

SOVEREIGN'S NATURAL RUTILE TO SIGNIFICANTLY REDUCE PIGMENT INDUSTRY CARBON FOOTPRINT

- Industry defining independent Life Cycle Assessment Study shows the potential for Sovereign's natural rutile to significantly reduce the carbon footprint of the titanium pigment industry
- Each tonne of natural rutile produced at Kasiya is expected to have a Global Warming Potential of only 0.1 tonnes CO₂ eq., which equates to a 95% to 97% reduction in total greenhouse gas emissions (20 to 33 times less) compared to production of titania slag and synthetic rutile respectively - both of which are alternative titanium feedstocks produced by upgrading ilmenite via energy and carbon intensive processes
- Lowest Scope 3 emissions - Study further confirms producing titanium dioxide pigment in the EU from Sovereign's natural rutile has the lowest global warming potential versus ilmenite-upgraded alternative feedstocks
- Paint produced from Sovereign's natural rutile is estimated to have up to 35% lower carbon footprint than that produced from ilmenite-upgraded alternatives

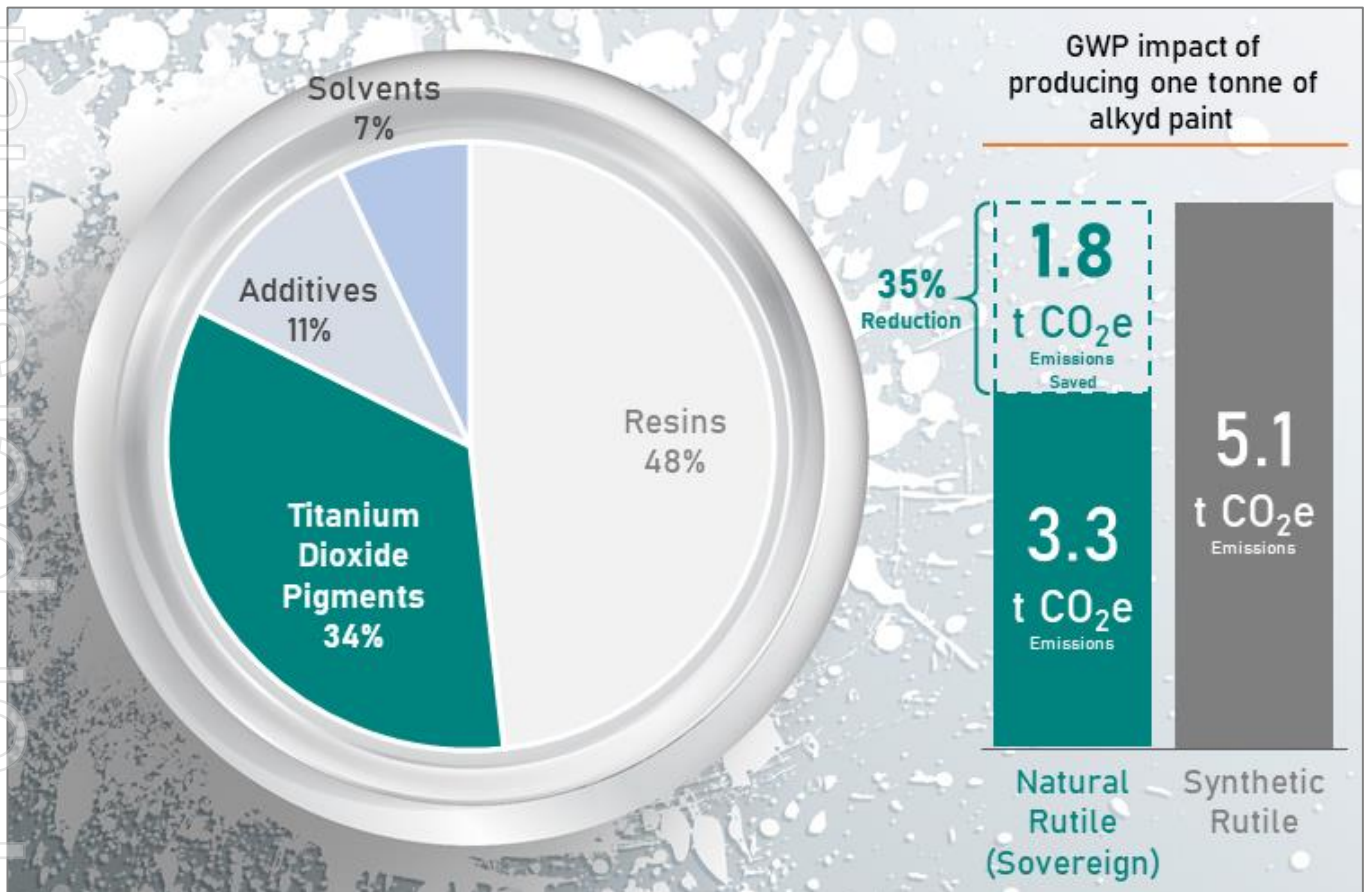


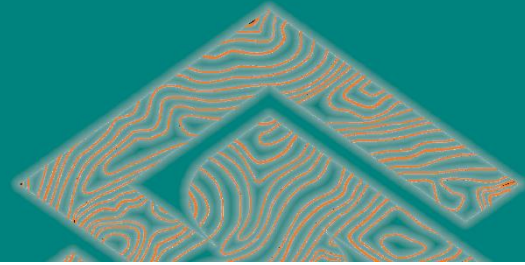
Figure 1: Composition of paints & GWP impact of producing alkyd paint from titanium dioxide pigment produced from different titanium feedstocks (Sources: Sherwin-Williams, Minviro)

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Sovereign Metals Limited (ASX:SVM; AIM:SVML) (the Company or Sovereign) is pleased to announce the results of an expanded Life Cycle Assessment Study (LCA or Study) assessing the Global Warming Potential (GWP) of natural rutile produced at the Company's Kasiya Rutile Project (Kasiya) in Malawi.

The Study concludes that Sovereign's natural rutile product is expected to have substantially lower GWP (Scope 1, 2 and 3 scope emissions) when compared to other titanium feedstock alternatives produced by upgrading ilmenite (i.e., synthetic rutile and titania slag). Using natural rutile from Kasiya as titanium feedstock for the chloride pigment