

Note on ERF opportunities for Hydrogen projects

Summary

- Hydrogen projects could be suitable for participation in the ERF, providing the hydrogen is from zero emissions sources (specifically “green” hydrogen, although in principle methane-derived hydrogen with carbon capture could also be suitable).
- Hydrogen projects may be able to utilise existing methods; however, it may be preferable to advocate for new methods specific to hydrogen. A qualitative assessment of the government’s method prioritisation criteria suggests hydrogen projects are good candidates for a new method.
- Providing the acceptable counterfactual is that the relevant activity (e.g. industrial heat, transport) would be carried out to the same extent but using fossil fuels, calculating the emissions reduction should be fairly straightforward.
- The exception is hydrogen for electricity storage where there may be more challenges.
- Export projects would not qualify, given they do not cause *domestic* abatement.
- Further work to estimate the value the ERF would put on abatement from hydrogen projects could be worthwhile as a cross check that it could help make hydrogen projects viable.
- It should be noted that little success has been had to date of getting ERF projects up using any of the existing industrial or transport methods.
- With this in mind, the ERF may not be the preferred vehicle for obtaining government support. Also, to the extent other support mechanisms impose requirements on parties to use hydrogen (e.g. a blending target in gas distribution) then hydrogen activity may not satisfy the additionality test.

Background

The Climate Change Authority (CCA) is undertaking a [consultation on the Emissions Reduction Fund](#) (ERF). The CCA’s consultation is high-level and generic, however it presents an opportunity to consider whether the ERF is a suitable vehicle for government support of hydrogen projects. It follows on from last year’s *Expert panel examining opportunities for further abatement*.

The expert panel’s discussion paper and industry submissions to both this paper and previous ERF consultations have noted the challenges for commercial and industrial energy efficiency or emissions reduction projects to qualify for the ERF. Typically these relate to challenges around proving up the counterfactual (that the project would not have gone ahead without the ERF); measurement (or modelling) of the emissions reduction, which again typically requires a robust baseline or counterfactual of what emissions would have been without the project; sufficient certainty in advance of the emissions reduction outcome in order to factor the ERF income into the project appraisal. This is evidenced by the limited take-up of existing industrial methods or the general facilities method.

The expert panel's discussion paper canvassed options to lower the barriers to accessing ERF revenue streams, including crediting of emissions outcomes below the baseline (this would be challenging to get legislated given the manifest risk that the government ends up paying for apparent reductions that are actually BAU) and establishing funds to pay a fixed price for emissions reduction outcomes, which could improve revenue certainty and lower administration costs when compared to the need to participate in the auction process.

Opportunities for hydrogen projects

Hydrogen projects can take various forms – some of the more likely possibilities are discussed further in table 1 below. It's assumed that only "green hydrogen" projects have the potential to generate cost-effective abatement, even if it may be technically possible for other hydrogen production methods to contribute emissions reduction at the margins. In this case green hydrogen refers to hydrogen produced via an electrolyser using electricity from verifiable renewable energy sources. In principle methane-derived hydrogen with carbon capture could also be suitable.

Hydrogen projects achieve abatement via fuel switching (i.e. using hydrogen in place of fossil fuels to generate heat for use in industrial processes, transport, or electricity generation). By contrast most of the existing industrial ERF methods are focussed on energy efficiency. This point of difference has two main implications:

- Several of the existing methods are unlikely to be suitable for hydrogen projects, but in some cases, they may be amenable to being adapted
- On the face of it, hydrogen projects should find it easier to calculate the emissions reduction they have generated as there is easier to calculate the emissions that would have occurred without hydrogen.

Table 1: Hydrogen project types – analysis of applicability of ERF

Project type	Applicability of existing method	Potential for new method
Hydrogen blending in gas distribution network	<i>Aggregation of small energy users</i> : This method requires control group and measurement of energy use by both control and treatment groups. Seems onerous in context of hydrogen blending. Emissions reduction not achieved by reducing gas usage (and thus needing a baseline from the control group) but by reducing the emissions intensity of the fuel.	A new method could be based on the crediting the volume of hydrogen blended multiplied by the emissions intensity of the equivalent amount of natural gas (in calorific terms). Eligibility would depend on interaction with other policies to support blending.
Hydrogen powering industrial heat process	<ul style="list-style-type: none"> a) <i>Facilities method</i> – the conditions of this method mean it has proved difficult for any project to qualify b) <i>Industrial Electricity and Fuel Efficiency method</i> – this includes boiler upgrades, so may be suitable. Sub method 2 allows for emissions reduction to be modelled, making calculation easier. 	If there are barriers to utilising existing methods, then there is value in advocating for a new method. Modelling emissions reduction should be straightforward along the lines suggested for hydrogen blending above.
New/upgraded hydrogen production facility	New facilities in themselves not eligible for ERF. In principle a hydrogen plant that used SMR that was converted to green hydrogen production might be eligible under the <i>facilities method</i> . In practice the two technologies are so different and use different feedstock, so a conversion is not a likely outcome.	See previous column. However, the downstream use of the hydrogen may be an eligible project if the hydrogen is “green”.
Hydrogen export	This would not lead to emissions reduction in Australia so would not be eligible under the ERF	Applying the ERF to this activity seems like a square peg in a round hole. Would be less complex for governments to provide direct subsidy if that’s what is desired. Could potentially qualify for other types of units if demonstrably displacing fossil fuels at point of use but seems more likely that units would accrue to the user.

