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Second Party Opinion

MuniFin Green Bond Framework

Aug. 15, 2025

Location: Finland

Sector: International Public Finance

Alignment Summary

Aligned = ✓ Conceptually aligned = ○ Not aligned = ✗

✓ Green Bond Principles, ICMA, June 2025

See [Alignment Assessment](#) for more detail.

Primary contact

Maxime Chul

Paris
+33 6 10 45 00 98
maxime.chul
@spglobal.com

Medium green

Activities that represent significant steps towards a low-carbon climate resilient future but will require further improvements to be long-term low-carbon climate resilient solutions.

Our [Shades of Green Analytical Approach](#) >

Strengths

The issuer engages with clients and offers margin discounts for projects that go beyond the green eligibility criteria defined in the framework. MuniFin aims to increase the share of sustainable projects in its overall lending portfolio. It aims to grow the share of green loans from 19% in 2024 to 25% by 2030. Eligible projects financed under this framework should contribute to this goal.

Munifin has measured its financed emissions and has set targets to decrease the energy intensity of financed buildings. Considering buildings make up the majority of the green portfolio, the achievement of this target will have a material impact on MuniFin's overall carbon footprint.

Publication of an annual comprehensive impact report, including project-by-project reporting. Munifin also collaborates with Nordic public-sector green bond issuers to harmonize reporting principles, with which it seeks to comply in this framework.

Weaknesses

No weaknesses to report.

Areas to watch

New buildings entail high emissions from construction, notwithstanding the issuer's life cycle emissions thresholds. Finland has not yet published the global warming potential (GWP) limit values that apply from 2026, which limits our ability to assess the framework's ambition. We view positively that MuniFin has set GWP limits for new construction.

Munifin expects bioenergy projects will run on wood chip feedstock from certified local forests, mitigating some environmental risks. However, as Finnish forests no longer act as carbon sinks, strong due diligence is required to ensure positive climate impacts.

The issuer only assesses the flooding risks of financed buildings at the property level. It identified flooding as the only material physical climate risk in Finland and considers this in clients' risk profiles. Physical risks affecting projects may change over time and may warrant the inclusion of additional hazards.

Shades of Green Projects Assessment Summary

As of December 2024, MuniFin's green loan portfolio was mainly composed of three project categories, and the company expects future allocations to remain broadly consistent with such proportions. This includes the green buildings project category (76.0% of green projects), transportation (17.0%), and sustainable water and wastewater management (6.0%). The share of loans for renewable energy projects was residual in the portfolio. Under this framework, two new categories were added: climate change adaptation and biodiversity. The company expects these two additional categories will only represent a minor share of green projects in the coming years.

The company expects, in line with previous years' breakdowns, about 80% of proceeds to be allocated to financing new projects, while about 20% will be directed to refinancing projects. The company labels projects as financing when they were completed within 12 months before approval for the green finance portfolio.

Based on the project categories' Shades of Green detailed below, the expected allocation of proceeds, and consideration of environmental ambitions reflected in MuniFin's Green Bond Framework, we assess the framework Medium green.

Buildings **Medium to Light green**

Construction of new buildings

Renovations

Individual energy efficiency measures

Renewable energy in buildings

Transportation **Dark green**

Public transportation

Supporting infrastructure for public transportation

Passenger cars, light commercial vehicles, and other vehicles

Infrastructure for personal mobility

Renewable energy **Dark to Medium green**

Solar energy

Wind energy

Bioenergy

Geothermal energy

Waste heat

Storage of energy


Water and wastewater management  **Medium green**

New wastewater facilities


Existing wastewater facilities

New water facilities

Existing water facilities

Climate change adaptation  **Dark to Medium green**

Adaptation measures

Biodiversity  **Dark to Medium green**

Biological diversity and healthy ecosystems

See [Analysis Of Eligible Projects](#) for more detail.

Issuer Sustainability Context

This section provides an analysis of the issuer's sustainability management and the embeddedness of the financing framework within its overall strategy.

Company Description

Municipality Finance Plc ("MuniFin") is one of Finland's largest credit institutions and the only one specialized in the financing and financial risk management of the municipal sector and state-subsidized housing. MuniFin is owned by Finnish municipalities, public sector pension provider Keva, and the State of Finland. Its customers include Finnish municipalities, joint municipal authorities, municipally-controlled entities, and non-profit housing organizations. At year-end 2024, the majority of new long-term lending was directed to green and social projects, and MuniFin released its first financed emissions report, disclosing greenhouse gas emissions related to its loan and investment portfolios. 49% of the long-term loan portfolio was lent to housing corporations, 42% to municipalities, joint municipal authorities and corporate entities under their control, and 10% to the wellbeing services counties sector.

Material Sustainability Factors

Climate transition risk

Policymakers have a key role in cutting greenhouse gas emissions to address climate change. While signatories to the 2015 Paris Agreement provide a broad basis for global action, many countries' climate pledges are falling significantly short of the reductions needed to reach net zero by 2050. A lack of policies to support climate pledges exacerbates the challenge, making it likely that the 1.5 degrees Celsius (°C) warming scenario (from pre-industrial levels) could be exceeded in the near future given past emissions and current increasing emission trends. Current commitments are expected to result in broadly constant global emissions of about 60 gigatons of carbon dioxide equivalent (CO₂e) annually, resulting in warming likely exceeding 3°C by the end of the century.

