Second-Party Opinion

PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework

SUSTAINALYTICS
a Morningstar company
SECOND-PARTY OPINION

Evaluation Summary

Evaluation Date	October 13, 2022
Issuer Location	Jakarta, Indonesia

Sustainability-Linked Instruments

Sustainability-Linked Bond Principles 2020, Sustainability-Linked Loan Principles 2022

Sustainalytics is of the opinion that the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework aligns with the Sustainability-Linked Bond Principles 2020 and Sustainability-Linked Loan Principles 2022. Overview of KPIs and SPTs:

KPI	Strength of the KPI	SPT	Ambitiousness of SPT
Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent)	Very Strong	SPT (Target): Specific net scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne of cement equivalent by 2032	Moderately Ambitious
		SPT (Stretch): Specific net scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032	Ambitious

Climate Transition Finance Handbook

Sustainalytics has evaluated PT Semen Indonesia (Persero) Tbk's transition governance, strategy, decarbonization targets and intentions to report on transition progress and finds the Company to be partially aligned with the recommendations of the Climate Transition Finance Handbook 2020. PT Semen Indonesia (Persero) Tbk has a sustainability strategy that outlines commitments, goals and actions on climate transition and decarbonization, and directly addresses the environmental impacts of its core business. In addition, PT Semen Indonesia (Persero) Tbk commits to disclosing investments relevant to its transition strategy and the climate-related outcomes of its implementation.

The SPTs contribute to the following SDGs:

Table of Contents

Scope of Work and Limitations

Sustainalytics' Second-Party Opinion reflects Sustainalytics' independent[1] opinion on the alignment of the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework with current market standards. As part of the Second-Party Opinion, Sustainalytics assessed the following:

- The Framework's alignment with the Sustainability-Linked Bond Principles 2020 and Sustainability-Linked Loan Principles 2022;[2,3]
- The credibility and anticipated positive impacts of the use of proceeds and SPTs;
- The issuer's sustainability strategy, performance and sustainability risk management; and
- The alignment with the recommendations of the Climate Transition Finance (CTF) Handbook 2020;[4]

As part of this engagement, Sustainalytics held conversations with various members of PT Semen Indonesia (Persero) Tbk's management team to understand the sustainability impact of their business processes and the core components of the Framework. Semen Indonesia Group representatives have confirmed that:

(1) They understand it is the sole responsibility of Semen Indonesia Group to ensure that the information provided is complete, accurate or up to date;

(2) They have provided Sustainalytics with all relevant information; and

(3) Any provided material information has been duly disclosed in a timely manner.

Sustainalytics also reviewed relevant public documents and non-public information. This document contains Sustainalytics' opinion of the Framework and should be read in conjunction with that Framework. Any update of the present Second-Party Opinion will be conducted according to the agreed engagement conditions between Sustainalytics and Semen Indonesia Group.

Sustainalytics' Second-Party Opinion, while reflecting on the alignment of the Framework with market standards, is no guarantee of alignment nor warrants any alignment with future versions of relevant market standards. The Second-Party Opinion is valid for issuances aligned with the respective Framework for which the Second-Party Opinion was written up to 24 months or until one of the following occurs: (1) A material change to the external benchmarks[5] against which targets were set; (2) A material corporate action (such as material M&A or change in business activity) which has a bearing on the achievement of the SPTs or the materiality of the KPI.

For sustainability-linked instruments, the Second-Party Opinion:

- Addresses the anticipated SPTs of KPIs but does not measure the KPIs' performance. The measurement and reporting of the KPIs is the responsibility of the Issuer.

No information provided by Sustainalytics under the present Second-Party Opinion shall be considered as being a statement, representation, warrant or argument, either in favour or against, the truthfulness, reliability or completeness of any facts or statements and related surrounding circumstances that PT Semen Indonesia (Persero) Tbk has made available to Sustainalytics for the purpose of this Second-Party Opinion.

---

[1] When operating multiple lines of business that serve a variety of client types, objective research is a cornerstone of Sustainalytics and ensuring analyst independence is paramount to producing objective, actionable research. Sustainalytics has therefore put in place a robust conflict management framework that specifically addresses the need for analyst independence, consistency of process, structural separation of commercial and research (and engagement) teams, data protection and systems separation. Last but not least, analyst compensation is not directly tied to specific commercial outcomes. One of Sustainalytics' hallmarks is integrity, another is transparency.
[2] The bond Principles, Guidelines and Handbooks are administered by the International Capital Market Association and are available at: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/
[3] The loan Principles and Guidelines are administered by the Loan Market Association, Asia Pacific Loan Market Association and Loan Syndications and Trading Association and are available at: https://www.lsta.org/content/?_industry_sector=guidelines-memos-primary-market
[4] The Climate Transition Finance Handbook is administered by the International Capital Market Association and is available at: https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Climate-Transition-Finance-Handbook-December-2020-091220.pdf
[5] Benchmarks refer to science-based benchmarks.

For inquiries, contact the Sustainable Finance Solutions project team:

Flora Mile (Singapore)
Project Manager
flora.mile@morningstar.com

Manali Vaidya (Mumbai)
Project Support
manali.vaidya@morningstar.com

Jasmine Hussain (Singapore)
Project Support
jasmine.hussain@morningstar.com

Jalaluddin Khatib (Mumbai)
Project Support
jalaluddin.khatib@morningstar.com

Vanessa Tang (Hong Kong)
Client Relations
susfinance.apac@sustainalytics.com
(+852) 3008 2391

Introduction

PT Semen Indonesia (Persero) Tbk ("SIG" or the "Company") is a state-owned enterprise and strategic holding company with entities in the field of cement, non-cement and service producers. Founded in 1957 and headquartered in Jakarta, Indonesia, the Company has 9,909 employees as of December 2021. SIG's cement subsidiaries engage in the production and sale of limestone, clay quarrying, ready-mix concrete and industry cluster development, which converts post-mining sites into areas that can be used for public facilities, reforestation and commercial development.

