



Atrium Ljungberg AB (publ)

Sustainability Linked Financing Framework Second Opinion

3 February 2022

Atrium Ljungberg owns, develops and manages properties in Sweden. The company's property portfolio is valued at SEK 49 billion and comprises offices, retail and residential buildings, with more than half the rental income from offices. Atrium Ljungberg had total revenues of SEK 2.8 billion in 2020 and is listed on Nasdaq Stockholm.

The company has a new sustainability strategy, which features the goal of achieving net zero emissions by 2030 across the building life cycle. This covers Scope 1 and 2 emissions, as well as Scope 3 emissions such as those embodied in building materials, from construction activities and waste, as well as tenant transport, waste and refurbishments. Atrium Ljungberg implements the TCFD recommendations, including transition risk assessments and scenario analysis for physical climate risks.

Approximately 60% of Atrium Ljungberg's rental revenues (Q1-Q3 2021) is from properties with poorer energy performance (kWh/m²) than national regulations for new buildings. 74% of revenues come from buildings without EPC labels or labels of D and below. BREEAM "Very Good" (new construction/in-use) is the main sustainability certification, linked with 78% of rental revenues. 77% of planned investments receive a Medium Green shading as they meet performance criteria in the company's 2022 green bond framework; 23% is shaded Yellow due to insufficient information.

The four KPIs and SPTs (see table on next page) reflect Atrium Ljungberg's very high level of ambition on environmental and social sustainability, especially in comparison to peers in the Swedish real estate sector, and the company has well-founded strategies to achieve them. The high ambition pertains to the wide extent of emissions addressed by KPI/SPT 1 and 2, exceeding those covered by any peer targets. KPI/SPT 3 includes 21 indicators across five environmental and social dimensions, demonstrating a very high level of commitment to sustainability. KPI/SPT 4 enhances supplier dialogue, which is key to addressing the sector's supply chain impacts.

However, the KPIs only indirectly address energy efficiency, which may be a source of transition risk for the company (see revenue assessment). Climate resiliency is only addressed to a small extent in KPI 3.

SPT 1 and 2 are ambitious when benchmarked against climate scenarios, albeit with caveats. SPT 1 is 1.5-degree/Paris aligned provided that Atrium Ljungberg applies the green building criteria in its 2022 green bond framework to all new construction projects. SPT 2 is 1.5-degree/Paris aligned, but not for one out of the five emissions categories covered (tenant transport). These assessments assume growth in floor area does not substantially erode absolute emissions reductions from the SPTs' targeted intensity improvements. SPT 3 and 4 are not relevant to benchmark with climate scenarios.

However, all four KPIs/SPTs have methodological pitfalls due to the lack of historical data and comparability over time, which may be impacted by the expected shift from use of generic to specific data for calculating emissions. It is also a pitfall that emissions accounting is market-based and thus may not reflect actual emissions linked with Atrium Ljungberg's properties. As such, we encourage the company to report equivalent location-based data when reporting its performance on KPI 1 and 2.

Included in the overall shading is an assessment of the governance structure of the sustainability linked bond framework. CICERO Shades of Green finds the governance procedures in Atrium Ljungberg's framework to be **Excellent**.



SUSTAINABILITY LINKED BOND PRINCIPLES

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

SUSTAINABILITY LINKED LOAN PRINCIPLES

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



Summary of KPI / SPT Assessment

Assessment of KPIs	KPI 1: Climate-neutral construction projects (kg CO₂e/m²)	KPI 2: Reduced climate footprint in property management (kg CO₂e/m²)	KPI 3: Our City - Index for social sustainability	KPI 4: Supplier reviews
Materiality	KPIs 1 and 2 are material in terms of addressing climate risks and impacts.		KPI 3 is material in terms of addressing a range of sustainability challenges in the real estate sector.	KPI 4 is most likely material, depending on extent to which supplier reviews drive performance improvements.
Strategic significance	KPIs 1, 2, 3 and 4 are strategically significant.			
Methodology	KPIs 1 and 2 have robust and transparent methodologies, but comparability may be impacted over time.		The underlying methodology for KPI 3 is robust, but complex in nature and has not yet been calculated using actual data.	Methodological transparency can be improved.
Assessment of SPT	50% reduction by 2025 from 2021 baseline	22% reduction by 2025 from 2021 baseline	50% index score by 2025 from 2021 estimate	Supplier reviews 100% by 2025 from 2021 baseline
Own past performance	Insufficient basis for assessment of SPTs 1, 2 and 3 due to lack of historical data.			Ambitious in requiring substantial efforts, assuming robust implementation.
Peers	SPTs 1, 2 and 3 are more ambitious than peers in the Swedish real estate sector on the basis of scope.			More ambitious than one peer in Swedish real estate with a similar target.
Science-based scenarios or international targets	1.5-degree/Paris-aligned with caveats.	Mostly 1.5-degree/Paris-aligned.	Not applicable.	Not applicable.

CICERO Green has not reviewed the degree to which the variation in the financial characteristics is commensurate and meaningful. Investors are encouraged to review the term sheets in detail and conduct their own assessment of the financial characteristics of the SLBs.



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1 Assessment of Atrium Ljungberg's activities and sustainability governance

Company Description

Atrium Ljungberg AB (publ) is one of Sweden's biggest listed property companies and owns, develops and manages properties in Sweden, with a focus on "developing attractive urban environments" in the cities of Stockholm, Gothenburg, Malmö and Uppsala. Atrium Ljungberg manages properties totaling 1,052,000 m² letting area with a property value of SEK 49 billion, as of September 2021. Office properties are 55% of the total letting area, with retail and residential comprising a further 29% and 4%, respectively. Accordingly, more than half of annual rental income is from offices.

The largest owners of Atrium Ljungberg are the Ljungberg family, the Stockholm Consumers Cooperative Society and the Holmström family. Atrium Ljungberg had total revenues of SEK 2.8 billion in 2020, of which 83% was rental income. The remaining 17% was from net sales, project and construction work, which primarily includes revenues from its fully-owned building contractor subsidiary, TL Bygg. Atrium Ljungberg is listed on Nasdaq Stockholm and has over 300 employees.

Sector Risk Exposure

The below text box highlights some key risks for the real estate sector in general.



Physical climate risks: For the Nordic building sector, the most severe physical impacts will likely be increased flooding, snow loads and urban overflow, as well as increased storms and extreme weather. Developing projects with climate resilience in mind is critical for this sector. The real estate sector is also exposed to climate risks through links to the construction industry and the utilities sector.

Transition risks: Companies in the sector are exposed to transition risks from stricter climate policies e.g., mandatory efficiency upgrades. The company is also exposed to liability risks due to e.g., legal challenges if preventable damages from climate change increases. In addition, the real estate sector is exposed to changing consumer preference for more climate smart and energy efficient buildings.

Environmental risks: The construction sector is at risk of polluting the local environment during the construction of the properties, e.g., from poor waste handling. There are also risks related to impacts on local biodiversity/habitats as well as the use of un-sustainably sourced material like tropical wood.

Social risks: The social risks related to the real estate and construction sector in the Nordics include risks for human rights violations primarily in the supply chain in the sourcing of materials and services. Risks in relation to workers' rights are particularly linked to health and safety for the issuers'/the companies' own employees as well as those of subcontractors. Corruption can be a challenge in this sector and should be paid extra attention.



Governance Assessment

The strategy and goals of Atrium Ljungberg are comprehensive, clear and ambitious with clear targets both for 2025 and the longer term 2030, which were newly announced at end 2021 and developed on the basis of stakeholder dialogue and materiality analysis (see Emissions and Targets section for details). The board of directors oversees the company’s sustainability policy and strategy, and climate-related goals and issues are discussed at board meetings throughout the year. The CEO is responsible for implementation of the sustainability strategy, supported by a Head of Sustainability and sustainability steering group.

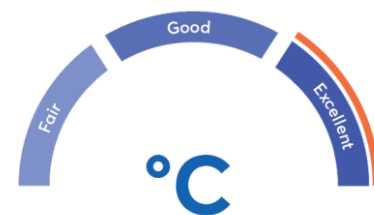
Atrium Ljungberg is implementing and disclosing against the TCFD Recommendations, and the company’s disclosures include its Scope 1 and 2, as well as partial Scope 3 emissions, in addition to estimates of potential financial losses from physical and transition risks. According to the company, it also conducts scenario analysis of physical climate risks using the RCP 4.5 and 8.5 warming scenarios, but not transition risks. According to the company, it is working to integrate sustainability into the decision materials that must be produced for all investment decisions, as well as to update project plans with key climate related figures, such as life-cycle emissions and energy efficiency performance.

The company is acutely aware of its supply chain impacts and has a supplier code of conduct with specific and relevant expectations for suppliers, including, among others, to measure and have at least one goal for reducing its environmental impacts. The code of conduct clearly contains provisions for contracts to be terminated should suppliers fail to meet requirements, and Atrium Ljungberg discloses key figures on supplier monitoring and engagement in its sustainability reporting.

Key social risks such as human and labour rights are also addressed in Atrium Ljungberg’s policies, including reference to international standards such as the Universal Declaration of Human Rights and ILO Core Conventions.

Atrium Ljungberg’s corporate sustainability reporting includes disclosure of performance against key sustainability KPIs and targets. The reporting is according to the Core level of the GRI standard and also takes European Public Real Estate Association (EPRA) Sustainability Best Practice Recommendation Guidelines into account. The company discloses to CDP annually and its most recent (2021) disclosures received a score of B.

The overall assessment of Atrium Ljungberg’s governance structure and processes gives it a rating of **Excellent**.



Atrium Ljungberg’s Emissions and Targets

Atrium Ljungberg’s emissions for 2018-2020 are summarized in the table below.