process would significantly reduce Scope 1, 2 and 3 greenhouse gas emissions. Titanium feedstock is a key component of various industrial and consumer products. Therefore, utilising natural rutile such as from Kasiya, as direct use titanium feedstock could hold the solution to developing low-carbon footprint products including low carbon paints.

Sovereign's Managing Director, Julian Stephens commented: *"We knew from the previous work done by Minviro that natural rutile has a lower carbon footprint than its upgraded substitutes produced from ilmenite. The expanded study now highlights the significant reduction in greenhouse gas emissions the titanium pigment industry could achieve by utilising natural rutile produced at Kasiya. This has direct economic benefits to end users in jurisdictions such as the EU, where industry pays for carbon dioxide emissions via the EU's Emissions Trading System and the proposed Carbon Border Adjustment Mechanism"*

Sovereign's Chair of the ESG Committee, Nigel Jones commented: *"Since its discovery, the Kasiya rutile project has been designed to help decarbonise the myriad of uses of titanium pigment in industrial and consumer products. This LCA is another step towards providing a solution to an industry targeting material reduction in its global carbon footprint while wholly encompassing values of sustainability."*

LCA SUMMARY

The Company appointed Minviro Ltd (Minviro) to conduct a cradle-to-gate life cycle assessment on the production of natural rutile using methods and parameters in the 2021 initial Kasiya Scoping Study.

This expanded LCA builds on the Company's LCA study completed last year which demonstrated the substantial environmental benefits possible by utilising natural rutile (TiO_2) versus beneficiated high-grade titanium feedstocks made from the lower quality mineral ilmenite ($\sim FeTiO_3$) such as synthetic rutile and titania slag, with this latest study extending the scope to include the positive environmental attributes of the Kasiya operation.

