S&P Global Ratings

Green Equity Designation External Review

Solar Foods

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Location: Finland | **Sector:** Consumer goods

Alignment Summary

Aligned = ✓ Not aligned = ✗

✓ Nasdaq Green Equity Designation

Designation Summary

In 2025, all of Solar Foods' revenue was linked to the production of Solein®, its proprietary sustainable protein source, which we consider green because it is low-carbon and has minimal environmental impacts. As such, Solar Foods exceeds by a large extent the threshold for at least 50% of revenue and investments to be green required by the Nasdaq Green Equity Principles. The company operates exclusively in the field of cellular agriculture, a segment of biotechnology that can support the decarbonization of food supply chains by generating products that have substantially lower climate and environmental impacts than animal or plant proteins. The emissions savings are due to the production taking place in bioreactors, rather than through conventional greenhouse gas- and land-intensive agriculture, and facilities connected to the Finnish grid, which is almost entirely powered by renewable and low-carbon sources.

Between 2024 and 2025, the company made progress on its ambition to expand into the health and performance nutrition sector by signing supply agreements with U.S. companies that will use Solein® as a protein powder. Though Solein® has a lower carbon footprint than conventional whey sources, the actual life cycle benefits are uncertain because the supply chains have yet to be compared.

We think that Solar Foods will continue to play a role in decarbonizing the food value chain by increasing its production capacity of Solein®. Key investments in 2025 were in advancing the development of its second production facility, Factory 02 (F02). This facility, once operational in 2028, will allow Solar Foods to produce more Solein® and increase the role the company will play in reducing the carbon footprint of food products. Although it has yet to disclose a formal sustainability strategy, its main source of emissions, namely the electricity used for production processes, is largely mitigated by its existing facility Factory 01 (F01) and F02 facilities being connected to the Finnish grid. This is further supported by the implementation of energy efficiency measures at F01. In addition, because all production takes place in its facilities, Solein® has low biodiversity risks.

Strengths	Areas to watch
Solar Foods could play a role in the decarbonization of food systems. Its products offer an alternative to greenhouse gas- and land-intensive animal and plant-based protein sources. One of its main carbon exposures is mitigated by its F01 and F02 being connected to the largely decarbonized Finnish electricity grid. **Solein® has low biodiversity risks.** Its production does not require the use of land or conventional agricultural inputs such as pesticides or fertilizers. Instead, all processes take place within its facilities, with electricity, carbon dioxide, oxygen, and hydrogen as the main feedstocks.	**As the production of Solein® expands, life cycle impacts will depend on Solar Foods' ability to manage them**. This includes addressing transport emissions and continuing to source renewable electricity.

Company Description

Solar Foods is a Finnish business-to-business (B2B) company that produces a low-carbon alternative protein source and develops food production technologies. The company currently operates a facility called Factory 01 (F01), which began operating in April 2024, with an annual capacity of 160 tons. It is in the engineering phase for a second facility, Factory 02 (F02), in Lappeenranta, Finland, which is aiming to be operational by 2028. It has signed initial supply agreements corresponding to 100%-120% of the planned 6.4 kiloton annual design production capacity of F02.

Solar Foods developed a proprietary microbial biomass rich protein called Solein®. This sustainable protein source is produced through anaerobic gas fermentation in continuously operated bioreactors using carbon dioxide, oxygen, and hydrogen gases as the main feedstocks. Minor amounts of minerals (for example, phosphorous and calcium) are also used. In the downstream process, the biomass and water are separated, and the biomass is subsequently dried, becoming a powder called Solein®. The product can then be used as an alternative ingredient to animal-based products such as dairy and eggs in several food applications, including ice cream, beverages, and snacks.

In 2025, Solar Foods generated €0.1 million in revenue from the sale of Solein®, with a net turnover of 64,600 kilograms of Solein®. The Ajinomoto Group has launched products containing Solein® in Singapore. In addition, the company has also signed a supply agreement with health and performance nutrition company Ambrosia Collective, which was introduced as a ready-to-mix protein powder in the U.S. in June of 2026.

Nasdaq Green Equity Principles Assessment

Solar Foods meets all the criteria set out in the Nasdaq Green Equity Principles.