Emissions	2018	2019	2020
Absolute emissions (tCO ₂ eq)			
Scope 1	320	246	238
Scope 2	7,736	8,889	4,636
Scope 3	10,607	8,012	6,625
Total absolute emissions	20,681	19,166	13,519
GHG emissions intensity (kgCO ₂ eq /m ²)	8.0	8.6	6.5



Total Scope 1, 2 and 3 emissions in 2020 were 13,519 tCO₂eq, corresponding to an emissions intensity of 6.5 kgCO₂eq/m². Scope 1 emissions includes use of fuel in properties and business trips using service and company cars. Scope 2 emissions came from properties' electricity consumption, district heating, and district cooling. Scope 3 emissions included business trips by air and train, private vehicle travel for work, transportation emissions from visitors to Atrium Ljungberg's retail hubs, and energy use from tenants with their own electricity contracts (approx. 10%). Note that these historical data are not directly comparable with Atrium Ljungberg's new climate targets and SPTs in the framework.

It should be noted that Atrium Ljungberg's Scope 2 emissions from properties' electricity consumption are based on market-based emissions accounting and assume an emissions intensity of 0g CO₂eq/kWh. The reason for this is that Atrium Ljungberg purchases hydropower electricity via guarantees of origin. Location-based accounting is used for Scope 2 emissions from Atrium Ljungberg's own offices and operations. According to its 2020 annual report and as disclosed in its framework, using location-based accounting increases Atrium Ljungberg's total Scope 2 emissions by 243% from 4,636 to 15,898 tCO₂eq.

According to the company's disclosures, the main source of emissions is from district heating, as well as from transportation emissions from visitors to its retail hubs. Based on like-for-like emissions data, 54% of Atrium Ljungberg's property-related emissions in 2020 were from offices, 36% from retail, and 10% from residential units. The corresponding emissions intensities were 5.1, 7.5 and 14.6 kgCO₂eq/m², respectively.

Atrium Ljungberg's emissions in 2020 represented a decline of 29% from the previous year. Correspondingly, emissions intensity declined by 24%. According to the company's disclosures, this was due to fewer business trips, divestments, less use of district heating, and lower emissions from district heating suppliers owing to changes in their fuel mix.

At the end of 2021, Atrium Ljungberg announced new sustainability targets, including the goal achieving net zero Scope 1, 2 and 3 emissions by 2030, with emissions halving by 2025. In its framework, the company also specifies two additional goals for 2030:

- Climate-neutral construction projects by 2030 (75% reduction without offsets)
- Reduced climate footprint in property management by 2030 (43% reduction without offsets)

Atrium Ljungberg has clarified that "climate impact of construction projects" refers to construction phase, building material, and future, i.e. modeled, Scope 1, 2 and 3 emissions of new projects across their useful stage and end of life. To achieve these goals, the company anticipates that it will primarily need to focus on reducing energy use, making improved material choices for lower climate impacts and efficient resource management, avoiding waste and increasing sorting rates, and improving transportation efficiency. According to the company, the remaining 25% and 57% emissions reductions required will require the use of offsets, and to an extent, future technological solutions, to achieve. According to the company, it will focus resources on lowering emissions until 2030, but will look into offsets from 2027 or 2028.

Atrium Ljungberg previously did not have any emissions-related targets, but its environmental targets instead related to improving energy consumption, increasing the proportion of environmentally certified properties, and increasing the proportion of green lease contracts.



Assessment of Atrium Ljungberg's Property Portfolio

Investors should be aware of the extent of climate risk associated with Atrium Ljungberg's current rental revenues. In order to provide an indication of this, we offer some analysis of the sustainability of the company's property portfolio as of Q3 2021, based on data shared by the company on the environmental characteristics of properties in its portfolio. The complexity of assigning a shade of green to each property renders this beyond the scope of this assessment.

Actual energy performance vs emissions intensity

The average energy performance of the 46 buildings for which these data were available was 110 kWh/m² and the range was 43 to 326 kWh/m². The average Scope 2 emissions intensity for the 36 buildings for which these data were available was 4.6 kgCO₂eq/m² and the range was 0 to 19 kgCO₂eq/m².

The energy performance of Atrium Ljungberg's properties was compared against the emissions intensity for the 32 buildings in the portfolio for which both these data points were available (Figure 1).

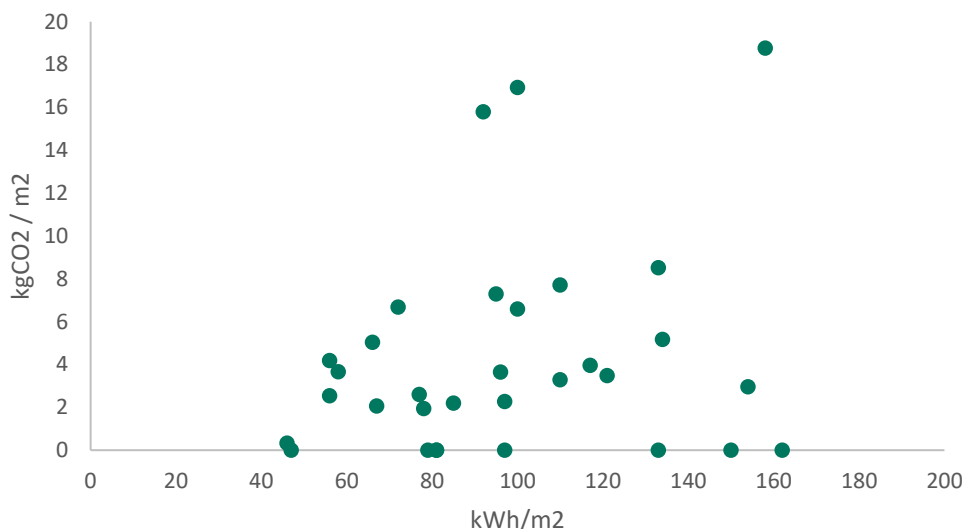


Figure 1. Emissions intensity vs energy performance

The data did not reveal a strong level of correlation between energy performance and emissions intensity. Notably, the properties in this data subset with zero emissions had energy performance levels ranging from 47 to 162 kWh/m². This likely reflects Atrium Ljungberg's purchase of guarantees of origin for hydropower electricity for its properties and the use of market-based emissions accounting, which allows the use of zero for electricity emissions factors. It may also reflect the use of on-site renewable energy.

This is a pitfall as while guarantees of origin do support the expansion of renewable energy capacity, the electricity used by the buildings could still be physically linked with emissions. For this reason, a focus should be on improving energy efficiency in buildings, alongside reducing emissions intensity. This applies even if electricity is directly generated from renewable energy, given the embodied emissions and non-carbon environmental footprint associated with renewable energy sources (rare earths and critical metals, land use, etc.).



Actual energy performance vs new building regulations

The energy performance of each building in the portfolio was compared to the minimum requirement for new buildings in Sweden's national building code,¹ which requires all new construction to be nearly zero energy buildings (Figure 2).



Figure 2. Energy performance (% above/below new building regulations)

According to these data, ten out of the 46 buildings had levels of energy performance better than the new building requirement, corresponding to 15% of total revenues.² The remaining 36 buildings accounted for 61% of total revenues. This division is important as IEA's Net Zero by 2050 scenario,³ i.e. that corresponding to a 1.5-degree scenario, indicates that by 2050, nearly 85% of buildings are zero-carbon-ready—this not only implies that new construction needs to comply with this requirement, but substantial and deep retrofits are required as well.

Note that new building regulations cover primary landlord energy use, whereas the energy performance data provided by Atrium Ljungberg may also include tenant energy use, and this is a limitation of the analysis. Nevertheless, the analysis provides an indication of the extent to which Atrium Ljungberg's property portfolio may be exposed to transition risks. It is thus positive that the company is aiming to finance major renovations to its existing property portfolio via green bonds issued under its 2022 green bond framework.

Energy performance certificate labels

Energy Performance Certificates (EPC) provide an indication of the building's level of energy efficiency and are determined based on the extent to which it is lower than building regulations. EPC A, B and C indicate energy efficiency that exceeds the minimum requirement for new buildings by 50%, 25% and <25%, respectively. The distribution of revenues and number of properties by EPC label is presented in the table below.

¹ 75 kWh/m² for residential, 70 kWh/m² for commercial

² We note that the two buildings with the best energy performance were not yet revenue generating as of Q3 2021.

³ https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf



EPC label	A		B	C	D	E	F	G	None
% of revenues	-		8	18	35	15	-	-	24

The data show that the largest portion of revenues (35%) come from buildings with EPC label D. This is followed by buildings with no EPC label (24%), and then by buildings with EPC labels C (18%), E (15%) and B (8%). It should be noted that the portfolio includes two properties with EPC label A, but that these are not yet revenue generating as they are still under development.

Environmental certifications

Voluntary environmental certifications such as BREEAM and others measure or estimate the environmental footprint of buildings and raise awareness of environmental issues. 41 out of 53 properties in Atrium Ljungberg’s portfolio has mostly received some form of environmental certification, with a further four currently undergoing the certification process. The revenues corresponding to each form of certification are shown in the table below.

Certification	Level	% of revenues
BREEAM	Very good	4
	Excellent	2
BREEAM In Use	Very good	74
	Good	6
Miljöbyggnad	Silver	3
Certification process ongoing		4
None		7

The data indicate that BREEAM (either new construction or BREEAM In Use) are the predominant certification scheme used by Atrium Ljungberg, accounting for 86% of revenues. Under this standard, 78% of revenues in the portfolio comes from buildings certified to the “Very Good” level, with a further 2% corresponding to “Excellent” and 6% “Good.” Seven percent of revenues come from buildings with no sustainability certification.

