



Teekay Shuttle Tankers L.L.C Green Bond Second Opinion

September 29, 2019

Teekay Shuttle Tankers L.L.C. (“Teekay”) is a globally operating owner and operator of shuttle tankers and headquartered in Hamilton, Bermuda. Teekay transports oil from offshore fields to the shore by specialized tankers. Teekay’s customer base consists of primarily oil majors and producers. Teekay is operating a fleet of 33 shuttle tankers mainly in the North Sea, Brazil and the East Coast of Canada.

Proceeds under this framework finance or refinance shuttle tankers. Eligible assets are E-Shuttles with an expected lifetime of 20 years, in whole or in part, that are powered by battery hybrid technology, LNG and condensed Volatile Organic Compounds (VOC, crude oil vapors) as an LNG additive. With the first issuance four vessels will be financed. According to the issuer, each shuttle features annual CO₂ savings of 47% (23 200 tCO₂) as well as an 88% NO_x and a 99% SO_x and 95% VOC emissions reduction compared to business-as-usual in the North Sea context.

CICERO Green welcomes innovation in the oil based shipping industry that has the potential to accelerate the adoption of lower emission technology also in the wider shipping industry. E-Shuttle technology was partly funded by the Norwegian government entity ENOVA which have a clear mandate to reduce carbon emissions. In this context CICERO Green views Teekay’s investments in significantly more efficient shipping as important shorter term steps to reach the well below 2°C target.

E-Shuttles have been acquired to directly replace older, conventional vessels of Teekay’s fleet based on already committed field developments and can be converted to transport other goods (e.g., bio diesel, potable water etc.) should oil production decrease. However, the shuttles transport an estimate of 23.5 million barrels of crude oil with associated emissions of 9.4MtCO₂ – more than the total emissions from road traffic in Norway in 2018. In the case of decreased oil production, Teekay will likely phase out conventional vessels first. This points towards long-term emissions reduction of investments. The issuer does not exclude utilizing E-Shuttles for new field developments in the future.

Despite the vessels estimated lifetime of 20 years, this framework bears significant risks of stranded assets and would therefore benefit from TCFD reporting. This framework could receive a better shading if no fossil fuels were transported as no alternatives to LNG/battery solutions currently exist for long-haul shipping.

Based on the overall assessment of the project types that will be financed by the green bonds, governance and transparency considerations, Teekay’s green bond framework receives a **CICERO Light Green** shading and governance score of **Good**. Teekay provides a short-term solution for important efficiency improvements and supports accelerating lower emission shipping but does not provide a long-term solution to a low-carbon and climate resilient future.

SHADES OF GREEN

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

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



GREEN BOND PRINCIPLES

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





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1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated September, 2019. This second opinion remains relevant to all green bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

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

Expressing concerns with 'shades of green'

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

CICERO Shades of Green



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



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



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



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

Examples



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



Bridging technologies such as plug-in hybrid buses



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



New infrastructure for coal

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



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

Teekay Shuttle Tankers L.L.C. ("Teekay") is a globally operating owner and operator of shuttle tankers and headquartered in Hamilton, Bermuda. Teekay was formed in 2017 and is wholly-owned by Teekay Offshore Partner L.P. ("TOO") in order to expand its operations in the shuttle tanker shipping segment. Teekay transports oil from offshore fields to the shore by specialized tankers. Teekay's customer base consists of primarily oil majors and producers mainly in the North Sea, Brazil and the East Coast of Canada.

According to the annual report, "Teekay's business strategy is primarily focused on implementing existing growth projects, extending assets on long term charters and pursuing additional strategic growth projects". Currently, Teekay's fleet consists of 33 shuttle tankers (total capacity of 4.3 million deadweight ton) of which 27 are held by wholly-owned subsidiaries and four are owned through 50%-owned subsidiaries.

Environmental Strategies and Policies

CO₂ emissions are reported by TOO on parent company level as Teekay currently does not produce a separate sustainability report and does not report its own emissions. However, Teekay informed us that in Q1 2019, Teekay's three fleets in Canada, Brazil and the North Sea emitted a total of 177kt CO₂. While TOO's total emissions amounted to 1.03MtCO₂ in 2018 – a reduction of 16% compared to 2016 –, the emission intensity per barrel of oil produced has increased by 32% to 54 kgCO₂/bbl mainly due to elevated water content of oil in some oil fields that are close to the end of their lifetime. In addition to targets for the newly built vessels subject to this green bond framework, Teekay has a target of annual 2% improvement in fuel efficiency of its vessels. The issuer informed us that Teekay aims to set overall targets higher than the International Maritime Organization (IMO) target of 50% emissions reduction by 2050 compared to 2008¹.

