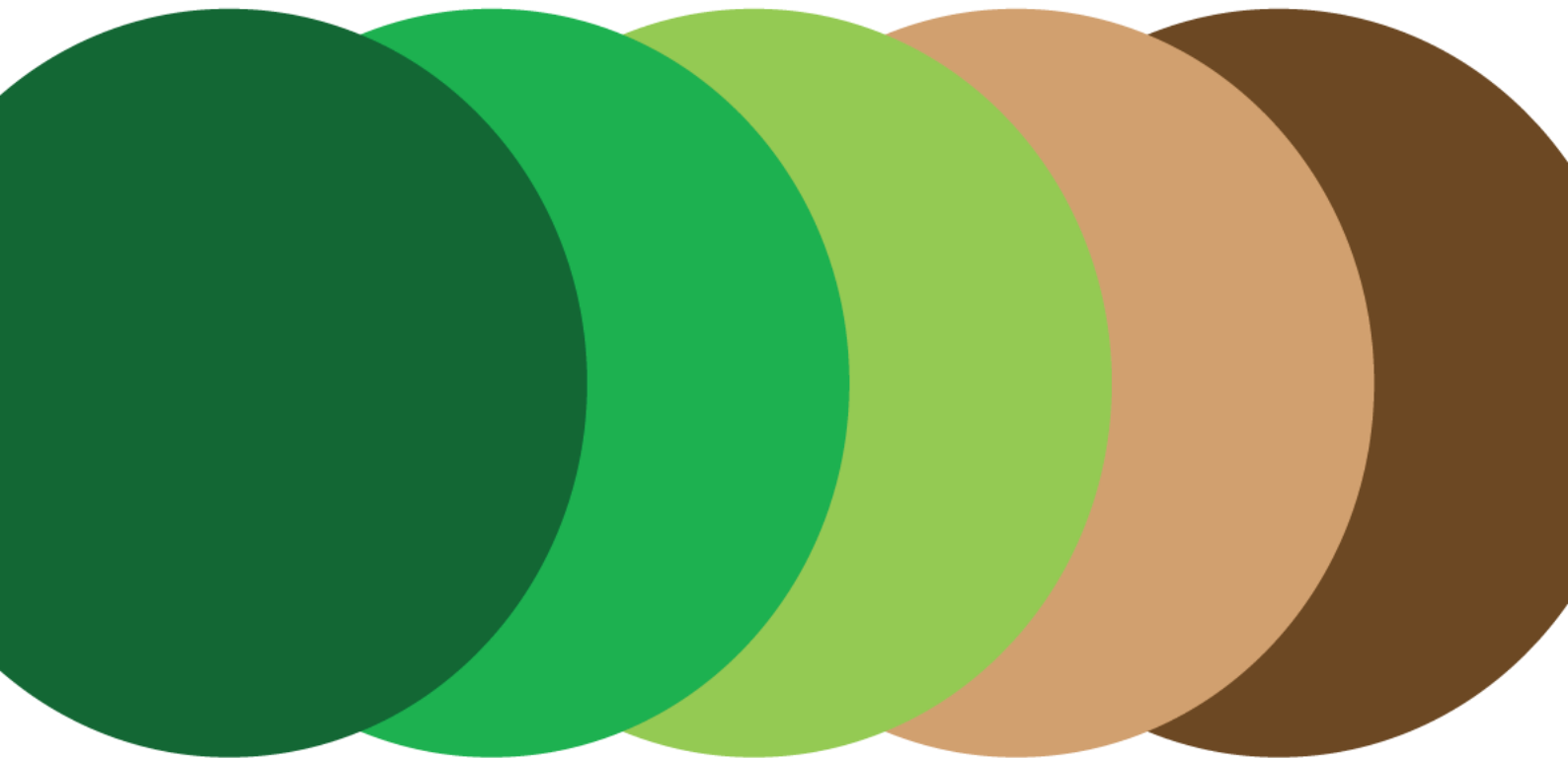


Sustainable Edge: Exploring green shading for companies



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Abstract: Despite the importance of finance in driving the green economic transition, it is not easy for investors to analyze the degree of sustainability and climate risk exposure of their portfolios – and to fully exploit the value creation potential associated with companies providing sustainable solutions.

