

December 4, 2017

Sam Wade  
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California Air Resources Board  
1001 I Street  
Sacramento CA, 95814

**Dear Mr. Wade,**

Thank you for the opportunity to comment on the November 6th workshop relating to the proposed Low-Carbon Fuel Standard (LCFS) re-adoption for 2020-2030. The LCFS has been a foundational element of California's efforts to reduce greenhouse gas (GHG) emissions, improve air quality and incentivize the deployment of advanced technology within the transportation sector. The LCFS now has over a half-decade of successful operation, during which time it has reduced GHG emissions by over 30 million metric tons and displaced 8% of statewide petroleum consumption with alternative fuels.<sup>1</sup> The success of this program is also reflected by the choice of other jurisdictions, notably Oregon and British Columbia, to model their fuel carbon policies after the LCFS and by Canada's choice to model a forthcoming nation-wide fuel carbon policy after the LCFS. We applaud ARB for committing to continue the historic success of this program to help the state meet its goal of reducing GHG emissions by 40% from 1990 levels by 2030.

We commend staff for their commitment to releasing draft regulatory language, discussion papers and supporting materials in a very timely fashion, which has helped stimulate a robust and valuable discussion which has laid the groundwork for rulemaking and we look forward to engaging constructively in the rulemaking process over the coming months.

We wish to make a number of specific comments relating to the issues raised in the November 6th workshop and respond to Staff's requests for feedback in this letter. We would also like to reiterate our most important element of feedback to the LCFS readoption: that the 18% CI target for 2030 is excessively conservative and puts the state at risk of failing to meet its critical 2030 GHG and air quality goals. Rather than reproduce them in this letter we refer you to our October 6th letter,<sup>2</sup> and note that in many conversations with Staff, we

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<sup>1</sup> [https://itspubs.ucdavis.edu/wp-content/themes/ucdavis/pubs/download\\_pdf.php?id=2634](https://itspubs.ucdavis.edu/wp-content/themes/ucdavis/pubs/download_pdf.php?id=2634)

<sup>2</sup> [https://www.arb.ca.gov/fuels/lcfs/workshops/10062017\\_nextgen.pdf](https://www.arb.ca.gov/fuels/lcfs/workshops/10062017_nextgen.pdf)

have not received a satisfactory answer regarding what evidence indicates that a more ambitious target would be unattainable. Increasing the CI target significantly above 20% would send a strong market signal to incentivize innovative clean technology and maximize the climate, air quality and economic development benefits to California. We are moving forward with our plans to produce a comprehensive assessment of low-carbon fuel supply in the 2020-2030 time period and will share the results of that work with you as soon as it is available; we expect some preliminary results by mid-December and final results by late January.

### **Carbon Capture and Sequestration Under the LCFS**

NextGen supports the inclusion of Carbon Capture and Sequestration (CCS) under the LCFS, as long as the GHG sequestration from such projects are permanent, quantifiable, verifiable, enforceable, additional and strongly linked to transportation fuel projects. We would caution that CCS is still an uncertain technology, with substantial economic, policy and technical risks. LCFS credit generation should account for this risk by taking a conservative approach to credit generation, until CCS has demonstrated a track record of success and there is a body of research which can support informed decisions about these projects. CARB's requirement for careful site selection, co-application by capture and storage facilities, robust technical safeguards against release, extensive data collection and long-term monitoring of the storage site after injection is complete are sensible measures, which we support.

CARB should also review CCS pathway provisions establishing technical and liability safeguards on a regular basis to ensure they reflect the latest science and best practices. CARB should define a clear and transparent process for how pathways will be updated to reflect changes in the scientific understanding. Where GHG sequestration estimates change, up or down, credit generation should be adjusted to match. While we recognize that modification of existing pathways adds uncertainty for project developers, the LCFS program's strength is in large part due to its strong basis in science. Given the potential risks to the climate from inaccurate incentives in the CCS space, it is imperative that LCFS market incentives reflect actual GHG reductions.

Staff indicated a desire to hear from the stakeholder community regarding the assignment of liability relating to CCS projects. This is a critical issue, given the uncertainty surrounding the new technology. CARB should take steps to ensure that liability risk for CO<sub>2</sub> release, fraud or measurement error be assumed by the

entities which stand to benefit from the additional LCFS credits generated by CCS projects.

