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4th December, 2023

Office of Energy and Climate Change (OECC)
NSW Treasury
Submitted via email: renewablefuelscheme@environment.nsw.gov.au

Dear Madam/Sir,

Re: NSW Renewable Fuel Scheme – Discussion Paper on Scheme Expansion

Thank you for the opportunity to provide a submission on the scheme expansion for the NSW Renewable Fuel Scheme.

SEATA is providing feedback on the following specific aspects sought for feedback on the above-mentioned discussion paper issued by the Office of Energy and Climate Change (OECC) within NSW Treasury:

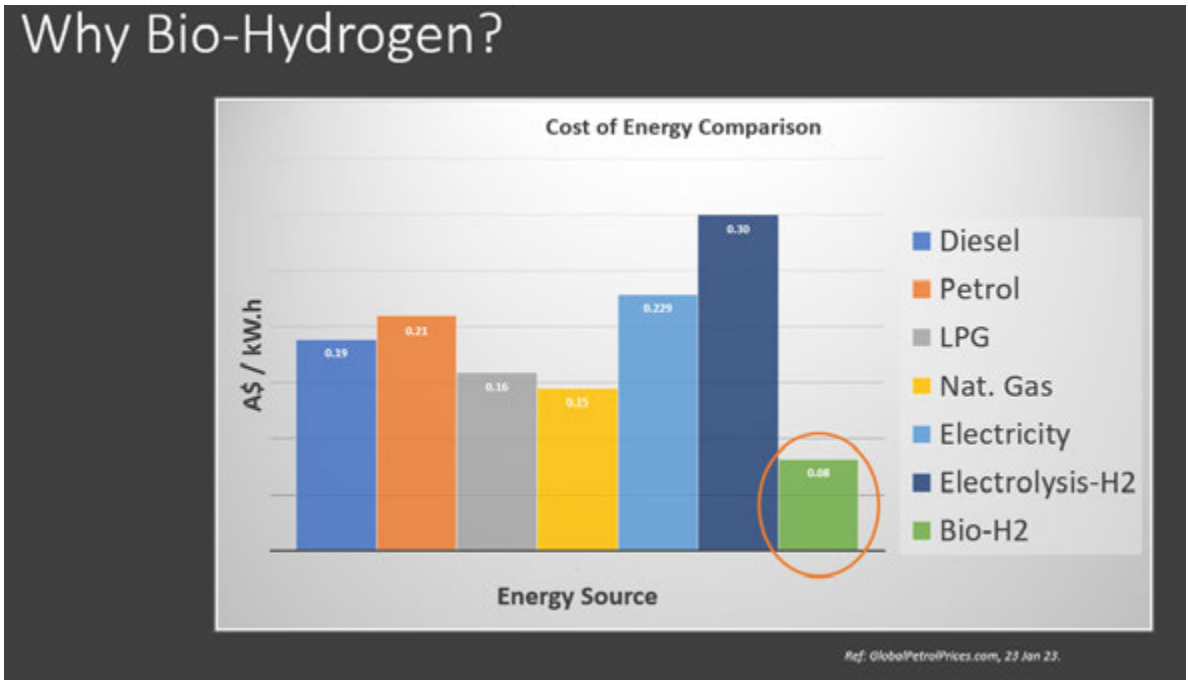
- **Inclusion of other eligible fuels (e.g. biogenic fuels)**
- **Scheme exemption options**
- **Response to the 15 Consultation Questions of the Discussion Paper** (refer **Table 1** appended to this letter)