Finland's Climate Change Act was updated in July 2022 with a legal obligation to reach carbon neutrality by 2035, one of the most ambitious national climate goals in Europe. By 2030, the Finnish government is targeting a reduction in emissions by 60% compared to 1990 levels. As an EU member, Finland is covered by ambitious European climate policies, including regulations on land use, which limit the risk of deforestation and illegal land use conversion. Achieving such ambitious goals will require addressing, at the local level, environmental issues relevant to many of the regions and municipalities that MuniFin lends to. These include reducing the carbon footprints of the sectors with high emissions, including the electricity and heat sectors which accounted for 35% of total energy-related carbon dioxide (CO₂) emissions in Finland in 2022, according to the International Energy Agency (IEA), and the transport sector, which accounted for 28%. To reach its targets, Finland will also need to address emissions released from its forests, which for the last few years did not act as a carbon sink but as a net greenhouse gas emissions source.

Physical climate risk

Physical climate risks can affect many economic activities and unabated greenhouse gas emissions will lead to more frequent and severe climate hazards, absent adaptation. While the physical impacts of climate change and extreme weather will continue to play out globally, the direct effects--including (but not limited to) rising sea levels and associated flooding, heat waves, and wildfires--are more localized. The indirect impacts of such events will affect different channels (such as the volume and pricing of traded goods and services), going beyond administrative borders and cascading through multiple sectors.

Over the past century, Finland has experienced a noticeable rise in average temperatures that are expected to rise faster than the global average in the coming decades, with a greater increase in winter than in summer. The country faces a range of intensifying weather events, notably flooding risks related to rising sea levels and increased precipitation. Given its extensive

coastlines and low-lying land, the country is vulnerable in the long term to coastal inundation, particularly on its southern coast. As a result of climate change, Finland's forests also face heightened threats from heat waves, wildfires, droughts, and the proliferation of pests and diseases.

Other environmental factors

Institutions providing financing services to public actors play a key role in protecting biodiversity, and containing land, air, and water pollution, as these tasks fall under government mandates. Economic development goals can exert considerable pressure on natural ecosystems locally and for trading partners. Environmental factors are often intertwined, including with climate transition and physical climate risks.

Forests comprise over 70% of Finland's land area, while inland waters, including lakes and ponds, account for nearly 10%. The country has ambitious policies to foster environmental protection and conservation and about 10% of the territory is protected, including national parks, nature reserves, and protected areas. Nonetheless, Finland remains exposed to environmental challenges such as biodiversity loss resulting from natural habitats degradation and climate change impacts, marine pollution, and eutrophication from agricultural nutrient releases, particularly in the Baltic Sea.

Social factors

Institutions providing financing services to public actors play a key role in socioeconomic development as this falls under government mandates. Depending on national and local circumstances, governments may prioritize economic advancement; poverty, hunger, or inequality reduction; improving access to essential services or infrastructure, clean water or sanitation; or other social goals.

Finland is a high-income economy with a human development index ranking of 0.948 as of 2023, placing it among the top 15 countries globally. The country's Gini index, which measures the degree of income inequality in a state, increased to 27.9 in 2022 from 22 in 1987. In addition to environmental targets, Finland's National Climate Act mentions climate justice and sustainable development as objectives. The act also aims to ensure that the indigenous Sámi people can maintain and develop their language and culture.

Issuer And Context Analysis

Projects financed under the framework directly address the environmental factors that we consider most relevant to MuniFin and the municipalities it supports. We believe the buildings, transportation, and energy project categories contribute to mitigating climate transition risks. The climate change adaptation, biodiversity, and water project categories also aim to address the other environmental risks which we view as relevant to Finland. Additionally, while not the primary objective, we view positively that some project categories also provide social co-benefits, including social housing construction within the green buildings category.

MuniFin plans to increase the social and green portions of its portfolio through financial incentives and customer engagement. As a lending institution, MuniFin's environmental and social impact mostly stems from the projects it helps financing. We consider a strength the company's targets to increase the proportion of social financing in its portfolio to 8% by 2030 from 7% in 2024, and green financing to 25% from 19%. To achieve these targets, MuniFin is offering margin discounts to all social projects and to green projects which exceed the eligibility criteria in the framework. The company also actively engages with clients to support the identification of eligible projects. Its annual client risk assessments include an evaluation of their exposure to various environmental, social, and governance (ESG) risks, using external third-party data.

The company's portfolio of green projects supports Finland's aim of achieving carbon neutrality by 2035. MuniFin published its first financed emissions report in 2024 and it aims to do so annually, which we view as strong practice. Its financed emissions calculations are based on the Partnership for Carbon Accounting Financials, which it joined in 2022. Such financed emissions represent about 99% of its total emissions, thus we value MuniFin's efforts to monitor

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and reduce them. It has set targets related to buildings, which represent the most material category in the green loan portfolio and over 50% of its long-term customer finance portfolio. It aims to decrease financed emissions from buildings to an intensity of 8 kilograms of CO₂e per square meter by 2035 from 10.8 kg CO₂e per square meter in 2023. We note that this target focuses on energy consumption and does not account for embodied emissions.

