**ACCELERATE DECARBONIZATION BY ASSESSING SUITABILITY OF HYDROGEN AND AMMONIA SOURCES BASED ON LIFECYCLE CARBON INTENSITY RATHER THAN “COLOR”**

 **REVISED: July 6,2022**

1. **Dismissal of “Blue Hydrogen” by NYSERDA is unjustified**
	1. We are concerned that early and substantial decarbonization opportunities will be lost, along with accompanying environmental and health benefits, by focusing on generic colors of hydrogen production pathways, rather than the objective lifecycle carbon intensity of ammonia/hydrogen sources.
	2. NYSERDA noted in its kickoff webinar *‘Hydrogen in NYS: State of the Science’* on 5/31/2022 that “blue hydrogen” includes emissions and are “deemed” to be inconsistent with the achievement of Climate Act emissions limits.[[1]](#footnote-1)[[2]](#footnote-2)
		1. This conclusion requires revisiting because certain key assumptions upon which NYSERDA relies are outdated or incorrect.
		2. Dismissing Blue Hydrogen may actually delay decarbonization, contrary to the Climate Act’s goals

#### Instead of a color scheme, we recommend focusing on the hydrogen’s lifecycle emission profile, as utilized by the United States Department of Energy. This was described in the same NYSERDA webinar[[3]](#footnote-3) [[4]](#footnote-4)

#### By focusing on lifecycle emissions, rather than broad color categories, an ammonia or hydrogen project that is prima facie “green”, but for example has a large transportation carbon footprint will be identified, and a project that is prima facie “blue”, but avoids the methane leakage and carbon capture inefficiencies assumed in the “color” chart, may be acceptable for purposes of the Climate Act.

1. **Assumed Decarbonization of Manhattan steam system is too slow.**
	1. The Manhattan steam system can be substantially decarbonized by 2030 by utilizing “blue” ammonia with carbon intensity consistent with “green ammonia”.
	2. This accelerates by some 20 years the climate and health benefits of decarbonization, versus the slower “glidepath” reduction assumed in the Draft Scoping Plan through to 2050 (page 121 and footnote 158)
	3. The “blue” ammonia itself may be displaced in the 2040s by “green” ammonia, but millions of tons of CO2e can be displaced in the meantime by using blue ammonia now.
2. **NYSERDA’s “Blue Hydrogen” carbon emissions assumptions are out of date**
	1. The “blue” emissions assumptions cross referenced in NYSERDA’s presentation and described by Sierra Club, Earth Justice, and Pembina Institute :
		1. mistakenly assumes that methane solely will be extracted from natural gas wells and fails to contemplate an ammonia plant utilizing local coal mine methane and coal bed methane. By not considering coal bed methane and coal mine waste methane, assumed greenhouse gas emissions are well in excess of what is readily achievable. Both are not under pressure and don’t “leak when extracted”. In addition, the recovery and use of coal mine waste methane is identified by the EPA as emissions avoidance[[5]](#footnote-5), and so can have a carbon intensity below zero. In addition, the California Air Resources Board has identified that capturing coal mine methane provides direct environmental benefits by reducing or avoiding emissions, and can generate offset credits there [[6]](#footnote-6)
		2. Is not current – for example, in 2022 the % capture of carbon emissions by an ammonia plant utilizing an Autothermal Reformer (ATR) plus carbon capture and sequestration - are in excess of 99.3%, substantially higher than the 90-95% assumed in NYSERDA’s presentation. Further, by utilizing say 25% coal bed methane and 75% coal mine methane, carbon capture can be 99.48%

* + 1. Ignores the carbon footprint necessary for refrigeration to 423 degrees below zero and transportation of Green Hydrogen. Blue Ammonia produced from coal mine methane and coal bed methane can have lower carbon intensity (or is “greener”) than Green Hydrogen, is cheaper and crucially is available now.
	1. So for example, the the DOE chart in the NYSERDA report contemplates a range of 3-5 kg\_CO2e/Kg\_H2 for blue hydrogen based on 90% carbon capture rate and upstream methane leakage. A blue hydrogen project that has better carbon capture, and lower leakage, may have carbon intensity less than the 2kg\_CO2e/Kg\_H2 “clean hydrogen” definition in the IIJA[[7]](#footnote-7).
1. <https://www.nyserda.ny.gov/-/media/Files/Researcher-and-Policymakers/2022-05-31-H2-in-NYS-SOTScience-Kickoff-Slides.pdf> slide 23 [↑](#footnote-ref-1)
2. <https://youtu.be/hPs7xBpxC18?t=3695> [↑](#footnote-ref-2)
3. <https://www.nyserda.ny.gov/-/media/Files/Researcher-and-Policymakers/2022-05-31-H2-in-NYS-SOTScience-Kickoff-Slides.pdf> slide 49 [↑](#footnote-ref-3)
4. <https://youtu.be/hPs7xBpxC18?t=7224> [↑](#footnote-ref-4)
5. https://www.epa.gov/cmop/about-coal-mine-methane [↑](#footnote-ref-5)
6. https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/compliance-offset-protocols/mine-methane-capture-projects [↑](#footnote-ref-6)
7. <https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=42-USC-783187369-501199121&term_occur=999&term_src=title:42:chapter:149:subchapter:VIII:section:16166>

6https://www.nasa.gov/pdf/513855main\_ASK\_41s\_explosive.pdf [↑](#footnote-ref-7)