Dairy and Livestock Working Group Digester Subgroup DRAFT Working Recommendations for Discussion September 20, 2018

Deliverable #1: Dairy Methane Digester Project Expansion: Dairy digesters represent a proven and highly cost-effective way of reducing dairy methane emissions in California. Removing barriers to ongoing dairy digester development and improving incentives for ongoing project development is critical to achieving a 40% reduction in dairy manure methane emissions as sought under the state's Short-Lived Climate Pollution (SLCP) Plan.

Issue	Discussion	Recommendation	
A) As many as 200 digesters may need to be built in order to contribute to the reduction of manure methane by 40% from dairies. Further research can help determine the	a) Digesters allow for the initial collection of raw biogas. Digesters are a critical component of the state's SLCP plan along with other methane reduction options.	 The legislature should continue to allocate GGRF incentive funding to encourage and incentivize dairy methane reduction efforts, including digesters, in accordance with CARB and CDFA's recommendations. 	
number of digesters needed vs. other methane reduction practices. To make investments in these digesters attractive to farmers, incentive funding, <u>may</u> continue to be needed.	 b) CDFA has estimated that \$500M is needed to encourage and incentivize dairy methane reduction efforts in California. \$260 million has been allocated to CDFA to date through the state Climate Investment Portfolio (GGRF) for dairy methane reduction efforts. Approximately \$150 million has been made available to date for dairy methane reduction projects (AAMP & CDDRDP). An additional \$94 million is expected to be made available in December 2018 	 <u>Consistent with 2017-2018 and 2108-2019 fiscal years, the Governor legislature should continue appropriating at least \$100 million annually from GGRF for each of the next several years.</u> <u>California should further encourage sustainable dairy methane reduction projects through outreach and education to dairy farm.</u> <u>California should further encourage sustainable dairy methane reduction projects through outreach and education to dairy farm.</u> 	
	c) CDFA is currently funding a research project through the California Dairy Research Foundation to further assess strategies for methane emission reduction effectiveness and appropriateness in small and large dairies in California. The project is expected to be		

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	completed in 2019 and will further inform the state's dairy methane reduction efforts.	

Issue	Discussion	Recommendation	
B) Currently, a large majority of RNG supplied to California originates from out of state and this out of state supply is growing rapidly. It is unclear how RNG derived from in-state dairy biomethane will remain competitive with these sources in the future. Equally important, no program to provide	 a) Additional incentives or rules may be needed to help in-state RNG production <u>remain</u> competitive with out-of-state sources. Approaches to insure robust demand for CA dairy biomethane is key. <u>The</u> legislature recently passed SB <u>1440 (Hueso) which requires</u> the CPUC, in consultation with ARB, to consider development of a biomethane procurement program inducting the cont 	 ARB should finalize development of a pilot financial mechanism. The state should adopt and fund the pilot financial mechanism for dairy digester projects. The CPUC should implement SB 1440 in an expeditious manner to create-long- term markets for biomethane, prioritizing - dairy biomethane. dairy biomethane. 	Deleted: become Deleted: competitive Deleted: Approaches to insure robust demand for CA dairy biomethane is key. Legislative discussions are currently taking place advocating for a biomethane procurement program, in which utilities could "take" a certain level of dairy RNG. Deleted: be
<u>long-term contracts exists</u> <u>for dairy biomethane</u> <u>projects.</u>	 program, including its cost effectiveness. b) The CPUC is also currently considering a number of issues to improve access for pipeline biomethane projects in California (OIR 13-02-008), including critical gas quality requirements and ongoing incentives for pipeline interconnection. 	 biomethane incentive program and implement a queue program to better enable effective utilization of the program. 4) ARB should develop clear incentives to prioritize LCFS eligibility for in-state dairy biomethane LCFS eligibility should include direct in-state benefits from methane capture and destruction. 	
	c) Other approaches are being discussed, <u>including adoption of</u> <u>pilot financial mechanism to</u> <u>LCFS volatility for dairy</u> <u>biomethane projects</u> . It is critical that there is adequate demand at a sufficient price for California dairy R-CNG in order to encourage <u>ongoing digester</u> development and <u>ensure the</u> <u>state achieves its goals for</u> <u>dairy methane reduction.</u>		Deleted: Deleted: digester development and secure successful operations of state or privately funded projects.

