



PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED (“PTTGC”) SUSTAINABLE FINANCE FRAMEWORK

Document title: Second Party Opinion on PTTGC's Sustainable Finance Framework

Prepared by: DNV (Thailand) Co., Ltd.

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This statement is valid until the Framework provided in October 2023 remains unchanged.

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Disclaimer

Our assessment relies on the premise that the data and information provided by the client to us as part of our review procedures have been provided in good faith. Because of the selected nature (sampling) and other inherent limitation of both procedures and systems of internal control, there remains the unavoidable risk that errors or irregularities, possibly significant, may not have been detected. Limited depth of evidence gathering including inquiry and analytical procedures and limited sampling at lower levels in the organization were applied as per scope of work. DNV expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Statement.

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DNV applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2011 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. We have complied with the DNV Code of Conduct¹ during the assessment and maintain independence where required by relevant ethical requirements. This engagement work was carried out by an independent team of sustainability assurance professionals. DNV was not involved in the preparation of statements or data included in the Framework except for this Statement. DNV maintains complete impartiality toward stakeholders interviewed during the assessment process.

¹ DNV Code of Conduct is available from DNV website (www.dnv.com)

DNV'S INDEPENDENT ASSESSMENT

Scope and Objectives

PTT Global Chemical Public Company Limited ("PTTGC" or the "Customer") is a leader in the integrated petrochemical and refining business with combined petrochemical and chemical production capacity of more than 14.23 million tons per year, plus a crude oil and condensate refining capacity of 280,000 barrels per day. Besides its production facilities in Thailand, PTTGC has stamped its global footprint with 43 global production facilities.

PTTGC's vision is to become a leading global chemical company for better living that combines environmentally friendly innovations with advanced technologies to develop products which enable improvement of people's lives. More recently, PTTGC has set itself a net-zero target for Scope 1 and 2 emissions to be reached by 2050 with 50% emissions reduction in Scope 3 emissions within the same timeline. PTTGC also has set up an interim target of Scope 1 and 2 emission reduction 20% by 2030 with a 2021 baseline year. The company aims to be a net-zero company that maintains sustainable growth, that applies three different approaches to offset its carbon emissions and decarbonize. PTTGC is:

- Efficiency-driven, which is to enhance process efficiency, switch to alternative energy, and develop and implement new low-carbon technology in the production process to reduce greenhouse gas emission with more efficiency;
- Portfolio-driven, which is to transform its portfolio to low-carbon business in line with the demands of more environmentally conscious consumers through investments in the High Value Business (HVB) group which includes high-performance specialty chemicals, bioplastics and recycled plastics; and
- Compensation-driven, which is to employ high-efficiency carbon capture, utilization and storage (CCUS) technology, nature-based solutions, such as reforestation, soil and ocean sequestration, etc., and carbon credit management to deal with excess carbon from production processes and business operations.

PTTGC has developed a Sustainable Finance Framework ("Framework") with the aim to communicate its sustainable finance issuances in a clear, comprehensive, and transparent manner. Proceeds raised under the Framework – sustainable finance instruments ("SFI") and/or green finance instruments ("GFI") – will be utilized to support the company's long-term target of reaching net-zero GHG emissions (Scope 1 and 2) by 2050. PTTGC's Sustainable Finance Framework includes a Sustainability-Linked Finance Framework and a Green Finance Framework.

The Framework is in alignment with the stated standards and principles (collectively the "Principles").

(1) With regards to the Sustainability-Linked Finance Framework, these include:

- Sustainability-Linked Bond Principles ("SLBP"), issued by the International Capital Markets Forum ("ICMA") in June 2020.
- Sustainability-Linked Loan Principles ("SLLP"), issued by the Loan Market Association ("LMA"), the Loan Syndications and Trading Association ("LSTA"), and the Asia Pacific Loan Market Association ("APLMA") in February 2023.
- ASEAN Sustainability-Linked Bond Standards ("ASEAN SBS"), issued by the ASEAN Capital Markets Forum ("ACMF") in October 2022.

(2) With regards to the Green Finance Framework, these include:

- Green Bond Principles ("GBP"), issued by the International Capital Markets Forum ("ICMA") in June 2021.
- Green Loan Principles ("GLP"), issued by the Loan Market Association ("LMA"), the Loan Syndications and Trading Association ("LSTA"), and the Asia Pacific Loan Market Association ("APLMA") in February 2023.



- ASEAN Green Bond Standards ("ASEAN GBS"), issued by the ASEAN Capital Markets Forum ("ACMF") in October 2018.

DNV (Thailand) Co., Ltd. ("DNV") has been commissioned by the Customer to review its Framework and provide a Second Party Opinion on the Framework, based on the above-mentioned Principles.

Our methodology to achieve this is described under the 'Work Undertaken' below. We were not commissioned to provide independent assurance or other audit activities.

Responsibilities of the Management of the Customer and DNV

The management of the Customer has provided the information and data used by DNV during the delivery of this review. Our statement represents an independent opinion and is intended to inform the Customer's management and other interested stakeholders in the Framework as to whether the Framework is aligned with Principles. In our work, we have relied on the information and the facts presented to us by the Customer. DNV is not responsible for any aspect of the nominated assets referred to in this opinion and cannot be held liable if estimates, findings, opinions, or conclusions are incorrect. Thus, DNV shall not be held liable if any of the information or data provided by the Customer's management and used as a basis for this assessment were not correct or complete.

Basis of DNV's opinion

We have adapted our assessment methodology to create the PTTGC-specific Eligibility Assessment Protocol (henceforth referred to as "Protocol"). Our Protocol includes a set of suitable criteria that can be used to underpin DNV's opinion.

As per our Protocol, the criteria against which the Framework has been reviewed are grouped accordingly:

Sustainability-Linked Financing Protocol includes the five core components:

- **Principle One: Selection of Key Performance Indicators (KPIs).** The Borrower/Issuer of an SFI should clearly communicate its overall sustainability objectives, as set out in its sustainability strategy, and how these relate to its proposed SPTs. The KPI should be reliable, material to the Borrower's core sustainability and business strategy, address relevant ESG challenges of the industry sector and be under management control.
- **Principle Two: Calibration of Sustainability Performance Targets (SPTs).** The SPTs should be ambitious, meaningful, and realistic. The target setting should be done in good faith and based on a sustainability improvement in relation to a predetermined performance target benchmark.
- **Principle Three: Loan/Bond Characteristics.** The loan/bond will need to include a financial and/or structural impact depending on whether the selected KPIs reach (or not) the predefined SPTs. The loan/bond documentation needs to include the definitions of the KPI(s) and SPT(s) and the potential variation of the SLL's/SLB's financial and/or structural characteristics. Any fallback mechanisms in case the SPTs cannot be calculated or observed in a satisfactory manner, should be explained.
- **Principle Four: Reporting.** The Borrower/Issuer should publish and keep readily available and easily accessible up to date information on the performance of the selected KPI(s), as well as a verification assurance report (see Principle 5) outlining the performance against the SPTs and the related impact and timing of such impact on the Loan's/Bond's financial and/or structural characteristics, with such information to be provided to those institutions participating in this securities/ loan or to investors participating in the Loan at least once per annum.
- **Principle Five: Verification (Post-issuance).** The Borrower/Issuer should have its performance against its SPTs independently verified by a qualified external reviewer with relevant expertise, at least once per annum. The verification of the performance against the SPTs should be made publicly available.

Green Financing Protocol includes the four core components:

1. Use of Proceeds

The Use of Proceeds criteria are guided by the requirement that an issuer of a bond / a borrower of a loan must use the funds raised to finance or refinance or to repay equity of eligible activities. The eligible activities should produce clear environmental and social benefits.

