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Submitted via the Federal eRulemaking Portal at: www.regulations.gov

Re: Comments by KeyState Energy on the Notice of Proposed Rulemaking for the Section 45V Credit for the Production of Clean Hydrogen ("Proposal") (REG-117631-23)

Dear Assistant Secretary Batchelder and Deputy Commissioner O'Donnell:

Thank you for this opportunity to provide comment on this important rulemaking.

Executive Summary

KeyState Energy is the developer of 2 large scale Qualified Clean Hydrogen production facilities in Appalachia which will manufacture more than 400 tpd of hydrogen for use in mobility, power, clean ammonia, and fertilizers. These projects represent a combined \$4,000,000,000 investment and thousands of construction and permanent jobs for desperate energy transition communities in Pennsylvania and Virginia. Also, the Clinton County, Pennsylvania project is a principal project of ARCH2 hydrogen hub.

KeyState Energy employs a unique approach in the production of Qualified Clean Hydrogen (QCH₂) via methane reforming by avoiding essentially all methane and CO₂ emissions associated with the extraction, processing, and transport of natural gas feedstock.

First, KeyState's has innovated a 'Captive-Closed Methane Supply System'. KeyState will extract all gas used in QCH₂ production from its own onsite wells, all new wells, all new gathering system, and supply this 'captive' gas directly to the QCH₂ production facility only a few miles away. This 'Closed' system is not connected to the gas grid. There is not a molecule of natural gas used at the manufacturing facility that is from outside this 'Captive-Closed Methane Supply System'.

Second, in the context of this captive gas supply system, KeyState has innovated a powerful 'Upstream Emissions Avoidance & Monitoring Program' of technologies and protocols with the effect of eliminating 99% methane and CO₂ emission typically associated with natural gas production and transport. This is a breakthrough with enormous implications for large scale clean hydrogen production in Appalachia and beyond and demonstrate the value proposition for producing natural gas in a new way.

Third, the 'Captive-Closed Methane Supply System' and 'Upstream Emissions Avoidance and Monitoring Program' were designed specifically for an ease of auditing, through the capture of real-time data of every well and well pad, every processing step, every valve, every foot of gathering system 24/7/365. This Program was tailored to the Inflation Reduction Act requirement of an annual audit of carbon emissions in the production QCH₂ in order to determine the actual carbon intensity score of the hydrogen produced. An emissions audit is not an estimate or extrapolation of emissions, but the quantification of specific point-source emissions data. Under KeyState's approach an annual audit of CO₂ emissions can be concluded with confidence.

Resent 45V Guidance nullifies this innovation by insisting a default value for upstream emissions must be used in the GREET model rather than actual data.

A principal criticism for hydrogen produced from natural gas is the largely unknown volume of methane emissions generated in the extraction, processing, and transport of that gas. KeyState has eliminated this valid concern. This innovation has far-reaching implications for large-scale clean hydrogen production in Appalachia.

Qualified Clean Hydrogen produced from natural gas with 99% of the upstream methane and CO₂ emissions avoided is the type of innovation intended by the IRA.

KeyState is now replicating this 'Captive-Closed Methane Supply System' and 'Upstream Emissions Avoidance and Monitoring Program' at other proposed QCH₂ projects.

This innovation and the level of carbon intensity score achievable, and the resulting hydrogen production tax credit eligibility will push other large scale, methane reforming QCH₂ production projects to move in the same direction of avoiding essentially all upstream emissions in order to be competitive.

KeyState is appreciative that in the published Guidance, Treasury is seeking comments on the calculation, quantification, monitoring, avoidance, and accounting of fugitive methane/CO₂e emissions in natural gas production and transport when used in manufacturing QCH₂ in order to ascertain an accurate carbon intensity of this feedstock.

Finally, in all areas of QCH₂ production guidance, it appears the goal of Treasury is to maintain equal treatment of hydrogen production from the electrolysis of water or via the reforming of methane with carbon capture. This is essential to meet the letter and spirit of the IRA and 45V. However, there appears to be a lapse of this objective related to power used to make QCH₂. The guidance published allows for federal tax incentives provided for power used to make hydrogen from electrolysis, but low carbon power used to make QCH₂ is not allowed a federal tax incentive.