Alignment summary

Criteria	Alignment
Revenue More than 50% of turnover from activities are considered green. The minimum threshold requirement for turnover considered green does not apply for companies in pre-turnover phase. As soon as a pre-turnover company starts generating any turnover it must fulfill the requirement.	✓
Investment* More than 50% of the company's investments must be allocated to activities considered green.	✓
Fossil fuel limitation Revenue from fossil fuel activities must be less than 5%. Fossil fuel activities include the extraction, production, processing, transportation, sale, or use of coal or hydrocarbon, as well as related supporting services.	✓
Disclosure The company must provide information on its relevant environmental targets and key performance indicators (KPIs).	✓
Taxonomy alignment If applicable, the company must state its alignment with the EU Taxonomy for sustainable activities, including Do No Significant Harm and Minimum Safeguards.	**N.A.**

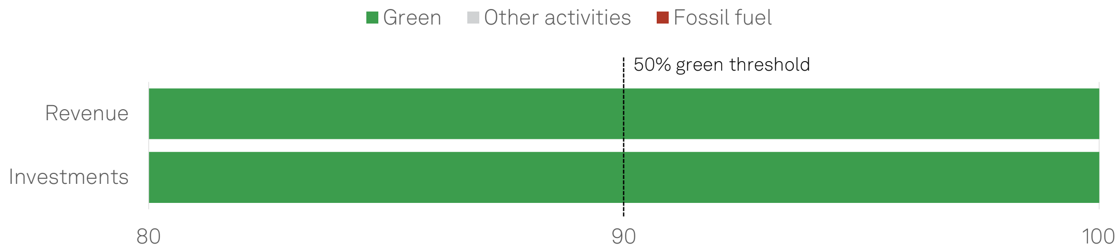
Aligned = ✓ Not aligned = ✗ Not applicable = **N.A.**

Investments are the sum of operational expenditure and capital expenditure. Source: S&P Global Ratings.

Assessment of revenue and investments

All Solar Foods' revenue and investments in 2025 were linked to the production of Solein®, a low-carbon alternative protein source produced through cellular agriculture. Its 2025 revenue was relatively small, but this is in line with its status as a company in the early stages of commercialization. Its investments were tied to the development of its second production facility, F02, which is in the engineering phase, as well as the advancement of its production technology.

Distribution (%)



Source: S&P Global Ratings.

Activities summary

Description	Revenue share (%)	Investments share (%)*	Analytical considerations
Green			
Production of Solein ® Production of Solein ® at Solar Foods' demonstration scale facility, F01. Operating and capital expenditure linked to the manufacturing of Solein®, as well as the development of its production technology.	100	100	We consider the production of alternative protein Solein® to be an important step in the decarbonization of the food supply chain. Solar Foods operates in the field of cellular agriculture, which generally involves producing animal, microbial, and plant cells in bioreactors. This, in turn, reduces the carbon and environmental footprint of food products by decreasing the need for emissions and land-intensive livestock. The main carbon exposure in the Solein® supply chain is the electricity used to power its processes. All production is connected to the Finnish grid, which is almost entirely powered by renewables and low-carbon sources, further contributing to the low-carbon nature of Solein®. Although the proportion of minerals that Solar Foods sources is minor, especially in comparison to electricity, it can still result in life cycle emissions, especially if generated from fossil-fuel based hydrogen, as is the case for nitrogen. To mitigate this, Solar Foods evaluates alternative sources.
Capital expenditure related to F02 Development of second production facility, F02, in Finland, to be operational by 2028.	-	100	Any new construction activity results in substantial emissions from the materials (e.g., cement or steel) and equipment used. That said, we think the role that F02 will play once operational in enabling the production of an alternative to carbon-intensive animal-based protein products should be the determining factor when assessing the carbon and environmental impacts of Solar Foods' capex in 2025. The company has yet to develop a formal strategy to mitigate the risks associated with new construction, though we note that F02 is still in the engineering stage and materials have yet to be purchased as construction has yet to start.

*Investments are the sum of operational expenditure and capital expenditure. Source: S&P Global Ratings.

Climate Transition Plan

We think that Solar Foods' revenue, operational expenditure, and capital expenditure will continue to be associated with the production and development of low-carbon alternatives to greenhouse gas- and land-intensive animal- and plant-based protein sources. The company has yet to set climate targets or establish a formal sustainability strategy, but it is adopting measures to reduce operational emissions in its development plan for F02 and in its existing facility F01.