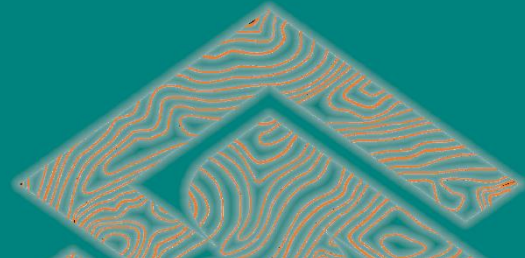
In assessing each GWP, Scope 1, 2 and 3 greenhouse gas emissions were included. The Greenhouse Gas Protocol supplies the world's most widely used greenhouse gas (GHG) accounting standards and establishes comprehensive global standardised frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions. The Protocol identifies three "scopes" of GHG emissions which were included in this study.

The scopes of emissions for the mining industry can broadly be defined as:

Scope 1: Direct GHG emissions from operations (e.g., combustion of fuels in mining fleet i.e., bulldozers)

Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat, or steam (e.g., emissions embodied in grid power)

Scope 3: Emissions created by end-users utilising its products (e.g., a chloride pigment plant using titanium feedstock to produce pigment, or a blast furnace using iron ore to make steel) and other indirect emissions that generally are out of control of the mining industry.



Rio Tinto plc and Rio Tinto Limited combined (Rio Tinto) have defined their emissions boundaries for their titanium dioxide business in their “Scope 1, 2 and 3 Emissions Calculation Methodology 2021” report.

In calculating Scope 1, 2 and 3 emissions, Rio Tinto treat emissions from mining, mineral processing, smelting and refining titanium dioxide feedstock as Scope 1 and 2 emissions. Rio Tinto’s Scope 3 emissions estimate incorporates the emissions associated with the conversion of titanium feedstocks to titanium dioxide pigment.

In the context of titanium feedstock for the chloride pigment process, the LCA Study similarly estimates Scope 3 emissions by accounting for the emissions associated with the production of titanium dioxide pigment from either direct use natural rutile or other high grade titanium feedstocks derived from upgrading ilmenite.

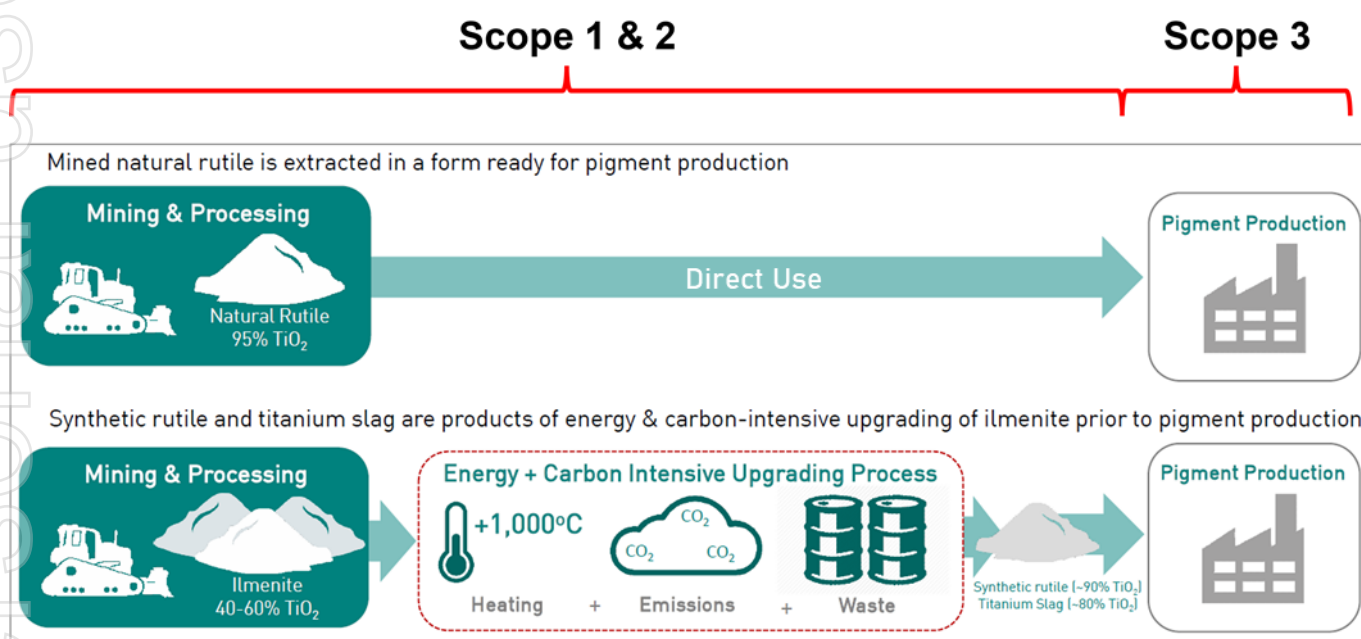
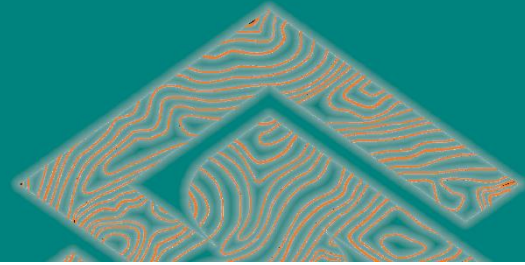