2. Process for Project Evaluation and Selection

The Project Evaluation and Selection criteria are guided by the requirements that an issuer of a bond / a borrower of a loan should outline the process it follows when determining eligibility of an investment using Green Bond / Loan proceeds and outline any impact objectives it will consider.

3. Management of Proceeds

The Management of Proceeds criteria are guided by the requirements that a bond / loan should be tracked within the organization, that separate portfolios should be created when necessary and that a declaration of how unallocated funds will be handled.

4. Reporting

The Reporting criteria are guided by the recommendation that at least annual reporting should be made of the use of proceeds and that quantitative and/or qualitative performance indicators should be used, where feasible.

No assurance is provided regarding the financial performance of instruments issued via the Framework, the value of any investments, or the long-term environmental benefits of the transaction. Our objective has been to provide an assessment that the Framework has met the criteria established on the basis set out below.

Work Undertaken

Our work constituted a high-level review of the available information, based on the understanding that this information was provided to us by the Customer in good faith. We have not performed an audit or other tests to check the veracity of the information provided to us. The work undertaken to form our opinion included:

- Creation of an PTTGC-specific Protocol, adapted to the purpose of the Framework, as described above and in Schedule 3 to this Assessment;
- Assessment of documentary evidence provided by the Customer on the Framework and supplemented by a high-level desktop research. These checks refer to current assessment best practices and standards methodology;
- Review of published materials by the Customer and the website of the Customer, and where relevant, parent organizations;
- Discussions with the Customer's management, and review of relevant documentation and evidence related to the criteria of the Protocol; and
- Documentation of findings against each element of the criteria. Our opinion as detailed below is a summary of these findings.

Our opinion as detailed below is a summary of these findings.

Findings and DNV's Opinion – Sustainability-Linked Financing

DNV's findings on the alignment with Principles are listed below:

- Principle One: Selection of Key Performance Indicators (KPIs).** DNV confirms that PTTGC's KPIs are core, relevant, material, and consistent with the company's overarching sustainability position and strategy: KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions; KPI 2: Dow Jones Sustainability™ World Indices (DJSI World) Ranking in the Chemicals Sector. The proposed KPIs are considered to be material to the activities of PTTGC and are core to the sustainability of the organisation, its stakeholders and are aligned with Thailand's BCG (Bio-Circular-Green) national strategy to decarbonize as well as international commitments to low carbon economy and net-zero.
- Principle Two: Calibration of Sustainability Performance Targets (SPTs).** DNV concludes that the SPTs: (1) Reduction of Scope 1 and 2 Greenhouse Gas Emissions; and (2) To obtain a Top 5 Ranking within the Chemicals Sector in DJSI World, are meaningful and relevant in the context of PTTGC's broader sustainability and business strategy and represent a material improvement over a predefined timeline. DNV concludes that PTTGC's targets are ambitious and deemed to go beyond what is considered 'business-as-usual'. DNV has also reviewed the credibility of PTTGC's approach to achieve the SPTs and considers them to be achievable within the timing set.
- Principle Three: Financial Characteristics.** DNV reviewed the disclosures related to sustainability-linked financing instrument ("SLF Instruments") characteristics stated in PTTGC's Framework and, in our opinion, the financial characteristics of securities to be issued under the Terms that could be impacted based on KPI performance under SPTs, are in line with the Principles. This impact includes, but is not limited to, coupon/margin rate variation via step-ups and step-downs, and specific performance obligations which may include committing funding towards pre-defined projects with specific ESG objectives, purchase (and forthwith cancellation) of carbon credits, etc.
- Principle Four: Reporting.** DNV concludes that the SLF Instruments Terms include the required information on annual reporting of PTTGC's annual performance including measurement, monitoring and reporting of metrics including chosen formats for reporting and meets the requirement as outlined in the Principles. PTTGC confirms that dedicated reporting will be provided to lenders/investors on an annual basis.
- Principle Five: Verification.** DNV confirms that the SLF Instruments Terms require PTTGC to have its performance against the SPTs independently verified annually by an independent third party.

On the basis of the information provided by PTTGC and the work undertaken, it is DNV's opinion that the Sustainability-Linked Financing Framework proposed meets the criteria established in the Protocol and is aligned with the Principles. The SPTs are material and relevant to PTTGC's business strategy, operational environment and are considered to be ambitious and meaningful in the context of their operational environment.

For DNV (Thailand) Co., Ltd.

Bangkok, Thailand / 10 October 2023



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Schedule 1. Sustainability-Linked Financing Eligibility Assessment Protocol

1. Selection of Key Performance Indicators (KPIs)

Ref	Criteria	Requirements	Work Undertaken	DNV Findings
1a	KPI – material to core sustainability and business strategy	<p>The Borrower/Issuer's sustainability performance is measured using sustainability KPIs that can be external or internal.</p> <p>The KPIs should be material to the Borrower/Issuer's core sustainability and business strategy and address relevant environmental, social and/or governance challenges of the industry sector and be under management's control.</p> <p>The KPI should be of high strategic significance to the Borrower/Issuer's current and/ or future operations.</p> <p>It is recommended that Borrower/Issuer communicate clearly to investors the rationale and process according to which the KPI(s) have been selected and how the KPI(s) fit into their sustainability strategy.</p>	<p>Review of:</p> <ul style="list-style-type: none"> PTTGC Sustainability-Linked Financing Framework, October 2023 PTTGC Sustainability Report PTTGC – Website <p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>DNV has reviewed PTTGC's proposed KPIs for the prospective SFI including:</p> <ul style="list-style-type: none"> KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions KPI 2: Dow Jones Sustainability™ World Index (DJSI World) Ranking in the Chemicals Sector <p>Note that KPI 2 should be seen as a relative indicator of benchmarking PTTGC's performance against that of its peers in the chemicals sector globally across ESG factors.</p> <p>In addition to the SLF Instruments Terms, PTTGC also shared its broader sustainability strategy and aims. These were reviewed by DNV and confirmed to include key related commitments, linked to the UN SDGs and covering key issues through management guidelines and goals.</p> <p>DNV regards these KPIs as appropriate indicators for showing a transition and commitment to achieve net-zero in the future, as well as a positive contribution to sustainability. Initiatives under the net-zero ambition align with the ASEAN and Thailand Taxonomies, as well as Section 1 of the SLLP Guidance:</p> <ul style="list-style-type: none"> of being material and measurable to the overall business; are externally verifiable; and can be benchmarked against other standards, requirements, and guidelines.
1b	KPI – Measurability	<p>KPIs should be measurable or quantifiable on a consistent methodological basis; externally verifiable; and able to be benchmarked, i.e., as much as possible using an external reference or definitions to facilitate the assessment of the SPT's level of ambition.</p>	<p>Review of:</p> <ul style="list-style-type: none"> PTTGC Sustainability-Linked Financing Framework, October 2023 PTTGC Sustainability Report PTTGC – Website <p>Correspondence with PTTGC representatives</p>	<p>DNV concludes that the KPIs are measurable using quantifiable performance data and established benchmarks as follows:</p> <ul style="list-style-type: none"> KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions <p>This includes all PTTGC's own operations including subsidiaries in Thailand. PTTGC utilizes the Operational Control approach for GHG accounting, which accounts for GHG emissions from operations where it has</p>