Teekay actively works on reducing its current fleet's emissions by investing in energy efficient vessels (E-Shuttles) partly funded by ENOVA SF. ENOVA SF promotes environmentally friendly production and consumption of energy and is a Norwegian government entity. According to the issuer, E-Shuttles are directly replacing older conventional shuttles and will only operate on already committed North Sea fields and have been built to future proof the fleet. According to the issuer, E-Shuttles were acquired based on existing and committed field developments to directly replace older conventional shuttles. However, if new field developments are to come on stream during the lifetime of the vessels, E-Shuttles may also be used for these new fields. However, no increased oil supply is expected from E-Shuttle investments. Teekay informed us that should the oil industry be phased out or reduced, this would not influence the newbuilds financed via this framework, as they are built on a supply/demand basis of already committed field developments. In addition, Teekay believes that according to future energy outlook projections, oil and gas will still be part of the energy mix in 2050 resulting in a certain need for oil and gas production, albeit at a lower level than today.

According to the issuer, Teekay screens and anticipates a range of transition climate risks as part of their future fleet development such as global carbon pricing, tighter emission regulations and increased stakeholder demand regarding environmental performance as well as increased operational costs. Teekay also anticipates potential shifts in business strategy due to potential oil demand reductions toward utilization of vessels as heavy lift vessels, potable water

¹ <http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx>



transport and synthetic diesel or closed fish farm vessels. Teekay also sees a potential role in future offshore carbon capture and storage (CCS) with offshore injection of CO₂, which meets Teekay's technical capabilities. In addition, TCFD recommendations are currently under consideration by Teekay, but are not being implemented as of yet.

Use of proceeds

Proceeds will be used by Teekay and its subsidiaries for financing and refinancing of assets in the clean transportation category. Eligible assets are E-Shuttle vessels, in whole or in part, that are powered by battery hybrid technology, LNG and condensed Volatile Organic Compounds (VOC, crude oil vapors) as an LNG additive. According to the issuer, this results in annual CO₂ saving of 47% as well as an 88% reduction of NO_x emissions, a 99% SO_x and 95% VOC emission reduction compared to business-as-usual in the North Sea context. The vessels are owned by Teekay or its subsidiaries Aurora Spirit AS, Rainbow Spirit AS, Tide Spirit AS, Current Spirit AS. With the first issuance only four vessels will be financed, but Teekay envisions to also utilize this framework to finance additional vessels that satisfy the requirements in the future.

E-Shuttle will trade under Norwegian flag and are built by Samsung Heavy Industries in Korea. The vessels can transport approximately 870,000 barrels (129,840 dwt) of crude oil each and transport an estimate of around 30 cargos with an approximate 90% filling level each year. According to the issuer, the expected lifetime of the vessels is 20 years.

Selection:

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

Teekay has established a Green Bond Eligibility Committee. The committee consists of the parent company TOO's Chief Compliance Officer, Finance Director and Sustainability Manager. The latter holds a veto right with respect to new financing decisions based on outlined eligibility criteria and sustainability related risks. Teekay does currently not conduct lifecycle assessments or includes broader environmental considerations on supply chain, subcontractors or construction of vessels into their selection process.

Management of proceeds

CICERO Green finds the management of proceeds of Teekay to be in accordance with the Green Bond Principles. An amount equal to the net proceeds of the issue of the green bonds will be credited to an earmarked account that will support the financing of eligible projects. As long as green bonds are outstanding and the earmarked account has a positive balance, funds may be deducted from the earmarked account and added to Teekay's eligible project portfolio to refinance the debt of intercompany debt of the four subsidiaries. The Chief Compliance Officer will ensure that financing processes and allocation processes are in accordance with the framework. Teekay does not anticipate having unallocated proceeds, but these would be held as liquidity reserves and managed as such.

Reporting

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society. The Sustainability manager will compile the reporting and Teekay will report on its emissions results of each E-Shuttle in the annual Teekay Offshore Sustainability Report. The methodology will be in accordance with EU's and IMO's regulations and external verification will be enforced by relevant authorities.