SIG has developed the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework (the "Framework"), under which the Company and its cement segment entities[6] intend to issue sustainability-linked bonds and loans. SIG engaged Sustainalytics to review the Framework, dated October 2022, and provide a Second-Party Opinion on the Framework's alignment with the Sustainability-Linked Bond Principles 2020 (SLBP), Sustainability-Linked Loan Principles 2022 (SLLP) (the "Sustainability-Linked Principles") and the recommendations of the Climate Transition Finance (CTF) Handbook 2020.[7] The Framework will be published in a separate document.[8]

The financial characteristics of the sustainability-linked bond and loan will be tied to the achievement of the sustainability performance targets for one key performance indicator: Specific net scope 1 CO_2 emission ($kgCO_2$/tonne cement equivalent).

The KPI and SPTs used by SIG are defined in Tables 1 and 2 below.

Table 1: KPI Definitions

KPI	Definition
Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent)	The KPI is a measure of specific net scope 1 emissions expressed per tonne of cement equivalent produced. The KPI is defined according to the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Incentive's (CSI) Cement CO_2 and Energy Protocol version 3.0[9] and the Global Cement and Concrete Association Sustainability Guidelines (GCCA) for the cement industry:[10] • Specific net CO_2 per tonne of cement equivalent = (net emissions from raw materials, kiln fuels and non-kiln fuels, excluding CO_2 from on-site power generation)/(SIG's production of cement equivalent)

Table 2: SPTs and Past Performance

KPI	SPT Trajectory	2019 (baseline)	2020	2021	2032 (SPT)
Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent)	SPT (Target)	630	601	594	520
	SPT (Stretch)				493

[6] SIG has confirmed to Sustainalytics that the subsidiaries being considered are cement manufacturers in Indonesia that are fully owned by SIG and who may issue sustainability-linked bonds and loans under the Framework with Company-level KPIs and SPTs where the financial penalty is tied to the parent Company achieving the targets and not the issuing subsidiary.
[7] Sustainalytics' assessment of the KPI and SPTs specified in the Framework is limited to the Group and does not extend to SIG's subsidiaries.
[8] The Semen Indonesia Group Sustainability-Linked Finance Framework is available on SIG's website at: https://sig.id/en/investor/bonds-information-sukuk/
[9] WBCSD, "CO2 and Energy Accounting and Reporting Standard for the Cement Industry", (2011), at: https://docs.wbcsd.org/2011/05/CSI-CO2-Protocol.pdf
[10] GCCA, "Sustainability Charter and Guidelines", (2019), at: https://gccassociation.org/sustainability-innovation/sustainability-charter-and-guidelines/

Sustainalytics' Opinion

Section 1: Sustainalytics' Opinion on the Alignment of the Framework with Relevant Market Standards

Alignment with Sustainability-Linked Principles

Sustainalytics is of the opinion that the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework aligns with the five core components of the Sustainability-Linked Principles. For detailed information, please refer to Appendix 1: Sustainability Linked Bond External Review Form. Sustainalytics highlights the following elements of the Framework:

Selection of Key Performance Indicators (KPIs)

Relevance and Materiality of KPIs

In its assessment of materiality and relevance, Sustainalytics considers: (i) whether an indicator speaks to a material impact of the issuer's business on environmental or social issues; and (ii) to what portion of impact the KPI is applicable.

Sustainalytics considers the KPI: Specific net scope 1 CO_2 emission ($kgCO_2$/tonne cement equivalent) to be material and relevant given:

- Cement is the most widely used construction material globally and is among the most energy-intensive manufacturing processes, accounting for approximately 3.4 gigatonnes of CO_2 emissions or 6% of global anthropogenic CO_2 emissions in 2022.[11] Therefore, the decarbonization of the cement industry is important for the transition towards a low carbon economy.
- Sustainalytics' Industry Report for the Construction Materials industry and ESG Risk Rating methodology identifies Carbon-Own Operations as a material ESG issue for companies in the construction materials subindustry and SIG. Additionally, the Sustainability Accounting Standards Board (SASB) identifies GHG emissions as a material issue for companies in the construction materials industry.[12]
- SIG recognizes CO_2 emissions as a material issue for the Company and has identified the reduction of GHG emissions as one of the key strategies to achieve the goals set under the environmental pillar of its Sustainability Roadmap 2020-2030.[13]

Regarding applicability, Sustainalytics notes that SIG has not measured its scope 3 emissions and is, therefore, unable to determine the share of specific net scope 1 emissions as a proportion of the Company's total emissions. However, according to the World Economic Forum's Net Zero Industry Tracker for the cement industry, scope 1 emissions are responsible for an estimated 70% of the total scope 1, 2 and 3 emissions for the industry. On this basis, Sustainalytics considers the KPI to be relevant and material with a high scope of applicability.

[11] World Economic Forum, "The Net-zero Industry Tracker", (2022), at: https://www.weforum.org/reports/the-net-zero-industry-tracker/in-full/cement-industry
[12] SASB, "Construction Materials", at: https://www.sasb.org/standards/materiality-finder/find/?industry[]=EM-CM&lang=en-us
[13] SIG, "Annual Report 2021", at: https://sig.id/en/investor/annual-report/

KPI Characteristics

In its assessment of the KPI characteristics, Sustainalytics considers: (i) whether a clear and consistent methodology is used; (ii) the issuer follows an externally recognized definition; (iii) whether the KPIs are a direct measure of the performance of the issuer on a material environmental or social issue; and, if applicable, (iv) whether the methodology can be benchmarked to an external contextual benchmark.[14]