		<p>Borrowers/Issuers are encouraged, when possible, to select KPI(s) that they have already been included in their previous annual reports, sustainability reports or other non-financial reporting disclosures to allow investors to evaluate historical performance of the KPIs selected. In situations where the KPIs have not been previously disclosed, Borrowers/Issuers should, to the extent possible, provide historical externally verified KPI values covering at least the previous 3 years.</p>	<p>through weekly meetings.</p>	<p>authority to introduce and implement relevant GHG policies at the operational level.</p> <ul style="list-style-type: none"> • KPI 2: Dow Jones Sustainability™ World Indices (DJSI World) Ranking in the Chemicals Sector <p>Being a top leader in DJSI World members (Top 5) in chemicals sector is a result of Corporate Sustainability Assessment (CSA). DJSI is a globally accepted and competitive standard.</p> <p>The methodology of CSA (Corporate Sustainability assessment) is a rules-based methodology with the industry-specific (Chemicals). The CSA requires the rationale of each answer including supporting evidence to illustrate all answers</p> <ol style="list-style-type: none"> 1. Economic Dimension: This encompasses corporate governance, risk management, financial performance, and innovation-related indicators. It evaluates factors such as corporate governance practices, transparency, business ethics, risk management systems, and financial stability. 2. Environmental Dimension: This focuses on a company's environmental impact and management practices. It assesses areas such as climate strategy, energy consumption, greenhouse gas emissions, water usage and management, waste management, and environmental reporting. 3. Social Dimension: This evaluates a company's performance in social criteria such as labor practices, human rights, talent attraction and retention, occupational health and safety, supply chain management, community engagement, diversity and inclusion, and social reporting. <p>DNV concludes that the measurement methodology is robust and a reliable set of metrics to measure the KPIs has been selected.</p>
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1c	KPI – Clear definition	A clear definition of the KPI(s) should be provided and include the applicable scope or perimeter as well as the calculation methodology	<p>Review of:</p> <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website <p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>DNV confirms that the KPIs have been clearly defined and are readily understood in the correct context:</p> <ul style="list-style-type: none"> • KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions <p>PTTGC's Framework provides a detailed explanation of the approach taken to determining GHG emissions. GHG Emissions are calculated as per the "GHG Protocol Corporate Accounting and Reporting Standard" by World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD).</p> <ul style="list-style-type: none"> • KPI 2: Dow Jones Sustainability™ World Indices (DJSI World) Ranking in the Chemicals Sector <p>In order to earn a high DJSI score, the candidate has to perform excellent in economic, environmental, social, and governance for at least four consecutive years.</p> <p>Moreover, DJSI adjusts scoring criteria annually leading to more tightening as a result of peers' performance.</p>
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2. Calibration of Sustainability Performance Targets (SPTs)

Ref	Criteria	Requirements	Work Undertaken	DNV Findings
2a	Target Setting – Meaningful	The SPTs should be ambitious, realistic and meaningful to the Borrower's business and be consistent with the Borrowers' overall strategic sustainability/ESG strategy	<p>Review of:</p> <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website <p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>DNV confirms that the SPTs are consistent with the Borrower/Issuer's overall strategic sustainability/ESG strategy and aligned with core ESG policy goals.</p> <p>The targets are ambitious in the context of PTTGC's business:</p> <ul style="list-style-type: none"> • KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions <p>Targets set out under SPT #1 are part of PTTGC's overall net-zero roadmap plans to 2050. In order to achieve its SPT, this will require several decarbonization initiatives to be carried out by PTTGC. There are 3 strategies to achieve the intended targets – (i) Efficiency-driven; (ii) Portfolio-driven; and (iii) Compensation-driven. PTTGC's projects require significant investments to be developed hence the need for PTTGC to access capital markets to finance these capital-intensive projects.</p> <ul style="list-style-type: none"> • KPI 2: Dow Jones Sustainability™ World Index (DJSI World) Ranking in the Chemicals Sector <p>In line with PTTGC's vision to be a leading global chemical company for better living, PTTGC aims to integrate social and environmental responsibility into its business to achieve sustainable development.</p> <p>In order to achieve a Top 5 Ranking within the Chemicals Sector in DJSI World, PTTGC would be required to meet certain criteria, such as having a score among the highest scoring companies in the Eligible Universe and being ranked within the top 10% for ESG score within its industry. PTTGC would have to ensure it obtains a leading S&P Global ESG Score within its industry.</p>
2b	Target Setting – Meaningful	SPTs should represent a material improvement in the respective KPIs and be beyond a "Business as Usual" trajectory; where possible be compared to a benchmark or an external reference and	<p>Review of:</p> <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report 	<p>DNV confirms that the chosen SPTs represent a material improvement of the KPIs, being substantial improvements over the baseline condition and through the SFI term:</p> <ul style="list-style-type: none"> • KPI 1: Reduction of Absolute Scope 1 and Scope 2 Greenhouse Gas Emissions

		<p>be determined on a predefined timeline, set before (or concurrently with) the issuance of the Bond/Loan.</p>	<ul style="list-style-type: none"> • PTTGC – Website Correspondence with PTTGC representatives through weekly meetings. 	<p>PTTGC has set a baseline year (2021) for benchmarking its GHG emissions reduction, in absolute terms, measured out to 2030. In practicality, this corresponds to a more material measurement of emissions compared to reductions from efficiency; given the diverse products from PTTGC's manufacturing. The Framework indicates PTTGC's efforts to invest funds from SLF Instruments into aspects such as R&D and other plants on its roadmap to diverge from a BAU trajectory. This is evidenced through meeting the recommendations under the IPCC scenario for industrial processes, of adapting more energy efficient equipment and building CCUS before 2030 to avoid BAU scenarios for climate change mitigation. This is also set out through PTTGC's overall commitment towards a low carbon future and a net-zero roadmap by 2050.</p> <ul style="list-style-type: none"> • KPI 2: Dow Jones Sustainability™ World Index (DJSI World) Ranking in the Chemicals Sector <p>The methodology of the Corporate Sustainability Assessment (CSA), which the DJSI World is based on, is reviewed and updated on an annual basis to ensure that it addresses emerging, forward looking sustainability issues. As such, PTTGC would have to address periodically such changes in the methodology as they are updated to ensure that it remains ahead of the curve and retains its positioning.</p> <p>At the same time, PTTGC's peers are also constantly improving their sustainability practices and reporting and have the potential to improve their ranking within the DJSI World. As a result, PTTGC aims, through this Framework, to maintain its position in the DJSI World Ranking Index to remain as one of the world's leading chemical companies.</p>
2c	Target Setting – Benchmarks	<p>The target setting exercise should be based on a combination of benchmarking approaches:</p> <ol style="list-style-type: none"> 1. The Borrower/Issuer's own performance over time for which a minimum of 3 years, 	<p>Review of:</p> <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website 	<p>Based on our discussions and review of documents - DNV confirms that the SPT target setting exercise has been based on an appropriate combination of methodologies including benchmarking approaches:</p> <ol style="list-style-type: none"> 1. DNV confirms that the SLF Instruments Terms provide KPI descriptions and SPT performance as relevant to meet a minimum of 3 years

