THE COALITION FOR
RENEWABLE
NATURAL GAS

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September 28, 2011

Mr. Robert B. Weisenmiller, Ph.D.
Chairman
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **RPS Proceeding, Docket Numbers 02-REN-1038 and 11-RPS-01**

Dear Chairman Weisenmiller:

The Coalition For Renewable Natural Gas thanks you for your leadership and for the care and diligence with which you and the other Commissioners have undertaken the review of California's Renewable Portfolio Standard (RPS) policies.

Your RPS Program staff are also to be commended. We are thankful for the invitation they extended to us to address the Commission, and specific staff questions , as part of an RPS panel during the September 20, 2011 staff workshop. We are greatly appreciative for the opportunity to have shared our members' collective experience and expertise.

The Coalition For Renewable Natural Gas represents industry leaders in green fuels and technology. Our membership includes California-based companies and California labor unions.

We are committed to a successful RPS program.

Accordingly, please find attached our formal written response to the direct questions distributed by the Commission regarding the treatment of renewable natural gas (RNG, or biomethane) under the RPS.

In summary, and in response to the questions raised to the panelists at the staff workshop, The Coalition For Renewable Natural Gas asserts the following:

Renewable Natural Gas (RNG) is a compliment to existing and future wind and solar projects, although RNG projects that have been and can be successfully developed nationally are in relatively short supply and volume when compared to wind and solar. In a relative sense, the resource is scarce.

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However, it is a renewable fuel resource that can be utilized in base-load green energy generation and as a clean transportation fuel. In accordance with SBX1-2 (Simitian, 2011), RNG can and does assist in California's noble effort to derive 33 percent of its energy from renewable sources by 2020.

Upon careful examination, we believe the current guidebook should be maintained in its current form. Any effort to revise the guidebook to limit distribution of RNG fuels via the natural gas pipeline system and use of RNG for power generation at California load serving entities would be counter-productive and harmful to California energy consumers as well as contrary to the letter and spirit of the legislation and regulations governing the RPS.

California biomethane development should be encouraged and its ultimate success will depend on a vibrant national market – which in turn is dependent on reliable and cost-effective pipeline distribution of RNG. Restricting the manner or use of the natural gas pipeline distribution system to sell RNG or denying "Bucket #1" bundled renewable energy credits to California load-serving entities that use pipeline distributed biomethane for power generation will not provide any benefit to California ratepayers. Quite the opposite is true. Realistically, such a limitation would result in an effective ban on biomethane project development. It would have negative consequences for California's environment, economy, jobs and on rate-paying consumers.

Environmentally speaking, limiting RNG's viability will increase, not decrease, the State's already significantly high dependence upon fossil fuels, as RNG is the only "drop-in" fuel that can displace natural gas as a peak load energy resource when consumed in existing power generation infrastructure. As of 2009, more than 57% of our State's energy was derived from natural gas fossil fuels.

Commercially, economically and from a consumer perspective, the resulting costs from limiting RNG far outweigh any perceived benefits. The cost to produce a kilowatt-hour of renewable electric power from pipeline distributed biomethane is typically equal-to or less-than the subsidized costs to produce renewable electric power from wind or solar resources. RNG is a fuel that when injected in the pipeline and used in power generation downstream, receives no federal grants, tax credits or other meaningful subsidies.

In fact the U.S. Energy Information Administration recently reported that the U.S. Department of Treasury has spent $6.6 billion funding solar and wind power projects since September 2009. By comparison, the U.S. Treasury has not provided a single dollar of funding for biomethane projects that inject pipeline quality biomethane for distribution in the natural gas pipeline system. Nevertheless, the biomethane industry has been able to produce renewable energy from waste streams at prices that are below the prices paid for solar and wind power.

The Treasury program that has provided the cash grant funding to solar and wind (Section 1603) is also slated to expire at the end of the 2011, which will make it even

more critical for California load-serving entities to be able to access lower cost renewable fuel like biomethane if California is going to achieve its RPS goals at a reasonable cost to the consumer.

Discouraging the use of biomethane that is distributed via the natural gas pipeline system for use in California facilities will place jobs in jeopardy by making it impossible to cost-effectively develop biomethane production projects in-State or outside of the State. It will almost certainly result in rate increases.

The Coalition For Renewable Natural Gas supports legislative action and utility cooperation that will enable economic development of in-State biomethane production facilities. Due to existing barriers that have effectively prevented in-sSate development of pipeline quality biomethane projects, our California-based member companies have been forced to primarily develop biomethane production facilities outside of the State. However, a number of our member companies are working to demonstrate the safety of pipeline injection of biomethane to the satisfaction of the California utilities and the Coalition for RNG is dedicated to seeing a thriving market develop for in-State biomethane projects. Realistically, however, we are years away from achieving that goal. In the interim, projects in-State will be limited in number (due to the cost and difficulty of distributing their product without pipeline access) and the industry will need to continue to develop biomethane production sites outside of the State to survive.

