



Tuesday, 2 November 2021

Expert Consenting Panel, c/o Environmental Protection Authority

Attention: Jane Cahill

RE: Kapuni Green Hydrogen Project

Ballance has reviewed the comments received on Kapuni Green Hydrogen Project consent application (the Proposal), which is before the Expert Consenting Panel and notes that the “end use” of the hydrogen produced as a result of the Project has been raised in some of the comments. While Ballance considers the production of urea at Ballance’s Kapuni plant is outside the scope of the current Application, Ballance offers responses to various comments made.

1. The Proposal will not vary the use and application of urea in New Zealand.

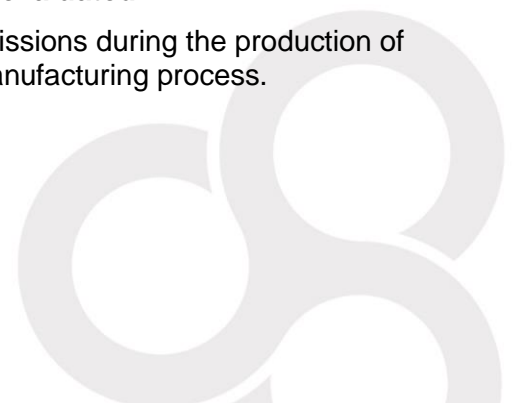
- The use and rate of application of urea is subject to a range of regulatory and industry based factors, which are independent of the way in which urea is manufactured.
- However, New Zealand currently imports over 67% of its urea consumption. This urea is predominantly manufactured in the Middle East from ammonia produced from natural gas and in China from coal.
- Balance anticipates that the effect of granting the Application will be a reduction in demand for imported urea, by enabling imported urea to be replaced with lower emission domestically produced urea.

2. The Kapuni project urea reduces global and New Zealand emissions from fertiliser use.

- The above noted reduction in demand for imported urea will, on a per tonne basis, significantly reduce the global greenhouse gas emissions associated with manufacture and importation.
- Preventing domestic manufacture of a low emission product results in a significant increase in global emissions.
- The alternative scenario is carbon leakage.

Emissions from urea production from the Kapuni project have been evaluated:

- The production of ammonia from the Kapuni Project involves zero emissions during the production of green hydrogen and 0.27 kg CO₂-e /kg emissions in the ammonia manufacturing process.





- The subsequent production of urea will utilise CO2 from the Kapuni gas field as a feedstock:
 - This CO2 is emitted as a by-product of natural gas production from the Kapuni gas field while the gas field is in operation.
 - Utilising this CO2 for urea production results in no net increase in CO2 emissions.
- Thus, the emissions from urea produced as part of the Kapuni project have a net intensity of 0.27 kg CO2-e / kg urea.

Emissions from imported urea (Gulf and China):

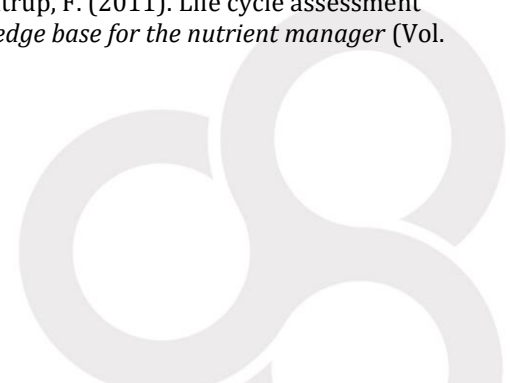
- Table 1 outlines the emissions associated with Gulf sourced and China sourced urea¹.
- Imported urea produced from natural gas in the Gulf states has a lower emissions footprint and higher emissions from shipping.
- Imported urea produced from coal in China has higher production emissions but lower emissions from shipping.
- The emissions from the soil application from both Gulf and China sourced emissions result in a net increase of NZ emissions.

Hence, analysis of the relative emissions of imported urea and Kapuni project, highlights that there is a significant reduction in both NZ domestic emissions, and global emissions from Kapuni project urea in comparison to imported urea.

Activity	Emissions kg CO2-e / kg urea			Notes
	Gulf Natural Gas	China Coal	Kapuni Green Ammonia	
CO2 Source			(0.73)	Reduction in Kapuni Gas Field Emissions
Urea Production	0.73	2.14	0.27	Higher emissions from coal sourced urea. Kapuni green urea production emissions of 0.27 kg CO2-e/kg during manufacture process.
Shipping	0.20	0.13	-	Higher emissions from middle east shipping distances
Soil Application	0.73	0.73	0.73	* net zero from recycled CO2
Total kg CO2-e / kg urea	1.66	3.00	0.27	
7000 tpa Urea Carbon Emissions	11,641	21,000	1,890	Equivalent emissions at Kapuni maximum project volumes (Assuming status quo gas field operation)

Table 1 Carbon emissions from imported urea vs Kapuni project urea

¹ Gulf and China manufacture emissions analysis from Ledgard, S., Boyes, M., & Brentrup, F. (2011). Life cycle assessment of local and imported fertilisers used on New Zealand farms. In *Adding to the knowledge base for the nutrient manager* (Vol. 24, p. 13 p.).