The aim of our feasibility study is to provide a starting point for a methodology that gives investors and public authorities a practical tool for understanding climate risk and which companies are best situated to contribute to the low-carbon, climate resilient future. Our method is based on the CICERO Shades of Green methodology which allocates a shade of green to activities depending on how well the investment is aligned with a low-carbon, climate resilient future. We have taken an iterative approach to methodology development with the involvement of financial sector partners and engagement with companies to guide our process. A key strength of this methodology lies in the facilitation of a dialogue between investors and companies to understand how green the companies are and to track their progress in aligning with a low carbon and climate resilient future.

We found that the methodology is robust across the small sample of companies analyzed in this preliminary study. Further development and testing is required to advance the methodology and approach. The feasibility study also identified key challenges, the foremost of them data availability and data quality. The feasibility study is a starting point for discussion and further development and not yet a conclusive analysis. While the method has potential, the analysis presented in this report should be viewed as illustrative and not a conclusive view on the companies analyzed. The next phase of development would include testing the method against a larger pool of companies, developing sector benchmarks and will be to incorporate quantitative aspects into our qualitative approach.

Language of Report: English

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Executive summary

Why develop a new approach to climate risk rating?

Despite the importance of finance in driving the green economic transition, it is not easy for investors to analyze the degree of sustainability and climate risk exposure of their portfolios – and to fully exploit the value creation potential associated with companies providing sustainable solutions.

Our research found that comprehensive climate risk assessment of existing environmental, social and governance (ESG) risk rating or other risk rating company or organizations is deemed insufficient by investors. Existing initiatives for corporate communications on sustainability to investors tend to be focused more general on ESG risks or carbon emissions and omit climate risks.

The aim of our analysis is to provide a starting point for a methodology that gives investors and public authorities a practical tool for understanding climate risk and which companies are best situated to contribute to the low-carbon, climate resilient future. In the feasibility study we met with a broad group of financial sector stakeholders in Norway. The engagement confirmed that there is a need for an analysis tool that puts green innovation and transformation in the focus.

Methodology and approach

The motivation for our approach is to facilitate longer term thinking by investors guided by climate science. Our method is based on the CICERO Shades of Green methodology which allocates a shade of green to activities depending on how well the investment is aligned with a low-carbon, climate resilient future. We have taken an iterative approach to methodology development with the involvement of financial sector partners and engagement with companies to guide our process. A key strength of this methodology lies in the facilitation of a dialogue between investors and companies to understand how green the companies are and to track their progress in aligning with a low carbon and climate resilient future.

CICERO introduced the Shades of Green methodology for green bond framework assessment in 2015. The methodology is rooted in and developed to apply CICERO's climate science to the green bond market see (CICERO, CICERO Milestones 2018, September 2018) for more details about CICERO's Shades of Green methodology.



For a successful transition we need all sectors to move towards low-carbon and climate resilient solutions. By assessing a company's current revenues via our expanded methodology, we gain a snapshot overview of current risk exposure. Through the shading of the investments, we assess the companies' efforts towards a green transition. We can in this way encompass a forward-looking analysis allowing companies in transition to show how they are a part of the solution.

Shades of green and brown






	Dark Green	Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future.
	Medium Green	Medium green is allocated to projects and solutions that represent steps towards the long-term vision but are not quite there yet.
	Light Green	Light green is allocated to projects and solutions that are environmentally friendly, but do not by themselves represent or contribute to the long-term vision.
	Light Brown	Light brown is allocated to projects that can lower emissions, but still represent risk of locking in fossil fuel infrastructure and are exposed to risk of stranded assets.
	Dark Brown	Dark brown is allocated to the heaviest emitting projects, with the most potential for lock-in of investments and risk of stranded assets.

Figure 1: CICERO Shades of Green

Key findings

We found that the methodology is robust across the small sample of companies analyzed in this preliminary study. Further development and testing is required to advance the methodology and approach. The feasibility study also identified key challenges, the foremost of them data availability and data quality. Going forward, the key challenge will be to move from a qualitative to more data-driven, quantitative approach.

The feasibility study is a starting point for discussion and further development and not yet a conclusive analysis. While the method has potential, the analysis presented in this report should be viewed as illustrative and not a conclusive view on the companies analyzed.

What's next?