It is also important to note that it is no more difficult to verify the production and use of biomethane fuel produced outside of California and used at an in-State power generation facility than it will be to verify the direct production and use of biomethane at an in-State facility. In all cases there are auditable third party meter and transportation records that can confirm the volumes produced and used to generate renewable power. The CEC maintains a successful track-record of auditing these projects under existing rules.

The Coalition For Renewable Natural Gas requests that the current CEC rules remain unchanged in subsequent editions of the RPS Eligibility and Overall Program Guidebook.

We request that the Commission be especially mindful to continue the existing rules that 1) allow California load-serving entities to procure biomethane that is shipped to a load-serving entity via the pipeline system via any means of physical delivery available (interruptible, forward haul, back haul, or firm), 2) use the biomethane as a fuel for the production of renewable power at in-State facilities and 3) generate bundled "Bucket #1" RECS for electricity.

Having completed a thorough analysis of California's Renewable Portfolio Standard (RPS), and given our understanding of its intent, we believe that preserving the status quo is appropriate, both as a matter of statutory interpretation and good public policy.

Please find our entire written comments attached.

Sincerely,

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California State Council of Laborers

Cambrian Energy Development

Clean Energy Renewable Fuels

Clean Energy
North America's leader in clean transportation

Shell Energy North America (US), L.P.

Element Markets

ELEMENT MARKETS

Montauk Energy Capital

Montauk energy

Energy Power Partners

SouthTex Renewables

SOUTHTEX RENEWABLES

International Union of Operating Engineers

Landfill Energy Systems

SCS Engineers

Sustainable Energy Solutions LLC

Renewco

Energy Systems Group

Columbia Biogas

CC: Commissioner James D. Boyd, Vice Chair
Commissioner Karen Douglas, J.D.
Commissioner Carla Peterman
Kate Zocchetti
Mark Kootstra

Coalition For Renewable Natural Gas - Response to Questions in Attachment A

Question 1: The fourth edition of the RPS guidebook requires biomethane to be delivered to California or the electricity generation facility if it is located outside of California before it can be used in the generation facility. Given the two separate pipeline systems in California is it appropriate to require:

a. Delivery of biomethane to the gaspipeline system in California from which the facility accepts delivery of gas, or directly to the electricity generation facility if it is located outside of California, or

b. Delivery of biomethane directly to the electricity generating facility.

The existing RPS guidebook rules should be maintained. The physical delivery requirements of the RPS Guidebook ensure that the biomethane that is used to generate renewable power under California's RPS is, in fact, placed in the resource pool that feeds California's natural gas demand. The existing rules require that the energy content of the biomethane, as measured in MMBtus, is physically transferred from the point of production to the point of consumption on each and every interconnecting pipeline system. This is consistent with ensuring that the biomethane product is injected into the natural gas pool that provides 57% of California's power.

Once delivered to the California border, biomethane buyers and sellers should be able to move the product in any manner consistent with the applicable regulations and capable of audit by review of documentation of third party pipeline and meter data.

In the case of facilities outside California, it is appropriate to require that the gas be delivered directly to the facility if it is to qualify for biomethane use at that facility. This requirement will also ensure that the biomethane resource is, in fact, placed in the resource pool that feeds California's natural gas demand and that the energy content is physically transferred to and used by the subject facility.

Question #2: Should the Energy Commission consider adding any location requirements to sources allowed to provide biomethane to facilities participating in California's RPS in addition to any restrictions implied by required delivery agreements?

Biomethane, as is the case with all other fuels used for power generation, should be allowed to flow into California for qualification as an in-state Bucket 1 renewable resource from all locations so long as a physical path is demonstrated and the fuel is used to generate power in compliance with the RPS.

Biomethane producers cannot pick the location of the projects that are suitable for development. Biomethane projects are rarely, if ever, located near efficient power generation facilities that would enable a dedicated pipeline. Due to climate and population factors, there are extremely limited opportunities to develop biomethane

projects in the Western United States. Today, there are no projects in the WECC injecting pipeline quality biomethane into the gas grid. Moreover, the nature of the natural gas production and distribution infrastructure in the United States is such that geographic distance is not necessarily the most relevant factor in determining whether the energy content of biomethane, as measured in MMBtus, may be reliably and physically transported to the California market. California consumes significant quantities of conventional natural gas that is transported to the California market primarily from Canada, the Rockies and Texas. This gas is transported via the interstate pipeline system. Proximity to the interstate pipeline system is the primary determinant of the ease of transportation of biomethane to the California market. For example, a project located in Pennsylvania that is a short distance from the Rockies Express Pipeline and can move their product on to the pipeline via a high volume transmission line may find it far easier to transport their product to California than a producer injecting gas into the pipeline grid in Oregon, if the distribution system in Oregon has limited connectivity and gas exchange with the interstate.

