31 May 2019

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GEA RESPONSE TO THE REVIEW OF THE CARBON CREDITS (CARBON FARMING INITIATIVE - LAND AND SEA TRANSPORT) METHODOLOGY DETERMINATION 2015

Dear Mr Dessi

Gas Energy Australia (GEA) welcomes the opportunity to respond to the Department of the Environment and Energy's review of the carbon credits (Carbon farming initiative - land and sea transport) methodology determination 2015 consultation paper.

By way of background, GEA is the national peak body, which represents the bulk of the downstream alternative gaseous fuels industry, which covers Liquefied Petroleum Gas (LPG), Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG). The industry comprises major companies and small to medium businesses in the gaseous fuels supply chain including producers, refiners, distributors, transporters, retailers, vehicle manufacturers, equipment manufacturers and suppliers, installers, educators and consultants.

GEA considers that incentives to reduce greenhouse gas (GHG) emissions for land and sea transport such as the Emissions Reduction Fund (ERF) to be vital in ensuring Australia's domestic transport fleet is encouraged to reduce emissions and utilise best practice technology to do so.

That said, GEA sees significant conceptual and practical problems with the current ERF methodology which compares calculations using the International Maritime Organisation's (IMO's) Energy Efficiency Design Index (EEDI) with its Energy Efficiency Operational Indicator (EEOI) to measure GHG abatement. The EEDI measures the theoretical emissions performance of a newbuild ship and provides an estimate of average CO2 emissions per ton-nautical mile (CO2/tnm) based on the ship's specifications and assumed operating conditions, including speed and cargo. On the other hand, the EEOI measures the actual emissions performance of a ship and provides an estimate of CO2/tnm based on the ship's historical operations, including actual speeds travelled and cargo carried. The analogous comparison for road vehicles would be the rated emissions performance of new cars in gCO2/km on a laboratory test cycle versus actual on-road emissions performance in gCO2/km.

The EEDI was developed by the IMO to be used as a benchmark for the design emissions performance of newbuild ships. GEA considers it to be unrealistic to compare a ship's design EEDI with its operational EEOI to determine GHG abatement. This is particularly so when a vessel's real-world operating conditions require faster speeds than assumed in the EEDI, for example Roll-on Roll-off (RoRo) vessels as further discussed below. A true comparison of a technology's capacity to reduce emissions would be to compare a vessel without and with the new technology using the same theoretical measure ie the EEDI or the same actual operating conditions ie the EEOI. In addition, in the case of a new build dual fuel (DF) ship able to use low emission fuel as well as Marine Diesel Oil (MDO), the ERF methodology incorporates the low emission fuel in the Business as Usual (BAU) baseline calculation therefore assuming away the abatement from fuel switching. Therefore, the ERF provides no incentive to invest in new technologies that enable ships to switch to lower emission fuels.

Overall, the current ERF methodology effectively prevents many marine vessels from claiming Australian Carbon Credit Units (ACCUs). And this is despite the enormous potential such vessels have to deliver significant transport emissions abatement through the use of lower emission fuels such as LNG, CNG or LPG.

GEA'S RESPONSES TO THE CONSULTATION PAPER QUESTIONS ARE OUTLINED BELOW.

For shipping:

- **Are International Maritime Organisation targets likely to lead to energy efficiency improvements for some or all domestic shipping?**

The IMO's EEDI targets should improve the emissions performance of new vessels used domestically over time. However, as discussed above, GEA considers using the IMO EEDI target as a baseline to compare against the IMO EEOI to measure emissions abatement from marine vessels is unrealistic. GEA's suggested approach is detailed below.

- **Are there any circumstances where project activities might result in abatement from both domestic and international shipping activities? If so, how could the calculations separate the abatement from domestic shipping?**

GEA notes that the CNG and LNG powered vessels currently and prospectively operating from Australian ports are servicing domestic routes.

- **Aside from improvements in vessel design, are there any other developments in global maritime energy efficiency that would be likely to lead to business as usual energy efficiency improvements for domestic shipping?**

New sulphur reduction regulations, which are being mandated around the world by the IMO, are encouraging the use of LNG as an alternate marine fuel. Compared to diesel, LNG can achieve 100% SOx emissions reductions, 85% NOx emissions reductions for low pressure engines, 40% NOx emissions reductions for high pressure engines (diesel cycle), 95 to100% particulate reductions and around 25% CO_2 reductions, while also being a commercially viable option.

Nevertheless, GEA considers the use of lower emissions fuels such as LNG to be outside of the scope of BAU given MDO is still the overwhelmingly dominant marine fuel and the significant extra cost of dual fuelled engines or engine overhauls and conversion to run on lower emission fuels. As such, GEA considers vessels running solely on MDO and fitted with scrubbers to meet the new IMO regulations should constitute the BAU baseline for measuring marine vessel abatement.