We also support CARB's intent to consider pathways which utilize a variety of CCS-related technologies, including sequestration in oil wells, saline aquifers, mineralization and direct air capture. All of these technologies are potentially applicable to the production of transportation fuels. We caution that LCFS credits should not be generated for projects that are not directly connected to transportation fuel production, which could dilute incentives in the transportation space. We suggest that projects must have a direct and essential connection to a transportation fuel-producing process to be eligible for LCFS credits. For example, a fuel production process which uses carbon from direct air capture of CO<sub>2</sub> should be eligible for LCFS credits which reflect the removed atmospheric CO<sub>2</sub>. Fuel producers should not, however, be able to merely fund a direct air capture project which sequesters the carbon and apply the credits towards LCFS compliance unless the air capture element serves a critical technical function in the fuel production process; such projects would be more accurately considered offsets than low-carbon fuel production measures. While NextGen is not opposed to limited use of offsets for compliance with carbon reduction policies, including them as LCFS credit generation sets a precedent that is beyond the intended scope of the CCS provisions.

## **CCS Accounting Provisions**

### *Invalidation Risk and Buffer Accounts*

CCS has the potential to be an important tool for mitigating the effect of GHG emissions. Including CCS in the LCFS program comports with the technology-promoting nature of LCFS and helps support early-commercial deployment, which will be necessary if CCS technologies are to become a significant contributor towards attaining long-term climate goals. CCS is, however, a new technology with significant technological and comparatively few commercial-scale real-world examples from which to base conclusions about its long-term efficacy. Accordingly, LCFS incentives for CCS must reflect the risk of any project's failure to provide durable sequestration of carbon into their credit generation

We suggest that CARB consider adding additional measures to ensure that large-scale projects have the resources to remedy the effects of significant releases, especially after injection is complete. For projects where there exists a risk of credit invalidation, particularly if that risk persists long after injection has ceased,

CARB may want to require project operators to secure a bond or insurance policy sufficient to offset the effect of released CO<sub>2</sub> and remedy any damages to the surrounding communities and environment.

Alternatively, CARB may want to consider allocating some fraction of permits generated by CCS projects over an extended period of time, rather than at the time of injection. For example, CARB could reserve one-quarter of permits, or the revenue from the sale of those permits, in an escrow account to be disbursed in yearly increments over several decades, provided that monitoring data from the site indicated the CO<sub>2</sub> remained fully contained underground. A structure like this ensures that the risk of invalidation due to release of the stored CO<sub>2</sub> remains with the entity which would receive the LCFS credits.

As the technology matures and more data on CCS projects become available, credit invalidation risk will decline; CARB should regularly review the literature on CCS projects as well as the experience of similar projects to re-evaluate credit invalidation risk and, if appropriate, reduce the impact of risk-management provisions to return more value to the project developer.

### *Carbon Accounting in CCS Projects*

The draft CCS proposal indicates that CARB will consider vented and fugitive CO<sub>2</sub> emissions when assigning LCFS credits from CCS activity. The proposal indicates that GHG emissions from every phase of the CCS operation will be considered, which is appropriate given the LCFS' basis in life-cycle analysis. We urge CARB to consider not only the direct GHG impact of vented and fugitive emissions, but the full life-cycle impact of such emissions, where the life-cycle emissions differ significantly from direct emissions. For example, in a bioenergy with carbon capture system that uses an energy crop as feedstock, the carbon released by fugitive emissions causes not only a direct effect on the global climate system, but also GHG emissions from the agricultural activities, material inputs and land-use change associated with growing the biomass from which the fugitive carbon was emitted. In these circumstances, counting only direct emissions under-estimates the real impact on climate.

Staff's draft proposal indicates that GHG emissions from direct land use change will be considered when developing CCS pathways. This is an appropriate decision and while current literature on land use change GHG impacts from petroleum extraction, which may be the closest analogous activity for which we have

representative data, indicates the effects may be small<sup>3</sup>, they warrant consideration. We urge CARB to consistently consider land-use change impacts in developing all pathways which affect credit or deficit generation under the LCFS. While it is appropriate to use screening methodology to identify pathways in which land-use change has a minimal impact, it is not appropriate to ignore land-use change entirely.

### **Amendments to EV and Hydrogen Charging Pathways**

Electric vehicles are likely to be a primary generator of credits under the re-adopted LCFS; ensuring accurate, fair and equitable measurement and distribution of these credits is therefore critical to the success of this program. Staff have suggested a number of amendments to EV charging provisions, most of which reflect appropriate, science-based improvements to the existing program. NextGen strongly supports more frequent updates to the CA Grid Electricity CI, Energy Efficiency Ratios (EERs) and assumptions about typical household charging behavior.<sup>4</sup>

We support CARB's desire to recognize and reward EV charging behavior that maximizes beneficial impacts to the grid, however the proposals put forth at the November 6th meeting do not meet this goal and instead, lead to issuing LCFS credits for behaviors that do not reduce emissions or support additional renewable energy deployment.