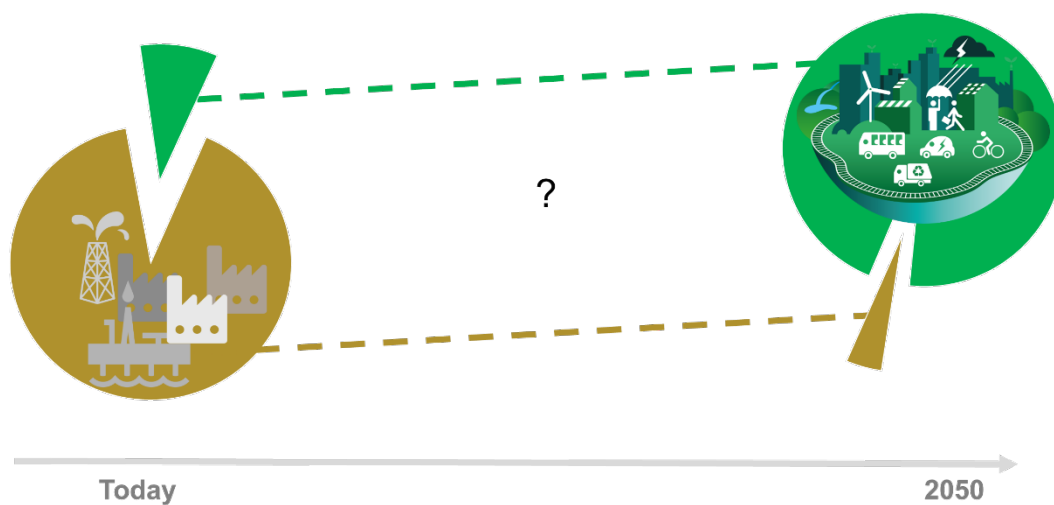
Given the recent international and national attention on climate risk and sustainable finance (see for example the report on climate risk and the Norwegian economy (Commission appointed by Royal Decree, December 2018)), we believe there is a current window of opportunity for science to influence how the financial sector approaches this topic.

During the feasibility study we successfully began the development of a tool urgently demanded by investors, which includes in-depth qualitative assessments of a company's policies, and their investment and revenue streams' exposure to climate risks. The next phase of development would include testing the method against a larger pool of companies, developing sector benchmarks and will be to incorporate quantitative aspects into our qualitative approach

1 Market needs assessment

1.1 The need for a comprehensive climate risk analysis

The transition to a low-carbon and climate resilient society requires financial flows to be channeled from 'brown' to 'green' investments. Tracking progress towards this goal has largely been measured through recording of emissions trends in various sectors. However, emissions might capture the overall environmental trend but is not sufficient for evaluating the climate risk of single investments.



With climate change, companies face increased threats via physical and transition climate risks. Due to increased atmospheric and sea temperatures, likelihoods and severity of floods, droughts, heat waves and other extreme weather events are increased. In addition, transition risks toward a low-carbon society, such as liability concerns, technology shifts or policy decisions illicit concerns for companies and their stakeholders, such as lenders and investors.

The financial impacts on companies arising from climate risks can be substantial and call for thorough and in-depth analysis of companies.

1.2 Landscape review

There are several providers of sustainability data to the financial sector. An often-used term for this data is Environmental, Social and Governance (ESG). This space includes both NGOs (like CDP - formally known as the Carbon Disclosure Project- which focuses on carbon data and climate risk), specialized ESG providers (like Sustainalytics), and data providers (like Bloomberg).

The landscape review of the ESG risk rating universe found that none of them has established a climate science based holistic approach for climate risk assessments (e.g., as studied in (CICERO, February 2017)). Competitors who provide a perspective singularly addressing physical climate risks, but who do not provide comprehensive analysis of companies, have been investigated by ClimINVEST (Hubert, Evain, & Nicol, December 2018). While most of the competitors use a

standard approach to provide data driven risk assessment, CICERO could provide an in-depth climate risk assessment for revenues, investments, physical climate risks as well as scenario work and aligned to the recommendation of the Task Force on Climate-related Disclosures (TCFD).