- **How can abatement from projects be calculated in a way that is more accurate while remaining consistent with the offsets integrity standards?**

The accuracy and efficacy of the methodology would be improved if LNG was measured by mass instead of volume. Part 3 section 33 (1) item 2 of the Land and Sea Transport methodology states that fuel quantity can be measured by kilolitres, cubic metres or gigajoules. GEA notes it is standard practice to measure LNG in terms of mass and not volume. For example, both the Australian Taxation Office measures LNG for excise

purposes in kilograms and the EEDI method developed by the IMO measures LNG in terms of mass. GEA considers addressing this issue to be vital in facilitating LNG fuelled vessel participation in the ERF.

General comments

Currently the Land and Sea Transport methodology (the method) states that '*if the vehicle is a ship that must comply with Annex VI of the International Convention for the Prevention of Pollution from Ships, then the baseline emissions intensity is set as the required Energy Efficiency Design Index (which effectively acts as a regulatory baseline) and the historical emissions intensity for the vehicle.*[1]

At present, a vessel's EEOI must be lower than the baseline set by its target EEDI to demonstrate abatement and subsequently claim ACCUs under the ERF methodology. GEA considers this approach makes it almost impossible for marine vessels particularly RoRo vessels to claim ACCUs even after switching to a lower emission fuel such as LNG which cuts CO2 emissions by around 25% compared to using MDO.

For example, if a DF vessel built to run on MDO and LNG, was operating on LNG, the method would use the lower of the required EEDI numbers for MDO and LNG as the baseline emissions performance compared to the EEOI for the ship running on LNG to calculate possible abatement.

This means marine vessels, especially RoRo vessels, are unlikely to be able to demonstrate any abatement as the EEOI of a ship is likely to be much higher than the target EEDI and thus the vessel is unable to claim ACCUs despite operating on a lower emission fuel.

There are a number of reasons why operational data from a ship may show a EEOI higher than the target EEDI. These include stationary fuel use for onboard operations and speed limitations of the EEDI for particular types of ships such as RoRo vessels where "it was further found that this type of ship can fulfil the EEDI only at physically impossible negative wave resistances for their desired design speed." This means that despite the vessel operating on a lower emission fuel such as LNG and abating emissions that would have occurred with the use of MDO, the vessel is unable to claim credits as the attained EEOI is higher than the target EEDI.

The interaction between the IMO's EEDI baseline and RoRo vessels is well documented in the paper by Stefan Krüger titled 'The Energy Efficiency Design Index (EEDI) for RoRo Vessels'. This paper highlights the limitations of the IMO's EEDI in relation to vessels with special characteristics such as high service speeds as well as installed reserve power that are required by short-sea shipping vessels[2].

This shortcoming of the current methodology is highlighted by the fact that RoRo vessels typically quickly move people and time sensitive freight. For example, the recently deployed DF capable SeaRoad vessel Mersey II carries about 6,800 tonnes of freight each trip between Victoria and Tasmania, of which approximately 25% is time sensitive perishable freight. It can be reasonable to assume that if this freight wasn't carried by a fast ship it would need to be airfreighted. The cost of this in dollar and emissions terms would be prohibitive given transporting cargo by air is around 10 times more emissions intensive than by a RoRo vessel with air freight emission factors roughly 602 (CO2 (in grams) emitted per metric ton of freight and

[1] Emission Reduction assurance Committee, 2019 Consultation paper, *Review of the Carbon Credits (Carbon Farming Initiative – Land and Sea Transport Methodology Determination*
[2] Deltamarin, 2011 Report for project 6543*, Study on tests and trials of the Energy Efficiency Design Index as developed by the IMO*

per km of transportation (gCO2 /tonne-km) compared to RoRo vessels' 49.5 - 60.3 gCO2 /tonne-km[1].

The above analysis demonstrates how using the target EEDI as a baseline to measure emissions performance prevents marine vessels from demonstrating abatement due to fuel switching.

GEA considers that if the vessel would have normally operated on MDO in a BAU case and was built with DF capability (at a higher cost to the ship operators) or there was an engine overhaul and conversion to gas, the abatement should be calculated by comparing the use of MDO and gas under the same operating conditions.

GEA considers modification of the current methodology would encourage increased uptake of lower emission fuels for marine vessels in Australia as the ERF scheme would encourage shipowners to look to low emission fuels as a means to reduce GHG emissions. GEA considers there are two ways the current methodology for marine vessels could be modified to encourage the greater uptake of the method and make it more usable and applicable for future domestic transport operations. In particular, the methodology should compare like operating conditions to correctly measure actual abatement.

