



Altech Chemicals Limited Green Bond Second Opinion

May 05, 2020

Altech Chemicals Limited (“Altech”) is a high purity alumina production company listed on the Frankfurt and the Australian Stock Exchanges. It is aiming to become one of the world’s leading suppliers of High Purity Alumina (HPA) through the construction and operation of an HPA processing plant at Johor, Malaysia, with an annual production capacity of 4,500t. The company does not produce or use conventional aluminium metal and has no other operations.

Net proceeds will solely be used for financing the construction and components of Altech’s High Purity Alumina (HPA) plant in Johor, Malaysia. Altech produces HPA for the sole purpose of manufacturing LEDs and Lithium-ion batteries for electric vehicles, which also includes mild hybrids – products important in the transition to a low carbon economy. Investments include components that operate on fossil fuels as well as fossil fuels used during the construction phase. No other investments are eligible under this framework.

Altech has developed a patented HPA production route based on kaolin mined from its own mine in Australia. According to Altech’s “mine-to-gate” study, which was not verified by an external party, its production process reduces emissions by 46% and reduces energy consumption by 41% compared to conventional aluminium metal based HPA production, which is based on bauxite. Unlike conventional aluminum production, Altech’s HPA production processes does not result in substantial amounts of solid or liquid waste (e.g., red muds) that would go to landfills or tailing ponds.

While Altech has only limited direct process related emissions compared to conventional aluminium production, investors should be aware that the Altech’s production of kaolin based HPA involves burning of natural gas and use of electricity from Malaysia’s fossil fuel dependent grid. Approximately 50% of Altech’s mine-to-gate emissions come from grid emissions, while 3% result from natural gas burning during production. With 6.6 tCO₂/t HPA, Altech’s overall annual emissions of approx. 29.7 ktCO₂ are equivalent to the annual consumption of 6,450 typical gasoline vehicles. Altech informed us that all fossil fuel burning equipment parts could be replaced with electricity based equipment in the future which significantly reduces the risk of lock-in of emissions.

Based on the overall assessment of the project types that will be financed by the green bonds, governance and transparency considerations, Altech’s green bond framework receives a **CICERO Light Green** shading and a governance score of **Good**. Altech could improve its framework by excluding natural gas based solutions, by setting up overall climate related emission reduction strategies and zero-emission pathways as well as by considering construction emissions, green building requirements, TCFD recommendations and systematic climate related risk assessments. A Medium Green shading could be achieved if renewable energy solutions at some scale are implemented.

SHADES OF GREEN

Based on our review, we rate the Altech’s green bond framework **CICERO Light Green**.

Included in the overall shading is an assessment of the governance structure of the green bond framework. CICERO Shades of Green finds the governance procedures in Altech’s framework to be **Good**.



GREEN BOND PRINCIPLES

Based on this review, this Framework is found in alignment with the principles.





Contents

1	Terms and methodology	3
	Expressing concerns with 'shades of green'	3
2	Brief description of Altech's green bond framework and related policies	4
	Environmental Strategies and Policies	4
	Use of proceeds	5
	Selection:	5
	Management of proceeds	5
	Reporting	6
3	Assessment of Altech's green bond framework and policies	7
	Overall shading	7
	Eligible projects under the Altech's green bond framework	7
	Background	8
	Governance Assessment	9
	Strengths	9
	Weaknesses	10
	Pitfalls	10
	Appendix 1: Referenced Documents List	12
	Appendix 2: About CICERO Shades of Green	13



1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated April 1, 2020. This second opinion remains relevant to all green bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

The second opinion is based on a review of the framework and documentation of the client's policies and processes, as well as information gathered during meetings, teleconferences and email correspondence.

Expressing concerns with 'shades of green'

CICERO Green second opinions are graded dark green, medium green or light green, reflecting a broad, qualitative review of the climate and environmental risks and ambitions. The shading methodology aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The shades are intended to communicate the following:

CICERO Shades of Green



Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated.



Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered.



Light green is allocated to projects and solutions that are climate friendly but do not represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions, but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them.



Brown is allocated to projects and solutions that are in opposition to the long-term vision of a low carbon and climate resilient future.