1.3 User needs

Key feedback from stakeholders collected during workshops and meetings:

- **There is a need for a climate risk analysis of companies.** There are many commercial actors providing ESG analysis to the financial sector, however, none with the in-depth focus on climate risk.
- **A sectoral approach would be useful.** While comparability across companies was highlighted as important and shades of green and brown will be useful in that regard, several stakeholders brought up in our meetings the difficulty of creating meaningful quantitative indicators across all sectors. Stakeholders suggested tailoring the metrics and approach to different sectors.
- **New initiatives need to be linked to relevant policy tracks including TCFD.** Large companies are already receiving many requests for sustainability or climate related data, and the concept of “reporting fatigue” was brought up in several of our meetings. A key suggestion to make our requests relevant and useful to the companies, is to ensure that the approach is well aligned with best reporting practices. TCFD and follow-up from the Norwegian Climate Risk Commission were mentioned specifically.
- **A key issue is to close data gaps in reporting from companies.** The reporting from companies is not currently providing investors with adequate information on climate risk, nor the data points we need for our analysis. The current gap in data and information was a key topic in many of the stakeholder meetings.

Organizations we engaged with:

- Aker Holding
- CDP
- DNB
- Finance Norway
- HSBC
- KLP
- Nabobil
- Nordea
- Nysnø
- Oslo Pensjonsforsikring
- Otovo
- Peik
- SEB
- Storebrand
- Sparebank 1 Midt-Norge
- Sparebank 1 Nord-Norge
- The Green Climate Fund
- The Norwegian Environment Agency
- Yara

2 Methodology development

The aim of our analysis is to provide a starting point for a methodology that gives investors and public authorities a practical tool to better understand and track how aligned companies are with what climate science tells is necessary in order to transform the economy in a low-carbon and climate resilient future.

For a successful transition we need all sectors to move towards low-carbon and climate resilient solutions. By assessing how companies are changing their investments and development efforts, we can encompass a forward-looking analysis allowing companies in transition to show how they are a part of the solution.

This first iteration provides several key elements of this analysis, but should be viewed as a starting point for discussion and further development, rather than a conclusive analysis.

2.1 Adapting the Shades of Green Methodology

CICERO introduced the Shades of Green methodology for green bond framework assessment in 2015 (CICERO, April 2016). The methodology is rooted in and developed to apply CICERO's climate science to the green bond market. This climate-science based rating method, focused on avoiding lock in of greenhouse gas emissions over the assets' life time and promoting transparency on resiliency planning and strategy, is what sets our Second Opinions on green bonds apart. With this methodology and more than a decade of experience (CICERO, September 2018) in the green finance market we have a versatile methodology ready for expanded application in the space of company risk ratings.

Our view is that the green transformation must be financially sustainable to be lasting at the corporate level. We have therefore shaded the companies' current revenue generating activities. Shaded investments add a forward-looking element and provide insight into future revenue streams and corporate strategy in relation to the green transformation. To encompass the full scale of potential projects, we have added two 'brown' categories, as described below.

The dark green shading applies the 2050 perspective today. It is typically allocated to zero-emission solutions, such as renewable energy investments (e.g., solar, wind, and hydro). CICERO's methodology strives to avoid fossil fuel elements, and locking-in of greenhouse gas emissions in infrastructure investments. The longer the time perspective, the more important it is to implement future-oriented solutions that could be part of a low-carbon society, today. This implies it is more difficult to achieve a dark green shading for investment with a long-time horizon.

Medium green is allocated to bridging solutions towards the long-term vision, for example investments in sustainable buildings with good but not the best energy efficiency ratings.

Light green is allocated to projects and solutions that are environmentally friendly but have no place in a low-carbon society, for example, energy efficiency investments in fossil fuel-based processes.

Light brown is allocated to projects that can lower emissions, but still represent risk of locking in fossil fuel infrastructure and are exposed to risk of stranded assets.

Dark brown is allocated to the heaviest emitting projects, with the most potential for lock-in of investments and risk of stranded assets.



Figure 2: CICERO Shades of Green and Brown

2.2 Assessing climate risk

The Financial Stability Board (FSB) Task Force on Climate-related Financial Disclosures (TCFD) developed a set of recommendations to stream-line climate related financial risk disclosure (TCFD, June 2017). These recommendations can be used by companies to effectively inform financial actors. The recommendations of Norway's Climate Risk Commission for climate risk disclosure are aligned with TCFD. The commission suggests that government should endorse the principles on disclosure and reporting recommended by TCFD, and there is a focus on the usefulness of scenario analysis (Commission appointed by Royal Decree, December 2018).