The key requirement that the CEC has imposed is that producers must contract for physical delivery of their product to the California border (or the electrical generation facility if outside of California). This ensures that the energy content of the biomethane, as measured in MMBtus, is delivered alongside the conventional natural gas resource that feeds California demand. In order to comply with the CEC rules – the physical energy content of the biomethane must be physically transferred from the point of production and at each measurement point on each interconnecting pipeline system to the point of consumption. There are many cases where the nature of the gas transportation system will not allow this – for example if any one of the interconnecting pipelines does not maintain an approved tariff to physically transport gas off of their system. Further geographic limitations would arbitrarily limit or potentially end the State's access to this valuable renewable energy product without any corresponding benefit for California energy consumers.

Based upon EPA LMOP data, the Coalition For RNG Coalition estimates that, at most, approximately 60,000 MMbtus per day of additional biomethane may be made available for purchase to California load-serving entities from new biomethane projects in the next three to five years. In an average heat rate plant this equates to approximately 350 MWs of additional capacity from biomethane if all biomethane produced flowed to California and was only used in the power sector. These estimates assume no geographical limitations are imposed. If the CEC were to arbitrarily determine that a biomethane production project must be located in the WECC in order for the buyer to use the product in an in-State facility and generation Bucket No. 1 RECs under California's RPS, we believe few if any biomethane projects would be able to offer RNG to California load-serving entities. The inability of load-serving entities to procure biomethane for their existing natural gas generation units (which the ratepayers are already paying for) would result in higher rates to achieve the RPS and an inability to load-shape wind and solar electricity production with a renewable resource - making it very difficult for smaller compliance entities to comply with the 33% RPS.

The utilities that spoke or presented at the Workshop on September 20th were universal in their view that pipeline delivered biomethane enhances the reliability of their energy production, reduces their fossil fuel use, reduces criteria pollution and lowers their rates. Given these substantial benefits, the Coalition for RNG believes that the focus of regulators and legislators should be how to *increase* California's access to RNG (including removing barriers to in-State development), not how to limit it.

<u>Question #3:</u> The Energy Commission currently allows backhaul and forward haul transportation agreements that are either firm or interruptible to be considered eligible delivery methods, should the Energy Commission:

a. Retain the current requirements?

b. Restrict delivery to only forward haul transportation?

c. Restrict delivery to only firm transportation agreements? Please provide reasoning for your response.

The Energy Commission should retain the current requirements. The variations in delivery methods are a function of the necessities for moving gas along a pipeline. Natural gas is produced, distributed and consumed in highly variable quantities every day. Patterns of distribution can also change dramatically based on new production and new sources of consumption. The natural gas industry uses forward haul, back haul, firm and interruptible transportation to help manage the variability of the system. Any requirement that physical delivery be achieved by one particular type of transportation arrangement would be impractical and potentially eliminate producers' ability to comply with the CEC requirements and deliver biomethane to the California market.

Restricting delivery to "forward haul transportation" would be equivalent to disallowing pipeline RNG deliveries to California load-serving entities under the RPS. The natural gas transportation industry does not typically if ever specify "forward haul" versus "back haul" as contractual terms – rather, gas transportation agreements either provide for firm or interruptible transportation from one point to another. In other words, a producer cannot contract for "Forward haul" transportation. Whether the energy content, as measured in MMBtus, is delivered via forward haul or back haul is a function of the differential pressure and variable consumption and production on the interconnected system, which changes daily and can dramatically (and unexpectedly) change over time. For example, in just the past few years the extensive and unforeseen shale gas production in Western Pennsylvania has radically altered the directional flows of interstate pipelines that were built to provide gas from the Rockies to the East Coast.

The actual pipeline transportation system flows are not fixed and are entirely outside of the control of the RNG producer – while a producer may be able to obtain firm contracts today that flow on a forward haul basis there is no certainty whatsoever that their product will always move on a forward haul basis and the RNG Coalition is unaware of any interstate pipeline that contracts in such a manner. No one will be able to finance or develop a project if they have no reasonable likelihood of controlling whether their

product is shipped to market in a manner that complies with the CEC's rules. A firm delivery contract that was met with forward haul today may be met with back haul tomorrow. It is also worth noting that this would apply to both in-State and out-of-State projects – a "forward haul" only requirement would severely limit if not entirely prevent the delivery of RNG via the pipeline distribution system to California load-serving entities under the RPS even from even an in-State project – as such contracts do not exist in the natural gas transportation industry

It is also true that firm transportation is not always available. Backhaul and interruptible transportation are common gas industry practice for meeting gas delivery and gas contracting requirements. Directional flow can change – which would inhibit a certain transportation method making another method necessary. The existing rules allow producers to use whatever method of physical delivery is possible and require that the energy content of the RNG, as measured in MMBtus, be accounted for and transferred along each interconnecting pipeline from production source to point of consumption. This physical delivery requirement is sufficient to ensure that the RNG is injected into the pooled energy resource that supplies California's energy demand and further restrictions would prove unmanageable and have a disastrous impact on the RNG industry.