Environmental certification schemes include many important environmental aspects, including energy efficiency and the sustainability of building construction materials. However, these certifications alone do not necessarily ensure that energy and resilience aspects are taken into considerations to a sufficiently high degree. For example, within the portfolio, the two buildings with BREEAM “Excellent” certification have only received EPC B labels, i.e. they do not exhibit the highest level of energy efficiency. Furthermore, one of these building’s energy performance is 10% higher than new building requirements. Note also that the BREEAM In Use “Very Good” level of certification has no minimum energy efficiency thresholds, only a requirement to monitor energy use.



Assessment of Atrium Ljungberg's Planned Investments

As of Q3 2021, Atrium Ljungberg had a total of SEK 4.9 billion in decided projects for investment. A Medium Green shading was allocated to 77% of this amount, with the remainder receiving a Yellow shading (Figure 3).

Shades of Green by decided investments as of Q3 2021

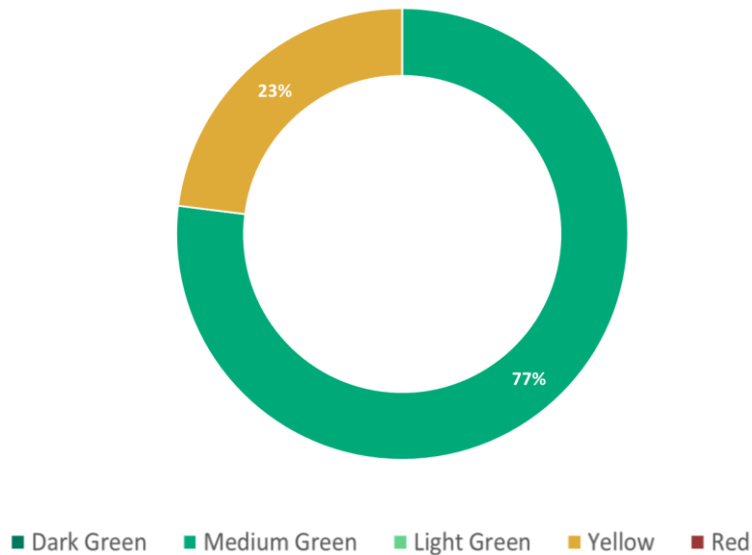


Figure 3. Shading of Atrium Ljungberg's planned investments

According to the company, of the SEK 4.9 billion, 65% is for new builds and extensions, 23% for reconstruction of existing buildings, and the remaining 12% for tenant-owned apartments. The company shared that nearly all of the new construction and extension projects are eligible for financing under the “Green Buildings” category of its 2022 green bond framework. This project category received a Medium Green shading from CICERO Shades of Green in its second party opinion for that framework. We have therefore also assigned a Medium Green shading to this portion of Atrium Ljungberg's planned investments.

According to Atrium Ljungberg, the 12% for tenant-owned apartments is not eligible for green financing as ownership will be transferred to apartment buyers upon completion. However, these apartments are certified “Silver” under the Miljöbyggnad scheme, and they meet the same energy performance criteria as other new builds that are eligible. They therefore receive the same Medium Green shading.

The company has clarified that within the remaining 23% of planned investments for reconstruction of existing buildings, a portion is eligible for financing under the green bond framework's “Energy Efficiency” category, which received a Medium to Dark Green shading. However, the data are currently unavailable and so this portion of planned investments has not been shaded separately.

The remainder of planned investments are not eligible for investments under the green bond framework, indicating that they do not meet the sustainability criteria specified under the green buildings project category of the framework. This may not mean that they are unsustainable investments, but as they are ineligible for green bond financing, and in the absence of specific information about Atrium Ljungberg's intended sustainability approach to these investments, we have allocated them with a Yellow shading.

Refer to the green bond framework and/or second party opinion for details of qualifying investments and further information about the shading.



2 Atrium Ljungberg’s Sustainability Linked Financing Framework

Description of the Sustainability Linked Framework

Selection of Key Performance Indicators (KPIs)

Summary information about Atrium Ljungberg’s four KPIs is provided in the table below. According to the framework, the KPIs were selected based on stakeholder dialogue and a thorough materiality analysis, and collectively represent areas of development and strategic significance to Atrium Ljungberg’s long-term sustainability strategy.

	KPI 1: Climate-neutral construction projects by 2030	KPI 2: Reduced climate footprint in property management by 2030	KPI 3: Our City - Index for social sustainability	KPI 4: Percentage of suppliers reviewed
Description	Climate footprint of construction projects (Scope 1, 2, 3 emissions)*	Climate footprint of property management (Scope 1, 2, 3 emissions related to energy, transport, waste and refurbishments)	Research-based index covering five environmental and social aspects of urban development	Percentage of significant suppliers reviewed according to Atrium Ljungberg’s supplier code of conduct
Units	kgCO ₂ e/GFA	kgCO ₂ eq/m ²	%	%

* For clarification, according to Atrium Ljungberg, KPI 1 refers not only to embodied emissions in building materials and construction phase emissions for new projects, but also the modeled emissions for the project across its use and end-of-life phases, as defined by stages A-C of a building’s life cycle.⁴

Calibration of the Sustainability Performance Targets (SPTs)

Atrium Ljungberg has identified a single SPT for each of the four KPIs, which are summarized below:

	KPI 1: Climate-neutral construction projects by 2030	KPI 2: Reduced climate footprint in property management by 2030	KPI 3: Our City - Index for social sustainability	KPI 4: Percentage of suppliers reviewed
SPT	50% reduction by 2025 from 2021 baseline	22% reduction by 2025 from 2021 baseline	50% index score by 2025 from 2021 estimate	Supplier reviews 100% by 2025 from 2021 baseline

⁴ See Figure. 9 of the Swedish Regulation on Climate Declarations for Buildings: <https://www.boverket.se/globalassets/publikationer/dokument/2020/regulation-on-climate-declarations-for-buildings.pdf>



Baseline/ reference value	Units: kgCO ₂ eq/GFA Offices: 455 Apartments: 550 Commercial/other: 368	16.3 kgCO ₂ eq/m ²	20% (estimate)	1%
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All four KPIs/SPTs will always be used for sustainability-linked financing instruments issued under the framework. The framework specifies a target observation date (TOD), 31 December 2025, on which the company’s performance on the KPIs will be compared against the SPT. Should the company fail to achieve any of the SPTs, a trigger event will occur, leading to the introduction of a financial effect via the adjustment mechanism (see Financial Characteristics section).

Fallback Mechanisms and Exceptional Events

According to Atrium Ljungberg’s framework, many situations could require the recalculation or proforma adjustments to baseline, KPIs, and/or SPTs. Such situations could include methodological changes and changes to the sourcing and measurement of data, as well as changes to its corporate structure and the regulatory environment.

The framework indicates that if such changes lead to revised SPTs, the new SPTs must not represent a lowered level of ambition and/or changes in the company’s sustainability targets and/or strategy. In such an event, Atrium Ljungberg will publish a new external review. See framework for full details.

Financial Characteristics

The adjustment mechanism introduced following a failure to meet any of the SPTs will be determined by the company; it could include an adjustment to the redemption price, the coupon or the margin, with preference for the former. The size of the financial effect introduced by the adjustment mechanism will be determined for each sustainability-linked financing instrument and will be specified in the associated documentation. The size of the financial effect is determined by the number of failed SPTs, with each SPT weighted equally when calculating the size of the financial effect to be applied. Further, the size of the financial effect will be meaningful and commensurate.

Reporting

Atrium Ljungberg will report on its performance on the KPIs annually in a Sustainability-Linked Progress Report, which will be published on its website. See framework for full details. Failure to report will result in a trigger event.

According to Atrium Ljungberg, its Sustainability-Linked Progress Report will also include commentary on the enablers and obstacles to its progress against the SPTs, examples from the business over the past year, as well as where the company believes it can drive progress on external factors, e.g., technological developments and regulations.

Verification

Atrium Ljungberg will obtain external and independent verification by qualified external reviewers of its performance on the KPI relative to the SPT, which will be of limited assurance. The verification will be published on its website together with the Sustainability-Linked Progress Report. Failure to provide the verification report will result in a trigger event.



Assessment of Atrium Ljungberg’s SLB Framework

In this section we comment on the alignment of Atrium Ljungberg’s framework with the Sustainability-Linked Bond Principles (SLBP) and Sustainability-Linked Loan Principles (SLLP). According to the SLBP and SLLP, the KPIs should be relevant, core and material to the issuer’s overall business, and of high strategic significance to the issuer’s current and/or future operations. The SLBP and SLLP further recommend that three benchmarking approaches are considered during the target-setting exercise. The sections below summarize our conclusions from our review of Atrium Ljungberg’s KPIs and target-setting processes for each SPT, which also includes more detailed comments on methodologies and the benchmarking of the targets. We conclude our assessment of this framework with general comments on bond characteristics, reporting and verification.

CICERO Green finds Atrium Ljungberg’s sustainability-linked financing framework to be aligned with the SLBP and SLLP.

Assessment of KPI 1: GHG intensity / gross floor area of construction activities (kgCO₂e/GFA)

Detailed comments on KPI selection

Aspect	CICERO Green Comments
Materiality	<p>The KPI addresses a material issue</p> <ul style="list-style-type: none"> ✓ KPI 1 is material in terms of addressing Atrium Ljungberg’s climate impacts, since it represents around 60% of the company’s total GHG emissions for 2021. However the company notes in its framework that this percentage may vary annually depending on the extent it has new construction projects. ✓ KPI 1 is also material to Atrium Ljungberg in terms of managing climate transition risks, principally those represented by Sweden’s Climate Act, which requires carbon neutrality by 2045, as well as the requirement to submit construction phase emissions data in order to receive a building permit, introduced in the Swedish Act on Climate Declarations for Buildings under Construction. ✓ According to the company, KPI 1 is relevant to 100% of its new construction projects moving forward; it can also be considered highly material from this perspective.
Strategic Significance	<p>The KPI is of strategic significance</p> <ul style="list-style-type: none"> ✓ Focusing on KPI 1 is of strategic significance given Atrium Ljungberg’s goals of being climate neutral by 2030 and halving emissions from construction activities by 2025. ✓ In particular, a focus on KPI 1 will push Atrium Ljungberg to systematically introduce life cycle assessments ahead of new projects in order to identify alternative construction materials, improve material efficiency, as well as engage with suppliers and service providers to support reductions in emissions from transportation, energy use and waste. ✓ KPI 1 is strategic from the point of view that it will likely prepare Atrium Ljungberg for limit values on construction phase emissions that may be introduced



in 2027 and downward ratchets that may be introduced thereafter, as has been proposed by the Swedish National Board of Housing, Building and Planning (Boverket). Note that the limit values have not yet been proposed.