		<p>where feasible, of measurement track record on the selected KPI(s) is recommended and when possible forward-looking guidance on the KPI</p> <ol style="list-style-type: none"> The SPTs relative positioning versus the Borrower's peers where comparable or available, or versus industry or sector standards Systematic reference to science-based scenarios, or absolute levels (e.g., carbon budgets) or official country / regional / international targets or to recognised Best-Available-Technologies or other proxies 	<p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>forward-looking guidance. PTTGC has provided an outlook to 2030.</p> <ol style="list-style-type: none"> DNV concludes that the SPTs outlined go beyond that of the industry standard. SPT #1 shows an ambitious commitment, in line with the Thailand Taxonomy and Thailand's NDC, to reduce the share of GHG emissions in the manufacturing industry by 2030 and 2065. DNV also considers the SPTs to be in line with international and local contexts, specifically aligning with Thailand's NDC of GHG reduction by 20% from projected BAU levels by 2030; which also falls in line with the IPCC scenario towards net-zero. DNV concludes that the SPT #1 references science-based scenarios for meeting net-zero GHG emissions; and SPT #2 meets the appropriate international context for benchmarking sustainability efforts in recognition of sustainable business practices that meet ESG criteria defined under the DJSI.
2d	<p>Target setting – Disclosures</p>	<p>Disclosures on target setting should make clear reference to:</p> <ol style="list-style-type: none"> the timelines for the target achievement, including the target observation date(s)/ period(s), the trigger event(s) and the frequency of review of the SPTs Where relevant, the verified baseline or reference point selected for improvement of KPIs as well as the rationale for that baseline or reference point to be used Where relevant, in what situations recalculations or pro-forma adjustments of baselines will take place Where possible and taking into account competition and confidentiality considerations, how the Borrower intends to reach such SPTs 	<p>Review of:</p> <ul style="list-style-type: none"> PTTGC Sustainability-Linked Financing Framework, October 2023 PTTGC Sustainability Report PTTGC – Website <p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>DNV confirms that the relevant disclosures on target setting are appropriately referenced:</p> <ol style="list-style-type: none"> The timeline of SPT target achievement are clearly referred to, indicative of a target achievement by 2030. The reference point for the SPTs is a baseline of 2021 (for KPI 1) and a 4-year lookback period (for KPI 2). This is a reasonable consideration for both KPIs, as the projections are to 2030, to follow Thailand's net-zero transition. Based on the review and discussion with the PTTGC team, DNV is of the opinion that PTTGC has considered any situations that could lead to a recalculation of the KPI baseline/trajectory. Accordingly, PTTGC has set its baseline year to 2021 for the KPIs (revised from 2022 previously), to take into consideration its normalized production levels post-COVID-19 as well as taking into consideration projected company growth until 2030. The SLF Instruments Terms and background information provided, offer sufficient information on how SPTs will be achieved, references how progress to date has been achieved and the

				<p>likely measures to be implemented to meet the KPI. Based on our interactions with PTTGC and review of the materials provided, the method by which each SPT is to be achieved is considered to be well explained and logical in context.</p> <p>After review of PTTGC's overall policy strategy and management approach, DNV concludes that the SPTs are realistic and possible to meet.</p>
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3. Financial Characteristics

Ref	Criteria	Requirements	Work Undertaken	DNV Findings
3a	Loan/Bond Characteristics – SPT Financial / structural impact	The SFI will need to include a financial and/or structural impact based on whether the KPI(s) reach the predefined SPT(s).	Review of: <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website Correspondence with PTTGC representatives through weekly meetings.	<p>The Framework states that PTTGC will set out the relevant KPI, SPT, as well as financial implications in the event of its failure to achieve the SPT in the documentation of the financial instrument.</p> <p>PTTGC will notify the holders of the instrument or the lenders whether the SPT is met or not, as soon as possible after the calculation date (as defined in the instrument's terms and conditions). If for any reason the KPI cannot be calculated, observed, or reported in a timely and satisfactory manner (as defined in the instrument's documentation), the defined bond or loan characteristic change will be triggered as if the SPT was not met. If the specified SPT(s) have been met, and the specified reporting is available publicly, the financial characteristics of the sustainability-linked instrument either remains unchanged, or changes (in the case that a margin benefit is applicable, as defined in the instrument's terms and conditions).</p>

4. Reporting

Ref	Criteria	Requirements	Work Undertaken	DNV Findings
4a	Reporting	<p>Borrowers of SFIs should publish, and keep readily available and easily accessible:</p> <ol style="list-style-type: none"> 1. Up-to-date information on the performance of the selected KPI(s), including baselines where relevant 2. A verification assurance report relative to the SPT outlining the performance against the SPTs and the related impact, and timing of such impact, on the Loan's financial and/or structural characteristics 3. Any information enabling investors to monitor the level of ambition of the SPTs <p>This reporting should be published regularly, at least annually, and in any case for any date/period relevant for assessing the SPT performance leading to a potential adjustment of the SFI's financial and/or structural characteristics.</p>	<p>Review of:</p> <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website <p>Correspondence with PTTGC representatives through weekly meetings.</p>	<p>PTTGC will report on its KPIs and SPTs on an annual basis, which will be disclosed within its annual report and/or sustainability report and/or standalone report to be published and made available to investors/lenders on PTTGC's website each year until the maturity of the sustainability-linked instrument.</p> <p>This will include:</p> <ul style="list-style-type: none"> • Annual information concerning the performance of PTTGC against the selected KPI(s) and SPT(s). • Details of any material change, or updates related to the KPIs set out in this framework. • Other information that will enable investors/lenders to monitor the progress of the SPT. • Verification assurance report related to the SPT as set out in Section 2.5 of the Framework.

5. Verification

Ref	Criteria	Requirements	Work Undertaken	DNV Findings
5a	External Verification	Borrowers should have its performance against each SPT for each KPI independently verified by a qualified external reviewer with relevant expertise, at least once a year.	Review of: <ul style="list-style-type: none"> • PTTGC Sustainability-Linked Financing Framework, October 2023 • PTTGC Sustainability Report • PTTGC – Website Correspondence with PTTGC representatives through weekly meetings.	PTTGC has provided assurances that it will obtain external verification on the KPIs and progress towards achieving the SPTs and disclose such findings to investors/lenders through a verification report provided by the independent auditor. For KPI 1: Annually, and in any case for any date/period relevant for assessing the KPI performance against the SPT leading to a potential financial adjustment until the KPI trigger event of the relevant SFI has been reached. For KPI 2: The results of KPI 2 will be announced in the fourth quarter every year and publicly released by S&P/DJSI.

Findings and DNV's Opinion – Green Financing

DNV's findings on the alignment with Principles are listed below:

1. Use of Proceeds

PTTGC intends to use the net proceeds from the issuance of the green instruments towards, (i) Repayment of intercompany loan within PTT Group and/or any other loans received from any external party used to fund the development of the eligible projects; (ii) Investments in fixed assets, other capital expenditures and/or equity injection required for new eligible projects; (iii) Working capital funding related to the eligible projects; and (iv) Financing costs and related expenses including operating expenditure.

The Framework defines the following eligible green project categories.

Eligible Green Project Categories

- Energy Efficiency
- Pollution Prevention and Control
- Renewable Energy
- Eco-efficient and/or Circular Economy Adapted Products, Production Technologies and Processes
- Terrestrial and Aquatic Biodiversity

DNV undertook an analysis of the associated project type to determine the eligibility as "Green" and in line with the Principles. DNV concludes that the eligible categories outlined in the Framework are consistent with the categories outlined in the Principles.

2. Process for Project Evaluation and Selection

PTTGC has set up an evaluation and selection process, in the form of an Investment Committee that will make decisions on the eligibility criteria as well as any financial considerations.

PTTGC's Investment Committee will have various responsibilities in the evaluation and selection process. The Investment Committee will be comprised of top management and supporting function from the Sustainability, Legal, Commercial, and Financial teams. A description of the responsibilities is described for the relevant parties in evaluating and selecting eligible projects for allocating the proceeds. Additionally, it is stated that the Investment Committee will convene a meeting once a year to discuss matters related to the green financing issued and its use of proceeds for eligible green projects.