A major part of this feasibility study was the inclusion of the TCFD recommendations into our risk assessment module. This was a request by investors and reflects the ongoing processes regarding transparency of climate risks.

The feedback we collected from companies as well as portfolio managers revealed that TCFD considerations in Norway are in a very nascent stage of development, even among the biggest listed companies. This project, consequently, moved to incorporate general considerations around climate risks, regulations and related ongoing processes within the company in order to reflect preparedness and awareness of the company. Particularly for small companies or start-ups, a non-TCFD based approach of disclosure was adopted to more thoroughly reflect ongoing processes.

2.3 Data gaps

Data availability is one of the key challenges we identified during the feasibility study. An overview of publicly available data for listed companies can be found in Figure 4. During the data-identification process we also looked at Hydro and Equinor. Non-listed companies are not mentioned in the table as very little data is publicly available for non-listed companies. While there is more information available for larger companies, there were large data gaps also for Equinor, Yara and Aker.

During our study we engaged directly with companies to fill the data gaps. Where we were unable to obtain sufficient data on revenues or investments, we used company activities for the start-ups and left the sections blank for the larger companies. If there are any activities that we have not been able to shade, we have noted this in the company factsheets. The current Shades of Green methodology is largely qualitative in its approach, and we were therefore able to conduct a rating of some corporate activities for all test cases based on available information and interviews. However, **the lack of data availability will be a key issue to resolve in order to scale up climate risk assessments.**

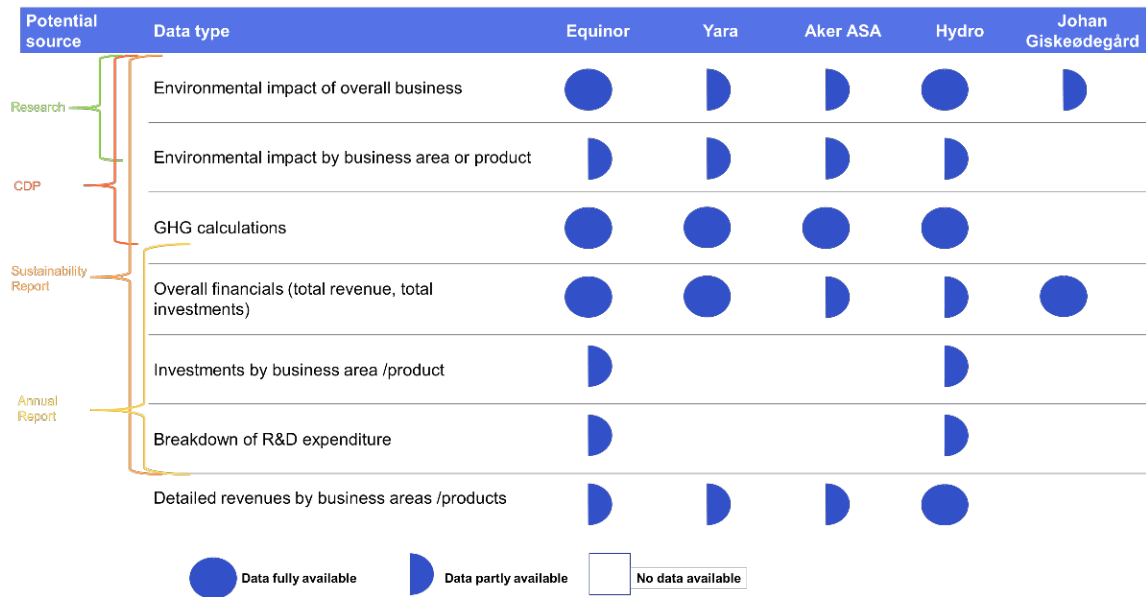


Figure 3: Data availability for company analyses

2.4 Process

We worked closely with our partners, Enova SF, Storebrand, Sparebank 1 Midt-Norge (SMN) and Sparebank 1 Nord-Norge (SNN) and Nysnø to identify companies in different industries to test our methodology. The selected companies ranged from large public companies, to smaller listed companies and unlisted start-ups. This span of company size and sector was selected to analyze if the methodology could be applied unilaterally across companies or if the main project should focus on a certain size or sectors.