<u>Question 4:</u> Should any delay be allowed in the consumption of biomethane at the electric generating facility once it has been delivered to California or the electricity generating facility? If so, please specify what reasons for delays should be allowed and what, if any, limits should be imposed on the delay. Explain your answer. If no delay should be allowed, please explain why.

Answer: In the natural gas industry delays in consumption are allowed and are critical in managing the dislocation between producer supply and consumption. The same delays should be allowed in the consumption of biomethane at the electric generating facility in order to utilize renewable natural gas as a dispatchable resource and to reduce the integration cost associated with intermittent renewable resources. Wind and PV generation introduce four factors that change how a utility's system must be operated and increase integration costs: (1) frequency regulation, due to an increase in the short-term variability of the net load, (2) necessity for load-following units to increase and decrease output more quickly, (3) uncertain net load due to the variability of the resource itself and (4) larger differential between daily minimum and maximum demand.[1] Integration costs are largely driven by the fuel cost necessary to provide the additional required reserves, and gas fired units provide flexible generation to meet additional ramping requirements.[2] By using biomethane in gas fired units, generators can address the variability challenges associated with increased reliance on intermittent renewable resources without resorting to the use of fossil-fuel fired facilities.

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[1] Denholm, P; Ela, E.; Kirby, B.; and Milligan, M., "The Role of energy storage with renewable electricity generation" (2010), p.19. Available at http://digitalcommons.library.unlv.edu/cgi/viewcontent.cgi?article=1005&context=renew_pubs (last visited September 14, 2011).

[2] *Id.* at 21.

No limitation on the length of delay should be implemented. Biomethane is stored on a pipeline in accordance with the same standards and policies used for storage of natural gas across the gas industry. Once placed in storage, the biomethane is not removed from the system until nominated out of storage by the transporter or the storage is otherwise terminated. Pipeline reports provide detailed calculations of the amount of gas injected into and delivered from storage on a daily basis. Reconciliation and comparison of the pipeline storage reports to production and transportation reports upstream and downstream of the storage facility for the same period of time provides an accurate determination of how much biomethane (as well as all associated environmental attributes) was delivered to a generator.

<u>Question 5:</u> How should the Energy Commission treat biomethane imbalances resulting from differences between scheduling and the use of biomethane?

a. Specify why such imbalances could occur, and if they should be allowed. Please explain.

Answer: Natural gas imbalances are a common occurrence with regard to the movement of natural gas, whether it is traditional or renewable natural gas. Imbalances serve a dual function in allowing the producer to manage through variable production and allowing the end user to manage consumption variability. These imbalances should be allowed because they facilitate the ability to more efficiently manage gas volumes and thus allowing for the renewable energy to be dispatchable.

b. What limits are placed on imbalances by pipelines, and should the Energy Commission enforce stricter limits on imbalances? Please explain.

Answer: Pipeline imbalance limits are defined in each pipeline's tariff and vary from pipeline to pipeline based on physical and operational conditions. Pipelines typically allow imbalances so long as the physical capacity of the pipeline is not exceeded. Many pipelines offer management tools for imbalances, including park and loan services. Because the reconciliation of actual production and consumption to nominations can take up to two days, most pipelines manage imbalances monthly (while some have the capability to balance daily). Limits on imbalances only impact the assessment of penalties and whether an imbalance is "cashed out", which is the settling by the pipeline, which in the case of biogas would result in a sale of the gas as natural gas and a loss of the environmental attributes and an inability to deliver the gas into the CAalifornia market.

Because imbalances are effectively managed by individual pipelines according to FERC regulations (where applicable) and pipeline tariff provisions, biomethane should receive the same treatment as natural gas in the regulated tariff provisions.

c. What is the magnitude of imbalances in natural gas deliveries, and how do imbalances in biomethane deliveries differ?

Imbalances in natural gas deliveries typically range from 2-5% of a facility's production volume. Production of biomethane tends to be more volatile than natural gas due to the fact that landfills, anaerobic digestion facilities, and waste water treatment biogas generating facilities have more variability than traditional gas wells due to operational difficulties and variability in gas production, and imbalances are used to manage large swings in production relative to the nominations to generators. In biomethane purchase agreements, generators typically require delivery of a certain quantity of biomethane on each delivery day to support consistent generation capacity. If an interruption in production creates a differential between the quantity nominated to a generation facility and the actual amount produced, creation of an imbalance allows for the producer and the facility to manage through the interruption through the delivery of biomethane made up in the current term. At the conclusion of the applicable accounting period (daily, monthly or otherwise), the imbalance is reconciled with actual production volumes by the fuel production facility to ensure that the generator is only invoiced (and claims environmental attributes) for the amount of biomethane produced and delivered to the generator during the accounting period.