MuniFin annually assesses its clients' exposure to various environmental risks, including physical climate risks. The company does not consider such risks to be substantial in the short term, however it expects their impact to become increasingly material in the medium to long term. It uses various climate scenarios, such as the representative concentration pathway scenarios as part of this assessment. MuniFin's physical climate risk assessment is performed internally and includes a client level evaluation. The only risk deemed material by MuniFin in Finland is flood risk and the issuer has a limited number of projects located in areas vulnerable to flooding risk, such as coastal zones. The locations of the properties in its portfolio are evaluated against flooding risks. In turn, these properties' exposure affects the overall risk score of each client, which is considered in the loan margin.

MuniFin's financed projects will contribute to other environmental objectives, such as water management and biodiversity conservation. We believe its internal assessment tools and strategies on these topics are more nascent, in line with other financial institutions. The company informs us that it is developing an internal model for biodiversity risk assessments and that biodiversity considerations are being gradually integrated into its processes.

Measures to address climate change mitigation and adaptation can also provide social co-benefits, notably through the provision of essential services to local populations. Financing in the green buildings project category contributes to the provision of social housing solutions. Because of MuniFin's focus on public and municipality financing, we also consider the positive social impact stemming from the financing of public buildings such as hospitals and schools. Other indirect benefits may include health benefits from financed projects, such as lower air pollution from clean energy and transport projects.

Alignment Assessment

This section provides an analysis of the framework's alignment to green bond principles.

Alignment Summary

Aligned = ✓ Conceptually aligned = ○ Not aligned = ✗

✓ Green Bond Principles, ICMA, June 2025

✓ Use of proceeds

We assess all the framework's green project categories as having a green shade, and the issuer commits to allocating the net proceeds issued under the framework exclusively to eligible green projects. Please refer to the Analysis Of Eligible Projects section for more information on our analysis of the environmental benefits of the expected use of proceeds. MuniFin will allocate the net proceeds from instruments issued under the framework to finance or refinance a green portfolio of loans or leases disbursed by the issuer. All financed projects are in Finland. MuniFin may offer a margin discount to green projects approved by the sustainable finance team (SFT) based on the additional impacts of the projects beyond framework's eligibility criteria. We view the inclusion of such financial incentives positively as they may encourage stronger environmental performance.

✓ Process for project evaluation and selection

MuniFin's SFT is responsible for selecting and evaluating the projects against the eligibility criteria defined in the framework. The SFT comprises sustainability experts within MuniFin and it also approves the projects that are included in MuniFin's green project portfolio. The SFT has sole authority to remove a financed project from the green project portfolio if it no longer meets the green eligibility criteria or becomes controversial after approval.

The environmental and social risks are identified through a double materiality analysis and ESG risks are assessed through MuniFin's overall risk and governance framework. The risk management function conducts an additional annual climate and environmental risks materiality assessment covering MuniFin's lending and investment portfolio.

✓ Management of proceeds

MuniFin's funding team is responsible of tracking the allocation of net proceeds from a green bond issuance using a portfolio approach. Furthermore, the issuer ensures that the value of green bonds always exceeds the value of outstanding green finance instrument. In the case of unexpected events leading to some unallocated green bond proceeds, for example due to early repayments on green loans, funds would be held in a liquidity reserve and managed in accordance with MuniFin's sustainability policy and sustainable investment framework. These temporary holdings exclude investments in assets and activities directly connected to fossil energy.

✓ Reporting

The company commits to disclosing the allocation and impact of proceeds annually in its green bond impact report published on its website until full allocation of the proceeds. The report will include information on the total outstanding green bonds, a breakdown of green projects, the amount of unallocated proceeds, and the contribution to the UN sustainable development goals (SDGs). MuniFin will also report on the environmental impact of eligible projects financed by green bonds along with descriptions of projects, if applicable. The impact report will follow the principles stated in "Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting". We consider that MuniFin's latest green impact report is well detailed and stronger than standard market practice. It includes each financed project, allocated amounts, and key impact data. Furthermore, MuniFin commits to obtaining annual post-issuance verification of the allocation of proceeds.

Analysis Of Eligible Projects

This section provides details of our analysis of eligible projects, based on their environmental benefits and risks, using the "[Analytical Approach: Shades Of Green Assessments](#)".

Overall Shades of Green assessment

Based on the project category shades of green detailed below, the expected allocation of proceeds, and consideration of environmental ambitions reflected in MuniFin’s green bond framework, we assess the framework Medium green.

Medium green

Activities that represent significant steps towards a low-carbon climate resilient future but will require further improvements to be long-term low-carbon climate resilient solutions.

Our [Shades of Green Analytical Approach](#) >

Green project categories

Buildings

Assessment

 Medium to Light green

Description

1.1 Construction of new buildings

The construction of buildings that meet one of the following:

- a. An energy efficiency (e-value) limit as defined in the framework. In addition, projects approved after Aug. 31, 2025 should comply with the limit value for the life cycle GWP;
- b. Buildings that have an energy class A and a GWP that is 10% lower than the GWP limit value; or
- c. Buildings with no nearly zero energy buildings (NZEB) requirements that have a GWP 10% below the GWP limit value, and where energy efficiency measures have been implemented. These measures may include the integration of waste heat or renewable energy sources.