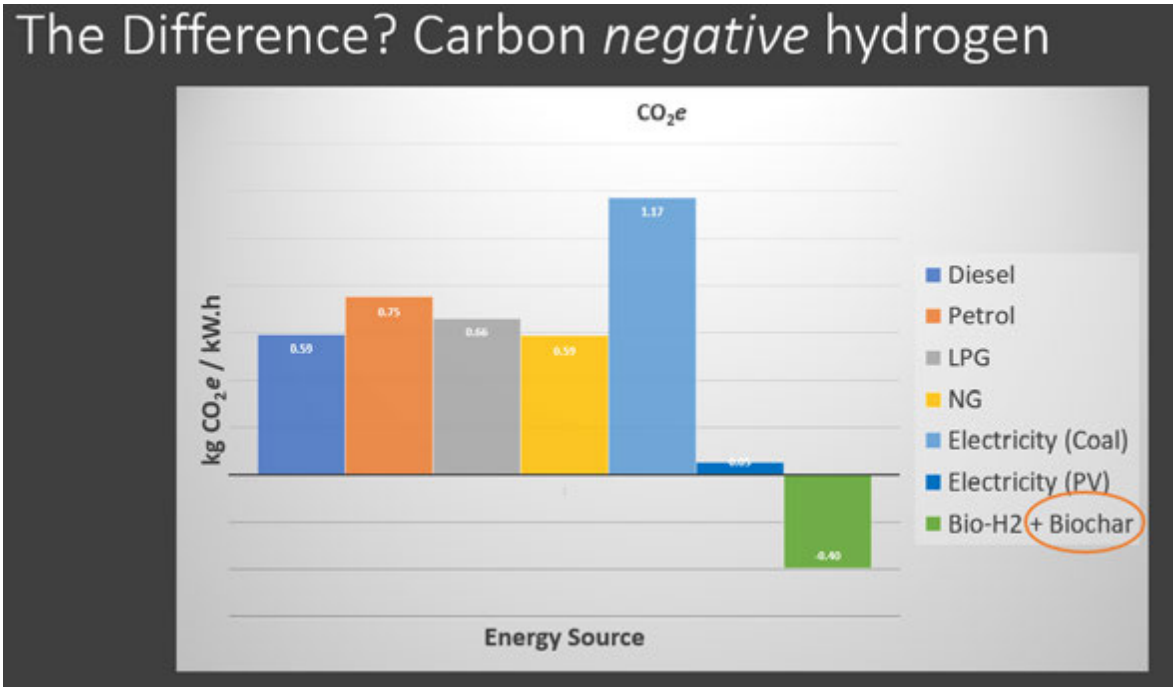
SEATA strongly supports the expansion of the scheme to include other eligible fuels, **particularly all forms of sustainable biomass**. Due to the unique nature of our technology which was developed right here in NSW, we are also writing to inform OEEC and NSW Treasury of the emergence this technology which has significant potential to provide **low-cost** carbon-*negative* hydrogen and/or a range of biofuels and related derivatives (including SAF, methanol, green ammonia, olefins etc) **at industrial scale.** Our pilot facility in Glen Innes NSW (shown below) has **already been constructed and approved** and is expecting to **commence shortly in Q1 2024**.

Above: SEATA Pilot Facility - Clean Energy and Carbon Sequestration R&D Centre, Glen Innes NSW (New England REZ).

"Greener than Green": Carbon-Negative Hydrogen

Please also find enclosed a copy of a presentation based on one made by SEATA at *Bio360* in France in January 2023, *"Hydrogen with Benefits – Carbon* ***Negative*** *H_2"*. Two notable screenshots from the presentation are shown below.