<u>Question 6:</u> What records should an applicant for an electric generating facility using pipeline biomethane be required to maintain and provide to the Energy Commission in the event of an audit process. How will these records ensure that the biomethane has not been claimed for use by more than one entity and all delivery and eligibility requirements have been met?

Answer: The Coalition For Renewable Natural Gas believes that a generating facility should be required to maintain pipeline reports to support any invoices received for biomethane, as well as all attestations provided to the generating facility by the fuel production facility and pipeline biomethane delivering entity as required under the current CEC Eligibility Guidebook.

Coalition For Renewable Natural Gas - Response to Questions in Attachment B

The following barriers have been summarized for the 2011 Bioenergy Plan. Please provide update on these barriers to instate biomethane injection into a natural gas pipeline or any additional barriers that are not addressed.

Biomethane quality standards and interconnection:

California utilities do not have uniform biomethane quality standards and the standards in place may not be appropriate for biomethane; most standards were designed for natural gas injection

The Rule 30 Tariffs adopted by the Sempra gas utilities (Southern California Gas Company and SDG&E) and the Rule 21 Tariff adopted by PG&E do have differing gas quality standards. Some of those standards are easily met by natural gas, but not as easily by biomethane (i.e., Renewable Natural Gas or RNG). It should be noted that gas quality standards adopted by natural gas pipeline companies vary widely across the United States. Unquestionably, however, the gas quality standards included in the Rule 30 and Rule 21 Tariffs are among the most, if not the most, stringent in the country.

Both Rule 30 and Rule 21 have very tight oxygen standards (0.1% in one and 0.2% in the other). These standards can be met by RNG, but require the installation of an oxygen catalyst to the gas processing facility used to treat the biogas resource (whether it is landfill gas or digester gas). Such a catalyst has both a substantial capital cost and carries additional operating expenses. Landfill gas, in particular, which is the largest potential in-state resource of RNG, is collected at a landfill from a large number of relatively shallow, interconnected wells placed in the deposited waste through which raw landfill gas is collected by means of a vacuum applied to the wells. Due to the shallow well structure, a small amount of air (and with it oxygen) can enter the raw collected landfill gas stream. Air can also enter the raw landfill gas stream if either a landfill gas collection well or related piping breaks by reason of the dynamic forces that are present within a landfill through settlement and the actions of large earth-moving equipment. The same phenomenon is not present with natural gas well gathering systems in which the wells are much deeper and are not subject to the intrusion of air as part of the gas gathering process because the natural gas is located beneath impermeable geological formations that are often deep within the earth. With natural gas extraction, the significant natural pressures accompanying the natural gas deposits are used for its extraction with no need for compression or other mechanical means that can allow for the intrusion of air. By contrast, landfill gas is produced in a moving body of deposited waste located near the surface and into which a large number of wells connected to a vacuum source are required for extraction, which, through breaks in the collection system or in the vacuum system, present a much higher potential for the intrusion of air (with attendant nitrogen and oxygen) into the collected landfill gas stream.

Perhaps the most significant gas quality standard that is problematic for RNG is the minimum heating value requirement of 990 btus per standard cubic foot that is present in the Rule 30 Tariffs. In most other states the heating value requirement for natural gas pipelines ranges from 950 btus per standard cubic foot to 960 btus per standard cubic foot. However one state has a 975 btus per standard cubic foot standard.

It is important to note that landfill gas and digester gas lack the higher chain hydrocarbons that typically accompany the methane found in fossil fuel natural gas. The heating value in landfill gas derives solely from methane, which has a lower heating value than the higher chain hydrocarbons found in natural gas. The higher chain hydrocarbons found in natural gas have higher heating values and are responsible for the higher heating values at which natural gas is normally produced, i.e. in the 990 to 1,200 btus per standard cubic foot range.

By contrast, RNG, when produced from landfill gas or digester gas under very low vacuums and processed with very efficient gas processing technologies, is a gas that typically has a heating value in the 950 to 980 btus per standard cubic foot range, with the higher end of that range being exceptional.

In other states, utilities routinely allow the blending of lower heating value RNG with higher heating value fuels, such as fossil fuel natural gas (including natural gas already in the pipeline to which the RNG project is interconnecting for which a "blending fee" is charged by the gas utility) or propane, in order to meet the heating value minimum standards under the various applicable gas tariffs. In certain cases, utilities have allowed the introduction of RNG with a heating value as low as 900 btus per standard cubic foot when the RNG is being introduced into a pipeline that contains very high heating value fuel, e.g. 1,300 btus per standard cubic foot refinery gas, in order to lower the heating value of the gas in the pipeline to a level more acceptable to the gas pipeline utility's customers for use in their combustion equipment. This may also occur where higher heating value LNG is present in the pipeline into which the RNG may be introduced.