Examples



Wind energy projects with a strong governance structure that integrates environmental concerns



Bridging technologies such as plug-in hybrid buses



Efficiency investments for fossil fuel technologies where clean alternatives are not available



New infrastructure for coal

Sound governance and transparency processes facilitate delivery of the client's climate and environmental ambitions laid out in the framework. Hence, the governance aspects are carefully considered and reflected in the overall shading of the green bond framework. CICERO Green considers four factors in its review of the client's governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: Fair, Good or Excellent.



2 Brief description of Altech's green bond framework and related policies

Altech Chemicals Limited ("Altech") is a high purity alumina production company listed on the Frankfurt and the Australian Stock Exchanges. It is aiming to become one of the world's leading suppliers of High Purity Alumina (HPA) through the construction and operation of an HPA processing plant at Johor, Malaysia, with an annual production capacity of 4,500t and a theoretical maximum of 6,000t. Feedstock for the plant will be sourced from the Company's 100%-owned kaolin deposit at Meckering, Western Australia, which lends itself to the HPA process due to its purity profile. Altech does not own other plants, does not own mining equipment and/or vehicles/vessels. The company does not produce or use conventional aluminium metal and has no other operations except for the planned HPA production.

Altech produces HPA for the sole purpose of manufacturing LEDs and Lithium-ion batteries for electric vehicles.

Environmental Strategies and Policies

Altech has developed an HPA production route and plant design enabling resource efficient sourcing, reduction of chemical waste and solid residues, and energy efficient production processes, reducing its carbon footprint significantly compared with its peers. This is due to Altech's efficient kaolin-alumina high purity alumina (HPA) production process compared to the current industry standard of producing HPA with a "alkoxide process" (bauxite – refinery – smelter – alkoxide), with high grade aluminium metal used as feedstock.

Altech has been granted an innovation patent, but is transparent about its schematic production process. According to Altech's "mine-to-gate" study, Altech's process will have a comparative carbon footprint of 6.6 tCO₂/t HPA versus 12.3 tCO₂/t HPA for the conventional alkoxide production method. Altech's main emissions in the plant result from the electrical power consumption entirely based on Malaysia's grid (approximately 50% of Altech's total emissions), while 3% results from natural gas burning. According to Altech's "mine-to-gate" study, its production process reduces emissions by 46% and reduces energy consumption by 41% compared to peers. The energy consumption for Altech's HPA process from cradle to gate is 12.5 MWh/t HPA produced. 74% of Altech's total energy consumption (incl. transport) from cradle to production gate occurs at the Malaysian HPA processing plant.

Altech's study further elaborates that the main difference of conventional HPA emission factors to Altech's total emission factor of 6.6 tCO₂/t HPA is the emission intensity of the raw material feeding the production plant: while the kaolin from cradle (mine) to HPA plant gate has an emission intensity of 0.8 tCO₂/t HPA, the aluminium metal to HPA plant gate has an emission factor of 7.5 t CO₂/t HPA.

Altech's used kaolin feedstock has low levels of iron compared to bauxite used by its peers resulting in avoidance of any red mud waste which is occurring in conventional aluminium production. Altech's solid residues (mainly silica sand) will entirely be re-utilized by local industries in Malaysia (e.g., for building products, glass production and sand filtration media). In addition, nearly 100% of the hydrochloric acid used in Altech's chemical process is recycled and reused in the process plant.

Altech is implementing an Environmental Management System (EMS) according to ISO 14001 and adheres to international standards for its HPA production, such as the Equator Principles and the IFC Performance Standards



on Environmental and Social Sustainability. In addition, the company's management reviews environmental compliance bi-annually.

The company informed us that due to its size and minimal level of activity as a start-up, the company has not yet implemented TCFD recommendations. However, Altech considers implementing TCFD recommendations in the future. The company informed us that due to the plant's location within an industrial complex with well managed systems for water overflows as well as low risk of disruptions of the supply of kaolin, Altech anticipates no substantial physical climate risk exposure.

Use of proceeds

Net proceeds will be used for financing the construction of Altech's High Purity Alumina (HPA) plant in Johor Malaysia. No other investments are eligible under this framework. The plant is utilizing natural gas as energy material. According to the issuer, state of the art process equipment, and best available techniques (BATs) for emissions management have been included in the design in order for the plant to meet and exceed both the local environmental regulations and IFC Environmental Guidelines.