- ✓ By including modeled emissions from new projects' use stage and end-of-life, KPI 1 also ensures that Atrium Ljungberg manages the future emissions of its properties, which is critical given the long useful life of buildings.
- ✓ KPI 1 is also strategically significant as it is linked to decision-making processes being introduced/updated in Atrium Ljungberg's 2022 climate strategy. For instance, business units are required to work with LCA in projects, as well as to present plans for reducing waste generation, with a focus on reuse, including for new construction projects.

Methodology

The methodology is mostly robust and transparent: comparability over time may be impacted by the replacement of generic data with product/activity-specific data

- ✓ KPI 1 is clearly defined and for the most part can be consistently measured and quantified. This is supported by Atrium Ljungberg's intention to follow guidelines in the Swedish Act on Climate Declarations for Buildings under Construction, which requires the use of generic data provided by the Swedish National Board of Housing, Building and Planning (Boverket). Where available, the Act allows for use of product-specific environmental product declaration (EPD) data, which are calculated according to the ISO 14025 standard and require independent review and verification before being published.
- ✓ The framework specifies that KPI 1 will cover emissions from life cycle stages A, B and C, which provides a degree of methodological consistency across the emissions estimates for each new construction project. However, it should be noted that the scope of emissions accounting could still vary due to the broadness of the various substages.
- ✓ According to the company, it plans to use generic data only if specific data do not exist, and that it will increasingly use product and activity-specific data in its calculation of KPI 1 over time. While this may increase the accuracy of the data, it may inhibit comparability of KPI 1 over different time periods. As such, it will be important for Atrium Ljungberg to be transparent about the extent to which improvements in KPI 1 are attributable to improved data.
- ✓ Investors should note that KPI 1 is based on modeled life cycle emissions of new construction projects, and that performance of projects once completed may differ.
- ✓ An emissions intensity measure based on floor area allows for greater comparability of performance over time, as it is not affected by acquisitions or divestments from Atrium Ljungberg's property portfolio. However, as an emissions intensity measure, performance on KPI 1 does not guarantee absolute emissions reductions if it decreases more slowly than growth in floor area. Note that Atrium Ljungberg expects absolute emissions to also decline if it achieves the associated SPT, and it will report on absolute emissions corresponding to those covered by KPI 1 in its annual disclosures.



- ✓ The 2021 baseline has been selected as it is the first year for which Atrium Ljungberg has data for KPI 1.

Assessment of SPT 1: 50% reduction by 2025 from 2021 baseline

Detailed comments on SPT ambitiousness

Benchmark	CICERO Green Comments
<i>Own performance</i>	<p>Insufficient basis for assessment due to lack of historical data</p> <ul style="list-style-type: none"> ✓ A direct comparison against Atrium Ljungberg’s own past performance is not possible as the company has not consistently collected or published historical data for this KPI. ✓ Atrium Ljungberg has shared that it has previously achieved a life cycle emissions intensity of 216 kgCO₂eq/m² for a rebuilding project by using recycled construction materials. The company also shared a case study demonstrating a 20% reduction in an office building’s embodied carbon from 420 to 338 kgCO₂eq/m² by using a floor structure made from over 90% recycled materials. ✓ According to the company, these improvements are representative of how it needs to work moving forwards in order to achieve SPT 1, and that further work needs to be done in order to turn such examples from exceptions into the norm. While this is a relevant data point for understanding the ambitiousness of KPI 1, it provides insufficient basis.
<i>Peers</i>	<p>More ambitious than peers</p> <ul style="list-style-type: none"> ✓ Noting that Atrium Ljungberg has also specified an overarching target of net zero Scope 1, 2 and 3 by 2030, the introduction of SPT 1 as an interim sub-target is a clear marker of ambition that differentiates it from its peer group. ✓ Atrium Ljungberg’s immediate peers include large cap Swedish listed real estate developers⁵ with residential, retail or office properties in their portfolios; Vasakronan is also included as the largest Swedish real estate developer. ✓ Among this peer group, four have announced the objective of becoming climate neutral by 2030 and included Scope 3 emissions: Castellum, JM, SBB, and Vasakronan. JM and Vasakronan clearly specify that this includes embodied emissions in building materials and emissions from the transport of building materials, but do not specify the inclusion of end-of-life emissions. Castellum and SBB indicate their targets are for the “entire value chain,” which suggests that building materials and construction phase emissions are included, but this is not clearly specified.

⁵ As defined by Nasdaq. See <http://www.nasdaqomxnordic.com/shares/listed-companies/stockholm>



- ✓ However, none of these peers have specified a more comparable target to SPT 1, either in terms of being interim in nature or in terms of focusing specifically on halving life cycle emissions from all new construction projects.

Science-based scenarios or international targets

Paris/1.5-degree aligned with caveats

- ✓ SPT 1 aligns with the International Energy Agency's Net Zero Emissions by 2050 (NZE) scenario, which corresponds to 1.5 degrees of climate warming, but mainly on the basis of the embodied emissions reductions it would likely entail. Alignment with the NZE criteria for zero-carbon-ready buildings is achieved provided Atrium Ljungberg maintains for all new construction projects the level of ambition outlined for new buildings in its 2022 green bond framework's green building project category.
- ✓ The IEA NZE⁶ indicates that mandatory zero-carbon-ready building codes for new construction must be introduced by 2030. Crucially, this means that new buildings after 2030 are highly energy efficient (entailing an average improvement of 29% from 2020) and either use renewable energy directly or an energy supply that will be fully decarbonised by 2050, such as electricity or district heat (1). The IEA also specifies that zero-carbon-ready building codes should target net zero emissions from material use in buildings, and that embodied emissions in building construction must decline by 40% per square metre of new floor area by 2030 (2).
- ✓ SPT 1 addresses both aspects of the NZE referenced above, as it targets all stages of a building's life cycle, including embodied emissions and use stage emissions. SPT 1 does not specify which stage of the building's life cycle these emissions reductions come from. According to Atrium Ljungberg, about 80% of emissions relevant to SPT 1 come from embodied emissions. As such, achieving SPT 1 would more than likely mean that Atrium Ljungberg is on a pathway to satisfying point (2) above.
- ✓ On the other hand, it is theoretically possible for Atrium Ljungberg to achieve SPT 1 by only reducing embodied emissions, with no improvements in use stage emissions. It should however be noted that with regards to point (1), Atrium Ljungberg's existing property portfolio is already electrified or utilizing district heat, and that its 2022 green bond framework requires new buildings to have 20% lower energy use than Sweden's national building code, which requires all new construction to be nearly zero energy buildings (NZEB). Assuming this criteria is applied to all new construction projects, SPT 1 would likely align with the IEA NZE.
- ✓ The conclusion above assumes that Atrium Ljungberg's future growth does not contradict the assumption in the IEA NZE scenario of 75% growth in floor area between 2020 and 2050, or about 2.5% per annum, with 85% occurring in emerging markets and developing economies.

⁶ https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf



Initiatives and Strategy to Achieve SPT 1

Given that up to 80% of emissions associated with KPI 1 are from material use, Atrium Ljungberg's strategy to achieve SPT 1 will hinge greatly upon the use of life cycle assessment (LCA) to identify the least carbon intensive building materials, as well as to identify other pathways for reducing building emissions during its use stage and end-of-life. According to the company, it does not believe in setting requirements for specific materials and is instead focusing on minimizing climate impacts on a project-by-project basis using LCA. The company has also indicated that it believes material efficiency, in addition to material choice, will play an important role in helping it achieve SPT 1.

The above aspects of Atrium Ljungberg's strategy align with the narrative in the IEA's NZE scenario, which identifies how material efficiency strategies can reduce demand for steel and cement in the building sector by more than a third compared to baseline trends, and that there is further potential to reduce embodied emissions with wider adoption of natural and innovative construction materials. Improved design-for-environment and materials choice can also improve the extent to which building materials are recoverable and recyclable, which also contributes to SPT 1 by reducing emissions at end-of-life.

The NZE further notes that gains in material efficiency will depend not only on technological innovation in manufacturing and buildings construction, but also on increased recycling and standards and regulations that support best practice and adoption of innovative approaches. In this regard, it is also appropriate that Atrium Ljungberg recognizes its dependence on external factors such as technological advancement in building materials. According to the company, it has a continuous dialogue with its project partners to encourage innovation in this regard, and KPI/SPT 4 was introduced to support this process.

Much of the other emissions Atrium Ljungberg must reduce to achieve SPT 1 are also dependent upon external factors, including supplier-related factors, e.g., construction site heating, and other external factors such as the decarbonization of road transport and Sweden's energy system. The company notes that it will introduce new requirements in procurement and contracts to help achieve its target, and that it believes Swedish/EU goals of climate neutrality will create the necessary changes to do so.

Summary of key factors beyond the issuers' direct control that may affect the achievement of SPT 1:

Atrium Ljungberg may not be able to achieve SPT 1 if there are insufficient advances in building material technology that allow it to sufficiently reduce embodied emissions, or if improvements in road transportation, the energy system, and waste management infrastructure do not permit the necessary emissions reductions required. The achievement of SPT 1 may also be impacted if Atrium Ljungberg's suppliers are not willing or unable to meet any new requirements the company may levy upon them.