### *Renewable Energy Credits*

The principle of giving vehicles which use renewable or carbon-neutral energy to recharge their batteries is sound. When a vehicle charges using renewable electricity and that charging results in real, verifiable and additional GHG reductions beyond those resulting from charging using grid electricity, additional LCFS credits should result. We are concerned, however, that the criteria Staff proposes to use to generate renewable EV charging credits, above the credits generated for grid-average charging, are insufficient and do not ensure that the charging behavior gaining these additional credits creates real, quantifiable, verifiable and additional reductions in emissions.

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<sup>3</sup> E.g. as reported by **Land Use Greenhouse Gas Emissions from Conventional Oil Production and Oil Sands**, Sonia Yeh, Sarah M. Jordaan, Adam R. Brandt, Merritt R. Turetsky, Sabrina Spatari, and David W. Keith *Environmental Science & Technology* **2010** 44 (22), 8766-8772 DOI: 10.1021/es1013278

<sup>4</sup> Data regarding household charging behavior is necessary only as it relates to the generation and assignment of credits from un-metered household EV charging.

Current conditions on California’s grid mean identifying real, quantifiable, verifiable and additional emissions can be challenging. The draft proposal indicated that if the charger was supplied by electricity purchased through a Green Tariff rate plan, as defined by the CPUC, the charging activity would generate additional credits beyond those provided for standard, grid-average charging. While the Green Tariff is a useful tool for expanding electricity supply choice for consumers, it is an insufficient indicator of real, verifiable and additional GHG reductions. If a charger owner - a homeowner in most cases or an charging station operator - who previously used grid standard electricity switches to a Green Tariff, this causes negligible changes in real emissions. The charger owner who joined a Green Tariff program would have some additional fraction of their electricity mix come from renewable sources and the non-renewable sources they previously used would re-enter the broader market and functionally replace the renewable energy the charger owner is receiving. Net emissions from the CA electricity system would remain identical, however the charger owner (or the local utility, in the case of un-metered residential charging) would receive more LCFS credits without actually reducing emissions. This flies in the face of the fundamental rationale behind market-based incentives, which is to reward behavior that reduces emissions. The additional credits generated through this pathway would reduce program stringency and mitigate the incentive to bring low-carbon fuels into the California market.

There must be a stronger test applied to renewable charging behavior than simply being on a Green Tariff rate plan. Our September 6 letter discusses some considerations for this test<sup>5</sup> which are, in brief, that the charger owner or operator must source their electricity from a renewable generator which was built after the renewable charging provisions were adopted and that the generation capacity cannot have been used to demonstrate compliance with RPS or other clean energy mandates. This ensures that additional credits are given only for behavior that actually reduces emissions compared to the status quo and does not dilute the effect of LCFS market signals by rewarding past behavior or actions that were motivated by a different policy.

### *Smart Charging Credits*

Staff’s proposal regarding issuing additional credits for “smart” charging addresses a long-standing concern in California energy policy regarding how best to manage the varying supply and demand on our grid. The

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<sup>5</sup> [https://www.arb.ca.gov/fuels/lcfs/workshops/09062017\\_nextgen.pdf](https://www.arb.ca.gov/fuels/lcfs/workshops/09062017_nextgen.pdf)

intent of the smart charging provision, to maximize the utilization of renewable generation that might otherwise be curtailed and minimize charging during times of peak demand, is admirable and something that the program should seek to accomplish.

We are very concerned, however, that if CARB adopts both renewable energy credit pathways and additional credits for smart charging, there is a significant risk of double-counting the same environmental benefit. Much of the benefit of smart charging arises from incentivizing vehicle owners or charger operators to maximize the amount of renewable energy being used to charge a vehicle by selecting at what times it charges. The environmental value of smart charging derives largely from the fact that a vehicle charged during a Smart Charging period would, on average, be charged with a higher fraction of renewable energy than grid average. This means that smart charging provisions capture a significant fraction of the value that renewable energy credits would as well. Allowing them both to be claimed for the same charging event would effectively double-count the environmental benefit and lead to the issuance of LCFS credits in excess of the actual GHG reductions (notwithstanding the problem with the current proposal regarding renewable energy, discussed above).

We strongly suggest that CARB adopt either a smart charging pathway or a renewable energy pathway, but not both unless there are provisions in one or the other that prevent this double-counting. At a minimum, CARB should not allow the same charging event to benefit from both a smart charging credit and a renewable energy credit.

## Hydrogen Refueling Provisions

We agree with Staff that when hydrogen is generated by electrolysis and subsequently used to fuel a vehicle, many of the same supplemental credit pathways which apply to electricity should apply to hydrogen as well.

