Introduction

Consumers Energy appreciates the ongoing collaboration in the Renewable Natural Gas ("RNG") Study Workgroup, and the opportunity to offer input on the Draft Final Report that was shared with stakeholders on June 7, 2022 and discussed at the Workgroup meeting on June 29, 2022.

Consumers Energy is broadly supportive of Staff's and ICF's efforts on this RNG Study to date, and believes the Draft Final Report illustrates that RNG will play a vital role in Michigan's energy future. Given the range of opinions shown by stakeholders on this issue, it is important that this report be as accurate as possible in its analysis, as the report in its final state may be relied on by decision-makers when evaluating RNG projects in the future.

With that in mind, Consumers Energy offers these comments. These comments focus primarily on the abatement accounting methodology used in the Draft Final Report. **As discussed below, reliance on the "combustion" methodology for emission abatement will incentivize high-volume, but low-abatement, RNG projects, and use of this methodology should not be mandated for future assessment of RNG projects.**

Additional technical observations are also provided regarding some of the analyses in the Draft Final Report.

Abatement accounting methodology

The Draft Final Report uses the "combustion" approach to emissions abatement accounting, as opposed to the alternative "lifecycle" approach. Appendix B of the Draft Final Report discusses the lifecycle approach, including additional emissions that can be abated by RNG outside of the actual combustion of the gas, but Appendix B does not provide any numbers for potential emissions abatement or abatement costs based on a lifecycle analysis; it does not calculate key data points, like abatement potential and abatement costs, using the lifecycle approach. Within the body of the Draft Final Report, and during discussion at the June 29 Workgroup meeting, ICF emphasized that they do not believe the combustion approach is more "correct" than the lifecycle approach, and indeed emphasized their agnosticism about which approach is preferable, but stated that they used the combustion approach because they believe it is a more standard approach in the industry.

Notwithstanding these clarifications that there is no "right" methodology for calculating emissions abatement, Consumers Energy notes that the methodology used can significantly affect the conclusions of the analysis. While the combustion methodology has historically been viewed as simple and somewhat analogous to well-established comparisons among electric generation technologies, the combustion methodology does not capture the full emissions abatement benefit of RNG across various projects and feedstocks. In addition, the combustion approach does not account for other emission contributions, such as fugitive methane emissions associated with transporting natural gas, or emissions associated with hauling RNG or manure in vehicles. Both of these should be used to differentiate performance of RNG projects and feedstocks; a lifecycle approach allows for this because it recognizes differences in projects, feedstocks, and performance.

When the combustion approach grants all RNG feedstocks carbon neutrality (as stated on page 71 of the Draft Final Report), it overestimates the emission benefits of feedstocks like landfill and water resource recovery facilities ("WRRF") and underestimates the emission benefits of manure or food wastes

feedstocks, where methane is captured. In other words, it makes every MMBtu of RNG equal to the next, in terms of carbon intensity, regardless of which feedstock is used and without respect to other project details. This may impact how RNG emission reduction potential is estimated, which projects are incentivized, how attributes are monetized in carbon-based markets, and how policy goals are structured.

Using the combustion approach also results in mischaracterization of the correlation between production cost and abatement costs. For example, page 7 of the Draft Study Report states, "Renewable natural gas under $10/MMBtu is equivalent to about $130/tCO2e, while renewable natural gas at $25/MMBtu has an estimated cost-effectiveness of about $400/tCO2e." These numbers in the Draft Study Report are based on the combustion approach. However, in nearly all real-world cases, and in all current markets where abatement attributes are monetized, the lifecycle approach is utilized. The lifecycle approach leads to very different abatement costs ($/tCO2e). This difference reverses the relationship between production cost and abatement costs. It is commonly accepted within the industry that feedstocks with higher production costs, most typically manure-based systems, result in greater abatement.

When using a lifecycle approach, the conclusions from the Draft Study Report would be inverted, so that a feedstock producing a higher cost per MMBtu would result in a lower abatement cost. The corollary is also true: lower cost RNG production, most typically landfill gas, achieves a lower overall abatement, and thus carries a higher abatement cost. In other words, lifecycle accounting ultimately incentivizes development of the best-performing projects: those abating the most greenhouse gas emissions and minimizing fugitive emissions.

The most significant potential impact of the combustion approach is that it may drive inefficient policy on RNG development as it regards emissions abatement incentives. A combustion approach, if utilized broadly for policy decisions or development incentives, would minimize the benefits of methane capture; methane has a global warming potential 25 times greater than that of carbon dioxide. If methane capture projects are not recognized as superior abatement opportunities, the likelihood of meeting deep decarbonization goals become harder.

Consumers Energy understands that ICF is likely to maintain the combustion approach for purposes of this report. However, the report should not imply that the combustion approach is a standard or preferred methodology. Developers of RNG projects in Michigan must have the flexibility to use the lifecycle approach in order to capture all of the emissions abatement potential of a proposed project.

Additional Technical Observations

The Draft Final Report identifies gas quality as a technical challenge in its summary table on page 10, but on pages 92 and 93 it apparently reverses its position and states that gas quality criteria, like Michigan's exceptionally low O_2 requirement, are not barriers to RNG projects. The summary table on page 10 also identifies the lack of a standard gas quality specification as a barrier. While we agree that standardization across all utility and interstate systems would be ideal, this is impractical given the physical and operations differences across these assets.