Assessment of KPI 2: Reduced climate footprint in property management by 2030 (kgCO₂e/m²)

Detailed comments on KPI selection

Aspect	CICERO Green Comments
Materiality	<p>The KPI addresses a material issue</p> <ul style="list-style-type: none"> ✓ KPI 2 is material in terms of addressing Atrium Ljungberg’s climate impacts, since it represents around 38% of the company’s total GHG emissions for 2021. ✓ KPI 2 is also material to Atrium Ljungberg in terms of managing climate transition risks, principally those represented by Sweden’s Climate Act, which requires carbon neutrality by 2045. ✓ According to the company, KPI 2 is relevant to 100% of its property portfolio; it can also be considered highly material from this perspective.
Strategic Significance	<p>The KPI is of strategic significance</p> <ul style="list-style-type: none"> ✓ Focusing on KPI 2 is of strategic significance given Atrium Ljungberg’s goals of being climate neutral by 2030 and halving emissions from construction activities by 2025. ✓ KPI 2 is also strategically significant as it is linked to decision-making processes being introduced in Atrium Ljungberg’s 2022 climate strategy. For instance, business units are required to present plans for reducing waste generation, with a focus on reuse, “especially” in relation to tenant refurbishments.
Methodology	<p>The methodology is mostly robust and transparent: comparability over time may be impacted by the replacement of generic data with product/activity-specific data</p> <ul style="list-style-type: none"> ✓ KPI 2 is clearly defined and can be consistently measured and quantified from the perspective that emissions accounting will be performed according to the Greenhouse Gas Protocol, albeit using market-based emissions accounting. Unlike KPI 1, generic data used are not limited to those provided by Boverket, and so there may be less assurance regarding data quality and consistency. ✓ As noted in the “Emissions” section, Atrium Ljungberg uses market-based emissions accounting and an emissions factor of zero for its properties’ emissions from electricity to reflect its purchase of guarantees of origin for hydropower electricity. This may not reflect actual emissions associated with its properties’ energy use. The location-based equivalent to KPI 2’s baseline is 243% higher, as disclosed in the framework. We encourage Atrium Ljungberg to maintain this level of transparency and continue disclosing location-based emissions data in its sustainability-linked progress reporting. ✓ Issues described for KPI 1 pertaining to use of generic vs specific data and the implications for comparability are applicable also to KPI 2. Further, given some reliance on survey data (see below), it is possible that circumstances prevent data collection across the entirety of Atrium Ljungberg’s portfolio. As such, it will be



important for Atrium Ljungberg to be transparent about the extent to which improvements in KPI 2 are attributable to improved data quality and coverage.

- ✓ The framework states that KPI 2 covers all emissions related to property management (scope 1, 2 and 3) but does not clearly specify a list of categories covered. Based on Atrium Ljungberg’s sustainability report and other text in the framework, this likely includes: energy use, tenant transport (including transport used by visitors to retail hubs), tenant and refurbishment waste, and emissions from refurbishments (e.g., embodied emissions from materials). According to Atrium Ljungberg, the type of data and collection methodology for each of the above categories are as follows:

Energy: Specific data, collected digitally with meters for 90% of tenants without their own energy contracts; generic data is used for the 10% with their own energy contracts.

Refurbishment and tenant waste: Specific data, collected directly from waste management service providers, who are contracted directly by Atrium Ljungberg.

Refurbishment materials: Specific data, collected directly from Atrium Ljungberg’s contractors, with whom tenants normally engage when implementing refurbishments.

Tenant transport: Generic data. According to Atrium Ljungberg, this poses the greatest challenge; the company is able to collect some data digitally on car traffic in and out, but otherwise needs to collect trip data via tenant surveys.

- ✓ An emissions intensity measure based on floor area allows for greater comparability of performance over time, as it is not affected by acquisitions or divestments from Atrium Ljungberg’s property portfolio. However, as an emissions intensity measure, performance on KPI 2 does not guarantee absolute emissions reductions if it decreases more slowly than growth in floor area. Note that Atrium Ljungberg expects absolute emissions to also decline if it achieves this SPT, and it will report on absolute emissions corresponding to those covered by KPI 2 in its annual disclosures.
- ✓ The 2021 baseline has been selected as it is the first year for which Atrium Ljungberg has data for KPI 2.

Assessment of SPT 2: 22% reduction by 2025 from 2021 baseline

Detailed comments on SPT ambitiousness

Benchmark	CICERO Green Comments
<i>Own performance</i>	<p>Insufficient basis for assessment due to lack of historical data</p> <ul style="list-style-type: none"> ✓ A direct comparison against Atrium Ljungberg’s own past performance is not possible as the company has not collected historical data for this KPI.



- ✓ Atrium Ljungberg’s historical Scope 1, 2 and 3 emissions intensity has declined from 8 to 6.5 kgCO₂eq/m² between 2018 and 2020, representing an annual average decline of 9%. This figure serves as a very poor basis for understanding the ambition level of SPT 2 due to the large difference with KPI 2 in terms of scope and categories of emissions included.

Peers

More ambitious than peers

- ✓ Noting that Atrium Ljungberg has also specified an overarching target of net zero Scope 1, 2 and 3 by 2030, the introduction of SPT 2 as an interim sub-target, and notably its inclusion of tenant emissions from refurbishment materials, waste and transportation, is a clear marker of ambition that differentiates it from its peer group.
- ✓ Atrium Ljungberg’s immediate peers include large cap Swedish listed real estate developers⁷ with residential, retail or office properties in their portfolios; Vasakronan is also included as the largest Swedish real estate developer.
- ✓ Among this peer group, four have announced the objective of becoming climate neutral by 2030 and included Scope 3 emissions: Castellum, JM, SBB, and Vasakronan. Vasakronan clearly specifies that this includes “tenant electricity, waste and commuting,” while JM includes “passenger transport” but not waste. Castellum and SBB indicate their targets are for the “entire value chain,” and it is unclear whether tenant emissions from transport and waste are included. None of these four companies explicitly include embodied emissions from refurbishment materials.
- ✓ Further, none of these peers have accompanied their 2030 climate neutrality targets with an interim target such as SPT 2.

Science-based scenarios or international targets

Mostly 1.5-degree and Paris Agreement aligned

- ✓ We find that SPT 2 is aligned with a 1.5-degree scenario and the Paris Agreement goals with respect to four out of five categories of emissions included in the target (all except tenant transport).
- ✓ According to Atrium Ljungberg, the distribution of emissions for KPI 2 in 2021 was: 27% energy, 24% tenant transport, 4% waste, 25% refurbishment waste, and 20% refurbishment materials; the company has shared that it anticipates making the most efforts to reduce emissions from energy, refurbishment materials, and refurbishment waste in order to achieve SPT 2, although it has not made any estimates and there is no requirement in the framework governing this. As such, the analyses below all assume proportional efforts by the company across all five components of KPI 2.

Emissions from energy and refurbishment materials

- ✓ The Carbon Risk Real Estate Monitor (CRREM) 1.5-degree decarbonization pathways⁸ for Sweden indicate that building emissions intensities (Scope 1 and 2,

⁷ As defined by Nasdaq. See <http://www.nasdaqomxnordic.com/shares/listed-companies/stockholm>

⁸ <https://www.crrem.eu>



as well as Scope 3 from embodied carbon in retrofits⁹) decline between 2021 and 2025 by 16% for offices, 17% for residential (multifamily), and 15% for retail (shopping centres). In comparison, if Atrium Ljungberg achieved SPT 1, the relevant portion of Atrium Ljungberg's KPI 2 (energy and refurbishment materials, i.e., 47% of the 2021 baseline figure) would decline by 22% from 7.7 to 6.0 kg CO₂eq/m². On this basis, we would consider these components of SPT 2 to be aligned with a 1.5-degree scenario and hence also the Paris Agreement goals.

Emissions from refurbishment waste and tenant waste

- ✓ According to Atrium Ljungberg, emissions from refurbishment waste and tenant waste are from incineration for energy and transportation of the waste. As data on waste transportation specifically are unavailable, we focus on emissions from the former. Swedish national data for Q1 2021¹⁰ indicate that emissions from electricity, gas, heat and waste totaled 2,110,000 tCO₂eq. Reducing this to net zero by 2045 in line with Sweden's Climate Law, assuming no offsets, implies an annual average reduction of approximately 4%. In comparison, achieving SPT 2 would imply a 5.5% annual decline in tenant and refurbishment waste emissions, assuming that the emissions intensity reductions are not undermined by growth in total floor area. On this basis, we would consider this component of SPT 2 to be aligned with a 1.5-degree scenario and hence also the Paris Agreement goals.

Emissions from tenant transport

- ✓ According to the Swedish Climate Policy Council,¹¹ domestic transportation emissions need to decline by 8% per year between 2019-2030 to meet the interim national target of a 70% decline by 2030 from 2010 levels, which is part of Sweden's goal to be climate neutral by 2045. In comparison, achieving SPT 2 would imply a 5.5% annual decline in tenant's transportation emissions. In reality, the percentage may be lower as the company has the least influence over this category of emissions. On this basis, we would not consider this component of SPT 2 to be aligned with a 1.5-degree scenario or the Paris Agreement goals.