Sustainalytics considers SIG's definition and methodology to calculate KPI performance to be clear and consistently applied across historical calculations based on externally recognized methodologies, namely the WBCSD CSI's Cement CO_2 and Energy Protocol and the GCCA Sustainability Guidelines, which are widely used in the cement industry. The GCCA provides technical guidelines for global cement manufacturers on accounting for CO_2 emissions and the classification of clean energy sources and alternative fuels. Sustainalytics notes the KPI to be a direct measure of SIG's performance on a material environmental issue of carbon emissions and is a commonly used metric in the cement industry to disclose operational carbon performance. In addition, the KPI lends itself well to be benchmarked against the Transition Pathway Initiative's (TPI) decarbonization trajectory for the cement industry.[15]

Overall Assessment

Sustainalytics considers the KPI to be very strong given that it: (i) is a direct measure of the Company's performance on a relevant and material ESG issue; (ii) has a high scope of applicability; (iii) follows a clear and consistent methodology; and (iv) lends itself to be externally benchmarked.

KPI	Strength of KPI			
Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent)	Not Aligned	Adequate	Strong	Very strong

2 Calibration of Sustainability Performance Targets (SPTs)

Alignment with Issuer's/Borrower's Sustainability Strategy

SIG has set the following SPTs for its KPI:

- SPT (Target): Specific net scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne of cement equivalent by 2032 from a 2019 baseline
- SPT (Stretch): Specific net scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032 from a 2019 baseline

Sustainalytics considers the SPTs to be aligned with SIG's sustainability strategy. Please refer to Section 2 for an analysis of the credibility of SIG's sustainability strategy.

SIG's sustainability roadmap is underpinned by three pillars, one of which includes reducing scope 1 emissions as a key strategy to achieve its goals pertaining to the environmental pillar.[16] In 2021, SIG achieved a 16% reduction in its specific net scope 1 emissions from the 2010 baseline to 594 $kgCO_2$/tonne cement equivalent. This encouraged the Company to raise its ambition for 2032 and set the above-listed SPTs as part of its overall decarbonization strategy.[17]

[14] External contextual benchmarks provide guidance on the alignment with ecological system boundaries. These criteria are not applied to social KPIs or impact areas for which such contextual benchmarks are not available.
[15] TPI, "Cement", at: https://www.transitionpathwayinitiative.org/sectors/cement
[16] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf
[17] Based on SIG's Sustainable Development Decarbonization Strategy document (August 2022), which was shared with Sustainalytics.

Strategy to Achieve the SPTs

SIG intends to achieve the SPTs through the following strategy:

- SIG's strategy is centred on three key initiatives: (i) reducing the clinker factor (clinker-to-cement ratio) of its cement production; (ii) increasing alternative fuel and raw material usage; and (iii) optimizing thermal energy consumption.[18]
- The Company aims to reduce its clinker factor from 70.2% in 2021 to 61% by 2032 by increasing the utilization of clinker substitutes, such as fly ash, synthetic gypsum, blast furnace slag, limestone and other suitable additive material.
- SIG aims to increase the use of alternative fuels in its operations by maximizing the co-processing of waste to displace the use of fossil fuels. To achieve this, the Company aims to improve its capacity for alternative fuel utilization, which comes from biomass, refuse-derived fuel (RDF) (from sorted municipal solid waste (MSW)) and other suitable industrial waste sources.
- The Company optimizes thermal energy consumption through increasing the efficiency of plant operations using advanced process control initiatives and utilizing hydrogen technology in its operations.

Ambitiousness, Baseline and Benchmarks

To determine the ambitiousness of the SPTs, Sustainalytics considers: (i) whether the SPTs go beyond a business-as-usual trajectory; (ii) how the SPTs compare to targets set by peers; and (iii) how the SPTs compare with science.[19]

SIG has set the baseline for the SPTs at 2019, which reflects the most representative year for the performance of the KPI prior to COVID-19, during which unusually low levels of cement were produced.

Sustainalytics was able to use the following benchmarks to assess ambitiousness: past performance, peer performance and science.

SPT (Target): Specific Net Scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne of cement equivalent by 2032 from a 2019 baseline

- Sustainalytics notes the overall downward trend observed in the Company's historical emissions, however Sustainalytics has not relied on historical data due to the recent acquisition of PT Solusi Bangun Indonesia in 2019. Nevertheless, Sustainalytics notes that SIG would need to reduce its specific net scope 1 intensity by an annual rate of 1.3% compared to the 2019 baseline to achieve the SPT. While acknowledging that data prior to 2019 is unrepresentative, Sustainalytics considers the targeted rate of reduction in net scope 1 intensity to represent a slight improvement over the Company's historical performance.
- Based on Sustainalytics' assessment of six of SIG's industry peers, SPT (Target) compares favourably to targets set by local and regional peers. However, among the global peers that were selected for analysis, three had established SBTi validated targets to either a below 2°C scenario (B2DS) or below-1.5 °C scenario, which demonstrates best market practice for the sector. Additionally, from TPI's assessment of 44 industry participants on the strength of management of GHG emissions and risks and opportunities related to the low-carbon transition categorized from Level 0 (unaware) to Level 4 (strategic assessment), 11 companies are ranked at the lowest two levels, of which SIG belongs to the Level 1: Awareness category. Overall, Sustainalytics considers SPT (Target) to be below its global peers while comparing favourably to local peers.
- SPT (Target) is aligned with TPI's National Pledges scenario.[20] TPI's National Pledges scenario is consistent with the global aggregate of emissions reductions pledged by countries up to at least mid-2020,

[18] Based on SIG's Sustainable Development Decarbonization Strategy document (August 2022), which was shared with Sustainalytics.
[19] Contextual benchmarks that indicate the alignment of targets with ecosystem boundaries.
[20] TPI, "Cement", at: https://www.transitionpathwayinitiative.org/sectors/cement

depending on the sector.[21] While this represents a departure from a business-as-usual trend, according to the International Energy Agency (IEA), this aggregate is insufficient to limit global warming to 2°C.