3 Assessment of Teekay’s green bond framework and policies

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

Overall shading

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

Eligible projects under the Teekay’s green bond framework

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

Category	Eligible project types	Green Shading and some concerns
Clean Transportation	 Financing or refinancing of E-Shuttle vessels (“low emissions vessels” as defined by the Norwegian government), in whole or in part, by TST and/or its subsidiaries. The E-Shuttle vessels will incorporate all the following Energy Efficiency and Pollution Prevention and Control measures: <ul style="list-style-type: none"> • Battery powered hybrid technology for fuel savings, peak load shaving, and added overall system redundancy • Liquefied Natural Gas (LNG) as fuel instead of marine gas oil (MGO) and heavy fuel oil (HFO) • Volatile Organic Compound (VOC, crude oil vapours) reduction plant - condensation type • Gas turbines for reducing non condensable VOCs (including methane) 	Light Green <ul style="list-style-type: none"> ✓ Substantial efficiency improvements in the oil and gas sector that do not directly lead to increased oil and gas production could qualify as Light Green if the funded projects could potentially accelerate adoption of lower emission technology in other sectors (in this case the shipping industry). ✓ E-Shuttle vessels financed under this category transport significant amounts of crude oil and use a combination of LNG, battery and VOC compounds as fuel ✓ Risk for rebound effects are reduced as E-Shuttles directly replace older, conventional vessels of Teekay’s fleet based on already committed field developments



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| <ul style="list-style-type: none">• Possibility to mix condensed VOCs with LNG – turning VOC emissions into usable fuel for the generators. <p>These measures are expected to lead to the following emission reductions:</p> <ul style="list-style-type: none">• Annual CO₂ emissions reduced by approximately 47 per cent• Annual NO_x emissions reduced by approximately 88 per cent• Annual SO_x emissions reduced by approximately 99 per cent• Annual VOC emissions reduced by approximately 95 per cent | <ul style="list-style-type: none">✓ Risk of lock-in of emissions and fossil fuel infrastructure is reduced as vessels have a 20 year lifetime and can be converted to transport other goods (e.g., bio diesel, potable water etc.)✓ E-Shuttles will trade under Norwegian flag and will be disposed recycled according to EU Ship recycling standard✓ Teekay confirmed that E-Shuttle technology is public and already taken up by other Shuttle and shipping companies |
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Table 1. Eligible project categories

Background

According to the IEA' Sustainable Development Scenario, oil demand is to peak soon after 2020 and is to decline by roughly 1.7% per year by 2030.² The Sustainable Development Scenario also anticipates a rate of decline of 4% per year for already-producing fields. Considering that oil and gas will be part of the next decades' energy supply, efficiency improvement for these ongoing activities are crucial to mitigate immediate climate impact.³ Currently, 15% of the energy sector's total GHG emissions are caused by oil and gas operations – this does not take into account actual consumption of fossil fuels – and amount to between 10% and 30% of the fuel's total lifecycle emissions intensity.³ In Norway, oil and gas extraction emissions have increased by 75.6% since 1990 and currently account for 27.4% of total Norwegian territorial emissions.⁴ These would have to be substantially reduced according to the commitments made toward the Paris Agreement within the Climate Change Act to reduce total emissions by 80-95% compared to 1990 levels.⁵ Regarding general primary energy intensity, the IEA reports a global decline of 1.3% in 2018, which falls short compared to the Sustainable Development Scenario's required global annual efficiency improvement rate of 3.4% between 2017 and 2040.⁶

Given the technologies available today, LNG based shipping and VOC reduction technology can play an important role for transitioning sectors that are particularly difficult to decarbonize. The transportation sector, especially shipping, is one of these sectors where LNG combined with battery technology can function as viable short-term solution. The International Maritime Organization (IMO) set a target to reduce emissions from shipping by at least 50% from the level of 2008 by 2050 and limiting the sulfur content to no more than 0.5% by 2020⁷. The IEA's 2018 World Energy Outlook, however, foresees that switching to LNG would not be sufficient on its own to achieve the IMO's long-term target⁸ – this could enable advanced battery technology as a complementary solution.