Figure 2: Natural rutile is a direct use titanium feedstock

The Kasiya project is designed considering both the Equator Principles and Scope 1, 2 and 3 emissions under the Green House Gas protocol so that the design meets high standards for ESG from the outset. Access to hydro-generated grid power and solar system to be installed on site will ensure low carbon power supply for the project. The use of predominantly rail rather than road transport for products will also reduce the carbon footprint of the Kasiya project.



BENCHMARKING SOVEREIGN'S NATURAL RUTILE AGAINST ALTERNATIVES

The Study benchmarked the GWP of Sovereign's 96% TiO₂ natural rutile product versus alternative titanium feedstocks produced from upgrading ilmenite, namely:

- Titania slag (85% TiO₂) produced from ilmenite via smelting in electric furnaces in South Africa; and
- Synthetic rutile (88-95% TiO₂) produced from ilmenite via the Becher Process in Australia.

These alternatives were chosen as comparison points as they are two of the largest production routes for titanium feedstocks. South African titania slag operations account for a significant proportion of global titania slag production, and the majority of the synthetic rutile is produced via the Becher process.

Titanium Feedstock Production – Scope 1 & 2 Emissions

Natural rutile produced at Kasiya has a fraction of the GWP of the alternative feedstocks. The GWP for natural rutile concentrate from Kasiya (0.1 t CO₂e per tonne) is significantly lower than producing titania slag in South Africa (2.0 t CO₂e per tonne) and producing synthetic rutile via the Becher process in Australia (3.3 t CO₂e per tonne).

The results comparing the three production routes can be seen in Figure 3. The higher result for synthetic rutile is mainly due to the use of coal and other reagents for the upgrading of lower grade ilmenite to the final synthetic rutile feedstock product.