Transition Plan Details

Summary

Key levers →	Targets →	Actions and investments →	Expected impact
Life cycle emissions	No targets have been developed to date.	The life cycle emissions of Solein ® are lower than for animal protein sources. An attributional life cycle assessment (which determines the proportion of global environmental impacts that can be associated with an activity) found that the global warming potential of Solein® was 6.2% that of bovine protein 7.3% that of dairy herd protein, when using electricity from the Finnish grid. The study also found that it could also result in agricultural land savings--15.9 square meters per 100 grams of protein when switching from dairy herd protein and 35.6 square meters per 100 g of protein when switching from bovine meat. That said, there is still uncertainty over the product's full life cycle emissions because the assessment does not cover emissions once Solein® leaves the factory, for example during transport. There is also some uncertainty related to the actual life cycle savings of Solein® when compared to whey powder, the segment that Solar Foods is targeting for its commercialization, because the supply chains have yet to be compared. That said, we think that the most important climate impact of Solein® will stem from its increased production and gradual replacement of animal-based proteins. In 2025, Solar Foods improved the operational efficiency of F01, its existing facility, achieving an energy efficiency value of 2.7 and productivity of 1 gram per labor hour (g/l/h). However, as production capacity increases, so will its overall emissions. Its longer-term carbon footprint will depend on its ability to manage such impacts.	We expect that Solar Foods will increase its green revenue, opex, and capex as it continues to grow and increase its production capacity, starting with the operationalization of F02.
Energy sources of production processes	No targets have been developed to date.	The main source of emissions in the life cycle of Solein® stems from the electricity used to power the production processes. This is largely mitigated by F01 and eventually F02 being connected to the Finnish grid. In 2024, the electricity generation mix in Finland was 96% renewables (solar, wind, hydropower) and low-carbon sources (nuclear, waste, biofuels), with only 4% from fossil fuels, according to the International Energy Agency. Solar Foods confirmed that one of the factors it considered when determining the location of F02 was the source of electricity.	We expect that Solar Foods will increase its green revenue, opex, and capex as it continues to grow and increase its production capacity, starting with the operationalization of F02.

		Solar Foods is also aiming to develop F02 alongside partners that will operate specific elements of the overall production process of Solein®. For example, it has entered into an engineering agreement with Nordic energy company Fortum, which aims to have low emissions in power production, to manage the hydrogen production, heating and cooling, and electricity infrastructure for F02.	
Mitigation of biodiversity risks	No targets have been developed to date.	Solar Foods does not use feedstocks that have substantial biodiversity or land use change risks, since it does not require crops or livestock. New construction activities can entail land use change and environmental impacts. Solar Foods has yet to develop a formal strategy to mitigate these exposures beyond what is required by regulation.	We expect Solar foods to continue to generate green revenue, opex, and capex related to activities that have minimal impact on biodiversity.

Opex--Operational expenditure. Capex--Capital expenditure. Source: S&P Global Ratings.

Metrics and targets

Solar Foods has yet to disclose an overarching sustainability and carbon reduction strategy, though this is consistent with it being at the start of its commercialization and production process. Solar Foods has not outlined emissions reduction targets or publicly disclosed its internal greenhouse gas emissions estimates. The company may be exposed to additional emissions from the construction of its new production facilities. It expects to update its life cycle emissions analysis using its operational data once it achieves the targeted design production capacity. Its current focus is on the commercialization of its proprietary low-carbon protein source, Solein®.

The expected production capacity and associated capital expenditure amounts are used as indications of Solar Foods' potential future climate impacts in the absence of emissions-reduction targets. Increasing the production of Solein® will result in climate benefits should its production continued to be powered by low-carbon and renewable sources. That said, the company is aiming to distribute its product in the health and performance nutrition sector, and the actual life cycle benefits of Solein® compared to conventional whey powder have yet to be calculated.

Solar Foods started production in 2024 and therefore only has limited data on its carbon footprint. The company estimated its scopes 1, 2, and 3 emissions from its operations for the purpose of this report and did not follow the Greenhouse Gas Protocol. However, the figures reported for 2025 are indicative of an inventory of emissions from a fully operational facility since construction was finalized in 2024 and was followed by a ramp-up production period.

Target time frames

Transition metrics	Baseline metric (2024)	2025	2026	2028	2029	2030
Production of Solein ® (kg)	19,000	64,600	-	-	-	-
Design production capacity of Solein ® at F02 (kilotons per phase/year)	-	-	-	3.2	3.2	6.4
Capex for phase 1, 2, and 3 of F02 (Mil. €)	-	-	-	134	48	135
Revenue from sale of Solein® from operationalization of F02 (Mil. €)	-	-	-	48-55	48-55	96-100

Targeted production capacity of Solein ® at F01 (metric tons)	160	160	230	230	230	230
Energy consumption (MWh)	5,567	8,929	-	-	-	-
Scope 1 and 2 emissions (tons CO_2e)	134	69	-	-	-	-
Scope 3 emissions (tons CO_2e)	29	124.0	-	-	-	-

F01--Factory 01. F02--Factory 02. Capex--Capital expenditure. CO_2e--Carbon dioxide equivalent. MWh--Megawatt hour. Source: Company Reporting. These figures were provided by Solar Foods and are illustrative. Scope 1 and 2 emissions were calculated using different emissions factors for the electricity from the Finnish grid. Using the same emissions factor for 2025 of 0, scope 1 and 2 emissions in 2024 are 60 tons CO2e.

Related Research

- Analytical Approach: Green and Transition Equity External Reviews, June 23, 2026
- Analytical Approach: Taxonomy Assessments, Oct. 15, 2025

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