In addition to the mandatory requirements stated above, the following non-compulsory criteria will be considered and promoted in order to make environmentally friendly investments more attractive to MuniFin’s customers and to facilitate the implementation of the EU Taxonomy:

- i. Compliance with one or more of the do no significant harm (DNSH) criteria related to EU taxonomy economic activity 7.1 (construction of new buildings). Each DNSH criteria will be considered and promoted separately in the assessment;
- ii. Obtained environmental certification according to Nordic Swan Ecolabel, The Building Information Foundation YL 4 stars or better, LEED Gold, BREEAM Very Good, or other equivalent certification with high ratings;
- iii. The building undergoes testing for air tightness and thermal integrity upon completion;
- iv. Biodiversity and stormwater management on site are supported by rich and varied landscaping.

1.2 Renovations

Renovations that lead to at least a 30% improvement in energy efficiency compared to the pre-investment situation or energy class A.

The following non-compulsory criteria will also be considered and promoted to make environmentally friendly investments more attractive to MuniFin's customers and to facilitate the implementation of the EU Taxonomy:

- i. Compliance with one or more of the DNSH criteria related to the EU taxonomy economic activity 7.2 (renovations of existing buildings). Each DNSH criteria will be considered and promoted separately in the assessment;
- ii. The life cycle GWP is calculated;
- iii. Biodiversity and stormwater management on site are supported by rich and varied landscaping.

1.3 Individual energy efficiency measures

Installation of energy efficient equipment such as energy efficient windows and doors, energy efficient light sources, ventilation, and measures to ensure air-tightness, which lead to a 30% improvement in energy efficiency compared to the pre-investment situation. This list is not exhaustive.

1.4 Renewable energy in buildings

Installation of renewable energy technologies such as solar power, heat pumps, or heat recovery systems.

Analytical considerations

- The IEA emphasizes that reaching net-zero emissions in buildings demands major strides in energy efficiency and the phase out of fossil fuels. All properties must achieve high energy performance. New properties should also have lower emissions from building materials and construction. Additionally, addressing physical climate risks is crucial for strengthening climate resilience across all buildings.
- We assign a Medium to Light green shade to this project category, reflecting our view that the framework criteria ensure financed buildings are more energy efficient than required by regulation, that physical risks are assessed adequately, and that embodied emissions are considered. The thresholds on embodied emissions for new construction cannot be fully assessed as long as the new regulatory values are not public. We expect that some buildings financed under the framework criteria may not go far beyond standard practice on embodied emissions and consider these Light green. The criteria that require a stronger life cycle emissions performance than regulation are likely to contain Medium green elements. MuniFin confirmed that flooding risk, which is the most material physical climate risk identified by the issuer, is assessed for all properties. The company will allocate most proceeds towards new construction, of which a significant share will finance affordable housing. It will allocate a minor share of financing toward renovation and individual energy efficiency measures, which we consider Medium green due to the resulting 30% improvement in energy efficiency.
- New and existing properties are exposed to physical climate risks. MuniFin performs an assessment at the property level of the exposure to flooding risks, which it has identified as the only material physical climate risk in the Finnish context. This flooding risk is considered in MuniFin's overall client risk assessments and may affect loan margin levels. In order to receive a building permit, the Finnish Building Act also requires developers to confirm that building sites are not at risk of flooding, landslides, or avalanches. The company informed us that where a flooding risk is identified, regulation requires adaptive measures such as flood barriers to be implemented. This analysis on exposure to flooding risks is considered in the overall risk profile of the client, and therefore may affect the client's interest rate.

The framework criteria contain e-value and life cycle GWP considerations, which we view positively. The inclusion of limit values on life cycle GWP for new construction could reduce the projects' environmental footprint because it accounts for embodied emissions from construction materials and end-of-life emissions. Finland aims to introduce mandatory national life cycle GWP limit values for buildings in 2025, which will be applicable on 2026 building permits. This is an important step to properly assess the climate impact of buildings considering the high emissions associated with construction. We see

the criterion (b) for new construction as likely more ambitious on life cycle emissions than criterion (a) because it requires a GWP value lower than the upcoming regulation. MuniFin also confirmed that the margin discount would be higher if the client met criterion (b), thus encouraging a gradual increase in the share of buildings meeting this criterion.

- The various criteria for new construction require a higher level of energy efficiency than required by regulation. The exact level of ambition compared to NZEB requirement differs depending on which of the three criteria is used. We view positively that MuniFin commits to adapt the level of improvement over NZEB to keep a corresponding level of ambition, once the updated limit values from the regulation are applicable. We believe the framework criteria allow for the construction of buildings with varying levels of performance in energy efficiency and life cycle emissions.
- MuniFin has confirmed that buildings with direct fossil fuel heating are excluded from the eligible asset portfolio. This applies to new construction, as well as renovation projects and individual efficiency measures.
- The achievement of certain non-compulsory criteria such as the compliance with EU Taxonomy DNSH criteria and environmental certifications may lead to margin discounts. We believe this form of financial incentive to promote stronger environmental performance from financed assets goes beyond market practice and constitutes a strength of this framework. Eligible certifications include the Nordic Swan Ecolabel, LEED Gold, and BREEAM Very Good or equivalents. Although green building certifications cover a broad set of environmental issues, they differ considerably in their requirements for energy efficiency, embodied emissions from construction materials, and climate resilience. Typically, their points-based systems do not guarantee low-carbon new construction nor highly energy efficient existing buildings. Nonetheless, we view positively that such criteria complement the main energy and life cycle emissions limit values that will determine eligibility of financed projects.
- For new construction, the company does not currently have a breakdown of properties to be built on brownfield and greenfield land. However, MuniFin confirmed that municipalities must conduct environmental assessments for new development areas. Finland’s Land Use and Building Act requires municipalities to evaluate the environmental effects of their local detailed or master plans, including impacts on nature, landscape, groundwater, noise, traffic, and climate. However, current practices might not sufficiently mitigate biodiversity risks, even in stringent regulatory environments.