CICERO Green's Light Green shading is allocated to vital efficiency improvements in fossil fuel related infrastructure particularly in sectors that are difficult to decarbonize and the fossil fuel production industry. Despite the fact that projects might be exposed to the risk of lock-in of emissions, CICERO Green views efficiency

²<https://www.iea.org/weo2018/qa/#targetText=Oil%20is%20an%20example%3B%20dramatic,at%20roughly%201.7%25%20per%20year>

³<https://www.iea.org/weo2018/oilandgas/>

⁴<https://www.ssb.no/en/klimagassn>

⁵<https://www.regjeringen.no/en/dokumenter/climate-change-act/id2593351/>

⁶<https://www.iea.org/geco/efficiency/>

⁷<http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx>

⁸<https://www.iea.org/weo>

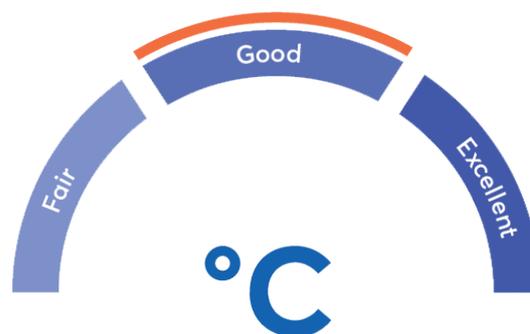


improvements as necessary to reach the well below 2°C target. In addition, CICERO Green views the innovation in the capital intensive oil based shipping industry as crucial to accelerate adoption of lower emission technology in the wider shipping industry. The heavy-duty shipping and oil shuttle industry is an example where no viable alternatives yet exist. Oil production of committed fields are not necessarily expected to stop in the near-term future and therefore need to be improved as much as possible to meet global emissions reduction targets according to the 2° target. In addition, other pollutants such as NO_x, SO_x and Volatile Organic Compounds (VOC) that are associated with burning fossil fuels can cause severe health impacts. Therefore, substantially reducing CO₂, NO_x, SO_x and VOC emissions for crude oil shuttles by utilizing advanced technology is vital but does not constitute a long-term green solution. Emissions from transportation should be zero in the long-term and transporting fossil fuels – especially crude oil – should become obsolete.

Governance Assessment

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

Teekay has in place a sound management and governance structure as well as regular and transparent reporting about green bond project achievements to investors and the public. Teekay has targets for efficiency improvements of its fleet as well as long-term strategies in place to address potential transition climate risks. However, Teekay has not implemented TCFD recommendations yet and currently does not have overall emissions targets. Projects are selected by a Green Bond Eligibility Committee including a Sustainability Manager who enjoys a veto right in case of potential sustainability risks. Reporting will be conducted within TOO's sustainability report in a separate chapter. Due to the nature of financed assets, the reporting will be according to EU and IMO standards and enforced by relevant authorities. The overall assessment of Teekay's governance structure and processes gives it a rating of **Good**.



Strengths

It is a strength that Teekay acted as a first-mover in this field and – together with ENOVA SF – has commenced the transitioning of an industry that is especially hard to decarbonize. This is supported by Teekay's willingness to share knowledge on technology with other market participants on conferences and by making LNG hybrid technology as well as VOC reduction technology is generally available. The issuer informed us that some competitors are already in the process of developing vessels with a similar design which supports wide spread adoption of green transition technology. CICERO Green views this effort of accelerating lower emission shipping technology as vital to reach the 2° target.

With substantial improvements of shuttle tanker technology, the issuer, a crude oil shuttle company, effectively addresses one of the IEA's key concerns in the Sustainable Development Scenario related to urgently needed improvements of the oil industry GHG emissions performance and aims to exceed the targets outlined by the IMO. This constitutes a crucial short-term building block for achieving the well-below 2° target. This is corroborated by the fact that Teekay does not envision increased oil and gas production due to the purchase of new E-Shuttles as vessels are built on the basis of committed field developments and the fact that vessels directly replace conventional shuttles tankers of the current fleet. Both reduces the risk of rebound effects. Efficiency



improvements and emissions reductions are likely going to be long-term as, according to the issuer, E-Shuttle are likely going to be outperforming conventional shuttle tankers in case of future reduced oil demand within the vessels' lifetime of 20 years. This would lead to phasing out conventional shuttle tankers first and reducing the risk of lock-in of emissions and fossil fuel infrastructure.

It is a clear strength that Teekay is actively aligning the business strategy with possible future regulations and fossil fuel related developments, such as global carbon pricing on shipping emissions, regional regulations on emissions, increased fuel costs, shifted stakeholder demands and potentially reduced oil demand. Associated potential climate transition risks are addressed anticipated in Teekay's long-term business strategy: in case of reduced oil demand, vessels can be used for other purposes, such as closed fish farming, potable water transportation and potential future carbon capture and storage activities

Teekay informed us that all vessels will trade under Norwegian flag. This is a strength as ship recycling requirements will be handled by an approved recycling facility according to the EU Ship Recycling Standard.