Initiatives and Strategy to Achieve SPT 2

Atrium Ljungberg's strategy to achieve SPT 2 includes investments in energy efficiency in existing buildings, aiming for zero energy new buildings, increasing on-site renewable energy production, as well as deploying technology that allows for better measurement and management of building energy performance. Given the profile of its properties with respect to energy performance (see

⁹ See pg. 11 of the CRREM Reference Guide: <https://www.crrem.eu/wp-content/uploads/2020/09/CRREM-Risk-Assessment-Reference-Guide-2020-09-21.pdf>

¹⁰ <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/environment/environmental-accounts-and-sustainable-development/system-of-environmental-and-economic-accounts/pong/statistical-news/environmental-accounts--emissions-to-air-q1-2021/>

¹¹ <https://www.klimatpolitiskaradet.se/wp-content/uploads/2021/06/report2021swedishclimatepolicycouncil.pdf>



Assessment of Atrium Ljungberg's Property Portfolio), there is likely a lot of potential to further reduce emissions, especially with investments in energy efficiency measures for those properties that are reliant on district heating. In general, these align with the measures outlined in the IEA's NZE scenario and are key features of zero-carbon-ready buildings.¹²

According to Atrium Ljungberg, its renewable energy investments will be primarily solar, although the company is also exploring geothermal energy. With regards to the former, the company has so far installed nearly 15,000 m² of solar cells at its properties, which are estimated to generate around 2,305 MWh per year, and at the end of 2021 it commissioned a study to further identify potential for increasing solar energy capacity. Since emissions associated with renewable energy are primarily embodied (Scope 3), it is important that the embodied emissions from renewable energy-related retrofits and upgrades will be included under the "refurbishment materials" component of KPI 2. Further, refrigerant used in geothermal heat pumps can be a risk to climate if leakages are not controlled.

The company also notes that achieving its SPT will also depend on the transition of the energy system, in particular the carbon intensity of district heating systems. In this regard we note that these systems are still fossil fuel linked by virtue of plastic fractions in waste-to-energy plants. As such, lowering the emissions intensity of these systems is inherently related to the improvement of waste management systems and infrastructure in Sweden.

To reduce tenant-related emissions, the company also indicates that it intends to encourage sustainable behaviour related to energy use, waste and transportation. This aspect of the company's strategy addresses needs outlined in the IEA's NZE scenario, which highlights how behavioural change can contribute to 250 Mt CO₂ reduction by 2030 and how urban design can reduce urban carbon footprints by 60% by shaping lifestyle choices and influencing day-to-day behaviour.¹³

In relation to energy emissions, according to Atrium Ljungberg, only 10% of its tenants have their own energy contracts, i.e. 90% are not responsible for their energy bills and hence there is no financial incentive for them to reduce energy consumption. It is thus positive that the company implements green leases, which introduce a contractual obligation for tenants to collaborate on improving energy use. To address other dimensions of behaviour, Atrium Ljungberg should explore having green leases address issues besides energy. According to the company, as of Q3 2021 55% of its contracts by value were green leases.

The company has shared that its efforts on behavioural include providing information and physical solutions. Whereas awareness raising is important and may be effective, there is a large body of literature highlighting the limits of improving knowledge for driving behavioural change, i.e. the "attitude-behaviour gap,"¹⁴ across multiple domains of sustainable behaviour. Atrium Ljungberg should also be aware of licensing and rebound effects, which may undermine emissions reduction benefits.¹⁵ It is positive that Atrium Ljungberg aims to provide physical solutions, e.g. improving conditions for bicycle commuting (e.g. showers, bicycle storage, connections to bike lanes), charging stations for electric vehicles, and improving the ease of waste sorting, which may help tenants translate improved knowledge and awareness into action.

¹² https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

¹³ https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

¹⁴ For instance, <https://www.sciencedirect.com/science/article/pii/S0973082612000701>

¹⁵ <https://www.frontiersin.org/articles/10.3389/fenrg.2018.00038/full>



Summary of key factors beyond the issuers' direct control that may affect the achievement of SPT 2:

Atrium Ljungberg may not be able to achieve SPT 2 if tenants' behaviours do not change sufficiently in response to its engagement efforts and physical solutions. Similar to SPT 1, SPT 2 is also dependent on improvements in road transportation, the energy system, and waste management infrastructure, which may not be realized in sufficient time. Given the inclusion of embodied emissions from refurbishment materials in KPI 2, achieving SPT 2 is, similar to SPT 1, also dependent on advancements in building materials technology.

Assessment of KPI 3: Our City - Index for social sustainability

Detailed comments on KPI selection

Aspect	IISD Comments
Materiality	<p>The KPI addresses a material issue</p> <ul style="list-style-type: none"> ✓ Atrium Ljungberg's "Our City" index with its 21 indicators across five dimensions, covers a wide range of sustainability considerations that are material for the company's overall business and address relevant sustainability challenges in the real estate sector. ✓ The indicators in the index are in line with priorities and guidelines for social sustainability in housing as outlined in various publications, including from the UN Habitat.¹⁶
Strategic Significance	<p>The KPI is of strategic significance</p> <ul style="list-style-type: none"> ✓ Focusing on KPI 3 is of strategic significance given Atrium Ljungberg's goals of developing sustainable cities and properties that are well equipped to handle urbanization, climate change and social transformation. ✓ In particular, a focus on KPI 3 will enable Atrium Ljungberg to achieve its ambitions to contribute towards SDG 5 (Achieve gender equality and empower all women and girls), SDG 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), and even SDG 13 (Take urgent action to combat climate change and its impact) through the index' focus on climate adaptation.
Methodology	<p>The underlying methodology for KPI 3 is robust, but complex in nature and has not yet been calculated using actual data.</p> <ul style="list-style-type: none"> ✓ Atrium Ljungberg has created a bespoke index on social sustainability that includes 21 indicators grouped under five sustainability dimensions. In its ambition and scope, this approach goes beyond what would be normally

¹⁶ <https://unhabitat.org/sustainable-housing-for-sustainable-cities-a-policy-framework-for-developing-cities>



expected for a KPI in an SLB framework. It underlines the company’s strong commitment to social sustainability.

- ✓ The index is calculated through a Microsoft Excel based scorecard that relies on various internal and external data sources, including surveys. At the time of writing, these surveys were not yet developed. Atrium Ljungberg seems to be well placed to collect the necessary data from relevant stakeholders.
- ✓ Each of the seven development areas, where Atrium Ljungberg has multiple properties, will have its own scorecard that will be used to calculate the overall score. In other words, the index does not cover the company’s entire portfolio of properties.
- ✓ The index has not been calculated using actual data from the development areas. Instead, it currently relies on estimates when defining the baseline scores.
- ✓ Based on how the scorecard of the index is set up, it is possible that the development areas assessed underperform for certain indicators, while overperforming for others. At the same time, the relatively small scoring range (0-3) together with the large number of indicators (21) limit the risk of a few indicators overcompensating too much for the shortcomings of others.
- ✓ As the index is calculated based on the overall equally weighted average score from the seven development areas, there is the possibility that the low score of certain areas is compensated by the high score of others. There is no minimum score required for each individual development area.

Assessment of SPT 3: 50% index score by 2025 from 2021 estimate

Detailed comments on SPT ambitiousness

Benchmark	IISD Comments
<i>Own performance</i>	<p>Insufficient basis for assessment due to lack of historical data</p> <ul style="list-style-type: none"> ✓ A direct comparison against Atrium Ljungberg’s own past performance is not possible as the company has not collected historical data for all the underlying indicators of this KPI. This is especially the case for survey-based indicators. Therefore, it is also not possible to assess whether the SPT goes beyond Atrium Ljungberg’s “business as usual” trajectory. ✓ The baseline performance was calculated based on Atrium Ljungberg’s estimates instead of actual data from the seven development areas. While the estimates are expected to be fairly accurate, the lack of a solid starting point can create uncertainties when assessing the difficulty of achieving the SPT. ✓ A 50% achievement represents a significant improvement compared to the 20% achievement that is the estimated baseline. This means that the average score of the



seven development areas need to improve from “12.6” to “18.9”, which represents a significant, 150%, improvement in 3 years.

Peers

Scope of ambition is beyond peers

- ✓ The SPT is based on a bespoke and innovative social sustainability index. However, as a result the SPT is hard to quantitatively benchmark against peers.
 - ✓ By using an index that covers a wide spectrum of sustainability objectives (21), the sustainability ambition of the KPI is significantly higher than what would be expected from issuers.
-

Science-based scenarios or international targets

Not applicable

- ✓ The “Our City” social sustainability index developed by Atrium Ljungberg does not have an internationally accepted equivalent that could be used for comparison.
 - ✓ Similarly, the underlying indicators of the index do not have officially accepted international targets that could be used as reference.
-

Initiatives and Strategy to Achieve SPT 3

Atrium Ljungberg’s “Our City” social sustainability index (KPI 3) has 21 indicators across 5 sustainability dimensions. Achievement of SPT 3 would require a unique set of measures for each of the dimensions. The company’s strategy to achieve SPT 3 is to focus on the improvement of the underlying indicators within each sustainability dimension. However, there is only limited information available on what specific measures Atrium Ljungberg plans to put in place to increase the scores for each indicator.

Sustainability dimension 1 - Safety, comfort and accessibility

This dimension is about improving the urban landscape by focusing on indicators such as the percentage of active ground floors along the main streets, crime statistics, perceived safety, balanced day / night population and 24/7 active lively area. Atrium Ljungberg can mainly influence these indicators through the selection of tenants, and the design and functionality of new buildings developed.

Sustainability dimension 2 – Closeness, meeting places and flexibility

This dimension aims to improve the overall attractiveness of the development area by focusing on indicators such as diverse neighborhoods, proximity to recreational places, public area for activities, sustainable travel habits, and good orientability. Atrium Ljungberg’s strategy of planning and investing in a diverse service offering, sustainable mobility solutions provides a credible plan to improve these indicators.

Sustainability dimension 3 – Ecosystem services and climate adaptation

This dimension aims for green and blue value creation by focusing on indicators such as green areas, climate resilience and good microclimate. As a property developer, Atrium Ljungberg is well placed to have a direct influence on some of these indicators, while relying on local governments and relevant policies for others.