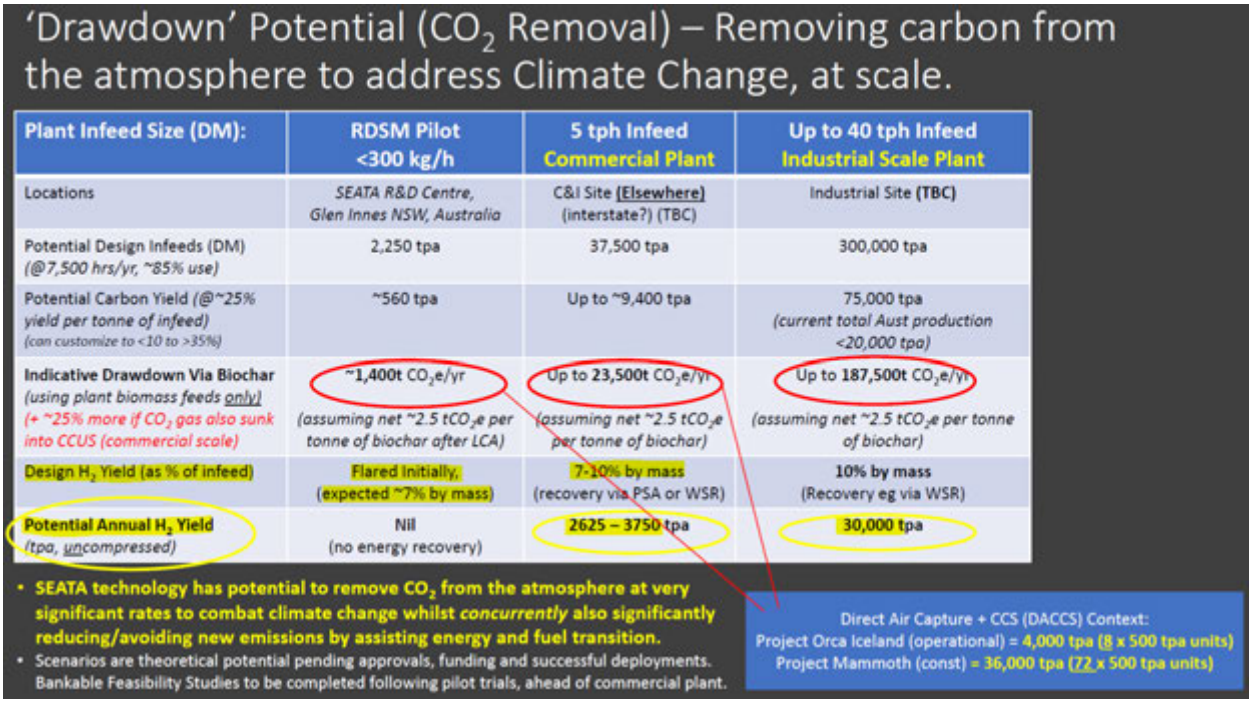


SEATA noted the deferred timing of the Scheme's commencement date to 2025. SEATA intends to be in a position to make a decision in relation to a commercial scale plant in 2024. With appropriate requisite support (financial, regulatory and market-specific), **SEATA could be ready to produce carbon-*negative* green hydrogen at scale in 2025** in line the original proposed timing for the scheme sought by the NSW government, providing measurable early action towards this and other objectives of the NSW government. Specifically, we noted the Scheme's original green hydrogen production target of **750 tonnes by 2024**. Based on our designs, we expect this goal could be met by **a single** 5 tonne per hour SEATA plant. Further, the Scheme's original **2030-2044 target** of 66,667 tonnes of H_2 could potentially be met by just over **two (2)** 40 tph SEATA plants and potentially inside the **next three years** (well ahead of the 2030-2044 target), as indicated in the two screenshots below:

Year	Gigajoule	Equivalent tonnes of hydrogen*	Megawatt equivalent**
2024***	90,000	750	5
2025	360,000	3,000	21
2026	890,000	7,417	53
2027	1,780,000	14,833	106
2028	3,200,000	26,667	190
2029	5,330,000	44,417	317
2030-2044	8,000,000	66,667	476

* Assuming lower heating value of 120 MJ per kilogram of hydrogen
** Estimated assuming 140 tonnes produced per year per megawatt of electrolyser capacity.
*** The 2024 target will not be enforced and no penalty rate will be set.

Left: Scheme Targets (OECC)



Left: SEATA Design Targets

SEATA would welcome the opportunity to engage further with NSW Treasury on the economic potential of our technology could bring to NSW via low cost carbon-*negative* hydrogen rapidly at industrial scale, and requests an **in-person meeting with OECC** at your convenience. SEATA also invites NSW Treasury representatives to visit our pilot facility when it opens in 2024.

We would also like to draw attention to NSW Treasury of the related importance of the ***Australian Biochar Industry 2030 Roadmap*** which was recently launched by the ANZ Biochar Industry Group (ANZBIG). **Biochar facilitates carbon-*negative* biohydrogen, sustainably, with multiple co-benefits across all sectors of the economy.** The roadmap developed by ANZBIG has significant potential to facilitate many related aspects for the production of industrial scale carbon-*negative* biohydrogen in NSW and beyond. A copy of an introductory presentation by ANZBIG is also enclosed for reference.