SPT (Stretch): Specific Net Scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032 from a 2019 baseline

- Sustainalytics notes the overall downward trend observed in the Company's historical emissions, however Sustainalytics has not relied on historical data due to the recent acquisition of PT Solusi Bangun Indonesia in 2019. Nevertheless, Sustainalytics notes that SIG would need to reduce its specific net scope 1 intensity by an annual rate of 1.7% compared to the 2019 baseline to achieve the SPT. While acknowledging that data prior to 2019 is unrepresentative, Sustainalytics considers the targeted rate of reduction in net scope 1 intensity to represent a slight improvement over the Company's historical performance.
- Based on Sustainalytics' assessment of six of SIG's industry peers, SPT (Stretch) compares favourably to targets set by local and regional peers. However, among the global peers that were selected for analysis, three had established SBTi validated targets to either a B2DS or below 1.5 °C scenario, which demonstrates best market practice for the sector. Overall, Sustainalytics considers SPT (Stretch) to be aligned with targets set by global peers while comparing favourably to local peers.
- The SPT trajectory is aligned with the TPI's recommendation of 508 $kgCO_2$ per tonne of cement equivalent under the B2DS for 2032.

Overall Assessment

Sustainalytics considers the SPTs to align with SIG's sustainability strategy and considers SIG's SPT (Target) to be moderately ambitious given that it represents a slight improvement compared to past performance, compares favourably to regional peers and performs below global peers and aligns with a science-based trajectory that is considered insufficient to limit global warming to 2°C or below.

Sustainalytics considers SPT (Stretch) to be ambitious given that it presents a slight improvement compared to past performance, compares favourably to regional peers and aligns with targets set by global peers and aligns with the TPI's B2DS trajectory.

SPT	Ambitiousness of SPT			
Specific net scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne of cement equivalent by 2032, representing a 17.2% reduction from its 2019 baseline	Not Aligned	Moderately Ambitious	Ambitious	Highly Ambitious
Specific net scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032, representing a 21.5% reduction from its 2019 baseline	Not Aligned	Moderately Ambitious	Ambitious	Highly Ambitious

Bond and Loan Characteristics

SIG has disclosed that it will link the achievement of the SPTs with the financial characteristics of the sustainability-linked bonds and loans. In terms of the financial characteristics, the Company intends to either include a premium or a discount to the cost of financing for the sustainability-linked instruments. SIG intends to report on the parameters of variation in the financial characteristics in the relevant documents of the specific transaction. This is aligned with the SLBP and the SLLP.

[21] TPI, "Methodology", at: https://www.transitionpathwayinitiative.org/methodology

Reporting

SIG commits to report on an annual basis on the performance of the KPI in the Company's sustainability report or a similar document, which will be made accessible on its website. SIG further commits to disclosing on an annual basis relevant information that may enable investors and other stakeholders to monitor the progress towards achieving the SPTs. The relevant information might include: (i) quantitative or qualitative factors that explain potential changes in the performance of the KPI, such as mergers or acquisitions; (ii) information regarding the impacts achieved; or (iii) any reassessments of the KPI or restatements of the SPTs. SIG's reporting commitments are aligned with the recommendations of the SLBP and SLLP.

Verification

SIG commits to having an external verifier provide limited assurance against the performance of each selected SPT for the KPI at least annually. The Company will disclose the verification report as part of its Sustainability report or a similar document on its website. Sustainalytics considers SIG's verification commitments to be aligned with the SLBP and SLLP.

Alignment with the Climate Transition Finance Handbook 2020

Sustainalytics has assessed SIG's alignment with the recommendations of the Climate Transition Finance (CTF) Handbook and considers the Company's transition strategy to be partially aligned. Sustainalytics highlights the following key elements of the assessment:

Key Elements	ICMA Recommendation	Sustainalytics' Assessment	
Issuer's climate transition strategy and governance	- Transition strategy to address climate-related risks and contribute to alignment with the goals of the Paris Agreement - Relevant interim targets on the trajectory towards long-term goal - Governance of transition strategy	- SIG's climate transition strategy is centred around reducing its clinker factor, increasing alternative fuel and raw material utilization and optimizing thermal energy consumption.[22] - The Company has set a long-term goal of climate change mitigation initiatives, with an ambition to achieve a specific net scope 1 emissions intensity reduction target that is aligned with a science-based trajectory. Further, the Company has indicated a commitment to adopt an SBTi-validated science-based emission target. For a detailed assessment of SIG's sustainability strategy, refer to Section 2. - In 2021, SIG's Board of Directors established a sustainability committee to support the evaluation and implementation of SIG's sustainability roadmap. Within the sustainability committee, the steering committee, which comprises the CEO and Directors, is responsible for maintaining oversight of SIG's performance related to its sustainability roadmap. The organizing committee, led by the sustainability office department and production excellence department and supported by heads of other departments, is responsible for aligning the Company's sustainability strategy with global sustainability development trends and monitoring and evaluating the achievement of the Company's	Aligned

[22] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf

		sustainability performance indicators, among other responsibilities.	
Business model environmental materiality	- Transition trajectory should be relevant to the environmentally material parts of the issuer's business model	- SIG's transition strategy directly addresses the environmental impact of the core part of its business.	Aligned
Climate transition strategy to be science-based including targets and pathways	- Transition strategy should reference science-based targets and transition pathways	- The Company's SPTs on the carbon intensity of its cement manufacturing operations reference TPI's science-based trajectories. - SPT (Target) is aligned with the TPI's National Pledges for the cement sector, which according to the IEA is insufficient at limiting global temperature rise to below 2°C. - On the other hand, SPT (Stretch) is aligned with TPI's B2DS for the cement sector.	Partially Aligned
Implementation transparency	- Disclosure of capex and opex plans - Climate-related outcomes and impacts of expenditures	- SIG has committed to providing ongoing annual public reporting through its sustainability report, which would include its investments and planned investments relevant to its climate transition strategy. - SIG also intends to report on the progress of its decarbonization and overall sustainability performance through its annual sustainability report. The information would include: (i) the performance of the selected KPI; (ii) a verification assurance report on the basis of limited assurance; and (iii) information to monitor the progress of the selected KPI. Where feasible, other information might include an explanation of qualitative or quantitative factors that affect the performance of the KPI and the impact achieved from any performance improvements.	Aligned