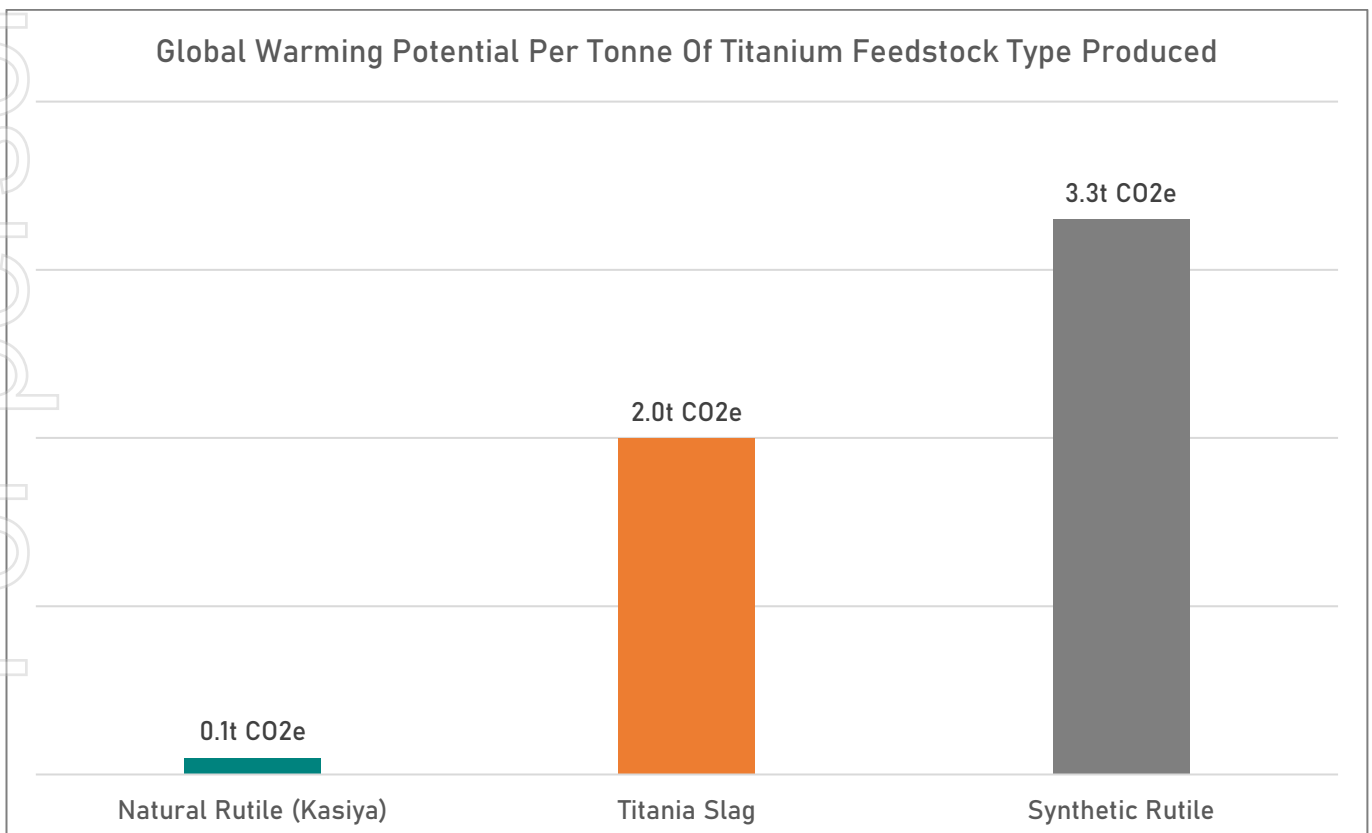
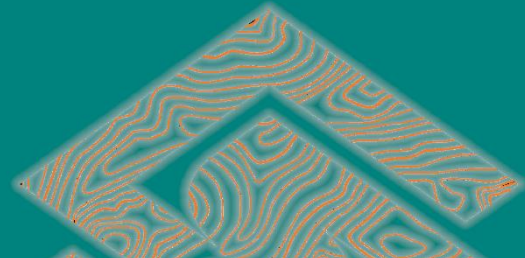


Figure 3: GWP impact of natural rutile production from Kasiya as a titanium feedstock vs. alternatives (Source: Minviro)



Titanium Dioxide Pigment Production Benchmarking – Scope 3 Emissions

Using Sovereign's natural rutile as feedstock for producing titanium dioxide pigment via the well-established chloride route provides a lower GWP for the production of one tonne of titanium dioxide pigment compared to using either titania slag or synthetic rutile.