Although not specifically set forth in the Rule 30 and Rule 21 Tariffs, developers of RNG projects (other than landfill gas-derived RNG projects, which are currently prohibited under such tariffs) have been told by gas pipeline utilities in California that the following guidelines must be met before interconnection to a gas pipeline would be allowed by the gas pipeline utility:

1.Blending of the RNG with a higher heating value fuel in order to meet the minimum heating value requirements of the tariffs would not be allowed

2.Interconnection would be allowed only to a transmission gas pipeline (ostensibly to assure the presence of sufficient quantities of fossil fuel natural gas to dilute the RNG), even though no transmission gas pipeline is located within any reasonable proximity to the proposed RNG project

3.Very expensive continuous monitoring of certain "constituents of interest", such as siloxanes, would be required as a condition to interconnecting to a pipeline

If any one of the foregoing requirements are imposed by a gas pipeline utility as a condition to the interconnection with the pipeline, it would, in effect, represent either a physical barrier (in the case of the first two listed items) or an economic barrier (in the case of the third item) to the successful completion of the project.

These types of barriers to RNG project development in California (as well as the high interconnection costs mentioned below) are reminiscent of the types of conditions that electric utilities would routinely impose on prospective independent power producers to prevent the development of generation projects before passage of the Public Utilities Regulatory Policy Act, which mandated equal access.

The issue of the "unknowns" that may be present in RNG is a topic that has been raised in the past by some of the California gas pipeline utilities as a reason for resisting the introduction of RNG into California pipelines. Although the need for changes to the absolute prohibition on RNG derived from landfill gas will be discussed in more detail below, it is important to recognize the change in view that has recently been exhibited by California natural gas utilities toward being more receptive to a change in the prohibition against RNG from landfill gas and in considering a change to some of the previously rigid positions on interconnection that have stalled developed of a number of in-state RNG projects from sources other than landfill gas.

The Gas Technology Institute (GTI), which is a non-profit research institute largely funded by contributions from natural gas distribution and transmission companies, approached the High Btu Gas Working Group of the Solid Waste Association of North America, many of which are now members of the Coalition for Renewable Natural Gas, about a study by GTI of 8 landfill gas-to-pipeline quality gas projects in which all material constituents of interest present in RNG derived from landfill gas would be sampled and measured and then compared with samples taken from fossil fuel natural gas in natural gas pipelines located near to RNG projects, but not containing RNG. GTI stated that the objective of the study would be to establish RNG as a "fungible zero-carbon product of the natural gas industry."

After numerous conference calls among representatives of the Coalition for RNG and representatives of GTI as well as follow-on conference calls with representatives of the natural gas industry, forms of agreements for the process to be undertaken by GTI for the conduct of the study using GTI's protocols and its sophisticated in-house laboratories and analyzers were agreed to and subsequently signed. The study by GTI was started at the end of 2010, is expected to be completed and it's final report on the study published by the end of 2011.

In two public presentations given by the Project Manager of GTI for the foregoing study, the results to date of all samples taken at the 8 landfills across the United States that were included in the study have produced very favorable results as to the high quality of the RNG and lack of the presence of any constituents of interest at levels that would represent any threat to either the health and safety of natural gas pipeline customers or to the integrity of the natural gas pipeline infrastructure.

GTI has conducted previous studies of landfill gas and dairy digester gas in which the constituents of the product gas were studied and found to be materially below levels established by OSHA and the EPA at which any concerns for health or safety would arise. However, the current GTI study covers a larger sampling of RNG from landfills throughout the United States than in previous studies and is expected to provide results that should meet the levels of inquiry that were requested by California natural gas utilities in prior meetings in which potential changes to California law as it pertains to landfill gas were being considered.

Current utility tariffs require project developers to pay for the costs of interconnection which is a large cost barrier:

RNG developers for potential RNG projects in California have been quoted gas pipeline interconnection costs that exceed $3,000,000. The California interconnection costs are extraordinarily high when compared with natural gas pipeline interconnection costs in other states.

RNG projects are small in comparison to the volumes of gas produced from natural gas formations in which large gathering systems and gas processing facilities are installed.

RNG projects lack the economies of scale frequently found with natural gas projects.

RNG projects currently receive no subsidies of any form from the federal or state governments. There are no tax credits, no grants, and no feed-in tariffs.

When dealing with small, unsubsidized renewable energy projects, the imposition of a large pipeline interconnection cost is tantamount to the signing of an economic death warrant. There are insufficient economics to support the investment of capital to pay for such a high interconnection cost.

A potential solution to both the gas pipeline utilities and to the RNG project developers would be to have the pipeline interconnection costs paid for by the natural gas pipeline utilities and then included in their rate base as an allowable cost.

Biomass to biomethane conversion technologies:

The commercially available conversion technologies, such as anaerobic digestion, are generally limited to high moisture (non-woody) feedstocks.