Transportation

Assessment

 Dark green

Description

2.1 Public transportation

Public transport systems with zero direct (tailpipe) CO₂ emissions such as trains, metro, buses, trams, vessels, coaches, and light rail systems.

2.2 Supporting infrastructure for public transportation

Supporting infrastructure that is dedicated to zero direct emissions transport such as stations, bridges, and tunnels.

2.3 Passenger cars, light commercial vehicles, and other vehicles

Passenger cars, light commercial vehicles, and other vehicles with zero direct (tailpipe) CO₂ emissions and related charging infrastructure.

2.4 Infrastructure for personal mobility

Infrastructure dedicated to personal mobility such as pavements, bike lanes, pedestrian zones, energy efficient street lighting, and electrical charging installations for personal mobility devices.

Analytical considerations

- Mitigating greenhouse gas emissions from transportation will be crucial for meeting global decarbonization goals. Fossil fuel-powered vehicles and vessels also create air pollution, such as nitrogen oxides and sulfur oxides. Electric road and rail transportation are key to decarbonizing land transportation. The decarbonization of all modes of transport will require a

significant expansion of low-carbon transport infrastructure. In the construction of supporting infrastructure projects, value chain emissions and environmental impacts can be significant and should be carefully managed--for example, by choosing low-carbon construction materials. Physical climate risks also are a material consideration for all infrastructure projects.

- Transportation accounted for 28% of Finland’s emissions in 2022, according to the IEA. Therefore, emissions reductions in this sector are crucial for the achievement of the country’s carbon neutrality target. MuniFin’s ongoing investments include the financing of tramway projects in various Finnish cities. It aims to finance public transport systems with zero direct (tailpipe) CO₂ emissions such as trains, metro, buses, trams, coaches, and light rail systems. These are more resource efficient than private modes of transportation and are viewed as Dark green. We note positively that Finland’s local grid factor is below 100 grams of CO₂e per kilowatt-hour (kWh), increasing the environmental benefit from financed projects.
- The electrification of ships is a sustainable solution to significantly reduce emissions and energy consumption. MuniFin confirmed that any financed ships would be equipped with propulsion systems such as hydrogen fuel cells, advanced batteries, and wind propulsion systems. However, these technologies currently require significant advancements in several areas, including technology, infrastructure, and cost effectiveness.
- Proceeds will also finance infrastructure that supports personal mobility solutions, such as pavements, bike lanes, pedestrian zones, and electrical charging installations. These projects have low emissions lock-in risks and are aligned with a low-carbon future.
- There are no requirements for the consideration of life cycle emissions as part of the procurement process for financed assets and activities. The production of batteries for electric vehicles and the sourcing of raw materials can have substantial climate and environmental impacts along the value chain. However, MuniFin provides margin discounts for measures implemented to reduce embodied emissions from financed projects.
- Large infrastructure projects will be subject to an EIAs, in line with national and EU regulation. MuniFin is currently developing internal tools to assess biodiversity risks.
- In line with the requirements applicable to all relevant assets under the framework, the company integrates physical climate risk into its risk assessment process, where they are considered material.
- MuniFin confirmed that the metro station and depot directly heated by fossil fuels and the transportation dedicated to fossil fuel transport are excluded under the framework, which we view positively.

Renewable energy

Assessment

 **Dark to Medium green**

Description

3.1 Solar energy

Energy generation using solar power.

3.2 Wind energy

Energy generation using wind power.

3.3 Bioenergy

Facilities producing heat from biomass as well as supporting infrastructure.

3.4 Geothermal energy

Geothermal energy generation facilities and geothermal heating systems that operate with life cycle emissions lower than 100g CO₂e per kWh.

3.5 Waste heat

Facilities that produce heat/cooling using waste heat, such as excess heat from data centers.

3.6 Storage of energy

Energy storage solutions--including batteries, thermal storage, and green hydrogen--and pumped hydropower storage, designed to manage the intermittency of renewable energy. This list is not exhaustive.