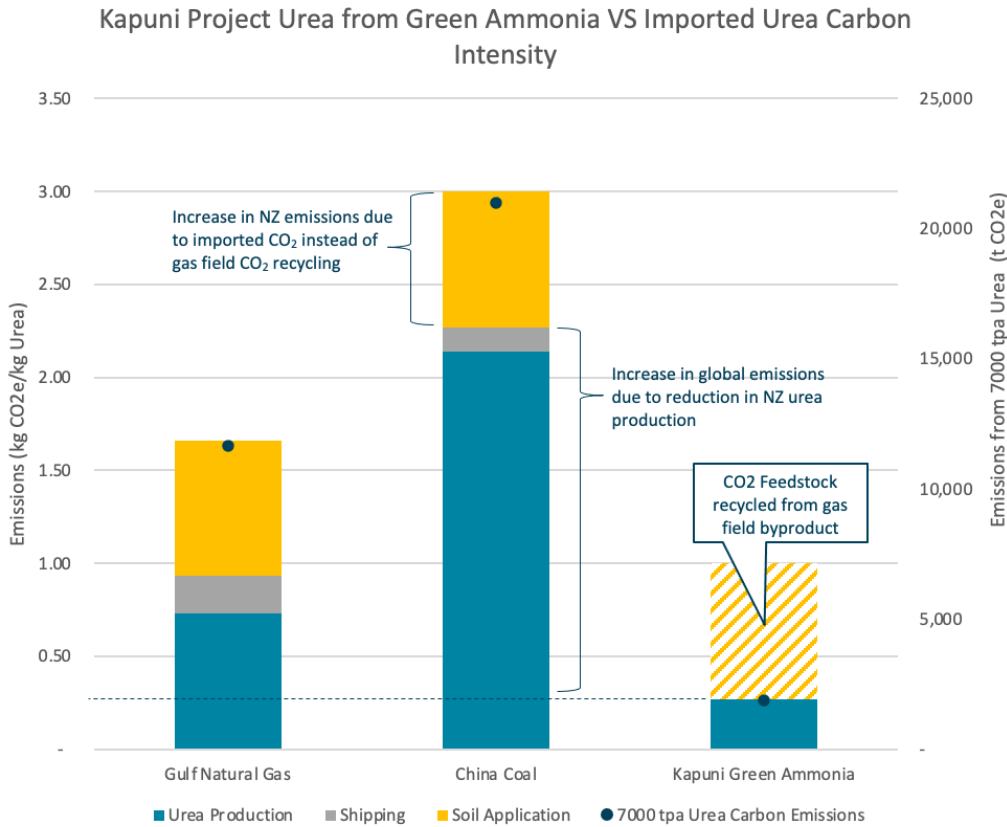
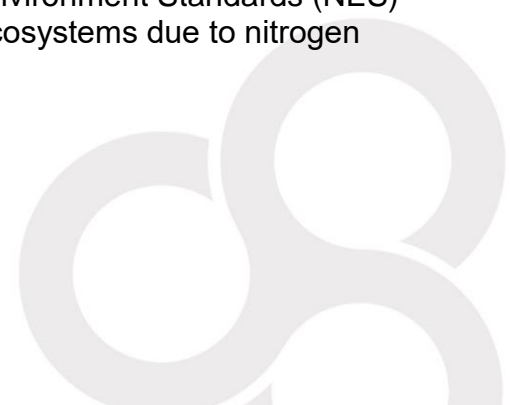


Figure 1 Comparison of net emissions from Kapuni project urea vs imported urea

Overall, the Ballance/Hiringa Green Ammonia project allows the production of urea with significantly reduced carbon emissions over both the status quo and other alternatives.

3. Pastoral application of urea is regulated to a maximum of 190kg N/ ha

- From 1 July 2021 a nitrogen fertiliser cap is in place on any contiguous parcel of pastoral land.
- The nitrogen component of any nitrogen fertiliser applied to that land must not exceed 190kg N/ ha/year.
- The nitrogen cap is one of several regulations in the National Environment Standards (NES) that aim to limit the degradation of New Zealand's freshwater ecosystems due to nitrogen enrichment.





4. Regulation and tools are being developed in partnership with the Government under He Waka eke Noa

- In October 2019, government agreed to a proposal from the primary sector to work together and with iwi/Māori to develop a system for measuring, managing and reducing agricultural greenhouse gas emissions, rather than simply putting farm products in the ETS.
- He Waka Eke Noa has been formed to equip farmers and growers with the knowledge and tools they need to reduce emissions, while continuing to sustainably produce quality food and fibre products for domestic and international markets.
- This work involves designing a practical and cost-effective system for reducing emissions at the farm level by 2025.

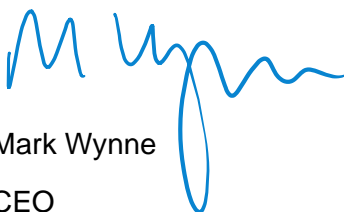
This fact sheet provides a summary of the regulations around the use and management of nitrogen fertiliser - [FW: factsheets for review \(environment.govt.nz\)](https://www.environment.govt.nz/factsheets)

Summary

Leadership of a low emissions just transition requires innovation and investment in our communities, our infrastructure and our people.

The Kapuni project accelerates a just transition to a low emissions economy by reducing both New Zealand and global carbon emissions in our manufacturing process, from heavy haulage transportation and agriculture nutrients.

By combining existing ammonia urea plant infrastructure with emerging green hydrogen technology, decarbonisation opportunities are enabled. Action is required to ensure New Zealand and the world achieve our carbon emissions targets.



Mark Wynne
CEO