Weaknesses

Investors should be aware that investments are directly supporting fossil fuel infrastructure in form of shuttle tankers transporting crude oil and that this could lead to an overall increase of oil production. In addition, for a company operating in the oil production sector, it is a weakness that Teekay is currently not following the TCFD framework and does not transparently report climate risks.

Pitfalls

It is a pitfall that Teekay does not generally require specific climate or environmental standards regarding the selection of a supplier and producer of the E-Shuttles. The vessels will be built by Samsung Heavy Industries in Korea, and will be built under the governing laws and regulations set forth by the Korean Authorities. The issuer informed us that due to the complexity of these technologically advanced vessels, only top-tier yards were evaluated to be capable of building the vessels. These yards are regarded as industry leading in their fields, and are therefore expected to have higher environmental standards than many other yards otherwise theoretically capable of building these vessels. However, this does not account for the fact that significant emissions can occur through energy intensive production as well as environmental concerns regarding sourcing materials and assembling the vessels. This pitfall is substantiated as Teekay does not conduct lifecycle assessments and does not apply broader environmental considerations regarding supply chain and subcontractors. According to the issuer Teekay is currently in the process of updating sustainability standards and increasing ambition regarding requirements for subcontractors and suppliers.

It is a pitfall that Teekay is currently not following TCFD recommendations. Teekay already anticipates potential developments on transition risks but has not formalized this process within the TCFD framework. Stress testing Teekay's business model against different scenarios and transparently communicating potential climate risks can reduce long-term risks for investors.

It is a pitfall that Teekay currently does not have in place own emission reduction or other specific medium- and long-term climate targets. In addition, reporting to investors will be focused on emission reductions of vessels according to existing standards. Supplementary metrics might be required to ensure that lock-in and rebound effects are avoided. This is especially important, as each vessel transports an estimate of 23.5 million barrels of



crude oil annually with associated emissions of 9.4MtCO₂ – more than the total emissions from road traffic in Norway in 2018⁹.

In addition to the weakness that this green bond framework's purpose includes direct investments in fossil fuel infrastructure, it is a pitfall that Teekay's whole business currently relies on operating shuttles in the oil production industry. Despite not focusing on oil fields that will be committed in the future, there is nevertheless the risk that E-Shuttles will be utilized to operate in new fields and that oil production could in general be prolonged due to potential cost benefits. As E-Shuttles have significant upfront investment costs, the issuer assumes that no significant cost benefits arise for actual transportation costs. However, due to potential compliance to future regulations, these shuttle tankers could in fact reduce costs through reduced regulatory fines or emission taxation and could potentially lead to extended oil production. According to the 2° target, oil production and combustion needs to be greatly reduced in order to reach the 2° target set forth in the Paris Agreement. This constitutes an inherent climate risk that is only partly mitigated by more efficient vessels that are still transporting crude oil.

Despite the vessels estimated lifetime of 20 years, this framework bears significant risks of stranded assets and would therefore benefit from TCFD reporting. This framework would further benefit from specific climate and emissions targets, from additional screening criteria regarding supply chain and vessel construction as well as increased efforts on impact reporting. Considering the nature of the underlying assets and the company's business model, the framework would also benefit from a broader climate strategy that already now supports business opportunities that are not locked in to crude oil production.

⁹ <https://www.ssb.no/en/klimagassn>



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Teekay's Green Bond Framework, September, 2019	
2	TEEKAY SHUTTLE TANKERS L.L.C., ANNUAL REPORT, 2018	Teekay's annual report
3	TEEKAY CORPORATION 2017, Sustainability Report	TOO's sustainability report
4	Wärtsilä / TEEKAY Shuttle Tanker "Spirit" Project Summary of LVOC Engine Testing	E-Shuttle technical report
5	Wärtsilä / NEW SPIRIT SHUTTLE TANKER PROJECT	E-Shuttle technical report
6	ENOVA / Energieffektive bøyelastere som bruker miljøskadelig avdampning fra lasten som drivstoff	E-Shuttle technical report
7	Søknad om støtte fra Energifondet	E-Shuttle technical report
8	Memo – CO ₂ vessel reduction estimate	Memo on CO ₂ reduction estimates of E-Shuttles
9	Teekay E-Shuttle Fuel consumption and Emissions	E-Shuttle technical report
10	Memo on Teekay's CCS initiatives	Memo to describe Teekay's
11	TOL ENERGY EFFICIENCY 2019 OPERATION KPI Q2 UPDATE	Teekay's status update on annual 2% fuel efficiency improvement



Appendix 2: About CICERO Shades of Green

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

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

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