Analytical considerations

- Renewable energy projects such as solar photovoltaic (PV), wind, and hydroelectricity are key elements in limiting global warming to well below 2°C, provided their negative impacts on the local environment and physical risks are sufficiently mitigated. Bioenergy derived from sustainably produced feedstocks can provide a lower-emission alternative to fossil fuels as well as a decarbonization pathway where electrification is not possible. At the same time, land use change and biodiversity risks related to feedstock production, transportation and processing emissions, and local pollution at combustion can undermine the climate and environmental benefits of bioenergy.
- The company's potential investments in wind and solar energy directly support the Paris Agreement modelled pathways. These imply that almost all electricity is supplied from zero- or low-carbon sources by 2050. MuniFin's bioenergy investments exclude the use of food and feed crops, focusing on certified wood chips. However, the framework criteria does not explicitly limit feedstock for bioenergy to certified local wood chips. There is also no exclusion criteria for the type of facility that generates the waste heat used. As a result, we assess this project category Dark to Medium green.
- According to the IEA, in 2023 most of Finland's electricity supply came from nuclear (42%), alongside hydro (18.6%), wind (18.4%), and biofuels (13.4%). In line with its 2035 carbon neutrality target, Finland and its municipalities aim for 53% of electricity generation to come from renewables by 2030, and to phase out coal by 2029. Nuclear power is expected to remain a major source for power generation but is not eligible under this framework.
- About half of final energy consumption in Finland is from renewable energy, according to the IEA. Biomass accounts for about 80% of these renewables, and close to 90% of this biomass comes from byproducts of the forest industries. MuniFin confirmed that the share of certified biomass in district heating generation is close to 100%, especially for large facilities. Such certifications include the Programme for the Endorsement of Forest Certification (PEFC), the Forest Stewardship Council (FSC), and the Sustainable Biomass Program (SBP), all of which reduce certain risks relating to supply chain sustainability. Use of the Finnish forest industry's byproducts limits the risks of long-distance transport-related emissions. MuniFin confirmed that whole logs are not expected to be used to produce wood chips. Fossil fuel use at biomass heat facilities is excluded except for startup or backup solutions.
- In its latest impact report, MuniFin discloses that it financed one project related to waste heat recovery. The project captured the energy generated as a byproduct of cooling and utilized this excess heat in district heating generation.
- We believe there could be Medium green projects financed under the waste heat and bioenergy project categories, because there is no specific requirements in the framework on the bioenergy feedstock or on which industry produces the excess heat. While MuniFin has said that district heating feedstock is mostly composed of residues from forestry, there is no clear commitment that this will be the only feedstock eligible. Similarly, the waste heat category does not include criteria on the type of facility that can generate the waste heat used. Thus, we cannot assess some of the environmental risks such as emissions lock-in for these associated industries.
- The company has so far not identified any geothermal or energy storage projects. It confirmed that, in case such projects were to be financed, considering the Finnish municipalities context, they would most likely be closed-loop systems rather than open-loop. We believe closed-loop systems have relatively lower environmental risks, notably related to water bodies and the potential contamination of groundwater. Energy storage projects would most likely be linked to district heating solutions and could include hot water tanks or underground thermal storage.
- Renewable energy can potentially have a negative impact on local biodiversity due to its large physical footprint. Legal requirements in Finland mandate EIAs for certain types of renewable projects. However, current practices might not sufficiently mitigate these risks, even in stringent regulatory environments. We understand that MuniFin does not have additional requirements related to biodiversity. However, it is developing an internal model for biodiversity risk assessments.
- MuniFin identified flooding as the only material physical risk to which its clients are exposed. It used various scenarios to assess the exposure to physical climate risks. Additional requirements are part of the regulatory approval process.
- There are carbon emission considerations at various stages of the life cycle of renewable energy assets, including emissions related to material sourcing, manufacturing, transportation, and equipment end-of-life management. MuniFin

does not require specific information related to the upstream and downstream impacts of financed projects, such as on minerals sourcing and recyclability.

- The company confirmed that the electricity generated from renewable sources will not be used for operations directly related to fossil fuels.

Water and wastewater management

Assessment

 Medium green

Description

4.1 New wastewater facilities

New treatment plants, systems, and technologies designed for wastewater collection (sewer network) and treatment where it is proven that substances (biochemical oxygen demand, phosphorus, nitrogen) have loading values better than required by the applicable environmental permit.

For large treatment plants, a heat recovery system is required.

4.2 Existing wastewater facilities

Measures at existing wastewater facilities, including capacity expansion and system upgrades, which achieve one of the following: a) improved treatment quality; b) at least a 20% increase in energy efficiency; c) at least a 30% reduction in the leakage rate; d) reduced use of chemicals; or e) recovering heat from wastewater.

4.3 New water facilities

New water collection, treatment, and supply systems, that achieve one of the following: a) the net average energy consumption of the water system is below 0.5 kWh per cubic meter produced water supply; or b) the leakage level of the water supply system section covered by the investment is equal to or lower than 1.5 (calculated using the Infrastructure Leakage Index (ILI) rating method or other adequate calculation method).

4.4 Existing water facilities

Measures at existing water facilities, including capacity expansion and upgrades, which achieve one of the following: a) at least a 20% increase in energy efficiency; b) reduced use of chemicals or leakages; or c) improved water quality.

Analytical considerations

- Efficient water and wastewater activities are generally positive for climate resilience and pollution prevention, and investments in these sectors are needed to reach net zero by 2050. Maintenance of existing water and wastewater facilities is generally positive both for public health and climate resilience. We view as a strength that the framework has quantitative criteria for some projects, however not all projects are likely to be fully low-carbon solutions that consider, for example, embodied emissions from new construction. These factors lead to our Medium green assessment.
- Energy consumption and leakages are important considerations for the sustainability of such projects. For several projects, MuniFin has not, however, set any quantitative criteria related to treatment quality and chemical use. We note that for new and existing water facilities as well as existing wastewater facilities, a project can be eligible by meeting one of the criteria, and not all of them. This constrains our assessment, especially because some of these criteria are not explicitly quantified and thus, their actual environmental impact cannot be fully assessed. The production of chemicals for use in water and wastewater treatment produces substantial greenhouse gas emissions, and reducing the use of these chemicals will help lower emissions from the treatment process.
- Water projects are identified depending on the local needs of municipalities. While water scarcity is typically not an issue in Finland, the issuer informed us that potential needs may arise from aging infrastructure in distribution networks and wastewater plants. This may in turn lead to water leakages or contamination risks for example. As per the latest green

bond impact report, most water projects related to wastewater facilities. MuniFin also confirmed that there are no projects identified currently related to water supply.