Section 2: Assessment of SIG's Sustainability Strategy

Emission-Reduction Targets

In 2021, SIG committed to reducing its specific net CO_2 scope 1 emissions per tonne of cement equivalent by 18% by 2030 to 580 $kgCO_2$ per tonne of cement equivalent from a 2010 baseline. In 2022, SIG revised its target for 2032 to align with the TPI's National Pledges[23] for the cement sector. This target aims for a 17% reduction in specific net scope 1 CO_2 emissions to 520 $kgCO_2$ per tonne of cement equivalent from a 2019 baseline, which represents an increased ambition to achieve a 1.3% annual rate of reduction as compared to SIG's initial target of 0.9% In the same year, SIG set an additional, more stringent target, which is dependent on the Company's ability to reduce its clinker factor and increase the utilization of non-fossil fuel-based energy in its cement production. This stretch target of limiting net CO_2 scope 1 emissions to equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032 aligns with TPI's B2DS pathway for the cement industry to keep global temperature rise to below 1.8°C with a 66% probability.[24] Furthermore, in 2022, SIG has expressed its commitment to adopt a science-based emission target in line with SBTi's target setting criteria and to have this target validated by SBTi.

Sustainalytics considers the set targets to have a positive impact on SIG's transition towards low-carbon operations and goal to align with TPI's National Pledges scenario and well-below 2°C scenario decarbonization pathway.

[23] The TPI's National Pledges represent a global benchmark emissions scenario consistent with policies introduced or under development up to at least mid-2020, depending on the sector. According to the IEA, these reductions collectively are insufficient to limit global warming to 2°C or below.
TPI, "Projects", at: https://www.transitionpathwayinitiative.org/projects
[24] Ibid.

Decarbonization Pathway and Implementation Plan

SIG's climate transition strategy and decarbonization pathway are centred around three key initiatives: (i) reducing the clinker factor (clinker-to-cement ratio) of its cement production; (ii) increasing alternative fuel and raw material; and (iii) optimizing thermal energy consumption.[25]

- The production of clinker, a key material used in cement production, is a carbon-intensive process and the main emitter of carbon in cement manufacturing. SIG aims to reduce the use of clinker in its operations by substituting clinker with waste and byproducts that are produced by other industrial sectors, including fly ash, synthetic gypsum and blast furnace slag. Additionally, the Company commits to continuing its investment in innovation and development to develop various technologies to produce cement with lower clinker factors, such as non-ordinary Portland cement products that achieve a clinker factor of below 67%.[26] Based on these efforts, SIG has achieved a clinker factor of 70.2% in 2021 and targets a 61% clinker factor by 2032.[27] This compares favourably to the IEA's Net Zero Scenario, which requires the cement industry's clinker ratio to fall to a global average of 65% by 2030.[28]
- As part of its initiative to increase the uptake of alternative fuel, all SIG-owned plants are powered by biomass, RDF from sorted MSW and other industrial wastes as alternative fuels as of 2021.[29] To support the supply of alternative fuels, SIG operates an integrated preprocessing facility at its Narogong plant in West Java, which is capable of handling 160,000 tonnes of various waste streams for use as an alternative fuel in the cement manufacturing process. In Cilicap City, in collaboration with the local government, SIG operates a RDF integrated waste management facility, which has the capacity of processing 160 tonnes of MSW daily into 60 tonnes of RDF, which is equivalent to eliminating the use of 40 tonnes of coal per day.[30] Moreover, the utilization of RFD results in a thermal substitution rate (TSR) of 3%, which refers to the rate at which coal is substituted for alternative fuel. Based on these efforts, SIG has managed to achieve a TSR of 5.5% in 2021, with a target to increase this rate to 20% by 2032.
- The Company optimizes thermal energy consumption through increasing the efficiency of plant operations using advanced process control initiatives and utilizing hydrogen technology in its operations.

Sustainalytics recognizes that SIG has prioritized the development of credible options for decarbonization and has reported on steps taken to begin implementing its policy commitments. Sustainalytics encourages SIG to continue to refine its plan in the face of ongoing technological innovation and to continue to report on the timelines to deploy the best available technologies.

SIG's Environmental and Social Risk Management

Sustainalytics recognizes that while SIG's defined targets are impactful, achieving the SPTs could bear environmental and social risks related to occupational health and safety; emissions, effluents and waste generated during operations; supply chain risks; resource use issues; and land use and biodiversity issues.