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Issue	Discussion	Recommendation	
C) <u>Community health</u> , air quality and environmental benefits should accrue, and impacts should be avoided, in the communities where dairy methane reduction projects are implemented.	 a) <u>California's dairy industry continues to</u> evolve with fewer, larger dairies. Over the past 70 years the total number of dairies has steadily declined and the average size of dairies in the state has continued to increase. The total number of dairy cows in California reached a peak of just over 1.8 million milk cows around 2008 and has declined slightly over the past decade. These overall trends are expected to continue in the near term. b) <u>Environmental justice representatives</u> have raised concerns about dairy "clusters" potentially increasing impacts to some local communities through increased herd size driven by digester development. While some limited consolidation may be occurring naturally, dairy "clusters" are being created from existing dairies with existing cows to improve the economies of scale necessary for pipeline biomethane development and injection. Small and individual dairies are not well-suited for pipeline biomethane. By working together as a "cluster" existing dairy benefit from shared expenses related to biogas cleaning and conditioning (upgrading) as well as a single point, and cost, of interconnection. In this "cluster" or "hub-and-spoke" model, raw biogas is collected from individual digesters on existing dairies in a network of biogas collection lines where it can then be centrally upgraded and injected into pipeline or used onsite for transportation fuel. Smaller local dairies also benefit from this model as they an more easily connect to the existing network. 	 LCFS pathways should be established for farm equipment <u>using low carbon fuels</u>. In addition, fleet conversion funding should include programs targeting dairy and agricultural <u>heavy-duty trucks</u>, resulting in benefits to San Joaquin Valley air quality. <u>Truck funding</u> should be contingent on utilization of in-state dairy C-RNG. CARB, CDFA and partners should implement a program to increase awareness in impacted communities of the benefits that RNG production will bring to those, regions, including the reduction of local impacts by dairy operations Local permitting agencies are best suited to <u>continue handling dairy</u> digester permit <u>applications and</u> <u>conducting review</u>, as required <u>under CEQA</u>. 	Deleted: natural gas tractors and other Deleted: equipment Deleted: equipment Deleted: geographies Deleted: c#>Educate key stakeholders of the value of dairy RNG infrastructure to reducing local impacts of dairy operations. ¶ Deleted: handle Deleted: s which includes dairy count counts at each dairy

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Issue	Discussion	Recommendation
	c) Dairy digesters add to environmental protection by decreasing ammonia, H2S, and other emissions. As a result, digesters improve local air quality. Further, dairy R-CNG projects advance air quality improvement by replacing diesel truck fleets with NZE vehicles.	

Deleted: California's dairy industry is shrinking overall, but in some cases, consolidation of dairies is leading to more new cows in certain locations. Some parties feel the issue of new cows in some places deserves an intervention by our group. Others maintain that relocation of cows within the state is both limited in scale and not a consequence of state methane reduction efforts, and therefore, such cases are best handled by local permitting authorities.

Consolidation of dairy farms can improve the economics of dairy biogas projects due to the increased number of cows in a single location and drive more projects. Dairy biogas projects can utilize the "hub and spoke" model which consists of numerous dairies supplying biogas into a network of biogas collection pipelines. This biogas goes to a central biogas upgrading facility where it is cleaned to pipeline quality and injected into the utility pipeline and/or used onsite for transportation fuel. Once the network of biogas collection pipelines are in place, additional dairy digester projects can connect to these pipelines in the future.

Dairy digesters add to environmental protection by decreasing ammonia, H2S, and other emissions. As a result, digesters improve local air quality when the gas is put into the pipeline. Further, dairy R-CNG projects advance air protection by replacing diesel truck fleets with NZE vehicles. There is also a nascent supply of natural gas tractors/farm equipment.¶

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Deliverable #2: Electricity Generation and Grid Interconnectivity

Recommendations for cost effective ways to further mitigate criteria pollutant emissions for on-site electricity generation projects, including market development incentives, policy development, removing barriers, and regulatory or legislative action.

Issue	Discussion	Recommendation	
A) Electricity production and sales, including programs like the BioMAT FiT program, provides an important revenue stream and financial diversification for dairy digesters.	 a) In March 2018, CPUC adopted a decision to continue the BioMAT FiT program, which expires in 2021. b) CPUC staff is currently conducting a program review and plans on releasing draft recommendations in the near future. CPUC may open a new phase of the proceeding to consider staff's recommendations and other proposals to revise the program 	 The BioMAT Fit program provides an important revenue stream for financing dairy digester projects and should be extended by the <u>CPUC.¹</u> As part of the BioMAT FiT program review and any follow-up proceeding, the CPUC should ensure public discussion and consideration of the following program revisions: ways to modify the BioMAT FiT program that will provide greater flexibility for project operations to migrate to and from electric generation, onsite vehicle fueling and/or pipeline injection. Possible ways to capture value from LCFS electric pathway opportunities for both procuring and producing parties. 	