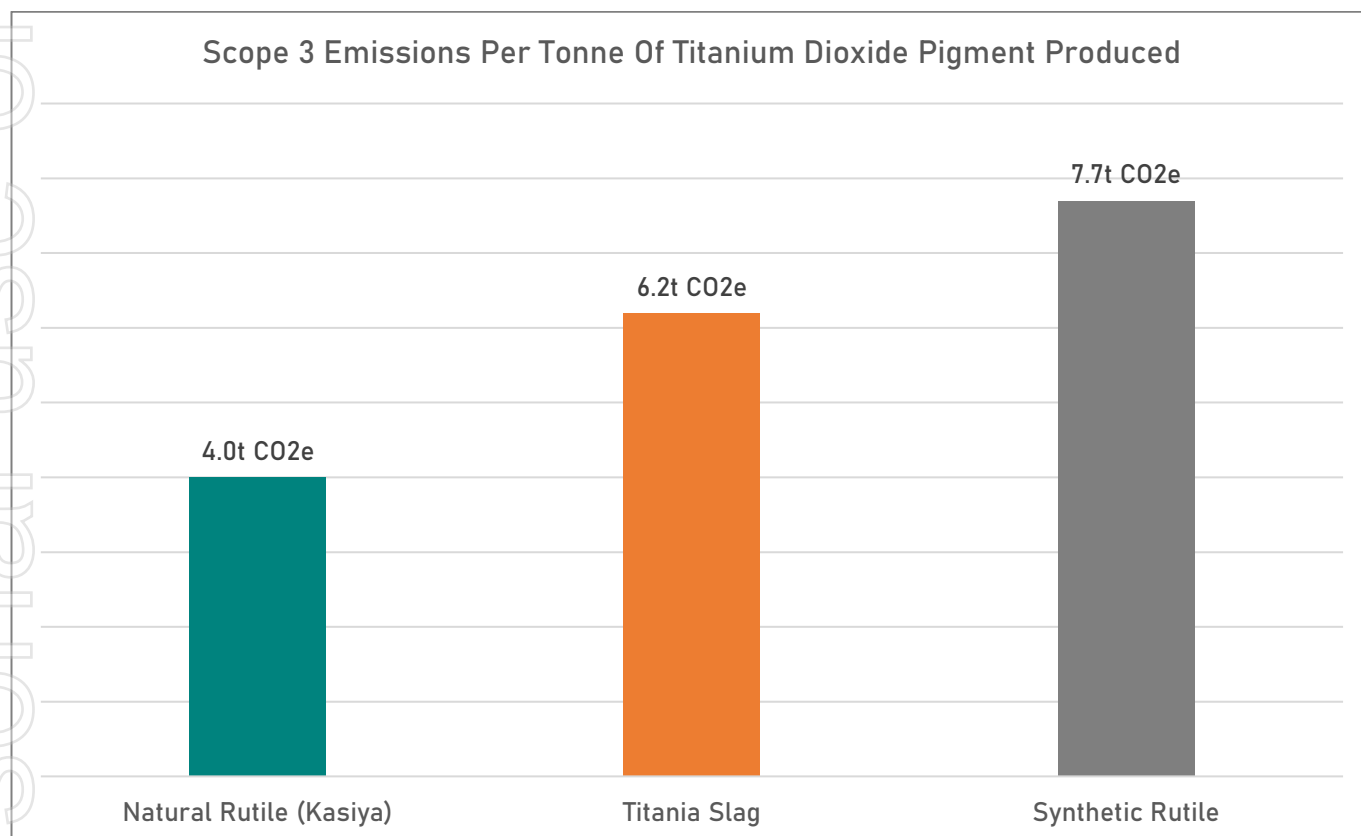
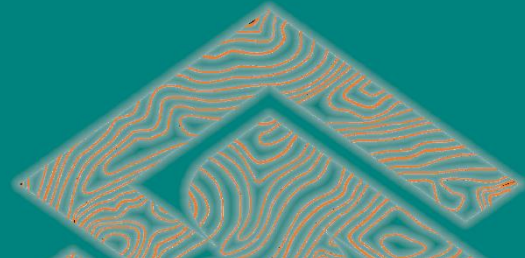


Figure 4: GWP impact of producing titanium dioxide pigment from different titanium feedstocks (Source: Minviro)

The pigment production was assumed to be located in the European Union. The transport of the feedstocks from the site of production to the titanium dioxide pigment production plant is included in the comparison. For Sovereign's natural rutile, this was Kasiya; the production of synthetic rutile was assumed at a plant in Australia; the production of titania slag was assumed at a plant in South Africa.