The Draft Final Report recognizes Michigan's winter peaking system, and suggests that "Seasonal variability in Michigan's natural gas systemwide demand may require the RNG production market to adapt," but the report does not identify any needed adaptations nor specific challenges that a winter peaking system presents to RNG development. It is possible that the report intends to suggest that RNG production would be curtailed during periods of low demand in the summer, due to physical constraints

on the gas system, which would significantly alter the abatement potential and the economics of RNG. If the authors intended an alternative adaptation, we recommend outlining it in the final version of the report so that utilities and other system owners can better understand and plan for the adaptation.

The summary table on page 11 of the Draft Study Report notes that, "RNG development will face scrutiny as it relates to fugitive methane emissions, which occur along the entire natural gas supply chain—during processing, transmission, and distribution." However, this is a benefit/opportunity of RNG, especially if produced and consumed locally. RNG development is not associated with the scale of fugitive emissions that are typical of oil and gas wells at the point of production and consuming RNG locally eliminates or significantly reduces the use of interstate pipelines where fugitive emissions may occur.

On page 15, the Draft Final Report predicts "…that the market for RNG in the transportation sector will be saturated in the next 2-4 years." However, the authors do not tie this prediction to specific markets or geographic areas. It is not clear if this refers to the entire nationwide transportation sector, or just obligated parties in California who must use RNG for transportation, or something else. Many emerging markets, new state-level LCFS programs, and financial incentives are expected to continue to drive new demand centers in the transportation sector, arguably well beyond four years.

Throughout the report, it is difficult for the reader to follow the assumptions carried across the landfill gas, municipal solid waste ("MSW"), and food waste feedstocks. For example, on pages 39 and 56, the report states that "only the potential for utilizing MSW that is currently landfilled as a feedstock for thermal gasification." MSW currently within a landfill may be contributing to both feedstock categories, in terms of production potential. If this interpretation is inaccurate, the final version of the report should better clarify what feedstocks were used, or which assumptions were made, as these should not be additive in nature to avoid double-counting.

The report implies that the "animal manure" feedstock is representative of all potential manure sources within Michigan. However, the differences or contributions of these different manure sources are not transparent in the production cost analysis nor in the assumptions. It appears that the focus of the report is on dairy manure, given the range of headcounts, and other dairy-specific costs allocated to this feedstock category in Tables 5-3 and 5-4. The final version of the report should clearly define whether costs and conclusions for "animal manure" do or do not include non-dairy manure inputs.

Tables 5-3 and 5-4 are also lacking key values. The value of "digestate" is defined as a $ per head of cow figure, but the table does not include payments for manure supply, which is a standard industry practice. The values in both tables do not align with respect to gas upgrading costs. For example, if referencing Table 5-3's values for CO_2 and O_2 removal costs, one should arrive at a combined costs within the range of $3.3 million to $7.0 million; Instead, Table 5-4 reflects a cost of only $1.035 million to $2.185 million for both removal technologies. These assumptions are inconsistent, and in Table 5-4 likely well below realistic deployment costs. Lastly, Table 5-3, and the section generally, lack any reference to costs associated with manure handling, specifically sand separation. Michigan's dairies continue to bed animals almost exclusively on sand, and while some projects may convert dairies to digestate-based bedding alternatives, this should not be assumed as a baseline for determining costs. These costs should be included as a range in total production costs.

Table 5-10 does not specify whether costs reflect systems where digesters are already in place, or whether any consideration was given to projects where new digesters are installed as part of the project development costs.

Electrolyzer costs curves in Table 7-1 depict an aggressive decrease which is not well supported. The citation within the footnote includes a broken link. The report cited only has one reference to electrolyzer cost curves, and the data within are inconsistent with those stated in Table 7-1. The cited study is a presentation, with very little data accessible. However, if the reader takes the cited material at face value, the study concludes that prices show a more gradual decline from today to 2050, resulting in prices between roughly $175/kw and $600/kw, which are much higher than $98/kw to $127.50/kw presented in this report. These differences are not clearly defined nor explained by the in the Draft Final Report.

Regulatory and Policy

The Draft Final Report notes the use, in other states, of Renewable Portfolio Standards ("RPS") for RNG metrics and compliance mechanisms. These approaches can be useful, but there are other alternatives that the report does not discuss. In particular, the report does not account for HB 558 in Virginia nor SB 1959 in Tennessee, two recent policy initiatives that represent shifts away from use of the combustion methodology for emissions accounting. Therefore, the report should not be read to advocate any policy solutions specific to RNG or gas system decarbonization.

As noted with respect to the combustion approach, an RPS-style policy, setting volumetric targets for RNG can have unintended outcomes. RPS mandates most often incentivize low-cost, low abatement projects onto the system to meet volumetric targets, while failing to make real progress toward emission reduction goals. RPS programs also risk selecting arbitrary targets that do not incorporate broader economy-wide considerations for cost-effectiveness or how to align goals across multiple policy areas.

Conclusion

Consumers Energy thanks Staff and ICF for the opportunity to provide these comments on the Draft Final Report. Consumers is concerned that reliance on the "combustion" methodology for emission abatement will incentivize high-volume, but low-abatement, RNG projects, and use of this methodology should not be mandated for future assessment of RNG projects. Overall, however, Consumers supports Staff's and ICF's efforts to date on this report, and looks forward to the final product.