Attachment 6.18).

Once the project is operational, it requires local hiring for skilled mechanical, electrical, and controls workers necessary to operate the machinery. Permanent workers will receive technical training.

The population of Kings County was 152,982 according to the last 2010 census. The County's economy is primarily based on agriculture, which produced in 2015 a gross value of $2,021,052,000 according to the 2016 Agricultural Crop Report. Milk represented 32.2% ($651,701,000) of the total gross value, placing milk as the top commodity in the County. Yet the dairy business model can be unstable due to milk price volatility as show in the Figure below. This project provides new revenue streams for the host dairy farms that will improve profitability and insulate the dairy from milk price spikes.

Figure 12 - Prices Received for Milk by Month - United States



Diaries that are part of the Lakeside Pipeline Project employ approximately 298 people. According to the University of California Agriculture Issue Center, 1 job on the farm creates 6 jobs beyond the farm, meaning that sustaining the dairies results in sustaining up to 1,788 other jobs.[80] The digester will also improve the regulatory compliance of the dairy with air district requirements, water board requirements, and the new Sustainable Groundwater Management Act. Once equipped with a digester, all dairies that are a part of the

[80] Attachment 17.18 – University of California Agriculture Issues Center – Economic Impact Study

Lakeside Pipeline Project will be stabilized and strengthened to continue making long term contributions to the local economy.

7 Project Readiness and Implementation

7.1 Overall Readiness / Permitting

Include information about the permitting required for the Pilot Project and whether or not the permitting has been completed. This includes any description of permits required for the Utility-owned Pipeline Infrastructure. If the permitting has not been completed, include a permitting schedule that ensures successful project completion within the timeframes specified in this solicitation.

Permitting: The project will require a Conditional Use Permit (including CEQA) from King's County prior to any construction permits. The project has already applied for this Conditional Use Permit in 2017 and the initial study and various environmental reviews are well under way. We estimate this permit will be secured by October of 2018. The CEQA process is the longest lead time item in the permitting pathway, and many permits cannot be secured until CEQA is first complete. That is why we initiated CEQA in 2017 long before making Pilot Project or grant applications. Thereafter, the pipeline requires a building permit, and also encroachment permits for each crossing of county roads. These permits will take another two months to procure, being received by December of 2018. A small portion of the project lies within Tulare County, but no further CEQA actions are necessary since the Kings County CEQA action has included those sections of the pipeline. The project will need to apply for encroachment permits to cross Tulare County roads, which are expected to also be received by December of 2018 (the team has crossed several Tulare County roads using the same permits during the Calgren Dairy Fuels construction).. The project also requires a building permit for the gas conditioning system at the Hub. This permit will take approximately 4 months from the completion of the Conditional Use Permit and should be received by February of 2019. The Hub gas conditioning equipment does not emit any Criteria Air Pollutants or other Toxic Air Pollutants, but the CO-2 membrane discharge gas and emergency onsite flare will still require an Authority to Construct from the Air District. Since issuance of this permit is dependent upon CEQA, the project will apply for this permit in August of 2018 and expects to receive it by January of 2019. Finally, each new dairy digester requires a Site Plan Review from King's County. This Site Plan Review (SPR) is a streamlined dairy use permit that is approved administratively and with much less process delays than a CUP. Some of the dairies such as River Ranch have already completed their SPR. The others will apply after the project is awarded Pilot Project status in October of 2018 and expect to be completed by January 2019. Finally, each digester will require a Regional Water Quality Control Board pond liner approval and updates to the dairy's Waste Management Plan and Nutrient Management Plan. River Ranch, Decade Dairy, Richard Westra, and Dixie Creek have completed their updated Waste Management Plan and Nutrient Management Plans updates while Clear Lake, Lakeside, Double L, High Roller, and Lone Oak #1 will complete these documents by November of 2018. The pond liners approvals will be completed by December of 2018. The schedule for all of these permits (see Attachment 10) is more than adequate for the project's likely timeline for selection as a Pilot Project.