DNV concludes that PTTGC's Framework appropriately describes the process for Project Evaluation and Selection.

3. Management of Proceeds

PTTGC describes the process for management of net proceeds under this Framework:

PTTGC will maintain a Green register and earmark the respective Green projects, which allows investors/lenders to have full transparency and traceability of the use of proceeds. The net proceeds shall be deposited either into PTTGC's general funding accounts or into separate and specifically assigned 'green' bank account to be set up to receive, hold, disburse, and manage the proceeds. All corresponding amounts are adjusted on the respective accounts on a timely basis and tracked on the register.

It also describes the process for financing vs. refinancing and any unallocated proceeds; that any unallocated proceeds will be placed temporarily into a dedicated sub-portfolio for any eligible investments/assets as determined by the Investment Committee. Pending full allocation of such amounts to the portfolio of Eligible Projects, PTTGC may hold and/or invest the balance of net proceeds not yet allocated, at their discretion, in their Treasury liquidity portfolio (in cash or cash equivalents, government bond, fixed income, etc.) by considering liquidity and security.

DNV has reviewed the evidence presented and concludes that the Framework appropriately describes the process for Management of Proceeds.

4. Reporting

The Framework explains the metrics and key information that is to be included in the annual Allocation Reporting (termed "Fund Allocation") and Impact Reporting (termed "Green Impact Report"). Where relevant and possible, PTTGC will aim to provide information on its data reporting and impact assessment methodologies in order to be fully transparent on use of proceeds. PTTGC may consider engaging an external auditor to verify its internal tracking method and the allocation of funds from proceeds.

On the basis of the information provided by PTTGC and the work undertaken, it is DNV's opinion that the Framework meets the criteria established in the Protocol and that it is aligned with the stated definition of Green Financing Instruments within the Principles.

For DNV (Thailand) Co., Ltd.

Bangkok, Thailand / 10 October 2023



Jerus D'Silva
Lead Assessor
Supply Chain and Product Assurance
(SCPA)



Kobrat Chotruangprasert
Technical Reviewer
Supply Chain & Product Assurance
(SCPA)

Schedule 1. Description of Categories to be financed or refinanced through the Customer's Green Financing Instruments

Eligible Green Project Categories	Eligible Criteria and Description	DNV Findings
Energy Efficiency	<p>Investments and expenditure to improve energy efficiency of production processes including revamps, modifications or installation of equipment (boilers, furnaces, reactors, heat exchanger, distillation columns and other separation units, etc.).</p> <p>Sample projects include:</p> <ul style="list-style-type: none"> • Applying digital technology and installing new equipment to optimize the heat management and operating condition (Aromatics business) • Utilize excess steam to produce electricity for existing production line (Polymers business) • Install new equipment and optimize ethylene yield with lower fuel usage (Olefins business) 	<p>DNV finds that the criteria and sample projects listed under this category to be aligned with the Principles for Eligible Green Projects.</p>
Pollution Prevention and Control (Sustainable Aviation Fuel)	<p>Expenditures and investments related to the development, construction, and installation of sustainable aviation fuels manufacturing facilities that utilize renewable and non-fossil fuel-based inputs.</p>	<p>DNV considers the criteria listed by PTTGC for investments and expenditures, to be eligible project categories under Pollution Prevention and Control, given its focus on redirecting the manufacturing facilities away from fossil-fuel based inputs. This is also aligned with relevant industry practices, as described under the ASEAN and Thailand Taxonomies.</p>
Pollution Prevention and Control (Carbon Capture and Storage)	<p>Expenditures and investments in carbon capture technologies, utilization and/or storage projects whereby carbon emissions are captured for further use or sequestered (such as permanent underground storage). Captured CO₂ will not be utilized for enhanced oil recovery (EOR).</p> <p>Sample projects include:</p> <ul style="list-style-type: none"> • Capture of CO₂ from operating assets for storage in Nearshore which is a new permanent storage; and • Capture of CO₂ emissions from a production plant in US and transport to storage at new permanent underground storage. 	<p>DNV noted that this project category is under research and development and would not materialize closer to the end of 2030. However, the project can support decarbonization pathway and the criteria for investment and expenditures are in line with the Principles for Pollution Prevention and Control, and also meet the criteria for eligibility under Green in the Principles.</p>
Renewable Energy	<p>Expenditures and investments related to the development, acquisition, construction, installation and maintenance of renewable power plants, generating energy using:</p> <ul style="list-style-type: none"> • Solar Power (photovoltaic) <p>This includes sourcing of renewable energy through long-term power purchase agreements (PPAs) or virtual power purchase agreements (vPPAs):</p> <ul style="list-style-type: none"> • Source of renewable energy is solar rooftop and floating solar PV 	<p>The Activities listed under this project category are automatically considered as Green in the ASEAN and Thailand Taxonomies. DNV considers these to be aligned with the Principles for Eligible Green Projects.</p>

	<p>Investment and expenditures related to the procurement of biogas from industry by-products, waste or sustainable feedstocks that do not compete with food production.</p> <p>Investment and expenditures related to R&D activities and the procurement of green hydrogen or ammonia (meeting the below criteria) and revamps or modifications to equipment (boilers, furnaces, burners, etc.) to employ switching of fuel source to hydrogen and ammonia or repair and maintenance of such assets and projects.</p> <ul style="list-style-type: none"> • Green Hydrogen (and ammonia) projects are limited to production of hydrogen using electrolysis that meet either of the following criteria: <ul style="list-style-type: none"> ○ Lifecycle GHG emissions threshold of under 3tCO₂e / tH₂; or ○ Powered using 100% renewable energy (as defined in the Renewable Energy category) 	
<p>Eco-efficient and/or Circular Economy Adapted Products, Production Technologies and Processes</p>	<p>Investments and expenditures related to the R&D, manufacturing and distribution of products that enable a circular economy, resulting in net reductions in product lifecycle GHG emissions. These include mechanical and chemical recycling of plastic waste as well as products made with:</p> <ul style="list-style-type: none"> • Mechanically recycled feedstocks; • Advanced (molecular) recycled feedstocks; and/or • Renewable-based feedstocks derived from bio-based wastes, residual oils, and other sustainable sources (e.g., sources should not include any inputs that divert arable land away from food). <p>These include projects that:</p> <ul style="list-style-type: none"> • Convert PET and HDPE waste or PE, PP to (food grade) rPET and (high-quality) rHDPE recycled resins • Investment in a PLA bioplastics plant. Bioplastic produced would have OK biobased and USDA BioPreferred certifications (biobased content of Ingeo biopolymer which can be determined through radiocarbon dating according to ASTM D6866). • Co-process with existing refinery plant for biomass to bio-naphtha for further production of biopolymers downstream. 	<p>PTTGC's commitments to projects under this category meet the criteria under the Principles, through designing for circularity and incorporating eco-efficient certification processes. DNV also considers these projects and investments to be aligned with relevant standards, such as the CBI Taxonomy (CBS).</p>
<p>Terrestrial and Aquatic Biodiversity</p>	<p>Projects related to terrestrial and aquatic biodiversity conservation and protection of coastal, marine and watershed environments which are limited to planting of mangroves.</p>	<p>DNV finds the criteria listed under this category to be aligned with the Principles for Eligible Green Projects.</p>