We apologise for the timing of our response as we were only just informed about the discussion paper this afternoon. SEATA would be happy to expand on any aspects if/as required. Please do not hesitate to contact us with any queries at all.

Yours sincerely,

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Enclosed:

1. *Presentation: "Hydrogen with Benefits – Carbon **Negative** H_2"* (SEATA, 2023)
2. *Presentation: Introduction to Biochar and the Australian Biochar Industry 2030 Roadmap* (ANZBIG, 2023)

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Table 1: SEATA Response to the Consultation Questions of the Discussion Paper (OECC, Nov 2023)

	OECC Consultation Question	SEATA Response
1	*What renewable fuels do we need to produce at scale to achieve net zero?*	Hydrogen, SAF (Sustainable Aviation Fuel), Green Ammonia, Biomethane, Bio Methanol, Di Methyl Ether (DME), and other widely used fuels currently based on *fossil* carbon (**see below**). Green CO_2 from biogenic sources to displace fossil CO_2 (e.g. refrigerants etc). SEATA technology has potential to: • facilitate replacement of current solid, liquid and gaseous **fossil** fuels with renewable biofuels and biocarbons/biochar with like-for-like properties. For example, biocarbons / chars to displace **metallurgical coal / coke**; bio-syngas to displace many fossil fuels such as **methane, LPG, petrol, kerosene (A1 Jet fuel), diesel, lubricating oils, bitumen** for road construction, **etc**. These can be synthesised from high quality syngas via Fischer-Tropsch processes (well-established technology), while in all these cases also generating biochar for carbon sequestration. • Ability to use any of these biofuels for peak-power generation on-demand, on a distributed basis, to support wind and solar without the need for large batteries or pumped hydro. This includes potential for *direct use* in gas engines with negligible clean up (high efficiency), a significant advance in its own right.
2	*Of these fuels, which need incentives under the scheme to be commercially viable and for how long?*	• Many biofuels have existing markets and applications, with some additional new aspects potentially requiring further consideration which may require some level of support for a period. • **Incentives to support biomass growing systems is key and should be prioritised**. E.g. **incentivise biomass growers** over the first ~3 years **until continuous year-on-year production can be achieved**. • Biomass grower support should include **appropriate native biomass** (refer further details in Q4), including invasive native species (INS) and *purpose-grown* native species (such as those successfully demonstrated by NSW DPI trials) which provide multiple co-benefits, including for biodiversity and water security (much lower water requirements). • Incentives for **biochar producers and users** should also be considered (e.g. **other** tax *incentives* in addition to tax *penalties* per the scheme), noting the success of schemes such as that used for renewables under the IR Act and in 45Q/45V in the USA). For example: ○ Use of biochar as carbon draw-down mechanism. ○ Use of biochar for methane reduction. ○ Use of biochar for NOx reduction. • To facilitate economic viability in the **initial stages** of development of renewable fuels, relevant accredited technologies would benefit from the following:

		○ **Set a cap on infeed fuel costs** (waste and biomass etc) and make identification of such infeed fuels and their utilisation more readily available to accredited users. ○ **Set a floor (collar) on offtake prices** for valuable product outputs (such as syngas (and derivatives if necessary), char and credits). Thereby a cap and collar approach would ensure the development pathway at small, medium and large scale can be traversed with certainty incorporating a combination of market and government support at the expenses/revenue relationship – viability/profitability is ensured through this stage. ○ **Streamline access to funding** for technology which is low emissions, neutral or carbon-negative, scalable and ready.
3	*Which fuels or production pathways should **not** receive incentives under the scheme? For example, should methane generated from landfill be excluded?*	• All fuels/pathways should consider **full life cycle** and **sustainability** assessment (against the UN Sustainable Development Goals), including feedstock and product costs and impacts 'upstream' and 'downstream' required for overall system delivery. This includes methane from landfill, desalinisation/water for electrolysis; biogas from anaerobic digestion; and ethanol from fermentation. • Water and food security is critical in adapting to climate change. Australia is the driest inhabited continent on Earth and *economy- wide* assessment and balance is becoming more crucial (e.g. Murray-Darling Basin water sharing issues). Cleaned/treated recycled water from water utilities could be directed into agriculture, horticulture and agroforestry ***first*** (including in urban areas not just rural), ***then*** convert biomass residues to biohydrogen (best of both worlds). • Encouraging electrolysis alone in isolation of all other interdependent economic sectors should be discouraged."Win:win" scenario's should be incentivised. • Groundwater, freshwater and all drinking quality water in particular should be protected and excluded from electrolysis for hydrogen.
4	*If biogenic fuels are included in the scheme, what **controls** should be in place to safeguard environmental outcomes and **avoid competing with food production**?*	• Unlike conventional bioenergy / waste to energy (including with CCS, known as BECCS), **biochar** bioenergy systems are well demonstrated to **enhance** food production and security, with the IPCC identifying a sustainable potential of up to 6.6Gt CO2e per year globally (CO_2 removal, CDR) **without** impacting food security (unlike BECCS). Refer Enclosure 2, more info can be provided on request. • The *Australian Biochar Industry 2030 Roadmap* (2023) uses and encourages **assessment against the UN Sustainable Development Goals (SDGs),** not *only* the aging waste hierarchy, to assess 'higher order use' in resource recovery. • The ANZ Biochar Industry Group's ***Code of Practice*** (2021) requires biochar producers to use **sustainable feedstocks**. ANZBIG is developing certification schemes which can also provide regulatory and market confidence. SEATA is a foundation member of ANZBIG. • Agricultural and plantation forestry residues, urban forestry plus end-of-life organic waste will be prioritised by SEATA. • Growing deep rooted plants as part of cropping areas will help manage salinity and provide shelter / micro-climate, which increase food production. • Food production can be enhanced by use of biochar into soils and provide **drought resilience** for Australian farmers (including by providing additional income streams). Currently very significant volumes of crop residues are simply burned or otherwise underutilised. NSWDPI estimates over 22 Million tonnes of sustainable biomass crops are available per year in NSW. • Appropriate programmes to facilitate **sustainable** use of **native** species should be included/encouraged, not blanket excluded as per past Liberal government. This includes **invasive** native species (INS), **bushfire** fuel load management (a

		critical issue and opportunity), roadworks and powerline biomass residues, purpose-grown native species (per the successful NSW DPI trials), sustainably managed native forestry (plantation and otherwise). When done right, these approaches can *enhance and protect* biodiversity rather than threaten it (eg via intense wildfires the way we currently often manage land).
5	*If the scheme is expanded to include other renewable fuels, who should be the liable parties and why?*	• There are multiple current uses of fossil carbon fuels throughout the economy which could be considered for accelerated transition as **detailed in Q1 earlier above**. • **Conventional combustion/incineration bioenergy systems** (e.g. wood boilers) provide 'single-use' **linear** waste to energy (single use of resources to energy, non-regenerative) and could also be included as scheme participants to encourage transition and investment alternatively toward the available circular, regenerative and sustainable bioenergy systems instead (e.g. biochar bioenergy). This kind of action is also justified by alignment with state and national objectives for sustainability, circular economy, energy and action on climate change.
6	*Are there any other liable parties or principles for choosing liable parties that we should consider?*	• Should SEATA technology be deployed at scale in NSW, it could enable the NSW Government, as it sees fit, to consider potentially including **multiple additional scheme participants/liable parties,** such as significant existing users of many fossil-carbon fuels (solid, liquid and gas) such as the types listed by SEATA in **Question 1** above. • Exemptions to those who utilise renewable alternatives in all cases should be considered to help drive transition. • In regards to principles, see above in 5, and comments in 4 regarding the use of the UN Sustainable Development Goals (SDGs)
7	*If there are multiple categories of liable parties, how should liability be apportioned between them?*	• This requires more detailed stakeholder engagement to flesh out (e.g. workshops etc). SEATA would welcome further discussion.
8	*What target levels are appropriate beyond 2030 to develop the scale of renewable fuel production needed for net zero in NSW by 2050?*	• As noted in our cover-letter, given that a single 10 tph SEATA plant (noting it is designed to scale to 25-40 tph) could help achieve annual targets to 2025 (well in advance of electrolysis), economically at low cost with multiple co-benefits, there may be potential for the government targets to be revised upward at a suitable time, assisting the NSW Government to leap beyond existing goals and the benefits that could bring to the climate transition at both state and federal levels. SEATA's pilot plant is already built, approved and, with requisite support, is in a position to commence asap in 2024, providing data for bankable feasibility assessment for **intended commercial scale deployment in 2025**.
9	*How can the scheme best provide targeted support for hydrogen and e-fuels until these fuels are commercially mature? Is it more effective to have a separate target for hydrogen or a certificate multiplier, and why?*	• Refer response for Q2. • See also related comments in our cover letter regarding the potential for all levels of government to support the implementation of the ***Australian Biochar Industry 2030 Roadmap*** (refer related **Enclosure 2** to our submission), which would concurrently assist the scale up of carbon-*negative* biohydrogen via SEATA technology. • This is a broad question and requires more in-depth analysis than was available at the time prior to this submission. SEATA would welcome the opportunity to assess this and discuss with OECC.
10	*If hydrogen and e-fuels do not have targeted support under the scheme, what support outside of the scheme should Government provide to help establish supply chains now?*	• This is a broad question and requires more in-depth analysis than was available at the time prior to this submission. SEATA would welcome the opportunity to assess this and discuss with OECC. • Notwithstanding this, see also the second dot point in Q9 immediately above regarding related comments in our cover letter for the ***Australian Biochar Industry 2030 Roadmap*** (and related **Enclosure 2** to our submission), which would concurrently assist the scale up of carbon-*negative* biohydrogen via SEATA technology.