A review of the operating biomethane projects in the United States today confirms that the commercially viable conversion technologies, such as anaerobic digestion, are generally limited to high moisture (non-woody) feedstocks.

New technologies are in development, but have high capital costs and other economic, regulatory and development barriers.

Although there may be new technologies in development for utilization or production of RNG that can be injected into pipelines, the small number of projects in the U.S. and

even in California that meet all of the criteria necessary to develop a successful RNG project is a significant deterrent to the development of new technologies. Further, the investment community is reluctant to finance new technologies that do not have long, successful track records and are supplied by creditworthy entities.

The foregoing, coupled with the lack of any financial subsidies for RNG projects and the unknown environment as to how such new technologies will be treated by regulatory agencies make the development and deployment of new technologies unlikely in the near term.

The GTI study now being undertaken samples RNG from RNG projects that utilize three known gas processing technologies that are being used by the RNG industry to produce RNG from landfill gas. The lack of any study of new technologies by GTI or another credible independent research organization will increase the reluctance of pipeline companies to accept the deployment of any such new technology.

Statutory and regulatory issues:

Statute currently prohibits the injection of landfill gas, despite allowing landfill gas from out-of-state to be scheduled into California; other states allow landfill gas to be injected into their systems that deliver gas into the California system.

Significant efforts have been undertaken recently to change the provisions in California Health & Safety Code Sections 25420 and 25421, commonly known as the Hayden Amendment. These statutes address the potential presence of vinyl chloride in RNG derived from landfill gas.

The tariffs of natural gas pipeline companies in other states on occasion do include as part of the gas quality standards in those tariffs maximum levels of vinyl chloride that may be present in the RNG product gas. If mentioned, the standard most often listed is 1 ppm of vinyl chloride. This is actually a lower standard than the 1.17 ppm (1,170 ppb) that was established through hearings before the California Public Utilities Commission after passage of the Hayden Amendment.

The difficulty presented by the Hayden Amendment is that it has criminalized adherence to the vinyl chloride standard. Not only the RNG producer, but also the natural gas pipeline company accepting gas that exceeds the vinyl chloride standard is subject to a $2,500 per day fine. In addition very expensive testing is mandated by the statute to assure compliance with the vinyl chloride standard.

Under gas quality standards in every state outside of California that includes a standard for vinyl chloride, the penalty for violating such standard is immense to an RNG producer. The producer will be shut out of the pipeline and lose its entire revenue stream. That is an extremely severe penalty - far greater than $2,500 per day.1616

The Hayden Amendment is a classic case of the axiom that bad facts make bad law. The Operating Industries Landfill in Southern California is the landfill at which conditions

existed that gave rise to the adoption of the Hayden Amendment. It was a badly managed hazardous waste landfill, one of the few hazardous waste landfills operating in California. Only about one-third of the area within which waste had been deposited had landfill gas collection wells installed that were collecting landfill gas. The collected landfill gas was processed by a sophisticated gas processing facility into pipeline quality gas that was introduced into a natural gas pipeline operated by Southern California Gas Company. The product gas was continuously monitored by a gas chromatograph and met the pipeline specifications then in effect by Southern California Gas Company.

The remaining two-thirds of the landfill had no landfill gas collection system installed. As a result, the landfill gas generated escaped into the atmosphere and into surrounding neighborhoods. Since the Operating Industries Landfill was a hazardous waste landfill it did contain chemical compounds that produced vinyl chloride that was present in the uncollected landfill gas that escaped into the surrounding neighborhoods. Vinyl chloride is hazardous and is a carcinogen.

However, the escaping landfill gas that contained vinyl chloride generated at this hazardous waste landfill is not what was regulated by the Hayden Amendment. That law regulated the collected landfill gas from the one-third of the landfill that was collected, was processed by sophisticated gas industry processing equipment and was continuously monitored for gas quality and delivered into the Southern California Gas Company pipeline in continual compliance with the gas pipeline specifications then in effect. Although there was no mention of it during the proceedings conducted by the California Public Utilities Commission after the adoption of the Hayden Amendment, it is highly likely that the processed product gas that was introduced into the Southern California Gas Company pipeline did not contain vinyl chloride that exceeded the 1,170 parts per billion maximum established by the CPUC.

Under both federal and California law governing sanitary landfill operations in effect today (and for a good part of the time after 1988), the collection of landfill gas from large landfills, and since the adoption of AB 32, landfills of all sizes, is mandated. Had those laws been in effect in 1988, the landfill gas produced in the two-thirds of the Operating Industries Landfill that escaped would have been mandated to be collected and destroyed, either by flaring or by conversion to a productive use, such as on-site electric power of pipeline quality RNG. Thus, the factual circumstances relating to the escaping landfill gas that contained vinyl chloride from the Operating Industries Landfill that presented a real threat to human safety are already addressed by existing federal and state laws.