Feedstock Contracts: The project has real, executed agreements for essentially all of the dairy feedstock. And, the Project Team has comprehensive developer agreements to build the digesters. These are not letters or intent or support, or non-binding agreements. Rather, both the investor owned, and the farmer-owned projects have executed comprehensive development agreements with Maas Energy Works to build thef digesters and provide 10 years of operations and maintenance support. The Project Team has already worked out its financial and contractual relationship with the dairies and is ready to move forward—rather

than seeking public financing first and then later negotiating the all-important terms for developing and operating digesters.

Financing: All necessary financing for the project has already been approved and documented. See section 3. a. 5) including table 21 for all digesters. The documentation provided is not letters of intent of letters of support, but actual, approved, available financing, ready to build.

Personnel: Maas Energy Works' has invested all of its profits in the past four years into growing a large team of over 20 full-time, W-2 employee personnel completely devoted to digester development and operations, plus another 10-specialty construction and design staff at our sister contractor Electric Innovations. To our knowledge, the next largest digester company active in California has as staff of four, some of whom may not be full time. A great gap exists in the true readiness of a company that has already invested in human capital, and one that plans to invest later when public funds are granted.

Note to Selection Committee: It can be very difficult for a reviewing organization to determine which projects are truly ready to construct, and which are merely claiming to be ready on paper. We ask the Selection Committee to consider the track record of the digester developers when determining project readiness. We note that of the 2015 CDFA grants awarded, Maas Energy Works completed all three of its awarded projects before any other awardees completed any of theirs and in fact all other projects from that round required extensions since none were online by the required date despite being "shovel ready" at the time of application. Likewise, in the 2017 CDFA grants awarded, Maas Energy Works has already begun construction on four awarded digester projects, while to the best of our knowledge no other awarded projects have begun physical construction. This Project Team is ready to deliver these projects as proposed and we ask that the Selection Committee take our (and others') track record into account when determining claims of project readiness.

7.2 Site Control

In Attachment 16 describe the proposed Pilot Project site and provide documentation and/or descriptions of site and equipment control. This includes any site control required for the Utility-owned Pipeline Infrastructure. Site and equipment control includes, but is not limited to: leases, ownership, or access rights. Proposed point of interconnection to a natural gas pipeline must be identified along with the distance between the proposed project and proposed point of interconnection. Applicants must also demonstrate thorough safety, maintenance, and training procedures will be in place.

The land for the project site is owned by Jacob de Jong (via River Ranch Farms LLC), one of the owners of the applicant entity, Lakeside Pipeline LLC. Lakeside Pipeline LLC has a secured a Lease Option from River Ranch Farms LLC to demonstrate site control for the biogas conditioning facility project site.[81] This land parcel is located across the street from the right of way where the existing SoCalGas distribution pipeline is located. Safety procedures are addressed in 7.6 below and throughout the narrative above.

7.3 California Environmental Quality Act

Include information documenting progress towards achieving compliance under the California Environmental Quality Act (CEQA). If CEQA compliance has not been obtained for an application, then include a schedule to complete CEQA activities for the proposed project.

[81] Attachment 16.1 – Lakeside Pipeline – Grant of Option to Lease Land for Hub Site

As described above, the project has already applied for a King's County Conditional Use Permit. This permit application triggers the CEQA process and consequently the various CEQA-required environmental reviews are underway including biological resources assessment, cultural resources assessment, and others. We expect these studies to be complete by the end of October 2018. The project biologist and archeologist have already determined that no sensitive habitat or cultural areas will be disturbed by the planned construction, which is a key milestone in CEQA review. The county public notice and inter-agency coordination process thereafter typically takes 2 months. Our various interactions with County environmental staff and community groups have so far found no opposition to the project that might otherwise delay approval.

7.4 Community Outreach

Include information about planned community outreach, including outreach and discussions with fire marshals and educational efforts to explain the proposed project to the public.

Community outreach efforts are detailed in 6.1 above.

7.5 Previous Awards

Include any received previous grants or awards from CEC, CDFA, and ARB, and describe how the requirements of the agreement(s) have been fulfilled/are being fulfilled. Describe previous grants or awards for the project from any source.