Schedule 2. Contributions to UN SDGs

Eligible Project Categories	UN SDGs	DNV Findings
<p>Energy Efficiency</p> <p>Renewable Energy</p>	<p>SDG 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.</p> <p>SDG 7.3 By 2030, double the global rate of improvement in energy efficiency.</p> <p>SDG 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.</p> <p>SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.</p> <p>SDG 13.2 Integrate climate change measures into national policies, strategies and planning.</p>	<p>DNV is of the opinion that the eligible category outlined in the Framework contributes to the achievement of the UN SDGs.</p>
<p>Pollution Prevention and Control (Sustainable Aviation Fuel)</p> <p>Pollution Prevention and Control (Carbon Capture and Storage)</p>	<p>SDG 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.</p> <p>SDG 12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.</p> <p>SDG 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.</p> <p>SDG 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</p> <p>SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.</p> <p>SDG 13.2 Integrate climate change measures into national policies, strategies and planning.</p>	
<p>Eco-efficient and/or Circular Economy Adapted Products, Production Technologies and Processes</p>	<p>SDG 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.</p> <p>SDG 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.</p>	

	<p>SDG 12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.</p> <p>SDG 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.</p> <p>SDG 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.</p> <p>SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.</p> <p>SDG 13.2 Integrate climate change measures into national policies, strategies and planning.</p>	
<p>Terrestrial and Aquatic Biodiversity</p>	<p>SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.</p> <p>SDG 13.2 Integrate climate change measures into national policies, strategies and planning.</p> <p>SDG 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.</p> <p>SDG 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.</p>	

Schedule 3. Eligibility Assessment Protocol

1. Use of Proceeds

Ref.	Criteria	Requirements	DNV Findings
1a	Type of bond / loan	<p>The Bond / Loan must fall in one of the following categories, as defined by the Principles:</p> <ul style="list-style-type: none"> Green Use of Proceeds Bond Green Use of Proceeds Revenue Bond Green Project Bond Green Securitized Bond Loan instrument made available for Green project (Green use of loan proceeds) 	<p>The Framework states that the net proceeds from the issuance of the green instruments will go towards, (i) Repayment of intercompany loan within PTT group and/or any other loans received from any external party used to fund the development of the eligible projects; (ii) Investments in fixed assets, other capital expenditures and/or equity injection required for new eligible projects; (iii) Working capital funding related to the eligible projects; and (iv) Financing costs and related expenses including operating expenditure.</p> <p>Additionally, the Framework indicates that the allocations of proceeds may be adjusted over the life of the financial instrument as determined by the Investment Committee and will be communicated clearly to investors/lenders.</p> <p>The reviewed evidence confirms that the Green Financing Instruments meet the criteria under the Principles.</p>
1b	Green Project Categories	<p>The cornerstones of Green Bonds and Loans are the utilization of the proceeds of the bonds or the loans which should be appropriately described in the legal documentation for the security.</p>	<p>Eligible project categories presented by PTTGC are as follows:</p> <ul style="list-style-type: none"> Energy efficiency Pollution Prevention and Control (Sustainable Aviation Fuel) Pollution Prevention and Control (Carbon Capture and Storage) Renewable Energy Eco-efficient and/or Circular Economy Adapted Products, Production Technologies and Processes Terrestrial and Aquatic Biodiversity <p>The above-mentioned project category meets the Eligible Green Project Categories in the Principles.</p>
1c	Environmental benefits	<p>All designated Green Project categories should provide clear environmentally sustainable benefits, which, where feasible, will be quantified or assessed by the Issuer.</p>	<p>Environmental benefits are noted to include, for the following eligible project categories:</p> <p><i>Energy Efficiency and Renewable Energy</i></p> <ul style="list-style-type: none"> Reduced Scope 1, Scope 2, and Scope 3 emissions by 2050 through energy conservation, efficiency improvements initiatives, deployment of low-carbon technologies, utilization of clean energy sources, and CCUS. PTTGC aims to maximize operational efficiency across all of its assets and implement new breakthrough technologies where possible. <p><i>Pollution Prevention and Control</i></p> <ul style="list-style-type: none"> Reduction and prevention of future GHG emissions by PTTGC through implementation of CCUS and creation of sustainable aviation fuels (SAF). PTTGC also plans on researching opportunities to invest in recycling facilities, to divert waste for recycling and create more opportunities for the creation of bio-based and biodegradable plastics.

			<ul style="list-style-type: none"> Through investments in SAF, PTTGC also sees opportunities to create lower carbon-intensive fuels (e.g., Hydrogen) which is seen as long-term offsetting / prevention of emissions by switching to more sustainable fuels. <p><i>Eco-efficient and/or Circular Economy Adapted Products, Production Technologies and Processes</i></p> <ul style="list-style-type: none"> Reduction of waste to the environment as well as GHG emissions, through creation of circularity options for customers and value chains (e.g., performance resins, bio-based products, and recycled resins). <p><i>Terrestrial and Aquatic Biodiversity</i></p> <ul style="list-style-type: none"> Increased (natural) carbon sequestration, as well as protection and improvement of water biodiversity through the planting of mangrove trees. <p>The proposed use of proceeds is confirmed by DNV to reasonably be expected to deliver meaningful environmental benefits.</p>
1d	Refinancing Share	In the event that a proportion of the proceeds may be used for refinancing, it is recommended that issuers provide an estimate of the share of financing vs. re-financing, and where appropriate, also clarify which investments or project portfolios may be refinanced.	<p>The Framework indicates that the allocations of proceeds may be adjusted over the life of the financial instrument as determined by the Investment Committee. The lookback period for projects to be eligible for any disbursement of proceeds shall be, where relevant: (i) Capital expenditures within a 36-month period prior to the date of issuance; (ii) Operating expenditures within a 36-month period prior to the date of issuance.</p> <p>Under the Annual Allocation Reporting, it is stated that PTTGC will list all eligible projects that have been financed / refinanced, including the share of refinancing to new financing. PTTGC will ensure that the estimated proportion of financing proceeds used for refinancing / financing will be explicitly documented in relevant publicly available company reports such as the annual report, sustainability report and annual impact report, whichever is relevant.</p> <p>Additionally, PTTGC will communicate to investors / lenders an indicative amount to be allocated to any look-back projects before the financing is issued.</p> <p>The proposed management of net proceeds from the Green Finance Instruments is confirmed by DNV to reasonably be expected to meet the criteria under the Principles.</p>

2. Process for Project Selection and Evaluation

Ref.	Criteria	Requirements	DNV Findings
2a	Investment-decision process	<p>The Issuer of a Green Bond and Loan should outline the decision-making process it follows to determine the eligibility of projects using Green Bond and Loan proceeds. This includes, without limitation:</p> <ul style="list-style-type: none"> The environmental objectives of the eligible Green Projects; 	<p>PTTGC has set up an evaluation and selection process, in the form of an Investment Committee that will make decisions on the eligibility criteria as well as any financial considerations.</p> <p>From the Framework</p> <p><i>Any potentially eligible Green Projects to be financed with these proceeds will be evaluated and selected by the Investment Committee who will decide based on the eligibility criteria as well as any financial considerations.</i></p>