Sustainalytics comments below on SIG's ability to mitigate potential risks:

- To manage risks related to occupational health and safety (OHS), the Company is committed to providing a safe and healthy workplace by regularly identifying potential OHS hazards and risks and conducting safety inductions and training for workers. SIG's sustainability department is responsible for developing relevant policies and systems for managing OHS hazards at the workplace, conducting audits and evaluating the implementation of OHS at SIG. Moreover, the Company is certified under the ISO 45001:2018[31] standard on OHS management, which demonstrates the presence of established processes and safety protocols to minimize work-related injury and ill health.[32]
- Considering the emissions-intensive process of cement production, SIG has a high risk of exposure to GHG emissions and energy consumption. To address emissions, SIG has established a decarbonization strategy and sustainability roadmap. Regarding energy use, SIG's energy management system is certified under ISO 50001:2018,[33] which specifies the presence of robust processes that help to efficiently reduce the energy use of its business activities. To monitor and

[25] Based on SIG's Sustainable Development Decarbonization Strategy document (August 2022), which was shared with Sustainalytics.
[26] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf
[27] Based on SIG's Sustainable Development Decarbonization Strategy document (August 2022), which was shared with Sustainalytics.
[28] IEA, "Cement Tracking Report", (2022), at: https://www.iea.org/reports/cement
[29] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf
[30] Ibid.
[31] ISO, "ISO 45001:2018 family – Occupational health and safety", at: https://www.iso.org/iso-45001-occupational-health-and-safety.html
[32] SIG, "Annual Report 2021", at: https://sig.id/en/investor/annual-report/
[33] ISO, "ISO 5001:2018 – Energy management", at: https://www.iso.org/iso-50001-energy-management.html

promote the ongoing effectiveness of the Company's energy efficiency initiatives, SIG conducts annual internal energy audits and employs an ISO certification body to conduct external audits every three years.[34]

- Regarding effluents, waste and non-carbon emissions generated in construction, SIG's environmental management system is certified under ISO 14001:2015,[35] indicating that robust processes are in place to enable the effective mitigation of negative impacts of SIG's business activities on the environment.[36] The Company identifies hazardous and non-hazardous waste and employs various waste management techniques to manage these appropriately, including reuse, recycling, recovery and composting. For example, hazardous and toxic waste, including fly ash, copper slag and used refractory materials, are utilized to generate alternative fuel through co-processing, where waste processing and energy recovery occur simultaneously. Regarding non-carbon emissions such as SO_x, NO_x and particulate matter, SIG is committed to minimizing air pollutant emissions in its factories by setting up a continuous emission monitoring system and rolling out initiatives such as using quicklime in gas conditioning towers to reduce SO_2 emissions and installing electrostatic precipitators to manage dust emissions.[37]
- SIG's approach to mitigating supply chain risks is guided by its Enterprise Risk Management Framework. This approach includes evaluating suppliers' environmental and social impacts and commitments to environmental and social protection during the supplier selection phase. SIG's criteria for environmental screening include requiring suppliers to have no history of environmental damage. Additionally, the Company's social screening criteria include a zero-tolerance policy towards child labour practices.[38]
- To encourage the sustainable use of resources, SIG adopts the following initiatives: (i) reducing groundwater consumption by utilizing retention basins to harvest rainwater; (ii) increasing water circulation by reusing domestic wastewater that has been treated; (iii) prioritizing raw material and fuel efficiency with the aim to increase the portion of sustainable products in SIG's product-mix and the share of alternative fuels in the cement manufacturing process; and (v) researching sustainable energy sources that have long-term availability.[39]
- To manage land use and biodiversity issues associated with large-scale infrastructure projects, the Company is committed to identifying and monitoring the impact of its operations on surrounding biodiversity and reporting on mitigation efforts for each of its constructed plants. Examples of mitigation efforts include managing biodiversity loss in post-mining areas by planting trees and designating buffer zones to enhance biodiversity protection. Moreover, in compliance with Indonesia's Environmental Protection and Management law,[40] SIG is required to conduct an environmental and social impact analysis (AMDAL) before commencing large-scale developments.[41] The AMDAL needs to be prepared by a certified consultant and approved by the Indonesian government. It covers a wide range of aspects, such as impacts on the climate, landscape, water, biodiversity and socio-economic conditions.

Based on the above Sustainalytics considers that SIG has adequate management programmes and policies to mitigate environmental and social risks that could arise in achieving the SPTs.

Section 3: Impact of the SPTs Selected

The importance of reducing the emission intensity of cement production in the transition towards a low-carbon economy

The cement sector is the second largest GHG emitting global sector after steel.[42] Demand for concrete has tripled in the past 40 years and based on the current trajectory, global cement production is expected to increase by 12-23% from 2018 levels by 2050.[43] Cement production is a carbon-intensive process where fossil fuels continue to provide most of the industry's energy. While

[34] SIG, "Annual Report 2021", at: https://sig.id/en/investor/annual-report/
[35] ISO, "ISO 14001 family – Environmental management", at: https://www.iso.org/iso-14001-environmental-management.html
[36] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf
[37] Ibid.
[38] Ibid.
[39] Ibid.
[40] InforMEA, "Law No. 32/2009 on Environmental Protection and Management", (2009), at: https://www.informea.org/en/legislation/law-no-322009-environmental-protection-and-management
[41] SIG, "Better Contribution to Deliver Sustainability", (2021), at: https://sig.id/wp-content/uploads/2022/04/SR-SIG-2021-r2.pdf
[42] World Economic Forum, "The Net-zero Industry Tracker", (2022) at: https://www.weforum.org/reports/the-net-zero-industry-tracker/in-full/cement-industry
[43] IEA, "Cement technology roadmap plots path to cutting CO_2 emissions 24% by 2050", (2018), at: https://www.iea.org/news/cement-technology-roadmap-plots-path-to-cutting-co2-emissions-24-by-2050

alternative fuels, including bioenergy and biomass-derived wastes, are effective means of reducing the fossil fuel share in the chemical and thermal combustion processes, these accounted for only 4% of thermal energy use in 2021.[44] According to the IEA, the direct CO_2 intensity of cement production increased by 1.5% annually between 2015 and 2021. However, to align with the IEA's Net Zero Emissions by 2050 Scenario, the emissions would need to decrease by 3% per year until 2030. To achieve the Net Zero Scenario and achieve the goal of the Paris Agreement, the share of bioenergy and renewable waste in the cement production process must increase from 4% in 2021 to 14% by 2030.[45]