Areas of Guidance Comment

I. Actual vs Generalized Upstream Emissions Data:

The use of actual data in the GREET model rather than a default estimate referred to as 'Background Data', in the assessment of emissions occurring in the extraction, processing, and transporting of natural gas to be used in the production of QCH₂ is essential, doable and in keeping with the letter and spirit of the Inflation Reduction Act. Treasury has requested comments and 'Fact & Circumstance' as to how fugitive methane and CO₂e emissions in

natural gas production and transport when used in manufacturing QCH₂ might be avoided, quantified, monitored, and annually audited in order to ascertain an accurate carbon intensity of this feedstock.

II. Equal Treatment of Electrolysis Hydrogen & Methane Reforming Hydrogen Production: The equal treatment of QCH₂ whether produced from the electrolysis of water or from the reforming of methane as to tax credit eligibility of power used to produce the hydrogen.

Guidance Comments:

I. Actual Data vs Generalized Data:

The use of actual data in the GREET model rather than a default or 'Background Data' in the assessment of emissions occurring in the extraction, processing, and transporting of natural gas to be used in the production of QCH₂ is critical to the purposes of the IRA and to the viability of the KeyState projects.

In the latest GREET model, upstream emissions from natural gas production are considered 'Background Data' and as such has a pre-set estimated value/emissions rate as postulated by GREET. According to Treasury guidance, this point of 'Background Data' cannot be modified within the GREET model with actual emissions data and thereby show upstream emissions reductions achieved.

This default value is extrapolated from estimates and modeling across a wide region or gas production basin and is not a measure of actual emissions. Treasury guidance writers have recognized that the IRA specifies that emissions associated with QCH₂ production must be audited annually and are therefore seeking comments as to how these emissions might be measured and monitored. Actual data readings are currently used in GREET to calculate, monitor, and audit the emissions of QCH₂ facility emissions throughout the production process. So, this call for the allowance of actual upstream emissions data to be allowed in determining CI score would make for a consistent approach across the QCH₂ production process.

Using estimates of emissions data rather than actual data runs counter to the letter and spirit of IRA. Emission reduction innovation is encouraged by IRA. Projects like KeyState which have spent substantial time and capital to reduce upstream emissions and to lead natural gas production into a new era of emissions reduction is penalized under this guidance as proposed. Wisely, Treasury is requesting comment as to how this data might be collected, monitored, and audited in the calculation of Upstream emissions. KeyState's system demonstrates how this data can be confidently captured and carbon intensity audited.

It is noteworthy, that QCH₂ projects using pipeline gas as feedstock would be challenged to facilitate an audit of actual emissions associated with its gas supply. This would be caused by a mix of modern and/or outdated gas production equipment and operations, by the distance gas feedstock it transported, perhaps hundreds or even thousands of miles through a likely mix of old and new pipelines, valves, and equipment, and by diverse gas processing plants and controlling parties, compressor stations, various interconnections, and custody changes, etc. An accurate audit of upstream emissions would be virtually impossible and financially impractical in this situation.

However, KeyState employs an innovative 'Captive-Closed Methane Supply System' for Natural Gas supply where every molecule of gas feedstock is produced on site, with all new state-of-the-art wells and gathering system, no compressor station with no gas of unknown origin or emissions pedigree in KeyState's system. Ground-level, real-time emission monitoring is enhanced by intermittent mid-level drone monitoring. In addition, all dehydration and CPU equipment conventionally powered by fossil energy is powered by low-carbon power. These steps virtually eliminate Upstream CO₂ and methane emissions. These innovations align with the letter and spirit of the IRA, qualification for Clean Hydrogen and mechanism to annually audit actual emissions data.

Potential Impact of the Guidance:

If KeyState would be required to use a default GREET 'Background Data' value for Upstream Emissions rather than an audit of actual emissions avoided, KeyState QCH₂ project would be unfinanceable. The cost of KeyState's emissions reduction and monitoring innovations are substantial. The \$3 HPTC is required to absorb the additional capital and operations cost to attain this historic level of emissions reduction. KeyState would be prevented from attaining the most stringent level of carbon reduction it has work for and the KeyState projects would not move forward

Facts & Circumstances:

This Guidance specifically requests comments and solutions, 'Facts & Circumstances' on upstream CO₂e avoidance, quantification, monitoring, and accounting for the purpose of calculating the upstream feedstock carbon intensity score in QCH₂ production.