Altech informed us that fossil fuels that are used during construction phase of the plant can be financed under this framework. In addition, the company informed us that approximately 7.1% of the plant's CAPEX will go to fossil fuel burning equipment within the plant, such as gas burners for rotary kilns and calciners.

Selection:

The selection process is a key governance factor to consider in CICERO Green's assessment. CICERO Green typically looks at how climate and environmental considerations are considered when evaluating whether projects can qualify for green finance funding. The broader the project categories, the more importance CICERO Green places on the governance process.

The framework describes the Malaysian HPA Johor plant as its only eligible asset. Therefore, no further selection process has been described in the framework. The investment decision was made in 2018 and were based on a bankable feasibility study in 2015 and subsequent Financial Investment Decision Study (FIDS), both of which considered environmental benefits of the plant including the supply of kaolin through the Altech Meckering kaolin deposit. The plant's environmental design was reviewed by external environmental experts.

Altech informed us that no protests or objections to the project have been identified to date and that all neighboring businesses are supportive of the project.

Management of proceeds

CICERO Green finds the management of proceeds of Altech to be in accordance with the Green Bond Principles. Altech informed us that the proceeds shall be deposited into a separate transaction account for traceability of spending. The net proceeds of Altech's Green Bonds will be exclusively used to finance Altech's HPA plant in Johor, Malaysia. No refinancing is anticipated by the company. Proceeds yet to be allocated towards eligible assets will be placed in short term investment in accordance with Altech's liquidity management policy. Unallocated proceeds will not be used to finance any alternative projects or chemical production plants. While Altech does not expect any unallocated proceeds, the company informed us that in case any unallocated proceeds occur these would not be used to invest in fossil fuel related assets.



Reporting

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society.

The environmental impact of the HPA plant shall be monitored on an annual basis and shall be disclosed in a Green Investor Report until the maturity of the bond.

The reporting will include details of the project and progress, unallocated proceeds (if any) as well as the following impact indicators:

- CO₂ reduction per annum
- CO₂ savings per annum (incl. Scope 1 and 2 emissions)
- Energy consumption per tonne HPA reduced (GJ)

Altech tracks additional indicators that can be included in the report, such as natural gas consumption, diesel consumption, electricity demand, lime consumption and kaolin imports data. In addition, Altech informed us that reductions are reported against benchmarks set for the traditional bauxite/alkoxide processing route. In addition, the issuer informed us that overall emissions and energy consumption shall be reported and then reported per tonne of HPA produced.

Annual reporting of the HPA plant green footprint once operational shall be reviewed and approved by the Altech Management team and an external auditor prior to circulation to investors. Data collection, calculations and reporting shall be compiled by the site Environmental Officer according to the company. The methodology for retrieving the calculated impact will be disclosed in the investor report.

Altech informed us that the company shall engage a third party to review and audit the data and calculations included in impact reporting. The report and the third party review will be disclosed on Altech's website.



3 Assessment of Altech’s green bond framework and policies

The framework and procedures for Altech’s green bond investments are assessed and their strengths and weaknesses are discussed in this section. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects; weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where Altech should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, and consideration of environmental ambitions and governance structure reflected in Altech’s green bond framework, we rate the framework **CICERO Light Green**.

Eligible projects under the Altech’s green bond framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green bonds aim to provide investors with certainty that their investments deliver environmental returns as well as financial returns. The Green Bonds Principles (GBP) state that the “overall environmental profile” of a project should be assessed and that the selection process should be “well defined”.

Category	Eligible project types	Green Shading and some concerns
Eco-efficient and/or circular economy adapted products, production technologies and processes	Altech Chemicals will finance the construction of its High Purity Alumina (HPA) plant in Johor, Malaysia.	<p>Light Green</p> <ul style="list-style-type: none"> ✓ Only physical parts and construction expenses for the HPA production plant in Johor can be financed. Mining operations, Raw materials, operations, material sourcing, transport machinery for fossil fuels are excluded ✓ Approximately 7.1% of the plant’s CAPEX will go to fossil fuel burning equipment within the plant, such as gas burners for rotary kilns and calciners. ✓ Altech has no additional environmental requirements regarding the plant’s buildings (e.g., energy efficiency, green building certifications, building materials, etc). ✓ According to Altech’s “mine-to-gate” study, this production process reduces emissions by 46% and reduces energy consumption by 41% compared to conventional HPA production processes.