		<ul style="list-style-type: none"> The process by which the issuer determines how the projects fit within the eligible Green Projects categories; and Complementary information on processes by which the issuer identifies and manages perceived environmental and social risks associated with the relevant project(s). 	<p>PTTGC's Investment Committee will have various responsibilities in the evaluation and selection process. The Investment Committee will be comprised of top management and supporting function from the Sustainability, Legal, Commercial, and Financial teams.</p> <p>DNV confirms this process to be well aligned with the Principles.</p>
2b	Issuer / borrower's environmental and governance framework	<p>Issuers are also encouraged to:</p> <ul style="list-style-type: none"> Position the relevant information within the context of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability. Provide information, if relevant, on the alignment of projects with official or market-based taxonomies, related eligibility criteria Have a process in place to identify mitigants to known material risks of negative environmental and/or social impacts from the relevant project(s). 	<p>PTTGC's vision is to become a leading global chemical company for better living that combines environmentally friendly innovations with advanced technologies to develop products which enable improvement of people's lives.</p> <p>The Framework describes a governance structure for selecting eligible green projects. PTTGC also indicates its strategy to manage the process and the approach taken for selection and evaluation, through the Investment Committee and with support from multi-departmental representatives.</p> <p>A description of the responsibilities is described for the relevant parties in evaluating and selecting eligible projects for allocating the proceeds. Additionally, it is stated that the Investment Committee will convene a meeting once a year to discuss matters related to the green financing issued and its use of proceeds for eligible green projects.</p> <p>DNV confirms that PTTGC's environmental sustainability strategies and alignment of projects with eligibility criteria are well aligned with the Principles.</p>

3. Management of Proceeds

Ref.	Criteria	Requirements	DNV Findings
3a	Tracking procedure	<ul style="list-style-type: none"> (Bond) The net proceeds of Green Bonds should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the Issuer in an appropriate manner and attested to by a formal internal process that will be linked to the Issuer's lending and investment operations for Green Projects. (Loan) The proceeds of Green Loans should be credited to a dedicated account or otherwise tracked by the borrower in an appropriate manner, so as to maintain transparency 	<p>The evidence reviewed shows how PTTGC plans to manage the net proceeds from the Green Finance Instruments, in accordance with the evaluation and selection process in the Principles.</p> <p>From the Framework</p> <p><i>PTTGC will maintain a Green register and earmark the respective Green projects, which allows investors/lenders to have full transparency and traceability of the use of proceeds.</i></p> <p><i>The net proceeds shall be deposited either into PTTGC's general funding account or into separate and specifically assigned 'green' bank account to be set up to receive, hold, disburse, and manage the proceeds. All corresponding amounts are adjusted on the respective accounts on a timely basis and tracked on the register.</i></p>

		<p>and promote the integrity of the product. Where a green loan takes the form of one or more tranches of a loan facility, each green tranche(s) must be clearly designated, with proceeds of the green tranche(s) credited to a separate account or tracked by the borrower in an appropriate manner.</p>	<p>It is also evidenced in the Framework for Annual Reporting that, with regards to Allocation Reporting, PTTGC will report on the following:</p> <p>From the Framework</p> <ul style="list-style-type: none"> • <i>List of eligible projects that have been financed/ refinanced, including the share of refinancing to new financing</i> • <i>Detail of projects</i> • <i>Total amount of assets and capital expenditures required or estimated for each of the eligible Green Projects, specified on category and activity level</i> • <i>Allocation of the proceeds to the respective eligible Green Projects</i> • <i>Breakdown of the eligible Green Projects according to what is being financed (e.g., assets, capital expenditures); and</i> • <i>Balance of unallocated proceeds (if any)</i> <p>DNV confirmed that the Framework outlines processes to track proceeds and allocations to the nominated projects that are well aligned with the Principles.</p>
<p>3b</p>	<p>Tracking procedure</p>	<p>So long as the Green Bonds or Loans are outstanding, the balance of the tracked proceeds should be periodically reduced by amounts matching eligible green investments or loan disbursements made during that period.</p>	<p>The related tracking process is covered in the Framework as follows:</p> <p>From the Framework</p> <p><i>PTTGC will aim to ensure that proceeds will be fully disbursed according to the Use of Proceeds set out under Section 2.2 [of the Framework] and / or to future eligible Green Projects within 36 months of receipt ("Disbursement Period").</i></p> <p><i>If PTTGC requires additional time beyond the Disbursement Period to fully disburse the proceeds for acceptable reasons, PTTGC will communicate explicitly and transparently to investors on a contingency plan within 3 months from the expiry.</i></p> <p>DNV confirmed that the Framework outlines processes to track proceeds and allocations to the nominated projects that are aligned with the Principles.</p>
<p>3c</p>	<p>Temporary holdings</p>	<p>Pending such investments or disbursements to eligible Green Projects, the Issuer should make known to investors the intended types of temporary investment instruments for the balance of unallocated proceeds.</p>	<p>The Framework explains the treatment of unallocated funds.</p> <p>Any unallocated proceeds will be placed temporarily into a dedicated sub-portfolio for any eligible investments/assets as determined by the Investment Committee. Pending full allocation of such amounts to the portfolio of Eligible Projects, PTTGC may hold and/or invest the balance of net proceeds not yet allocated, at their discretion, in their Treasury liquidity portfolio (in cash or cash equivalents, government bond, fixed income, etc.) by considering liquidity and security.</p> <p>DNV confirmed that the Framework outlines instruments to which unallocated proceeds will be invested that are well aligned with the Principles.</p>

4. Reporting

Ref.	Criteria	Requirements	DNV Findings
4a	Periodical reporting	<ul style="list-style-type: none"> • Issuers should make, and keep, readily available up to date information on the use of proceeds to be renewed annually until full allocation, and on a timely basis in case of material developments. • The annual report should include a list of the projects to which Green Bond proceeds have been allocated, as well as a brief description of the projects, the amounts allocated, and their expected impact. • Where confidentiality agreements, competitive considerations, or a large number of underlying projects limit the amount of detail that can be made available, the GBP recommend that information is presented in generic terms or on an aggregated portfolio basis (e.g. percentage allocated to certain project categories). 	<p>PTTGC has confirmed that it will disclose the allocation of the net proceeds of the Green Finance Instruments and publish updates of the allocation of the proceeds, as well as impact reporting, throughout the term.</p> <div data-bbox="759 495 1445 698" style="border: 1px solid black; padding: 5px;"> <p>From the Framework</p> <p><i>PTTGC will issue a dedicated impact report on an annual basis disclosing information on (“Annual Green Impact Report”) until full allocation or in case of any material change. This report will be published and shared with investors/lenders and shall be made publicly available on the Company’s website.</i></p> </div> <p>The Framework explains the metrics and key information that is to be included in the annual Allocation Reporting (termed “Fund Allocation”) and Impact Reporting (termed “Green Impact Report”).</p> <p>Where relevant and possible, PTTGC will aim to provide information on its data reporting and impact assessment methodologies in order to be fully transparent on use of proceeds. PTTGC may consider engaging an external auditor to verify its internal tracking method and the allocation of funds from proceeds.</p> <p>DNV confirms that the proposed reporting is consistent with the criteria set out in the Principles.</p>

Schedule 4. Green Bond / Loan External Review Form

Section 1. Basic Information

Issuer name:

PTT Global Chemical Public Company Limited ("PTTGC")

Green Finance ISIN or Issuer Framework Name, if applicable:

PTTGC's Sustainable Finance Framework

Independent External Review provider's name:

DNV (Thailand) Co., Ltd.

Completion date of this form:

11 August 2023

Publication date of review publication:

10 October 2023

Section 2. Review overview

SCOPE OF REVIEW

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

The review assessed the following elements and confirmed their alignment with the ICMA GBP, LMA/APLMA GLP and ACMF ASEAN GBS:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Use of Proceeds | <input checked="" type="checkbox"/> Process for Project Evaluation and Selection |
| <input checked="" type="checkbox"/> Management of Proceeds | <input checked="" type="checkbox"/> Reporting |

ROLE(S) OF INDEPENDENT EXTERNAL REVIEW PROVIDER

- | | |
|---|---|
| <input checked="" type="checkbox"/> Second Party Opinion | <input type="checkbox"/> Certification |
| <input type="checkbox"/> Verification | <input type="checkbox"/> Scoring/Rating |
| <input type="checkbox"/> Other (<i>please specify</i>): | |

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

EXECUTIVE SUMMARY OF REVIEW and/or LINK TO FULL REVIEW (if applicable)

On the basis of the information provided by the Customer and the work undertaken, it is DNV's opinion that the Customer's Framework meets the criteria established in the Protocol and are aligned with the stated Principles.