The Lakeside Pipeline Dairy Digester Cluster project does not currently have any grant awards from CEC, CDFA, ARB, or any other source. 7 grant applications were submitted in February 2018 to CDFA for the Dairy Digester Research and Development Program, but any resulting grant awards will not be announced until July 2018.

7.6 Safety Action Plan

Delineate potential unsafe conditions and note preliminary processes and procedures to respond to each.

Pipeline Controls: There are multiple isolation valves through the miles of gathering pipelines. These are underground, protected by traffic-rated access port covers. To prevent tampering, the valves will be locked in place using a lock-out/tag-out system with keys centrally controlled by operations personnel. Opening or closing a valve will at all times require communication with operations management staff at Maas Energy Works. In addition to the manually operated valves, each individual dairy digester is equipped with double check valves to ensure that gas from the pipeline does not back feed into the building or digester during a dairy blower failure or similar equipment outage. In addition to proper warning signing, a 24x7 active number will be posted at each dairy biogas handling building for bystander communication.

Gas in Building: The biogas pre-processing building at the dairies, or some of the control and equipment housing buildings at the gas cleanup hub present a safety risk if they are filled with biogas. Each building will be equipped with a gas monitoring system that present a visible alarm if biogas is present, and also sends out an alarm to the controller via the SCADA system. If gas is detected, no personnel will enter the building. Rather, all SCADA-controlled equipment will be shut down remotely. If the ventilation system is still working, it will be left on. If the ventilation system is not working, then power will be shut off to the building. Next, trained operations personnel will seal off the outside valves that allow biogas to flow into the building. Next, a minimum of two personnel (using buddy system) will approach the building wearing personal gas detection equipment. If gas is detected outside the building, personnel will not approach the

building until gas clears. If gas is not detected outside the building, then personnel will open doors to the building and wait for gas to dissipate and the in-building gas detection system to indicate gas is clear. Once gas is clear, personnel will enter the building wearing gas detection systems and confirm no gas is present. Finally, personnel will begin diagnosing and repairing the initial source of the gas using pressure testing and other means that do not require biogas to be re-introduced into the building until the problem has been remedied. Finally, once the system is restored, all similar devices or buildings in the Pilot Project will be checked for vulnerability to similar leaks.

Maintenance in Enclosed Spaces: Personnel could encounter safety risks when maintaining equipment in enclosed spaces where biogas can collect. The project has minimized this risk by using H2S scrubbers that are not emptied out by personnel inside of them, but rather are mounted in such a way that media can be gravity drained and installed from the outside of the vessel. Moisture knockouts have been designed to use pressurized moisture recovery systems or simple manual bailing, rather than requiring an operator to enter the trap. The moisture traps contain no interior equipment that could later require maintenance inside the trap. Should any enclosed spaces still require entry, the project will employ only personnel trained in enclosed space maintenance, using a two person “buddy” system procedures.

Pipeline Leaks: Gas leaking out of a gathering line could present an inhalation or combustion risk. The project has already mitigated this risk by installing thick-walled, low pressure piping systems that are buried deeply with tracer wires and marker tape. However, if a gas leak is detected (see integrity procedures in 2.2.2e above) the pipeline, or the applicable portion of the pipeline, will be depressurized by turning off the biogas blowers via SCADA remote control. Thereafter, no less than two trained personnel using personal gas detection systems will close the physical valves that isolate that section of pipe. If the leak is near a road, traffic will be stopped, and the county fire department contacted. A response plan with the jurisdictional fire department shall already have been designed and planned, including local notification to other emergency management services. Once the gas has cleared, the pipeline will be excavated, repaired, and pressure tested before biogas is re-introduced. Gas leaking out of a utility-owned high-pressure pipeline will not be handled by Lakeside Pipeline LLC personnel. Rather, all pipeline-connected equipment will be shut down remotely and no personnel will enter the area until the utility can respond with the appropriate equipment and personnel.

SB1383 DAIRY PILOT PROJECT APPLICATION
Lakeside Pipeline Dairy Digester Cluster

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