Higher scope 3 GWP of the ilmenite derived titanium feedstocks led to higher results for the use of synthetic rutile or titania slag in producing pigment. Using Sovereign Metal's natural rutile instead of the titania slag would give a scope 3 GWP reduction of 2.2 t CO₂e per tonne of titanium dioxide pigment. Furthermore, using Sovereign's natural rutile concentrate instead of the synthetic rutile would give a scope 3 GWP reduction of 3.7 t CO₂e per tonne titanium dioxide pigment.

Scope 3 emissions usually account for the highest proportion of greenhouse gases from the mining industry, with estimates as high as 95% of total mining sector emissions. The average scope 3 emissions of the five largest diversified miners are 26 times their scopes 1 and 2 emissions combined (source - company disclosures).



Paint Production Benchmarking

Minviro evaluated how using the different feedstocks affects the GWP of paint production. Using Sovereign's natural rutile provides the lowest GWP, at 3.3 t CO₂e per tonne of alkyd paint (Fig 5), which represents up to a 35% reduction in carbon footprint compared to paint produced from synthetic rutile.

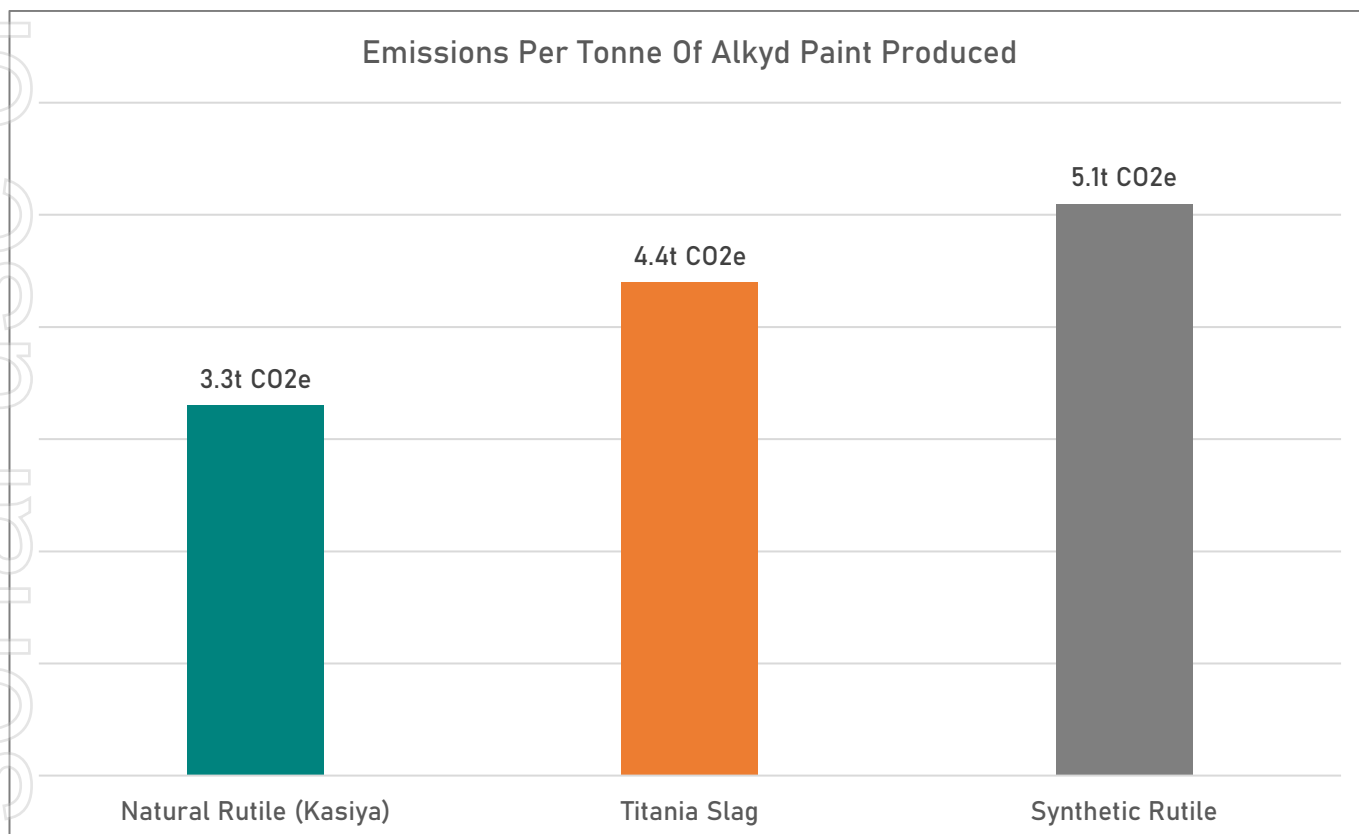
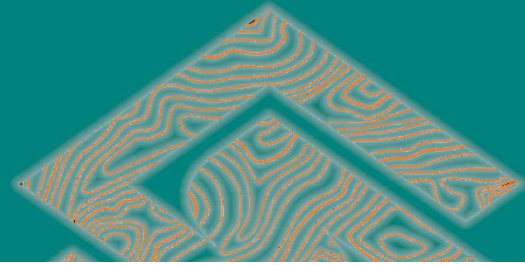