¹ PG&E recognizes the importance of electric generation contracts in diversifying dairy digester project financing opportunities but does not support extension of the BioMat FiT program at this time. PG&E prefers dairy digester biomethane be utilized for pipeline injection.

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Deliverable #3: Pipeline injected Biomethane

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Recommendations that can increase pipeline injection of biomethane, including market development incentives, cluster identification, policy development, regulatory or legislative action, removing barriers, and support the SB 1383 pilot project process.

Issue	Discussion	Recommendation	
A) The Low Carbon Fuel Standard (LCFS) provides substantial value for digester projects, and the perceived stability of credit prices is essential to project financing.	Since the group's formation, the LCFS has been statutorily protected by AB 398. Now the CARB Board is currently considering rulemaking for the 2020-30 period including a carbon intensity reduction target of 20% by 2030. Note: SB 1383 requires that CARB establish a pilot financial mechanism (PFM) to promote certainty and stability of credit prices.	 CARB to develop and propose a pilot financial mechanism (PFM) by the end of 2018. The legislature and State policymakers should ensure the PFM program is fully funded and implemented no later than January 1, 2020. 	 - ☐ Deleted: ¶
B) Interconnection costs can be a significant portion of total project costs, depending on size (biogas volume) of project and location to the nearest pipeline having capacity.	CPUC 's Biomethane Interconnection Incentive Program ends in 2021. This program based on AB 2313 provides a 50% reimbursement up to \$5M for dairy digester clusters (3 or more dairies) and up to \$3M for other biogas sources.	 CPUC should: 1) Extend the program from 2021 to 2030 and increase the funding cap from \$40M to NTE \$400M. 2) CPUC should also put in place eligibility criteria and establish a transparent queue process to enable developers to be certain of funding. 3) Allow the utilities to rate-base interconnection incentives for the interconnection facilities the process of the process of the series of the serie	 Deleted: e Deleted: Deleted: Formatted: List Paragraph, Numbered + Level: 1 + Numbering Style: 1, 2, 3, + Start at: 1 + Alignment: Left + Aligned at: 0" + Indent at: 0.25"
		operated by the utility	 Deleted: Working group is supportive of legislation that would expand the use of ratepayer dollars for the development of intercomparing infrastructure.

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C) Some dairies may not have access to a nearby utility pipeline due to cost and/or location to a nearby pipeline having capacity.	There may be an attractive use case for moving renewable gas via tube trucks and delivering via "wet fueling" (remote sites). Such an approach may potentially provide a lower cost solution compared to interconnecting to the utility pipeline.	 The CPUC should explore and address in their upcoming OIR the option for trucking of renewable gas in order to spur exploration of this approach. 	 	Deleted:

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Deliverable #4: Transportation Fuel Markets: Recommendations to increase biomethane access to all vehicle fuel markets, including market development incentives, policy development, regulatory or legislative action, and strategies to identify potential fleets and fuel networks/retailers.

Issue	Discussion	Recommendation	
A) Many current and emerging attractive pathways exist to replace conventional vehicle fossil fuels with sustainable alternatives derived from dairy manure outputs and emissions.	CARB has established a three-year investment plan for Medium- and Heavy-Duty Vehicles (MHDV) in the Low Carbon Transportation which calls for approximately \$685 million/year. Such funding covers demos, pilots, and commercial incentives and includes ZE and NZE technologies CARB, 2017).	 The legislature should allocate around \$700 million annually in a multi-year application for MHDVs in the Low Carbon Transportation program consistent with CARB's investment plan Funding for vehicles that use renewable fuels should first benefit fuels that are developed from in-state projects. Scrappage and outgoing vehicle age requirements should be relaxed when possible. 	Commented [A1]: Issue A from the 7/11/18 version has been split/expanded into Issues A and B in this version. Deleted: \$685 Deleted: Further, such vehicle funding should benefit in state projects first. Deleted: Such funding should not be restricted by scrappage or outgoing vehicle age requirements.