Table 1. Eligible project categories



Background

Aluminium end products are used in a wide range of industries (e.g., manufacturing, transport equipment, vehicles and parts, construction, machinery and many more). High purity alumina (HPA) are used, e.g., in electric vehicle batteries and LED lighting. Direct CO₂ emissions from the aluminium sector in 2014 were estimated at 200 Mt CO₂¹. The aluminium sector's Scope 2 emissions from energy consumption in 2014 were estimated at 506 Mt CO₂ (TPI, 2019).

The typical aluminium production industry is mainly based on similar processes compared to other metallurgical industries as smelters, foundries and electrochemical metal production are similar. In addition to the large electricity demand and associated greenhouse gas (GHG) emissions in some regions (e.g., coal based electricity grids such as in Malaysia), a particular difficulty is posed by the management of airborne emissions such as perfluorocarbons, fluoride gases, polycyclic aromatic hydrocarbons (PAHs), and particulate matter (e.g. unused cryolite) according to the EU taxonomy. Hydrogen fluorides can be toxic to vegetation.

Virgin aluminium produced with hydropower emits ~3t CO₂eq / t aluminium compared with aluminium produced with coal power, which emits ~20t CO₂eq / t aluminium. For comparison, aluminium metal production in Norway (and Brazil) based on Bauxite has 3-4 tonnes CO₂/tonne aluminium due to renewable energy supply, and the fact that scope 2, electricity, stands for the major part of mine-to-semi finished product emissions. According to Carbon Trust, Aluminium production and consumption is projected to grow significantly from ~40million tons/year consumed today – this figure is expected to triple or quadruple by 2040.

High Purity Alumina (HPA, 99.99% pure Al₂O₃) is required for the manufacturing of synthetic sapphire used in the production of LED's and HPA is used in lithium-ion batteries for electric vehicles and energy storage. The current industry standard is producing HPA via the "alkoxide process" (bauxite – refinery – smelter – alkoxide). Virgin aluminium is used in order to produce HPA in a conventional manner. Altech's kaolin-alumina high purity alumina (HPA) production process is a one-step process and does not require high grade aluminium as feedstock. According to Altech there currently exist no other producers of kaolin based HPA. Production of HPA based on kaolin (aluminous clay) offers significant reductions in CO₂ production (46%) and energy consumption (41%) per tonne of HPA when benchmarked against current HPA production using the alkoxide process according to Altech's study. This study also concludes that the kaolin based process has an emission intensity of 6.6 tCO₂/t HPA versus 12.3 tCO₂/t HPA for the alkoxide production method. With 6.6 tCO₂/t HPA, total annual emissions of approx. 30 ktCO₂ are equivalent to the annual consumption of 6,450 typical gasoline vehicles². Apart from kaolin, Altech sources its main reagents (Hydrochloric Acid (33%), Lime for waste water neutralization and caustic soda (50%) for HCl fume neutralization as well as natural gas) from local suppliers.

Malaysia produced 760kt of aluminium in 2017³. According to its NDCs, Malaysia aims to reduce GHG emissions intensity of GDP by 45% by 2030 compared to 2005.⁴ In 2018, Malaysia's emissions amounted to 257,840 ktCO₂ and a emissions intensity of 0.29 kg per 1000 dollar GDP in 2019 compared to 0.38 in 2005.⁵ In 2017, Malaysian Peninsula's electricity grid is based on coal (54%), natural gas (39%) and hydro (6%) and had an emission factor of 0.667tCO₂/MWh.⁶

¹ <https://www.iea.org/data-and-statistics/charts/industry-direct-co2-emissions-in-the-sustainable-development-scenario-2000-2030>

² <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

³ <https://www.bgs.ac.uk/downloads/start.cfm?id=3512>

⁴ <https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Malaysia/1/INDC%20Malaysia%20Final%2027%20November%202015%20Revised%20Final%20UNFCCC.pdf>