Figure 5: GWP impact of producing alkyd paint from titanium dioxide pigment produced from different titanium feedstocks (Source: Minviro)

SUMMARY OF HEADLINE GWP REDUCTIONS FROM USING NATURAL RUTILE

Emission Category	GWP	Potential Emissions Reduction
Production of a tonne of natural rutile from Kasiya – Global Warming Potential	0.1 t CO ₂ e	3.2 t CO ₂ e 97% emissions reduction
Production of a tonne of titanium pigment using natural rutile from Kasiya – Scope 3	4.0 t CO ₂ e	3.7 t CO ₂ e 48% emissions reduction
Production of a tonne of alkyd paint using titanium pigment produced from natural rutile	3.3 t CO ₂ e	1.8 t CO ₂ e 35% emissions reduction



Forward Looking Statement

This release may include forward-looking statements, which may be identified by words such as "expects", "anticipates", "believes", "projects", "plans", and similar expressions. These forward-looking statements are based on Sovereign's expectations and beliefs concerning future events. Forward looking statements are necessarily subject to risks, uncertainties and other factors, many of which are outside the control of Sovereign, which could cause actual results to differ materially from such statements. There can be no assurance that forward-looking statements will prove to be correct. Sovereign makes no undertaking to subsequently update or revise the forward-looking statements made in this release, to reflect the circumstances or events after the date of that release.

Competent Persons Statement

The information in this announcement that relates to Sovereign's Scoping Study at Kasiya is extracted from an announcement dated 16 December 2021 which is available to view at Sovereign's website at www.sovereignmetals.com.au. Sovereign confirms that a) it is not aware of any new information or data that materially affects the information included in the announcement; b) all material assumptions and technical parameters underpinning the Production Target, and related forecast financial information derived from the Production Target included in the announcement continue to apply and have not materially changed; and c) the form and context in which the relevant Competent Persons' findings are presented in this report have not been materially changed from the announcement

The information in this announcement that relates to Sovereign's Mineral Resource Estimate is extracted from an announcement dated 16 December 2021 which is available to view at Sovereign's website at www.sovereignmetals.com.au. Sovereign confirms that a) it is not aware of any new information or data that materially affects the information included in the announcement; b) all material assumptions included in the announcement continue to apply and have not materially changed; and c) the form and context in which the relevant Competent Persons' findings are presented in this report have not been materially changed from the announcement.

This ASX Announcement has been approved and authorised for release by the Company's Managing Director, Dr Julian Stephens.