Issue	Discussion	Recommendation	
B) The conversion of dairy biomethane to transport fuel is an essential strategy for expanding dairy digesters due to the financial conversion of LCFS credits and Renewable Identification Number (RIN) credits. At this time, the revenue from the sale of the credits associated with vehicle fuel is required in order to develop projects not reliant on state subsidization of energy prices. However, this strategy requires expanding the market for RNG in transportation in	 a) Commercializing the market for NG trucks requires establishing a "fully functioning" NG truck market. This means a market that has the same elements as the market it is intending to replace. b) The NG truck market currently lacks both a well-functioning secondary market and state programs that support the maintenance of NG truck assets on a broad and programmatic scale. Each of these market elements must be considered and accounted for by regulators to ensure the successful long-term 	 CARB should ensure that funding for Low NOx trucks fully covers the incremental cost premium over new diesel trucks for in-state fleets from diesel to NG. CARB and other state agencies should establish a multiyear investment framework to expand the market for California-produced dairy RNG in the transportation sector and encourage that RNG used for transportation fuel in California be sourced from California. Such a framework should aim to expand market demand to at least match the volume of RNG that can be produced by the California Dairy industry as soon as possible. 	Commented [A2]: This was part of Issue A in the 7/11/18 version and was discussed at the 7/11/18 meeting. Deleted: make an unambiguous commitment to expand the market for California-produced dairy RNG in the transportation sector. Such a commitment should target expanding market demand to at least match the volume of RNG that can be produced by the California Dairy industry as soon as possible. In addition, strategies should be developed to encourage the use of dairy RNG for the production and delivery of renewable electricity and hydrogen to those markets so when those technologies commercialize producers will be able to earn LCFS credi

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California, which today can be done by increasing the use of CNG/LNG trucks. Such trucks come with an initial purchase "premium" over and above diesel which discourages fleet operators from converting their operations from dirty diesel to much cleaner NGVs. To ensure that the market for RNG in transportation expands, which must occur if Dairy biomethane projects are to succeed, fleet operators should be compensated for the premium associated with the first-time purchase of	c)	commercialization of the NG truck market. Commercial vehicle operators must provide competitive transportation rates to be successful. If forced to absorb the premium associated with the purchase of medium and heavy-duty NGVs, it is difficult for commercial fleets to charge competitive shipping rates compared to their diesel-fueled competitors. To ensure that commercial fleets that choose RNG remain competitive, thus increasing the demand for diary RNG, mechanism should be put in place to level the purchase costs of NGVs.	3)	Such funding should be restricted to only funding NG trucks equipped with engines that meet or exceed the ARB Optional Low NOx standard. Priority should be given to the lowest emission technologies <u>available for each vehicle</u> <u>category.</u>
CNG/LNG vehicles.				

Issue	Discussion	Recommendation	
C) Expanded use of dairy methane for electric and hydrogen technologies that achieve greater benefits than natural gas are possible given current technology and expanded LCFS credits available, and should be given further public investment and support.	It is important to build out advanced technology to make further improvements in the later years of the regulation period.	 Strategies should be developed to incentivize investments for the production and delivery of dairy-manure-derived renewable electricity, hydrogen, and DME, and other biofuels, as well as to allow those technologies to generate LCFS credits if and when they become sufficiently commercialized. 	Commented [A3]: This was Letter D in the 7/11/18 version and has since been revised. Due to timing, this was not discussed by the Committee at the 7/11/18 meeting

Issue	Discussion	Recommendation	
D) Currently, NZE and ZE trucks weigh up to around	Current legislation for a 2,000- pound weight exemption for ZE and	1) The state should provide and expeditiously implement a 2,000-pound	Commented [A4]: This was Letter B in the 7/11/18 version and was discussed at the 7/11/18 meeting.
2,000 pounds more than conventional diesel trucks	NZE trucks is pending in the legislature, co-sponsored by	statutory weight exemption for ZE and <u>NZE trucks.</u>	Deleted: NG
	Frazier)		Deleted: The legislature should provide a 2,000 pound weight exemption for ZE and NZE trucks. pending confirmation from CalTrans/relevant engineering experts that this will not significantly alter
			wear-and-tear on the state's roads and highways