⁵ <https://knoema.com/atlas/Malaysia/CO2-emissions-intensity>

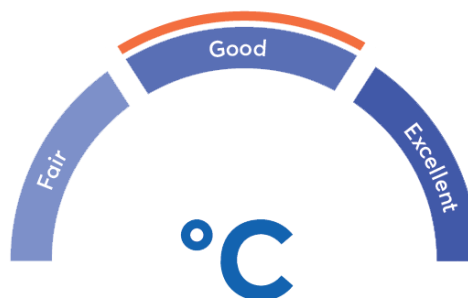
⁶ <https://www.greentechmalaysia.my/wp-content/uploads/2019/12/2017-CDM-Electricity-Baseline-Final-Report-Publication-Version.pdf>



Governance Assessment

Four aspects are studied when assessing the Altech's governance procedures: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent.

Altech has developed an HPA production plant that significantly reduces emissions compared to its peers. Due to the early stage of the project, Altech has yet to set a clear emissions reduction strategy. Furthermore, the company has not implemented TCFD recommendations and has no systematic climate risk assessment procedure at this stage. According to Altech, the company intends to implement these strategies during operations. The company already has selected the asset and, consequently, does not have further selection processes defined. The company will report annually on allocation and impact metrics incl. impact calculation methodologies. The reporting will obtain an annual review. The overall assessment of Altech's governance structure and processes gives it a rating of **Good**.



Strengths

Altech's process is a single step process that does not require production of conventional aluminium as an intermediate step. Altech's HPA production method provides a substantial improvement in terms of emission intensity and energy efficiency compared to conventional HPA production, which is based on conventional aluminium metal as feedstock. Altech's "mine-to-gate" study concludes that the emission intensity amounts to 6.6 t CO₂/t HPA (incl. mining and transport to production plant) versus 12.3 tCO₂/t HPA for the conventional method. In addition, the energy consumption for Altech's HPA process from cradle to gate is 12.5 MWh/t HPA produced. While this is well below the 15.29MWh per tonne of conventional aluminium produced suggested by the current EU taxonomy⁷, this cannot be directly compared as no conventional aluminium is utilized or produced by Altech. However, energy consumption for HPA process in a conventional way would exceed the 15.29MWh with additional production steps being required to obtain HPA from conventional aluminium. Similarly, the EU taxonomy suggests an emission factor of 1.514 tCO₂/t for conventional aluminium, which also cannot be compared directly to Altech's HPA production process. However, Altech has only very limited direct process related emissions from fossil fuels compare to conventional aluminium production emissions and could potentially run solely on renewable power.

It is a strength that Altech's process includes recycling processes and does not create substantial amounts of solid or liquid waste that would go to landfills or tailing ponds. In addition, nearly 100% of the hydrochloric acid used in its chemical process is recycled and reused in the process plant. The company informed us that small amounts of chloride lost in the process are neutralized in the waste water treatment area and discharged as effluent. No red mud waste or other waste produced in conventional aluminium production occurs from Altech's production process. Altech's solid residues (mainly silica sand) will entirely be re-utilized by local industries in Malaysia (e.g., for building products, glass production and sand filtration media).

⁷ https://ec.europa.eu/knowledge4policy/publication/sustainable-finance-teg-final-report-eu-taxonomy_en



Weaknesses

Altech's production of HPA uses natural gas and electricity that are sourced from a fossil fuel dependent grid in Malaysia. The company informed us that approximately 7.1% of the plant's CAPEX will go to fossil fuel burning equipment within the plant, such as calciners and roasters.

Pitfalls

While the emissions and the energy consumption reduction achievements of Altech's HPA production process are commendable there are currently no existing baselines, other producers or external reviews available that confirm Altech's achievements quantitatively. Based on information collected through the second opinion process CICERO Shades of Green is encouraged by Altech's approach, but it is Altech's responsibility to vigilantly follow market developments, actual emission reduction improvements as well as all potential routes for further emissions reductions.