The natural gas drilling, processing, transportation, and maintenance program to provide 100% of the natural gas feedstock to the Clinton County, Pennsylvania QCH₂ facility is comprised as follows:

- 22 Marcellus Wells
- 6 drilling pads
- Each drilling pad covers +/- 10 acre during drilling and well completion.
- Each drilling pad covers +/- 5-acre area during ongoing production of gas
- Methane avoidance monitoring would cover an area of +/- 30 acres (6 pads x 5-acres).
- Less than 15 miles on gas gathering system monitoring from all well pads to the QCH₂ production facility would be required.
- The short gas gathering distance does not require the use of a compressor station.
- None-venting pneumatic valves are used
- Planned methane venting to atmosphere is avoided and instead capture and utilized in the QCH₂ production process.

A 'Captive-Closed Methane Supply System' is the ideal gas supply approach to accurately monitor and measure CO₂e emissions.

- Baseline methane emissions study performed prior to any gas drilling or construction activities on the 7,000-acre tract.
- Ground-level, real-time, 24/7/365 emissions monitoring with current and historic data accessible through online SCADA system.
- Intermittent, mid-level drone monitoring

Emissions Avoidance Encompasses 3 Potential Point-Sources:

- Equipment
- Practices
- Power

KeyState's proprietary 'Upstream Emissions Avoidance & Monitoring Program' can be further disclosed under a confidentiality arrangement.

These systems were design for ease of accurate emissions auditing and specifically to meet the IRA requirement of annual emissions audit.

II. Equal Treatment of Green & Blue H2 Production:

The equal treatment of QCH2 whether produced from the electrolysis of water or from the reforming of methane as to tax credit eligibility of power used to produce the hydrogen.

Guidance: Use of QCH2 in Power Generation for QCH2 Production:

This guidance states that Qualified Clean H2 (QCH2) does not qualify for the HPTC if used to generated power to produce additional QCH2. This is inconsistent with the treatment of QCH2 from electrolysis where a tax credit is generated in the production of renewable power used to make the QCH2 and a HPTC is generated in the use of that power to make QCH2.

The stated objective of this guidance is to avoid the wasteful production of H2 merely for the purpose of claiming the HPTC, but the fact is this QCH2 is not wasted when used to generated low-carbon power to produce more QCH2, but serves a vital emission reduction purpose.

Further, QCH2 can be used to generate power for non-H2 production reasons and received HPTC, this includes power to the ammonia and urea production and to the QCH2 liquefaction facility and as direct electrical supply to adjacent power users. QCH2 used in power generation as a means of lowering CI of the QCH2 production is allowed but is not HPTC eligible.

In KeyState's system, the QCH2 is integral to the strategy of producing the lowest possible CI H2 by avoiding emissions associated with traditional power generation or from accessing power from the electrical grid. KeyState's QCH2 used to generate power is remediated hydrogen production with associated CO2 capture and sequestered. QCH2 used to power H2 production avoids emissions associated with power generation and meets the below .45kg CO2/kg H2. This use is not wasteful or a trivial use of QCH2, but vital to reach the lowest-carbon, lowest-cost QCH2.

Comments:

#1. QCH2 used to power H2 production meets all the requirements of QCH2 used for other purposes, has incurred all the same cost required to meet those standards, has avoided the same emissions, has displaced high emissions power generation and should therefore be eligible for the HPTC.


#2. QCH2 used to power H2 production is not a wasteful, but a practical and effective use of QCH2 for a facility to reach an unprecedented carbon intensity in largescale QCH2 production.

#3. QCH2 used in power generation as a means of lowering CI of the H2 is allowed and should be eligible for the HPTC.

#4. This guidance is inconsistent in the treatment of hydrogen production via electrolysis of water and hydrogen from natural gas reforming. In electrolysis hydrogen production, the producer of the renewable power needed to electrolyze the QCH₂ is eligible for a tax credit for its renewable power generation and the user of that renewable power needed to make the QCH₂ is also eligible to receive a tax credit, the HPTC. QCH₂ from methane reforming should be treated similarly.

It is KeyState's hope the Department of Treasury will consider these comments in their final rulemaking. America and particularly Appalachia is on the cusp of a clean hydrogen production revolution. However, only by removing barriers currently in place in this guidance and encouraging a data driven, technology-agnostic final rule with accurate emission accounting will we be able to be successful and make the U.S. a leader in the global energy transition.

Respectfully,


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