In September 2020, the Global Cement and Concrete Association (GCCA), an industry association with 38 member companies accounting for close to 50% of global cement production capacity, announced a commitment to achieve carbon-neutral concrete production by 2050. In October 2021, the GCCA launched its 2050 Net Zero Roadmap, which details the decarbonization pathway and implementation plan to help limit global warming to 1.5°C. The roadmap targets a 20% reduction in CO_2 emissions per tonne of cement by 2030 from a 2020 baseline. Achieving this goal will require key priorities that include increasing clinker substitution, reducing fossil fuels and increasing the use of alternative fuels, improving the efficiency of concrete production and design of concrete projects, investing in technological innovations, and deploying carbon capture utilization and storage technology.[46]

Based on the above, Sustainalytics expects the achievement of the SPTs under the Framework to help reduce the carbon emissions intensity of SIG's operations through enhancing the use of alternative fuels and reducing the clinker factor in the cement production process. This is expected to contribute to the decarbonization of the cement industry and broader climate mitigation goals.

Alignment with/contribution to SDGs

The Sustainable Development Goals were adopted by the United Nations General Assembly in September 2015 and form part of an agenda for achieving sustainable development by 2030. The instruments issued under the Semen Indonesia Group Sustainability-Linked Finance Framework are expected to help advance the following SDG goals and targets:

KPI	SDG	SDG Target
Specific net scope 1 CO_2 emission ($kgCO_2$/tonne cement equivalent)	7. Affordable and Clean Energy	7.3. By 2030, double the global rate of improvement in energy efficiency
	9. Industry, Innovation and Infrastructure	9.4. By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

Conclusion

PT Semen Indonesia (Persero) Tbk has developed the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework, under which it may issue sustainability-linked bonds and loans.

Under the sustainability-linked instruments, SIG intends to tie the financial characteristics to the achievements of the following SPTs:

(1) SPT (Target): Specific net scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne of cement equivalent by 2032, which represents a 17.2% reduction from its 2019 baseline

(2) SPT (Stretch): Specific net scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne of cement equivalent by 2032, representing a 21.5% reduction from its 2019 baseline

Sustainalytics considers the KPI chosen to be very strong based on its direct linkage to SIG's material issue, high materiality and scope of applicability, clear and consistent methodology used and its ability to be compared with an external contextual benchmark. Sustainalytics considers SPT (Target) to be moderately ambitious and SPT (Stretch) to be ambitious, based on SIG's

[44] Nature, "Concrete needs to lose its colossal carbon footprint", (2021), at: https://www.nature.com/articles/d41586-021-02612-5https://www.nature.com/articles/d41586-021-02612-5
[45] IEA, "Cement", (2022), at: https://www.iea.org/reports/cement
[46] GCCA, "Concrete Future – GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete", (2021), at: https://gccassociation.org/concretefuture/wp-content/uploads/2021/10/GCCA-Concrete-Future-Roadmap-Overview.pdf

past and peer performance and alignment with science. Furthermore, Sustainalytics considers SIG's reporting and verification commitments to be aligned with market expectations.

Sustainalytics is of the opinion that the PT Semen Indonesia (Persero) Tbk Sustainability-Linked Finance Framework aligns with the Sustainability-Linked Bond Principles 2020 and Sustainability-Linked Loan Principles 2022. Sustainalytics has also assessed PT Semen Indonesia (Persero) Tbk's alignment with the recommendations of the Climate Transition Finance Handbook and considers the Company's transition strategy to be partially aligned overall. Based on the above, Sustainalytics considers that PT Semen Indonesia (Persero) Tbk is well positioned to issue sustainability-linked bonds and loans.

Appendix 1: Sustainability-Linked Bonds - External Review Form

Section 1. Basic Information

Issuer name: PT Semen Indonesia (Persero) Tbk

Sustainability-Linked Bond ISIN:

Independent External Review provider's name for second party opinion pre-issuance (sections 2 & 3): Sustainalytics

Completion date of second party opinion pre-issuance: October 13, 2022

Independent External Review provider's name for post-issuance verification (section 4):

Completion date of post issuance verification:

At the launch of the bond, the structure is:

☐ a step-up structure

☒ a variable redemption structure

Section 2. Pre-Issuance Review

2-1 SCOPE OF REVIEW

The following may be used or adapted, where appropriate, to summarise the scope of the review.

The review:

☒ assessed all the following elements (complete review)

- ☒ Selection of Key Performance Indicators (KPIs)
- ☒ Calibration of Sustainability Performance Targets (SPTs)
- ☒ Verification

☐ only some of them (partial review):

- ☒ Bond characteristics (acknowledgment of)
- ☒ Reporting

☒ and confirmed their alignment with the SLBP.

2-2 ROLE(S) OF INDEPENDENT EXTERNAL REVIEW PROVIDER

- ☒ Second Party Opinion
- ☐ Verification
- ☐ Certification
- ☐ Scoring/Rating

Note: In case of multiple reviews / different providers, please provide separate forms for each review.

2-3 EXECUTIVE SUMMARY OF REVIEW and/or LINK TO FULL REVIEW *(if applicable)*

PT Semen Indonesia (Persero) Tbk intends to issue sustainability-linked bonds and loans tying the financial characteristics to the achievements of the following SPTs:

KPI 1: Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent) to be material and relevant given:

SPT (Target) Specific net scope 1 CO_2 emission intensity to be equal to or less than 520 $kgCO_2$ per tonne cement equivalent by 2032, which represents 17.2% reduction from its 2019 baseline
SPT (Stretch): Specific net scope 1 CO_2 emission intensity to be equal to or less than 493 $kgCO_2$ per tonne cement equivalent by 2032, representing 21.5% reduction from its 2019 baseline

Sustainalytics considers the KPI chosen to be very strong based on its direct linkage to SIG's material issue, high materiality and scope of applicability, clear and consistent methodology used and its ability to be compared with an external contextual benchmark. Sustainalytics considers SPT (Target) to be moderately ambitious and SPT (Stretch) to be ambitious, based on SIG's past and peer performance and alignment with science. Furthermore, Sustainalytics considers SIG's reporting and verification commitments to be aligned with market expectations.