- Any water facilities directly heated by fossil fuels are excluded from the framework. Waste products from financed wastewater plants are typically directed towards recovery processes, such as biogas production through anaerobic digestion. Treated sludge may also be converted to agricultural fertilizers.
- Similar to other projects financed under the framework, MuniFin assesses physical climate risk at the client level ahead of financing. It considers only flooding risk as material, and thus engages in property level evaluations of such risks.
- An EIA is usually carried for wastewater projects, which represent most of the proceeds going toward this category. In Finland, in line with the EU's Urban Wastewater Treatment Directive, wastewater treatment plants with the capacity to serve 100,000 people are always required to perform an EIA. For other plants, the requirement or not to perform an EIA is determined by the regional government offices known as ELY Centres--Centres for Economic Development, Transport and the Environment. Such projects could pose environmental risks related to biodiversity and the pollution of local water bodies if these risks are not fully mitigated.

Climate change adaptation

Assessment

 Dark to Medium green

Description

5.1 Adaptation measures

Physical or nature-based adaptation solutions to reduce climate-related risks in e.g., the built environment, infrastructure, or sensitive environments such as flood barriers, reinforcement of building structures, and rainwater harvesting.

Climate-related adaptation investments require a climate risk and vulnerability analysis.

Analytical considerations

- Climate scientists have been clear that some degree of climate change will take place, even in the most optimistic of scenarios. This makes it crucial to plan for and mitigate potential risks to reduce the financial and environmental effects. Implementing adaptation solutions can also reduce the resources and emissions linked to rebuilding damaged assets.
- Overall, we assess the project category as Dark to Medium green, reflecting the need for increased resilience and adaptation measures amid the increasing frequency of physical climate risks. Finland is exposed to extreme weather events such as floods, heat waves, and storms. Planning for and mitigating against such risks is pivotal for reducing the financial and environmental impacts of these events.
- Climate change adaptation projects such as those related to the implementation of flood defense systems and drought risk management systems are essential for building resilience against climate-related risks and protecting vulnerable communities from adverse impacts, such as extreme weather events and natural disasters. Stormwater management systems such as green roofs, infiltration basins, and permeable surfaces will further offer environmental benefits such as water quality improvement, groundwater recharge, increase water retention, and mitigate against the urban heat island effect. Upgraded water infrastructure will strengthen resilience against adverse climate impacts such as heavy rainfall, drought, and meltwater. We assign a Dark green shade to these projects, reflecting the need for increased resilience and adaptation measures amid the increasing frequency of physical climate risks.
- MuniFin may also finance the construction of flood mitigation solutions, which can lead to higher emissions due to the materials used (cement in particular) and the use of fossil-fuel-powered equipment in the construction process. We assess these projects as Medium green. Given the range of shades included in this project category, our overall assessment of this category is Dark to Medium green.
- Nature based solutions are viewed as Dark green activities. MuniFin aims to finance wetland conservation measures involving dyke realignment to restore natural floodplain functions, creation of conditions suitable for wetland vegetation, installation of drainage ditches, and modification of drainage systems.

Second Party Opinion: MuniFin Green Bond Framework

- MuniFin mandates borrowers to conduct a climate risk and vulnerability analysis when submitting projects for financing. Borrowers need to therefore identify the risks and opportunities from the physical climate solution being financed.
- In line with the requirements applicable to all relevant assets under the framework, MuniFin does not impose specific EIAs, as this is determined by the regional government offices.
- The company confirms that adaptation measures cannot be dedicated to any high-emitting assets. MuniFin also confirms that fossil fuel equipment or systems cannot be financed as part of projects qualifying under climate adaptation, and that projects cannot include the relocation of roads.

Biodiversity

Assessment

 Dark to Medium green

Description

6.1 Biological diversity and healthy ecosystems







Creation and conservation activities to maintain ecosystems, species, and habitats in good condition, or to re-establish or restore them toward good condition, which may include expanding their area or range, including but not limited to:

- Conservation of key biodiversity areas through the establishment of protected areas (including biodiversity credits for compensation);
- Rewilding through creating and restoring habitats for wildlife, including developing biodiversity corridors; or
- Wetland conservation/restoration to provide and sustain ecosystem services (including biodiversity credits for compensation).