11	*Should the target for an expanded scheme be a production volume in GJ or an increasing percentage of liable fuel sales, and why?*	• This is a good question and requires more in-depth analysis than was available at the time prior to this submission. SEATA would welcome the opportunity to assess this and discuss with OECC.
12	*How can we provide assurance of the maximum scheme incentives for hydrogen project developers planning investment decisions before the scheme expansion is finalised in 2024?*	• CAPEX Investments require an acceptable level of risk in regards to **policy certainty and clarity** (consideration against a CAPEX return period). Concerns over 'shifting goalposts' can hinder private investment. This can be goal/target based (e.g. Australia signed up to **triple renewable energy by 2030** at COP28, similar things can be done at State level). • **Consider other additional tax *incentives*** not just *penalties* (as deployed in the US and EU) which can significantly incentivise innovation, transition and private sector investment (e.g. US Inflation Reduction Act, 45Q/45V etc). • Clarity and **targets** in **Procurement policy** in all state government agencies to drive demand for renewable fuels and biochar / biocarbons (e.g. high weightings for circular / sustainability / climate-positive procurements, especially for CO2 removal benefit). *E.g. $XXXM of circular and CDR in state government procurement by 2030 (with interim/progressive targets prior to 2030 to drive early action).*
13	*What factors should the Government consider in setting the exemptions framework?*	• Impact / 'bang for buck' (if excluded, what is the effect on the goals of the scheme) • Sustainability (will the activity have broader positive or negative impacts on environmental sustainability?) • Maturity (is the system being exempted sufficiently established yet to be self-enabling) • Additionality (i.e. justification of why should the tax-payer subsidise this?)
14	*Should any exemptions be granted under the RFS?*	• Yes, but where appropriately justified and for suitable time period. • Exemptions should only be available to liable energy users in **critical activities** (e.g. food production, water and power supply) and only for a **limited timeframe** subject to producing confirmation they are assisting in the energy transition (either through internal technology development or industry support of developing outside technologies). • Provision for exemptions and exclusions on a justified *case-by case basis* (against defined assessment criteria) should also be included in any policy framework (i.e. **outcomes-based** regulation rather than prescriptive) to ensure desirable projects For NSW are not otherwise negated through use of a general 'blanket statement'.
15	*For the liquid fuel sector, should specific fuels or uses be exempt? For example, should agricultural use be exempt, and why? If so, how could this exemption be effectively regulated and audited, and when should it end?*	• Any exemptions established should probably continue until relevant Net Zero targets (relevant to that aspect) are being met, otherwise the primary goals of the scheme fall short.