Section 3. Detailed pre-issuance review

Reviewers are encouraged to provide the information below to the extent possible and use the comment section to explain the scope of their review.

3-1 SELECTION OF KEY PERFORMANCE INDICATORS (KPIS)

Overall comment on the section *(if applicable)*:

Sustainalytics considers the KPI to be very strong given that it: (i) is directly related to operational performance; (ii) is highly material; (iii) is highly applicable; (iv) follows a clear and consistent methodology; and (v) is comparable to an external benchmark.

List of selected KPIs:

- Specific net scope 1 CO_2 emission per tonne of cement equivalent ($kgCO_2$/tonne cement equivalent)

Definition, Scope, and parameters

☒ Clear definition of each selected KPIs
☒ Clear calculation methodology
☐ Other (please specify):

Relevance, robustness, and reliability of the selected KPIs

☒ Credentials that the selected KPIs are relevant, core and material to the issuer's sustainability and business strategy.
☒ Evidence that the KPIs are externally verifiable
☒ Credentials that the KPIs are measurable or quantifiable on a consistent methodological basis
☒ Evidence that the KPIs can be benchmarked
☐ Other (*please specify*):

3-2 CALIBRATION OF SUSTAINABILITY PERFORMANCE TARGETS (SPTs)

Overall comment on the section (*if applicable***):**
Sustainalytics considers the SPTs to be aligned with SIG's sustainability strategy. Sustainalytics further considers SPT (Target) to be moderately ambitious and SPT (Stretch) to be ambitious based on comparison with historical performance, targets set by peers and external science-based decarbonization pathways.

Rationale and level of ambition

☒ Evidence that the SPTs represent a material improvement

☒ Evidence that SPTs are consistent with the issuer's sustainability and business strategy

☒ Credentials on the relevance and reliability of selected benchmarks and baselines

☒ Credentials that the SPTs are determined on a predefined timeline

☐ Other (please specify):

Benchmarking approach

☒ Issuer own performance

☒ reference to the science

☒ Issuer's peers

☐ Other *(please specify):*

Additional disclosure

☒ potential recalculations or adjustments description

☒ identification of key factors that may affect the achievement of the SPTs

☐ issuer's strategy to achieve description

☐ Other (please specify):

3-3 BOND CHARACTERISTICS

Overall comment on the section (*if applicable*):

SIG has disclosed that it will link the achievement of the SPTs with the financial characteristics of the sustainability-linked bonds and loans. In terms of the financial characteristics, the Company intends to either include a premium or a discount to the cost of financing for the sustainability-linked instruments. SIG intends to report on the parameters of variation in the financial characteristics in the relevant documents of the specific transaction. This is aligned with the SLBP and the SLLP.

Financial impact:

☐ variation of the coupon

☐ …

☒ Other (*please specify*): a premium in the case that the Company does not reach the predefined SPTs by observation date or a discount if the SPTs are achieved

Structural characteristic:

☐ …

☐ …

☐ Other (*please specify*):

3-4 REPORTING

Overall comment on the section (*if applicable*):

SIG commits to report on an annual basis on the performance of the KPI in the Company's sustainability report, or a similar document, which will be made accessible on its website. SIG further commits to disclose on an annual basis relevant information that may enable investors and other stakeholders to monitor the progress towards achieving the SPTs. The relevant information might include: i) quantitative or qualitative factors that explain potential changes in the performance of the KPI,

such as mergers or acquisitions, ii) information regarding the impacts achieved or iii) any reassessments to the KPI or restatements of the SPTs. SIG's reporting commitments are aligned with the recommendations of the SLBP and SLLP.

Information reported:

- ☒ performance of the selected KPIs
- ☒ level of ambition of the SPTs
- ☒ verification assurance report
- ☐ Other (*please specify*):

Frequency:

- ☒ Annual
- ☐ Semi-annual
- ☐ Other (please specify):

Means of Disclosure

- ☐ Information published in financial report
- ☒ Information published in sustainability report
- ☐ Information published in ad hoc documents
- ☐ Other (please specify):
- ☐ Reporting reviewed *(if yes, please specify which parts of the reporting are subject to external review)*:

Where appropriate, please specify name and date of publication in the "useful links" section.

Level of Assurance on Reporting

- ☒ limited assurance
- ☐ reasonable assurance
- ☐ Other *(please specify)*:

USEFUL LINKS (*e.g. to review provider methodology or credentials, to issuer's documentation, etc.*)

Section 4. Post-issuance verification

Overall comment on the section (*if applicable*):

Information reported:

- ☐ limited assurance
- ☐ reasonable assurance
- ☐ Other (please specify):

Frequency:

☒	Annual	☐	Semi-annual
☐	Other (please specify):		

Material change:

☐	Perimeter	☐	KPI methodology
☐	SPTs calibration		

Disclaimer

About Sustainalytics, a Morningstar Company

Sustainalytics, a Morningstar Company, is a leading ESG research, ratings and data firm that supports investors around the world with the development and implementation of responsible investment strategies. For more than 25 years, the firm has been at the forefront of developing high-quality, innovative solutions to meet the evolving needs of global investors. Today, Sustainalytics works with hundreds of the world's leading asset managers and pension funds who incorporate ESG and corporate governance information and assessments into their investment processes. Sustainalytics also works with hundreds of companies and their financial intermediaries to help them consider sustainability in policies, practices and capital projects. With 17 offices globally, Sustainalytics has more than 800 staff members, including more than 300 analysts with varied multidisciplinary expertise across more than 40 industry groups.

For more information, visit www.sustainalytics.com

Or contact us contact@sustainalytics.com