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Issue	Discussion	Recommendation	
E) RNG markets in California are approaching saturation. In order to further increase <u>utilization</u> and foster the capture of dairy manure emissions and conversion into fuel in the near term, more demand is needed. However, the state is pursuing policies that are depressing NG demand markets in transportation. For example, ARB is considering a 100% zero- emission procurement requirement for transit bus purchases that, if approved, would reduce the current demand for RNG from natural gas buses.	 a) Heavy-duty diesel trucks are responsible for a vast portion of NOx and particulate pollution in the SJV. NZE 12L trucks are commercially available now and can reduce this problem by 90%. ZE alternatives with the same range are not yet commercially available. b) The ultimate goal is to reduce NOx emissions and improve air quality in California. It is important to act quickly and adopt available and commercially viable clean technologies (Near-Zero CNG engines with RNG fuel) now. This does not eliminate the need for continued investment in other technologies, but does provide the most air quality benefits today. c) This issue is very important as incentivizing supply through digester grants without incentivizing demand could have negative consequences for the RNG market. Incentivizing demand through conversions from diesel to CNG is an obvious solution. Taking it a step further, new CNG equipment vouchers could stipulate locally sourced RNG. More conversion funding through the local air districts with this stipulation could be helpful. 	 If and when the state requires MHDVs using natural gas to become zero- emission, and if that transition causes significant loss of RNG demand, the state shall seek opportunities to make up the lost RNG demand with other vehicle categories or uses that create beneficial emissions reductions. CARB shall bolster demand for RNG in transportation in the near term by supporting funding to cover the incremental cost of NZE MHD NGVs, and over the long term by supporting the development of policies and strategies to enable dairy RNG to produce LCFS and RIN credits when the RNG is used to generate electricity or hydrogen for transportation applications in the long term 	Commented [A5]: This was Letter C in the 7/11/18 version and was discussed at the 7/11/18 meeting Commented [A6]: Comment from 7/11 meeting was to consolidate/refine the previous two recommendations Deleted: <#>Heavy-duty diesel trucks are responsible for a vast portion of NOx and particulate pollution in the SJV. NZE 12L trucks are commercially available now and reduce this problem by 90%. ZE alternatives with the same range are not yet commercially available. Encouragement of bus fleets to move from NZE vehicles to ZE vehicles should follow the growth of sufficient fleets to capture the increasing supply of R-CNG.¶ <#>SCARB should be prepared to bolster demand for RNG in transportation in the near term by supporting funding to cover the incremental cost of NZE MHD NGVs, and over the long term by supporting the development of policies and strategies to enable dairy RNG to produce LCFS and RIN credits when the RNG is used to generate electricity or hydrogen for transportation applications in the long term¶ <#>¶ Deleted: supply Formatted: List Paragraph, Numbered + Level: 1 + Numbering Style: 1, 2, 3, + Start at: 1 + Alignment: Left + Aligned at: 0" + Indent at: 0.25" Deleted: ¶ Deleted: ¶

Issue	Discussion	Recommendation
F) Investors discount the potentially high value of LCFS credits for fuels derived from dairy manure, citing market uncertainty. This diminishes prospects for in-state projects to capture dairy emissions and generate renewable fuels. The issue is addressed in deliverable 3.	See deliverable 3.	See deliverable 3.

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Deliverable #5: <u>Potential Investments for Research/Development and Emerging Technologies</u> Identification of key current and emerging technologies and approaches for converting manure and digestate into useful products including fuel/energy. The assessment will characterize products by technology readiness and outline general opportunities and issues.

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Issue	Discussion	Recommendation	
A) Investment is needed to identify and demonstrate emerging technologies that can convert manure and digestate into useful products including fuel/energy	 a) CEC has issued various grants under the: 1) Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) and 2) California Energy Commission's Research and Development Program (EPIC and PIER funding) for low carbon fuels production facilities (both for commercial and for pilot/demonstration scale projects). 	 The legislature should allocate \$XM annually to expand research, demonstration and testing funding: 1) for process technologies and biomethane delivery alternatives capable of producing clean, low carbon renewable fuels from dairy manure, and 2) on approaches to integrate covered lagoon digesters and other solutions with nutrient export. 	Deleted: commercialization
	 b) Recently, annual ARFVTP funding for biofuel and biogas fuel production plants has been ~\$25M and R&D funding has been ~\$4M. Starting July 1, 2018, ARFVTP funds will no longer be allocated for biofuel and biogas fuel production plants, but the FY 2018- 19 state budget allocated \$12.5M from GGRF for these purposes (\$25M AFTVT funds being moved to support zero emission vehicles). 	2) The legislature should allocate \$XM annually to expand and enhance the commercialization of technology that has completed the RD&T phase of development, but which has not yet been brought to market because of cost/economy of scale barriers. Particular emphasis should be placed on technologies that have received public funding from California and successfully completed RD&T.	
	c) The CEC is currently implementing the Food Production Investment Program (FPIP). The program will provide nearly \$120 million in funding for eligible food processors, including dairy processing facilities in California, to implement projects that reduce greenhouse gas emissions.		Deleted: A one-time FY 2017-18 allocation of \$66M for food processing plants (potentially including dairies) energy RD&D projects has been augmented by \$68M in FY 2018-19 from GGRF.

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scussion document for re	aview – not for citation 1) Improve flexibility of how incentive <u>funding can be spent with the goal</u>		
	of displacing petroleum. Programs that integrate digester deployment with on-going water		
	guality requirements will be	 	Deleted: restrictions