Project type	Applicability of existing method	Potential for new method
Hydrogen as electricity storage.	No methods currently applicable to electricity generation sector.	A standalone electrolyser/turbine facility would like all storage essentially be a net consumer of electricity. It would be hard to make a case for that electricity to be treated as anything other than having grid average emissions intensity. Claiming that it could be displacing more emissions intensive OCGT is a long bow, and on that logic pumped hydro and li-ion batteries would be eligible for the same treatment, and potentially crowd out hydrogen anyway. A facility co-located behind the meter with a wind or solar plant that ran on electricity that would otherwise be curtailed would stand a better chance, as the input emissions could be considered zero and the output could be treated as displacing electricity generated at grid average intensity. Note also interaction with other schemes – if the input renewable electricity qualified for RECs or to meet state schemes, then would not be eligible.
Hydrogen transport projects	Could utilise existing <i>land and sea transport method</i> : “Emissions reductions are calculated by comparing the emissions intensity of a group of vehicles or individual vehicles before and after implementing activities to reduce emissions.” There may be some devil in the detail establishing the counterfactual. Fleet upgrades should be able to use the previous fleet fuel efficiency data.	There may be little to be gained by seeking a new method. Any challenges with emissions measurement or defining the scope of the project that arise from the existing method would likely carry over to the new method.

Table 2: New method prioritisation criteria

Criteria	Description of criteria	Applicability of green hydrogen projects
What is the potential uptake of the emissions reduction activity and the likely volume of abatement?	Is the activity cost effective, what is the level of business support for the activity, and what is the potential volume of abatement from the activity?	Note that green hydrogen projects are not considered “cost-effective” in sense of being cost-competitive without further support. However, much analysis has been undertaken to demonstrate a path to cost-effectiveness based on increasing scale of deployment.
Is the activity ready?	Is the technology proven and commercially ready?	Electrolysers are a proven technology.
Can emissions reductions be estimated with a reasonable degree of certainty and at an acceptable cost?	How straightforward is the approach to estimating emissions reductions?	In general, since hydrogen use is a fuel-switching proposition, it ought to be straightforward to estimate the emissions that would have resulted from using the fossil fuel that the hydrogen is displacing.
Are there any adverse impacts?	Could the activity have adverse social, environmental or economic impacts?	This is an extremely wide question; on the face of it hydrogen industrial activity is not expected to have material adverse impacts.
Could the activity be promoted more efficiently through other measures?	Is there another method, other mechanism or government program better suited to the activity?	Both federal and state and territory governments are supportive of the development of a hydrogen industry. Support mechanisms in place or under development may both be more suitable than the ERF and may affect project eligibility

Criteria	Description of criteria	Applicability of green hydrogen projects
Is the activity beyond business as usual?	Is the abatement unlikely to occur in the ordinary course of events?	Coupled with the “cost-effective” criterion above, this test implies that hydrogen projects need to have a narrow cost window such that they are not quite cost-effective without ERF funds (at c. \$10/t CO2e) but are not so out of the money that even ERF support doesn’t get them over the line.
Can the emissions reductions be measured and verified?	Can estimates be accurately measured and are they capable of being verified?	As noted above, providing emissions reductions based on displaced fuel is acceptable, then should be straightforward.
Is the abatement eligible?	Does the method align with Australia’s greenhouse gas inventory approaches and international reporting obligations?	Export projects not eligible, but others should be.
Is it supported by evidence?	Is the method supported by clear and convincing evidence?	Greenfield projects may struggle to demonstrate abatement.
Are material emissions from the activity deducted?	Are emissions that would occur as a result of the activity deducted when working out the estimated abatement from the project?	There would be embedded emissions associated with new electrolysers and construction of facilities.
Are the estimates conservative?	Is there evidence to demonstrate estimates, projections and assumptions are conservative?	The proposed calculation methods are reasonable.