The figures in the examples below for a hypothetical ship the X are used for illustrative purposes only.

GEA proposed EEDI abatement measurement methodology: taking the target EEDI number for the X using MDO and subtracting the target EEDI number for the X using a lower emission fuel such as LNG to calculate abatement from switching to a lower emission fuel. For example, if the X's IMO target EEDI number for MDO is 15gCO_2/tnm and its IMO target EEDI number for LNG is 11gCo2/tnm, the difference between the two numbers indicates the abatement that is likely to occur ie 4gCO_2/tnm – almost 27%. This is the magnitude of abatement one would expect from switching from MDO to LNG.

GEA considers that vessel operators should be able to use the variation between the required EEDI for MDO and the required EEDI for LNG to demonstrate abatement from the use of lower emission fuel. This deemed approach to measuring abatement is used in other government policies and programs that reward emissions abatement, such as the Small-scale Renewable Energy Scheme which provides 'up-front' certificates for abatement over a 15-year period.

GEA proposed EEOI abatement measurement methodology: use the EEOI formula to measure the actual emissions performance of a ship in operation and use the variation between the EEOI for MDO and LNG as the measurement of abatement. For example, if the X's historical EEOI for the ship using MDO shows the lowest attained was 30g Co2/tnm and the attained EEOI from subsequently running on LNG was 20gCo2/tnm, the operator should be able to claim ACCUs for 10gCO_2/tnm of abatement.

GEA also considers that the method could be revised to ensure that there are variations for vessels which effectively act as power stations which generate energy for on-board operations. Under the current methodology, an operator is unable to make two separate claims for the same project (eg, first, the abatement that occurs as a result of a less emissions intensive way of propelling the ship and its cargo, and second, the abatement that occurs as a result of a less emissions intensive way of powering the ship's on-board facilities). Under the *Carbon Credits (Carbon Farming Initiative) Methodology (Industrial Electricity and Fuel Efficiency) Determination 2015*, operators of mobile power generators would be able to provide a baseline historical fuel

[1] Ecta, Guidelines for Measuring and Managing CO2 Emission from Freight Transport Operations, Pg. 10- 11 https://www.ecta.com/resources/Documents/Best%20Practices%20Guidelines/guideline_for_measuring_and_managing_co2.pdf

use and compare that with the emissions intensity of a lower emission fuel use to claim abatement for the project. GEA considers that vessel operators should be able to claim abatement from on-board operations separately.

To address the issue of extra fuel use to generate energy when vessels aren't transporting freight and avoid the complexities of the above proposed options that modify the existing methodology, GEA suggests consideration be given to using the following simpler method which calculates abatement based on emission factors of fuels and quantity of fuel used.

GEA proposed Default Abatement Factor methodology: as mentioned above projects credited under the ERF must currently rely on a statistical baseline (such as the EEDI or historical data) for measuring abatement. GEA considers that for a fuel switching project, the baseline or BAU case can be accurately calculated using the actual fuel consumption and emissions factors for fuels and does not need to be based on historical data or a hypothetical energy efficiency index. For example, for a LNG fuel switching project the abatement for vessel X could be calculated as:
Abatement (tCO2e) = Quantity of LNG used to displace diesel (GJ) x (NGER Diesel Emission Factor (tCO2e/GJ) – NGER LNG Emission Factor (tCO2e/GJ)) x Service factor to cater for issues such as differences in engine efficiency or combustion completeness (if necessary)

GEA considers that this method of calculating abatement for fuel switching would address problems in the current methodology which restrict vessels operating on a lower emissions fuel from claiming ACCUs due to the operational nature of the vessel (eg, offtake support vessels such as those used in the domestic offshore oil and gas industry by Australian companies including Woodside) where emissions/abatement cannot be accurately measured in the service units required for the ERF methodology (ie gCO2/tnm).

In conclusion, GEA considers that modifying the current methodology, as suggested above, would encourage ship owners to look to low emissions fuels as a way of reducing CO_2 emissions as well as other harmful emissions. Given, as demonstrated in the consultation paper, domestic shipping and railways will contribute the bulk of the growth in transport emissions to 2030, it is important the methodology is made more accessible to promote greater use of the ERF by these sectors.

GEA welcomes the opportunity to discuss these issues in greater detail. If you have any questions regarding this submission please do not hesitate to contact GEA Policy Research Officer Melissa Dimovski at mdimovski@gasenergyaustralia.asn.au or 0436 353 877.

For your consideration.

John Griffiths
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