Sustainability dimension 4 – Cultural identity, history and diversity

The purpose of this dimension is to improve the attractiveness of the development areas by focusing on indicators such as location identity and number of visitors. By integrating these considerations in the planning and construction of properties, Atrium Ljungberg can indeed improve these indicators as outlined in its strategy.



Sustainability dimension 5 – Dialogue and involvement

This dimension is about improving dialogue with local stakeholders, including tenants, their employees, visitors and residents in the development area. The underlying indicators are the number of activities for dialogue and feedback from tenants and partners. Atrium Ljungberg has influence over these indicators, its strategy articulated in the framework provide a credible plan to have meaningful improvements for dimension 5.

Summary of key factors beyond the issuers’ direct control that may affect the achievement of SPT 3:

As the indicators are calculated for development areas as opposed to individual properties, Atrium Ljungberg does not have direct control over some of the indicators. The extent to which the company can influence these indicators differ across development areas due to their different characteristics. Some of the indicators in the index appear to be more within the influence of municipalities and urban planners and/or depend on the actions of other stakeholders. Another consideration is what Atrium Ljungberg can realistically do for some of the more ambitious indicators within only 3 years (by 2025). For example, improving the urban landscape, developing sustainable mobility habits, eliminating crime can all take longer time and require targeted efforts of different stakeholder groups.

Assessment of KPI 4: % of suppliers reviewed

Detailed comments on KPI selection

Aspect	CICERO Green Comments
Materiality	<p>The KPI most likely addresses material issues</p> <ul style="list-style-type: none"> ✓ We agree with Atrium Ljungberg’s assessment that its supply chain is a material source of the company’s impact on the environment and society, but the materiality of KPI 4 depends on the extent to which the supplier code of conduct and supplier reviews drive improvements in supplier performance. ✓ Atrium Ljungberg’s supplier code of conduct outlines the company’s expectations from suppliers and their subcontractors on topics including business ethics, environment and climate, and work environment and working conditions. In general, these expectations cover the range of relevant environmental and social issues that are material to the real estate sector’s supply chain. However, in order to be effective, the code of conduct must be enforced, requiring suppliers to be monitored for compliance and non-compliance to be addressed. ✓ Even if KPI 4 covers 90% of Atrium Ljungberg’s procurement by value, it is less clear to what extent KPI 4 covers suppliers associated with the most significant sustainability impacts. According to Atrium Ljungberg, its supply chain emissions come from suppliers of construction services and energy, all of whom fall under the definition of “significant” suppliers. From this perspective, KPI 4 is likely material in terms of addressing Atrium Ljungberg’s climate impacts. ✓ KPI 4’s materiality in terms of outward impact also depends on the extent to which Atrium Ljungberg’s supplier code of conduct actually drives improvement in sustainability performance among its suppliers. We are unable to independently



assess this aspect of materiality, although it likely plays some role given the buyer influence that Atrium Ljungberg probably enjoys as one of the largest real estate companies in Sweden.

- ✓ The framework specifies that KPI 4 covers “significant” suppliers, which are defined as those with framework agreements or those with contracts in excess of SEK 100,000. These account for about 50% of Atrium Ljungberg’s suppliers and about 90% of its total procurement costs, and the KPI can be considered material from this perspective.
- ✓ KPI 4 is also material to Atrium Ljungberg in terms of managing climate transition risks, principally those represented by Sweden’s Climate Act, which requires carbon neutrality by 2045. In addition, KPI 4 also helps to mitigate reputational and liability risks that may arise from Atrium Ljungberg’s association with negative environmental and social impacts in its supply chain.

Strategic
Significance

The KPI is of strategic significance

- ✓ KPI 4 is of strategic significance in terms of helping Atrium Ljungberg achieve its other sustainability objectives, notably KPI 1 and KPI 2. For instance, the supplier code of conduct contains specific expectations that help address emissions from construction materials (e.g., by requiring that suppliers must use Byggvarubedömningen, an NGO that supports improved choice of building materials), transport (e.g., by requiring that the best biofuel available is used over diesel and that drivers be trained in low emissions driving practices), and energy (e.g., by requiring suppliers to prioritize district and pellet heating). By ensuring that suppliers are compliant with such requirements, it may be more likely that Atrium Ljungberg will improve performance on KPI 1 and 2.

Methodology

The methodology is robust, but transparency could be improved with greater clarity over when a supplier review is considered complete

- ✓ According to the framework, suppliers are required to respond to questions on their adherence with Atrium Ljungberg’s code of conduct. However, the company also indicates that following up on supplier responses is a challenge to improving performance on KPI 4. As such, it is unclear whether a supplier review is completed once a supplier has responded to the digital survey, or whether additional follow up is required and all outstanding issues are resolved before the review is considered complete.
- ✓ The 2021 baseline has been selected as it is the first year for which Atrium Ljungberg has data for KPI 2.



Assessment of SPT 4: Supplier reviews 100% by 2025 from 2021 baseline

Detailed comments on SPT ambitiousness

Benchmark	CICERO Green Comments
<i>Own performance</i>	<p>Ambitious against own past performance in requiring substantial efforts, assuming robust implementation</p> <ul style="list-style-type: none"> ✓ Based on the information shared by Atrium Ljungberg about the challenges of conducting supplier reviews digitally and the number of suppliers it needs to review, we deem SPT 4 ambitious against own performance, provided that the supplier review process entails following up on every single digital review survey with detailed questions and feedback for suppliers. ✓ Atrium Ljungberg’s framework notes that historical data for KPI 4 are unavailable, but the framework also indicates that between 2018-2020, it reviewed 1% of its suppliers annually, i.e., 3% cumulatively. The company clarified that these data are not comparable to the KPI because the mode of review has changed; whereas supplier reviews previously took place via in-person interviews, moving forward the company will conduct reviews through a digital survey system so it can cover the majority of its suppliers. ✓ SPT 4 entails reviewing about 50% of the company’s suppliers, or around 1,000 suppliers, over four years, or about 250 suppliers per year. In addition to requiring suppliers to answer questions on their adherence to Atrium Ljungberg’s code of conduct, the company has shared that it follows up on suppliers’ responses with questions in order to help the supplier demonstrate compliance with the Code of Conduct, as well as feedback in order to support behaviour change. ✓ According to the company, a challenge with achieving SPT 4 is to achieve better contact with its suppliers in order to get them to actively answer follow-up questions digitally, which may be harder than scheduling in-person meetings under the previous system. Another challenge indicated is to improve internal processes to ensure that the code of conduct is always attached to the supplier agreement.
<i>Peers</i>	<p>More ambitious than the single peer with a comparable target</p> <ul style="list-style-type: none"> ✓ The target is considered more ambitious than peers considering that all but one have not announced a comparable target, and the existing target is most likely smaller in scope than SPT 3. ✓ Atrium Ljungberg’s immediate peers include large cap Swedish listed real estate developers¹⁷ with residential, retail or office properties in their portfolios; Vasakronan is also included as the largest Swedish real estate developer. ✓ Of these companies, only K-Fastigheter has specified a target for “the ten largest suppliers of construction materials to have been reviewed from a sustainability perspective under K-Fastigheter’s updated Code of Conduct” by 2023. However,

¹⁷ As defined by Nasdaq. See <http://www.nasdaqomxnordic.com/shares/listed-companies/stockholm>

‘Second Opinion’ on Atrium Ljungberg’s Sustainability-Linked Financing Framework



the baseline/timeframe for K-Fastigheter’s target is not clearly specified, and it is unclear what percentage of total suppliers is covered. We consider K-Fastigheter’s target to be less ambitious than SPT 3, given the limitation of the target’s scope to only suppliers of construction materials.

Science-based scenarios or international targets

Not applicable

- ✓ Science-based scenarios or international targets relevant to SPT 4 do not exist.

Initiatives and Strategy to Achieve SPT 4

Atrium Ljungberg’s strategy to achieve SPT involves the roll out of a digital system for carrying out supplier reviews, and also to ensure that the supplier code of conduct is attached to its supplier agreements. We do not perceive any significant sustainability related pitfalls related to this strategy.

Summary of key factors beyond the issuers’ direct control that may affect the achievement of SPT 4:

Achievement of the SPT may be impacted if suppliers refuse to accept the supplier code of conduct.

Comments on Financial Characteristics, Reporting and Verification

Component	CICERO Green Comments
Financial Characteristics	<ul style="list-style-type: none"> ✓ CICERO Green has not reviewed to what degree the variation in the financial characteristics of instruments issued under the framework is commensurate and meaningful. ✓ Investors are encouraged to review the terms sheets in detail and conduct their own assessment of the financial characteristics of the SLBs.
Reporting	<ul style="list-style-type: none"> ✓ Transparency, reporting, and verification of impacts are key to enable investors to follow the performance of the KPIs selected. Procedures for reporting and disclosure are also vital to build confidence that the SLB/SLL is contributing towards a sustainable and climate-friendly future, both among investors and in society. ✓ Atrium Ljungberg is committed to transparent and regular reporting on its performance against the four SPTs that includes relevant contextual information. ✓ Due to considerations for methodology for the KPIs (see respective sections on Methodology), we believe it will be important for Atrium Ljungberg to complement its planned sustainability-linked reporting with 1) information about the contribution to KPI 1 and 2 improvement from better quality data, and 2) absolute emissions data, as well as location-based emissions data.



Verification	✓ The KPIs are externally verifiable and Atrium Ljungberg has committed to securing verification from an independent third party, with the verification statement published
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3 Terms and Methodology

This note provides CICERO Shades of Green’s (CICERO Green) second opinion of the client’s framework dated February 2022. This second opinion remains relevant to all sustainability linked 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.

This assessment is based on a review of documentation of the client’s policies and processes, as well as information provided to us by the client during meetings, teleconferences and email correspondence. In our review we have relied on the correctness and completeness of the information made available to us by the company.