Section 3. Detailed 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.

1. USE OF PROCEEDS

Overall comment on section (if applicable):

DNV concludes that the Customer's Framework is aligned with the Principles under the Use of Proceeds for the stated Green Finance Instruments.

If applicable please specify the environmental taxonomy, if other than GBPs: GLP, ASEAN GBS.

Use of proceeds categories as per GLP:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Renewable energy | <input checked="" type="checkbox"/> Energy efficiency |
| <input checked="" type="checkbox"/> Pollution prevention and control | <input type="checkbox"/> Environmentally sustainable management of living natural resources and land use |
| <input checked="" type="checkbox"/> Terrestrial and aquatic biodiversity conservation | <input type="checkbox"/> Clean transportation |
| <input type="checkbox"/> Sustainable water and wastewater management | <input type="checkbox"/> Climate change adaptation |
| <input checked="" type="checkbox"/> Eco-efficient and/or circular economy adapted products, production technologies and processes | <input type="checkbox"/> Green buildings |

2. PROCESS FOR PROJECT EVALUATION AND SELECTION

Overall comment on section (if applicable):
 DNV reviewed the Framework which describes the process through which projects are evaluated and selected. DNV can confirm the proceeds of the Green Finance Instruments go through an internal process for evaluation and selection.

Evaluation and selection

- | | |
|--|---|
| <input checked="" type="checkbox"/> Credentials on the issuer's green objectives | <input checked="" type="checkbox"/> Documented process to determine that projects fit within defined categories |
| <input checked="" type="checkbox"/> Defined and transparent criteria for projects eligible for Green Loan proceeds | <input checked="" type="checkbox"/> Documented process to identify and manage potential ESG risks associated with the project |
| <input type="checkbox"/> Summary criteria for project evaluation and selection publicly available | <input type="checkbox"/> Other (please specify): |

Information on Responsibilities and Accountability

- | | |
|--|--|
| <input checked="" type="checkbox"/> Evaluation / Selection criteria subject to external advice or verification | <input type="checkbox"/> In-house assessment |
| <input type="checkbox"/> Other (please specify): | |

3. MANAGEMENT OF PROCEEDS

Overall comment on section (if applicable):
 The Customer's Framework states that the proceeds will be earmarked to finance or refinance eligible green projects, assets, and expenditures that meet the eligibility criteria set out in this Framework.

Tracking of proceeds:

- Green Bond/Loan proceeds segregated or tracked by the issuer in an appropriate manner
- Disclosure of intended types of temporary investment instruments for unallocated proceeds
- Other (please specify):

Additional disclosure:

- | | |
|--|---|
| <input type="checkbox"/> Allocations to future investments only | <input checked="" type="checkbox"/> Allocations to both existing and future investments |
| <input type="checkbox"/> Allocation to individual disbursements | <input checked="" type="checkbox"/> Allocation to a portfolio of disbursements |
| <input type="checkbox"/> Disclosure of portfolio balance of unallocated proceeds | <input type="checkbox"/> Other (please specify): |

4. REPORTING

Overall comment on section (if applicable):

The Framework states that the allocation of proceeds will be reported on a portfolio basis and made publicly available on the Customer's website.

Use of proceeds reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (please specify): |

Information reported:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Allocated amounts | <input type="checkbox"/> Sustainability Bond financed share of total investment |
| <input type="checkbox"/> Other (please specify): | |

Frequency:

- | | |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Annual | <input type="checkbox"/> Semi-annual |
| <input type="checkbox"/> Other (please specify): | |

Impact reporting:

- | | |
|--|--|
| <input type="checkbox"/> Project-by-project | <input checked="" type="checkbox"/> On a project portfolio basis |
| <input type="checkbox"/> Linkage to individual bond(s) | <input type="checkbox"/> Other (please specify): |

Frequency:

- | | |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Annual | <input type="checkbox"/> Semi-annual |
| <input type="checkbox"/> Other (please specify): | |

Information reported (expected or ex-post):

- | | |
|---|--|
| <input checked="" type="checkbox"/> GHG Emissions / Savings | <input checked="" type="checkbox"/> Energy Savings |
| <input type="checkbox"/> Decrease in water use | <input type="checkbox"/> Number of beneficiaries |
| <input type="checkbox"/> Target populations | <input type="checkbox"/> Other ESG indicators (please specify):
- Metric tons of plastic waste recycled |

Means of Disclosure

- | | |
|---|--|
| <input type="checkbox"/> Information published in financial report | <input checked="" type="checkbox"/> Information published in sustainability report |
| <input type="checkbox"/> Information published in ad hoc documents | <input checked="" type="checkbox"/> Other (please specify): PTTGC's website |
| <input type="checkbox"/> 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.

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

SPECIFY OTHER EXTERNAL REVIEWS AVAILABLE, IF APPROPRIATE



Type(s) of Review provided:

- | | | | |
|-------------------------------------|----------------------------------|--------------------------|----------------|
| <input checked="" type="checkbox"/> | Second Party Opinion | <input type="checkbox"/> | Certification |
| <input type="checkbox"/> | Verification | <input type="checkbox"/> | Scoring/Rating |
| <input type="checkbox"/> | Other (<i>please specify</i>): | | |

Review provider(s):

DNV (Thailand) Co., Ltd.

Date of publication:

10 October 2023

ABOUT ROLE(S) OF REVIEW PROVIDERS AS DEFINED BY THE GLP

1. **Second Party Opinion:** An institution with environmental expertise, that is independent from the issuer may issue a Second Party Opinion. The institution should be independent from the issuer's adviser for its Green Loan Framework, or appropriate procedures, such as information barriers, will have been implemented within the institution to ensure the independence of the Second Party Opinion. It normally entails an assessment of the alignment with the Green Loan Principles. In particular, it can include an assessment of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability, and an evaluation of the environmental features of the type of projects intended for the Use of Proceeds.
2. **Verification:** An issuer can obtain independent verification against a designated set of criteria, typically pertaining to business processes and/or environmental criteria. Verification may focus on alignment with internal or external standards or claims made by the issuer. Also, evaluation of the environmentally sustainable features of underlying assets may be termed verification and may reference external criteria. Assurance or attestation regarding an issuer's internal tracking method for use of proceeds, allocation of funds from Green Loan proceeds, statement of environmental impact or alignment of reporting with the GLP, may also be termed verification.
3. **Certification:** An issuer can have its Green Bond or associated Green Loan Framework or Use of Proceeds certified against a recognised external green standard or label. A standard or label defines specific criteria, and alignment with such criteria is normally tested by qualified, accredited third parties, which may verify consistency with the certification criteria.
4. **Green Loan Scoring/Rating:** An issuer can have its Green Loan, associated Green Loan Framework or a key feature such as Use of Proceeds evaluated or assessed by qualified third parties, such as specialised research providers or rating agencies, according to an established scoring/rating methodology. The output may include a focus on environmental performance data, the process relative to the GBP, or another benchmark, such as a 2-degree climate change scenario. Such scoring/rating is distinct from credit ratings, which may nonetheless reflect material environmental risks.



About DNV

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