Analytical considerations

- Under this project category, MuniFin intends to finance the conservation and restoration of wetlands, and the creation of protected areas and habitats for wildlife, among others. To date, no such projects have been financed, as they were not part of the previous framework. The company informs us that, in Finland, restoration projects typically target land that was degraded due to peatland drainage for forestry or agriculture, intensive farming, clear-cutting, and monoculture forestry.
- In Finland, protected areas cover 13.3% of the country's land and 10.95% of marine waters. Both figures are below the EU averages of 26.4% and 12.1%, respectively. MuniFin's green financed projects would help the country to address its biodiversity gaps and align with the EU Biodiversity Strategy for 2030. Additionally, such projects can provide substantial co-benefits for climate change mitigation and adaptation due to critical ecosystem services, including carbon sequestration, local climate regulation, soil stabilization, and storm surge protection.
- We consider that there are varying levels of environmental benefits and some uncertainty on the nature of eligible projects within this category, leading to a Dark to Medium green assessment. Programs fully dedicated to conservation and restoration that are in line with national biodiversity strategies we view as Dark green solutions. Some areas may be completely protected, for example statutory nature reserves. However, certain conservation programs may allow for active management, such as ecological restoration, grazing, and sustainable forestry. We consider that active management such as grazing and forestry may lead to additional environmental challenges if not managed adequately. MuniFin confirmed that financing of grazing and forestry activities are not eligible for financing under this category.
- Regarding the reference to biodiversity credits, we understand that using proceeds to purchase such credits is not eligible under the framework. Rather, the aim is to finance underlying projects that may be eligible for compensation through such credits. We also note the issuer has not defined specific requirements related to project design and impact monitoring in the selection process, which further complicates the assessment of the final environmental impacts of potential projects.

S&P Global Ratings' Shades of Green

Assessments					
Dark green	Medium green	Light green	Yellow	Orange	Red
Description					
Activities that correspond to the long-term vision of an LCCR future.	Activities that represent significant steps toward an LCCR future but will require further improvements to be long-term LCCR solutions.	Activities representing transition steps in the near-term that avoid emissions lock-in but do not represent long-term LCCR solutions.	Activities that do not have a material impact on the transition to an LCCR future, or, Activities that have some potential inconsistency with the transition to an LCCR future, albeit tempered by existing transition measures.	Activities that are not currently consistent with the transition to an LCCR future. These include activities with moderate potential for emissions lock-in and risk of stranded assets.	Activities that are inconsistent with, and likely to impede, the transition required to achieve the long-term LCCR future. These activities have the highest emissions intensity, with the most potential for emissions lock-in and risk of stranded assets.
Example projects					
 Solar power plants	 Energy efficient buildings	 Hybrid road vehicles	 Health care services	 Conventional steel production	 New oil exploration

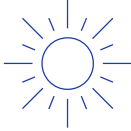
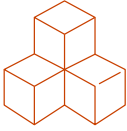







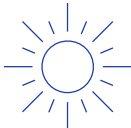

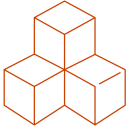
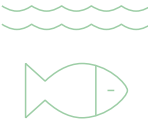
Note: For us to consider use of proceeds aligned with ICMA Principles for a green project, we require project categories directly funded by the financing to be assigned one of the three green Shades.

LCCR--Low-carbon climate resilient. An LCCR future is a future aligned with the Paris Agreement; where the global average temperature increase is held below 2 degrees Celsius (2 C), with efforts to limit it to 1.5 C, above pre-industrial levels, while building resilience to the adverse impact of climate change and achieving sustainable outcomes across both climate and non-climate environmental objectives. Long term and near term--For the purpose of this analysis, we consider the long term to be beyond the middle of the 21st century and the near term to be within the next decade. Emissions lock-in--Where an activity delays or prevents the transition to low-carbon alternatives by perpetuating assets or processes (often fossil fuel use and its corresponding greenhouse gas emissions) that are not aligned with, or cannot adapt to, an LCCR future. Stranded assets--Assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities (as defined by the University of Oxford).

Mapping To The U.N.'s Sustainable Development Goals

Where the financing documentation references the SDGs, we consider which SDGs it contributes to. We compare the activities funded by the financing to the International Capital Markets Association (ICMA)'s SDG mapping and outline the intended linkages within our SPO analysis. Our assessment of SDG mapping does not affect our alignment opinion.

This framework intends to contribute to the following SDGs:

Use of proceeds	SDGs				
Buildings	 7. Affordable and clean energy	 9. Industry, innovation and infrastructure	 11. Sustainable cities and communities*	 12. Responsible consumption and production	 13. Climate action
Transportation	 9. Industry, innovation and infrastructure	 11. Sustainable cities and communities*	 13. Climate action	 15. Life on land	
Renewable energy	 7. Affordable and clean energy*				
Water and wastewater management	 6. Clean water and sanitation*	 9. Industry, innovation and infrastructure	 14. Life below water		

Climate change adaptation



3. Good health and well-being



11. Sustainable cities and communities



13. Climate action*

Biodiversity



14. Life below water*



15. Life on land*

*The eligible project categories link to these SDGs in the ICMA mapping.

Related Research

- [Analytical Approach: Second Party Opinions](#), March 6, 2025
- [FAQ: Applying Our Integrated Analytical Approach For Second Party Opinions](#), March 6, 2025
- [Analytical Approach: Shades Of Green Assessments](#), July 27, 2023

Analytical Contacts

Primary contact

Maxime Chul
Paris
+33 6 10 45 00 98
maxime.chul
@spglobal.com

Secondary contacts

Irina Velieva
Stockholm
+46 70-957-0731
irina.velieva
@spglobal.com

Salaheddine Soumir

Paris
+ 3360-3748-108
salaheddine.soumir
@spglobal.com

Didre Schneider

Frankfurt
+496-9339-99244
didre.schneider
@spglobal.com

Research contributor

Sreenidhi M K
Pune

Second Party Opinion: MuniFin Green Bond Framework

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