The structure of Sustainability Linked Bonds (SLBs) linking financial returns with environmental performance can provide security around environmental impacts. However, SLBs can vary widely in terms of robustness depending on what KPIs are selected and how they are measured. We provide transparency on 1) the relevance, materiality and reliability of selected KPIs, 2) the rationale and level of ambition of the proposed Sustainability Performance Targets, 3) the relevance of selected benchmarks and baselines, as well as transparency on how well the strategy outlined to achieve them fits with a low carbon and climate resilient future. By considering these factors, we provide context to consider the ambition level of the SLB. Please note that CICERO Green does not evaluate any financial aspects of transaction, including to what degree the variation in the financial characteristics of an SLB is commensurate and meaningful.

Incorporated into the sustainability-linked bond assessment is our company climate risk assessment approach. We allocate a shade of green, yellow or red (see figure below) to revenues or portfolio value which reflect alignment of the underlying activities to a low carbon and climate resilient future and taking into account governance issues.

SHADES OF GREEN	EXAMPLES
 Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future.	 Solar energy projects
 Medium green is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet.	 Green buildings with a high level of certification and energy efficiency
 Light green is allocated to transition activities. These projects and solutions could have lower emissions, but do not by themselves represent or contribute to the long-term vision.	 Substantially more efficient manufacturing of fossil fuel intensive materials
 Yellow is allocated to projects and activities that do not actively contribute to the transition. These activities could have some emissions and be exposed to climate risks. This category also includes those with too little information to assess.	 Manufacturing of consumer goods with some emissions
 Red is allocated to projects and activities that have no role to play in a low-carbon and climate resilient future. These are heaviest emitting assets, with the most potential for lock-in of investments and risk of stranded assets.	 New infrastructure for fossil fuels

In addition to shading from dark green to red, CICERO Shades of Green also includes a governance score to show the robustness of the company’s sustainability governance structure. When assessing the governance of the company, CICERO Green looks at five elements: 1) strategy, policies and governance structure; 2) lifecycle



considerations including supply chain policies and environmental considerations towards customers; 3) the integration of climate considerations into their business and the handling of resilience issues; 4) the awareness of social risks and the management of these; and 5) reporting. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Sustainability-Linked Financing Framework (February 2022)	
2	Annual Report 2020	Annual disclosure, including sustainability report
3	Supplier policy (May 2021)	Document on which KPI 4 is based, also referred to as the “code of conduct”
4	Sustainability strategy 2022-2030	Outlines the background and details of Atrium Ljungberg’s new sustainability strategy. Internal document.
5	Stationshuset Sickla – LCA	Output from LCA of emissions from Stationshuset Sickla, showing embodied emissions from materials account for around 80% of total life-cycle emissions. Internal document.
6	A brief introduction to the “Our City – Index for sustainability”	Introduction to the index on which KPI 3 is based. Internal document.
7	Definitions and guidance on how to grade categories within the index (examples)	Guidance and examples on index scoring. Internal document.



Appendix 2: Sector background

According to the International Energy Agency (IEA), the buildings and buildings construction sectors combined are responsible for 36% of global final energy consumption in 2018 and nearly 40% of total direct and indirect CO₂ emissions. Appliances (excluding heating, cooking and cooling appliances) are responsible for around 17% of final electricity use by buildings.

Emissions from heating of buildings in Sweden have decreased from 9.3 million tonnes CO₂e to 0.8 million tonnes over the period from 1990 to 2019. In 2019, the sector accounted for less than 2% of Sweden's total emissions¹⁸. Emissions from production of materials, construction and demolition of the buildings constitute additional emission¹⁹. These (scope 3) emissions become increasingly important as buildings are built more energy efficient and the electricity and heat supply is converted to 'greener' sources, reducing scope 1 and 2 emissions. Around half of all life cycle greenhouse gas emissions in new buildings comes from heat and energy use²⁰, while approximately 40% comes from use of materials. Emissions associated with construction and demolition accounts for 2-5%.

The construction and real estate sector have a major impact on our common environment. According to the National Board of Housing, Building and Planning's environmental indicators, it accounts for 32% of Sweden's energy use, 31% of waste and 19% of domestic greenhouse gas emissions. Calculations from Sveriges Bygginndustrier indicate that the climate impact of new production of a house is as great as the operation of the house for 50 years.

As members of the EU, Sweden, Denmark and Finland are subject to the EU's climate targets of reducing collective EU greenhouse gas emissions 40% by 2030 compared to 1990 levels, increasing the share of renewable energy to 32% and improving energy efficiency by at least 32.5%.²¹ The European Green Deal aims for carbon neutrality in 2050.²² Sweden has developed a National Energy and Climate Plan (NECP) in which it outlines the targets and strategies in all sectors.²³ These strategies include measures such as increasing renewable energy capacity, improving energy efficiency, facilitating the large scale implementation of clean transportation alternatives, and implementing carbon sinks through reforestation and the LULUCF sector. Non-ETS emissions, of which public buildings and households are a part, must decrease by 63% by 2030. In February 2020, Norway released updated targets for 2030 to cut GHG emissions by 50-55% from 1990 levels²⁴.

The building sector accounts for a large share of primary energy consumption in most countries, and the IEA reports that the efficiency of building envelopes needs to improve by 30% by 2025 to keep pace with increased building size and energy demand – in addition to improvements in lighting and appliances and increased renewable heat sources.²⁵ The energy efficiency of buildings is dependent on multiple factors including increasing affluence

¹⁸ Naturvårdsverket: <https://www.naturvardsverket.se>

¹⁹ <https://www.miljostatus.no/tema/klima/norske-klimagassutslipp/klimagassutslipp-bygg/>

²⁰ Asplan Viak AS (2018): Utredning av livsløpsbaserte miljøkrav i TEK, https://dibk.no/globalassets/02.-om-oss/rapporter-og-publikasjoner/utredning_av_livsløpsbaserte_miljøkrav_i_tek_asplan_viak_2018.pdf

²¹ https://ec.europa.eu/clima/policies/strategies/2030_en

²² https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

²³ https://ec.europa.eu/energy/topics/energy-strategy/national-energy-climate-plans_en

²⁴ <https://www.regjeringen.no/no/aktuelt/norge-forsterker-klimamalet-for-2030-til-minst-50-prosent-og-opp-mot-55-prosent/id2689679/>

²⁵ <https://www.iea.org/reports/building-envelopes>



and expectations of larger living areas, growth in population and unpredictability of weather, and greater appliance ownership and use. Additionally, approximately half of life-cycle emissions from buildings stem from materials/construction. The other half stems from energy use, which becomes less important over time with the increasing adoption of off-grid solutions such as geothermal and solar. All of these factors should therefore be considered in the project selection process. In addition, voluntary environmental certifications such as LEED and BREEAM or equivalents measure or estimate the environmental footprint of buildings and raise awareness of environmental issues. These points-based certifications, however, fall short of guaranteeing a low-climate impact building, as they may not ensure compliance with all relevant factors e.g., energy efficiency, access to public transport, climate resilience, sustainable building materials. Many of these factors are covered under the World Green Building Council's recommendations for best practices for developing green buildings.²⁶ CICERO Shades of Green assesses all of these factors when evaluating the climate impact of buildings.

The Exponential Roadmap²⁷ lays out a trajectory for reducing emissions by 50% by 2030 and requires that emissions reduction strategies within the buildings sector be rapidly scaled up. The roadmap advocates for standardised strategies that are globally scalable within areas such as new procurement practices for construction and renovation that require dramatically improved energy and carbon emission standards, developing new low-carbon business models for sharing space and smart buildings to achieve economies of scale, and allocating green bond funding for sustainable retrofitting and construction.

A large number of LCA studies show that wood-frame building results in lower primary energy and GHG emission compared to non-wood alternatives including concrete and steel. Less energy, in particular fossil fuels, is needed to manufacture wood-based building materials compared with alternative non-wood materials. Wood-based materials use primarily biomass residues for processing energy. Wooden materials also store carbon during their lifetime, temporarily sequestering carbon from the atmosphere. Large amounts of biomass residues are produced during the manufacture and end-of-life of wood products, and these can be used to replace fossil fuels. Hence, wood-based buildings are appropriate for long-term strategies for reducing fossil fuel use and GHG emissions when combined with sustainable forestry²⁸. Quantitative estimates are imprecise, but some studies indicate energy savings in the order of one third in the construction phase of wood buildings compared to buildings using mainly other materials.

²⁶ <https://www.worldgbc.org/how-can-we-make-our-buildings-green>

²⁷ https://exponentialroadmap.org/wp-content/uploads/2020/03/ExponentialRoadmap_1.5.1_216x279_08_AW_Download_Singles_Small.pdf

²⁸ R&D Fund for public real estate, The Swedish Association of Local Authorities and Regions (2016): Climate impacts of wood vs. non-wood buildings. <https://webbutik.skl.se/bilder/artiklar/epub/7585-377-2.epub>



Appendix 3: 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, the International Institute for Sustainable Development (IISD) and the School for Environment and Sustainability (SEAS) at the University of Michigan.





Appendix 4: About IISD

The International Institute for Sustainable Development (IISD) is an independent policy research organization working to deliver the knowledge to act. From offices in Winnipeg, Geneva, Ottawa, Toronto and New York, IISD's work impacts lives in nearly 100 countries.

IISD provides practical solutions to the growing challenges and opportunities of integrating environmental and social priorities with economic development. IISD reports on international negotiations and shares knowledge gained through collaborative projects, resulting in more rigorous research, stronger global networks, and better engagement among researchers, citizens, businesses and policy-makers.

The Public Procurement and Infrastructure Finance Sub-Program at IISD provides advisory services to public and private sector clients for the design and implementation of policies, programs and tools to prepare, finance and de-risk sustainable and low-carbon infrastructure.

IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the International Development Research Centre (IDRC) and from the Province of Manitoba. IISD receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations, the private sector and individuals.

www.iisd.org