Altech's HPA process is based on the use of natural gas, which is responsible for 3% of the plant's total emissions. The company informed us that the plant could also run solely on electricity and without natural gas, but that electricity based equipment is less efficient and, therefore, would consume more fossil fuel based electricity from the grid. However, this poses a pitfall of lock-in through increased uptake of renewable energy by the grid or installing company owned renewable energy power generation facilities. However, this pitfall is mitigated as the company informed us that Altech has plans to purchase renewable electricity and/or install own renewable energy power in the future potentially decreasing the Altech's carbon intensity significantly. The plant is designed with diesel generators for emergency power only. The company expects diesel consumption to be low considering the stability of the power network. CICERO Shades of Green encourages the issuer to consider further emission reduction strategies and zero-emission pathways.

Altech produces HPA for the sole purpose of manufacturing LEDs and Lithium-ion batteries for electric vehicles, but has no exclusion criteria on its HPA's final deployment. This constitutes a pitfall: if Altech's customers use battery technology for low-range hybrid vehicles, mild hybrids or mining vehicles, actual emissions could increase through rebound effects. The company does not control the end usage of the HPA as Altech's main customer does not consume the HPA itself and HPA products are to be shipped directly from the Altech plant to the end users all around the world, mainly to Asian countries such as Japan, South Korea, China and Taiwan and Europe (Germany).

Altech currently has no climate related policies regarding the supply chain of raw materials, but informed us that where low-carbon solutions are available, and where the financial impact is negligible for the company these will be used. Altech will, e.g., use "green" diesel as fuel for road transport vehicles and for ocean going vessels, where possible. In addition, Altech asserts that contribution to overall emissions from shipping is low due to the comparative low tonnage of raw material used and other raw materials (HCl, lime and gas) being in close proximity to the HPA plant.

It is a pitfall that Altech currently has no strategies on how to recover the produced HPA after end of life in the battery or LED applications. The company informed us that this is mainly due to the small amounts of HPA used in the batteries and LEDs.

Altech currently does not have plans to monitor or manage construction emissions. In addition, Altech informed us that fossil fuels that are used during construction phase of the plant can be financed under this framework.

The production plant is located in an existing industrial/chemical park. While this has benefits in terms of delivery of local supplies, the delivery of kaolin will be conducted through the 66km distant port and road transportation with associated emissions. Altech informed us that the plant has no public transport access and that all access to



the plant is via road, which could result in rebound effects through transportation emissions. In addition, Altech has no substantial climate relevant requirements for the buildings of the plant, such as energy efficiency or green building certifications and building materials.

While Altech is aware of climate risks, Altech has no systematic approach to physical and transition climate risk assessment and does not yet screen for climate risks according to TCFD recommendations. Systematic physical risk assessments are especially important, as extreme weather events, in combination with sea level rise in coastal areas, in addition to increases in heavy precipitation and flooding in urban areas, have already been observed and are expected to increase across the range of climate scenarios explored in the IPCC 4th Assessment Report.^{8,9}

⁸ Shades of Climate Risk, CICERO 2017 (<https://cicero.oslo.no/en/climateriskreport>)

⁹ Flood Risk for Investors, CICERO 2018 (<https://www.cicero.oslo.no/en/posts/news/half-of-flooding-damage-left-uninsured>)



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Altech's Green Bond Framework, March 15, 2020	
2	Board Charter	Altech's board charter for guiding and monitoring the Company on behalf of shareholders
3	Code of Conduct	Altech's Code of Conduct
4	Continuous Disclosure	Altech's Disclosure Policies
5	Whistleblower Policy	Altech's Whistleblower Policies
6	Corporate Presentation	Company presentation summarizing Altech's business activities
7	Green Credentials	Ggreen credentials of Altech HPA production process
8	White paper: green credentials of altech high purity alumina process, March 2020	Mine to gate study of greenhouse gas emissions and energy consumption
9	Update note to Review of ESMS	Update note to due diligence review of enviromental and social management systems documentation for the high purity alumina project of altech chemicals sdn bhd
10	Environmental Footprint Calculation Procedure	Calculations to determine the environmental footprint of the Altech Chemicals Meckering and Johor HPA Operations through annual CO ₂ emissions and energy consumption
11	Company presentation	Overview of Altech's business



Appendix 2: About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD).