To better understand the counterproductive efforts by some to maintain the status quo in California as to continuing the prohibition on accepting RNG derived from landfill gas, one must understand the significant benefits of RNG that have been established by federal agencies and independent organizations such as GTI. Those benefits include the following:

-RNG is the lowest carbon footprint renewable fuel of any renewable

-Reported after extensive analysis by the Argonne National Laboratory branch of the Department of Energy after submitting all renewable energy sources to its GREET program to evaluate total carbon intensity of various fuels

-The California Air Resources Board in its proposed emissions cap and trade regulations, the Climate Action Reserve in its reporting protocols and the EPA regard RNG as a biogenic zero emission fuel

-RNG is the only renewable fuel that can be stored and used at times of peak demand or to shape electrical supply in support of intermittent renewable energy sources

-RNG is the most cost-effective fuel source for the production of renewable electricity to help load serving entities meet RPS requirements

-RNG receives no federal or state subsidies

-RNG projects from out-of-state resources and, if allowed, from in-state resources will support hundreds of green energy jobs required to build and maintain the essential energy infrastructure needed to transport RNG as a fuel and to convert it into renewable electric power

The advantages of RNG are manifold and have been verified by studies and data collected by federal and state agencies and by independent organizations such as GTI and CALSTART.

Rumors have recently surfaced that, if allowed in California, the huge RNG resource will suddenly result in the production of such enormous numbers of megawatt hours as to quickly meet the RPS requirements of all load-serving entities in California. Numbers thrown around in such rumors are in the thousands of megawatts of capacity!

Those rumors bear no relationship to the hard facts. In the 30 years in which the RNG industry has operated in the United States, less than 30 projects have been developed and are operating today. These 30 projects, none of which are in California, represent, if all RNG produced thereby were transported to California (which they are not) less than 200 megawatts of electric capacity. The largest project developed to date at the largest landfill in the State of Texas transports RNG that is utilized in a CEC-certified generating facility to produce less than 50 megawatts of renewable electric power.

If all of the landfills in the EPA Landfill Methane Outreach Program database that have sufficient waste in place to provide sufficient raw landfill gas to support the development of an RNG project were developed and all of the RNG were transported to California to produce renewable electric power. The resulting renewable electric power capacity fueled by such RNG would be less than 300 megawatts. That is far less than one large wind project.

Yes, RNG is a terrific fuel with many benefits, but the reality of its potential for development makes it a minute resource when compared to the potential for wind and solar energy projects.

The Coalition For RNG is highly supportive of wind projects, solar projects and geothermal projects. They are all valuable renewable energy resources. Each of them receives significant federal subsidies.

The total amount of renewable energy that is likely to result from development of all of the RNG resources in California (assuming the barriers discussed above are removed) as well as all of the potential out-of-state RNG resources if brought to California would constitute a spit in the ocean (and a small fraction of the RPS requirements imposed on load serving entities) when compared to the potential for wind, solar, geothermal and other renewable energy projects.

California has adopted a strong public policy (i) to increase renewable energy generation as evidenced by the newly increased RPS requirement to 33% of generation by an expanded class of load serving entities and (ii) to combat global warming by passage of the Global Warming Solutions Act. RNG is a fuel well suited to help California meet those goals.

Some of the regulatory barriers that now exist in California that inhibit the full development and utilization of the very scarce RNG national resource are the rulings and proposed regulations adopted by California regulatory agencies that are inconsistent with the policy goals adopted in California favoring increased renewable energy generation and actions that serve to limit global warming.

The following are examples of those conflicting regulatory actions:

- In its proposed cap and trade regulations, the Air Resources Board acknowledges that RNG is a zero emission fuel. However, it then adopts a series of restrictions that limit the treatment of out-of-state RNG as a zero emission fuel except for projects that were developed before a given date or that constitute incremental production of RNG. The Air Resources Board staff has stated that its emissions policies are to encourage only new production and to discourage contract shifting, a phenomenon of which there is absolutely no evidence has or will occur. This action imposes a penalty (based on projected prices for emission compliance offsets) of as much as $2 per MMBtu on a zero emission fuel that is not from incremental production. This penalty will direct the unsubsidized RNG, which is already in very limited supply, to other states where such a short-sighted and factually unsupported penalty does not exist.

- In a recently released decision by the California Public Utilities Commission involving the Small Generation Incentive Program, there were gratuitous statements made that out-of-state biogas should be disallowed as a fuel to qualify for the SGIP program because its use could not be verified. This statement in directly contrary to the effective verification and audit procedures that have been employed by the California Energy

Commission with respect to out-of-state RNG used as a fuel in certified facilities in California.

There is a strong need for the regulatory agencies in California to educate themselves as to the high value and extreme scarcity of the RNG resource, both outside of California as well as that which could be developed within the state if existing law is changed and supporting regulations are adopted.