We recognize the scarcity of hydrogen fueling stations at present, but strongly oppose the use of credits or revenue from LCFS to fund a special infrastructure deployment program for hydrogen. The LCFS already offers a significant financial incentive to fueling station operators from the LCFS credits themselves and there are multiple state programs, through the CEC and CARB, to support deployment of additional fueling infrastructure. While there may be significant value in adding additional hydrogen fueling infrastructure, the

LCFS should not give up its focus on technology-neutral performance standards.

### **Fuel Pathway Modifications**

We note the temporary FPC's for fuels with indeterminate CIs currently estimates renewable natural gas generated from dairy or food waste as having a CI of zero. This reflects a significant avoided methane credit. We support the inclusion of avoided methane credits at this time, since they clearly meet the standard of real, verifiable and additional reductions. We are concerned, however, that the avoided methane credits are scheduled to continue being added on to these pathways long after state policy would have required that the waste have been disposed of in methane-minimizing ways. The Short-Lived Climate Pollutant plan requires significant reductions in emitted methane by 2030, which will largely be implemented through organic waste diversion and controlling emissions from livestock operations. Per conversations with Staff, and based on the principles established in the livestock methane offset program, the LCFS credits for avoided methane may be available for up to 10 years after the emitting facility would have been required to control them. A one-size-fits all approach is unscientific and potentially yields credits long after the reductions from a given project are non-additional. If, for example, the Short-Lived Climate Pollutant Plan requires a methane source to be controlled by 2024, the 10 year limit on recognizing avoided methane credits seems to imply that a project constructed in 2023 could produce fuels which benefit from the avoided methane credit until 2034. This extended accounting for avoided methane is unscientific and undermines the principle that LCFS credits should reflect real, quantifiable, verifiable and additional reductions in GHG emissions.

We recognize the need to provide consistent market signals and that LCFS credits will play a significant role in supporting the deployment of critical methane-reducing projects. Extending avoided methane credits beyond the time when the methane would have otherwise had to have been controlled should be limited in duration. We ask Staff to review whether allowing this credit for 10 years is necessary to achieve LCFS program objectives and whether an earlier phase-out might strike a better balance between science and incentivizing important emissions-reducing technology.



## Refinery Investment Credit Projects

NextGen supports the development of pathways to reflect emissions-reducing investments at petroleum refineries. Not only does this help leverage the market incentives of the LCFS program into an area ripe for reducing emissions, but it also offers a chance to achieve many of the intended goals of AB 197 (Chapter 250, Statutes of 2016), to reduce pollutant emissions from major stationary sources like refineries, particularly near disadvantaged communities. We recognize the complexity of evaluating changes to complex technological systems like petroleum refineries. Staff has indicated that they currently intend to include on-site cogeneration of electricity, electrification, CCS and switching to renewable fuels as available pathways to generate refinery investment credits.

CCS projects should be evaluated by the same criteria and procedures used for CCS projects that are not part of a refinery investment. Electrification and on-site generation of electricity are comparatively simple procedures in which attributional life-cycle analysis techniques can be used to compare the emissions due to the fuels or energy being displaced against the emissions entailed in displacing them and award credits appropriately. For these projects, process-unit level accounting is likely to be appropriate.

Switching to renewable fuels can entail broader and more complicated changes to refinery operations. Renewable inputs to refineries do not always have the same chemical properties as the petroleum fuels they displace, which could result in changes to the energy and materials needed for refining as well as coproduct streams. For these projects, as well as projects which affect thermal management within the refinery by changes to heat exchangers or heater processes, changes in one part of the process can have effects in entirely different areas. For these projects, a consequential life-cycle analysis is required, which means effects at the refinery level must be monitored.

We also suggest that CARB generate a set of clear and comprehensive principles for conducting these life-cycle analyses. Slide 92 in the presentation deck includes the bullet point “draw a system boundary”. We note that this is not so simple as the bullet makes it sound, there are often multiple ways a system boundary could be drawn in an LCA and no objectively right or wrong way to do so. In order to ensure that analyses are consistent across projects, a transparent and consistent set of principles is required to guide analysts as they draw system boundaries in the future. CARB must ensure that its guidance in this area is clear and

comprehensive.

We would also like to reiterate our remarks from the October 6th letter which discuss the need for CARB to ensure that refinery investment credits only be given to projects that reduce emissions beyond existing legal requirements and industry best practices. The LCFS should not issue credits for refineries who merely follow normal maintenance and upgrade schedules according to standard industry practice.

### **Conclusion**

We thank Staff for their dedicated work on the LCFS readoption to date and look forward to constructive engagement in the months to come.

Sincerely,

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