All of the selected companies were analyzed on the basis of our science-based Shades of Green methodology. The analysis approach was co-developed with partners in a workshop at the beginning of the feasibility study. Based on the workshop discussions, we focused our research on four main components and completed the analysis in two phases. The key components are:

- Assessment of risk management for physical climate risk
- Assessment of transition risk and alignment with the TCFD
- Key quantitative metrics

Companies analyzed

- Aker Holding Asa
- Johan Giskeødegård AS
- Nabobil
- Otovo
- Yara International AS

The selected companies ranged from large public companies, to smaller listed companies and unlisted start-ups. This span of company size and sector was selected to analyze if the methodology could be applied unilaterally across companies or if the main project should focus on a certain size or sectors.

- Tracking of the share of green investments and revenue over time

Having selected relevant companies, the analysis itself for all of these four components was structured in two phases:

Phase 1: Screening publicly available data of the selected companies such as the sustainability report, annual report, CDP report and others.

Phase 2: In-person meetings or phone conferences with investors and companies to discuss key questions, our scientific approach, usefulness and steps forward

The below figure illustrates the iterative analysis process applied in the feasibility study. The gears represent the key elements of our analysis.

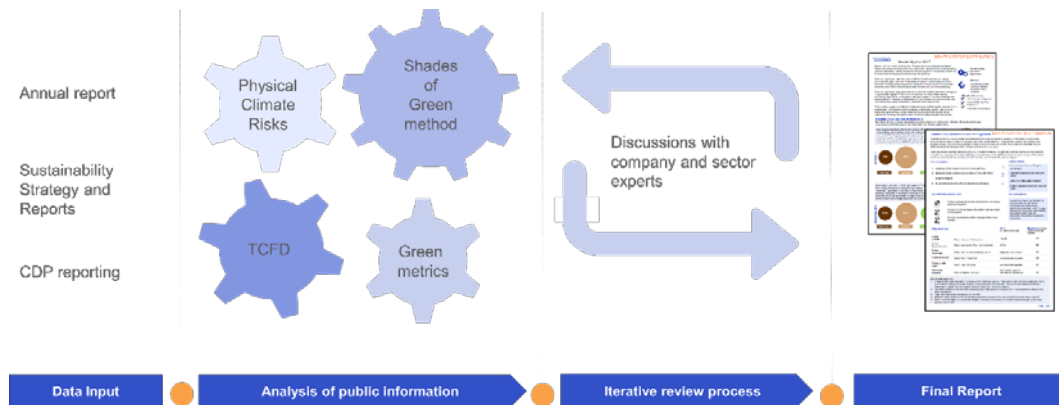


Figure 4: Process scheme of company analysis via CICERO Shades of Green

3 Key findings

3.1 Objectives of the feasibility study

1. Determine if there is a need for climate risk analysis of companies from the financial sector.
2. Determine if a science-based methodology for assessing green transformation can be developed building on the CICERO Shades of Green method for green bond assessment.

3.2 Key findings

- ✓ **The financial impacts on companies arising from climate risks can be substantial and call for thorough and in-depth analysis of companies.** Despite many actors populating the market for risk assessments for companies, Sustainable Edge fills the gap of in-depth climate risk assessments for companies.
- ✓ **Investors are interested in detailed and better information on corporate climate risk and the transition to low-carbon and climate resilient future than currently available.** The Sustainable Edge concept and draft communication tools were well received by investors as a potential response to their needs.
- ✓ **The CICERO Shades of Green methodology can be adapted to companies and has shown to be robust across the study's small sample size.** The feasibility study also identified key challenges, the foremost of them data availability and data quality. Going forward, the key challenge will be to move from a qualitative to more data-driven, quantitative approach.
- ✓ **The feasibility study is a starting point for discussion and further development and not yet a conclusive analysis.** While the method has potential, the analysis presented in this report should be viewed as illustrative and not a conclusive view on the companies analyzed.

3.3 Reading guide for the climate risk fact sheets

During the process of our analysis the companies were scrutinized regarding current revenues and investments according to our expanded Shades of Green methodology. Ideally, our methodology shades both investments and revenue. Shading investments provides insights in how a company is preparing for climate risks, while shading revenue provides insight in a company's current exposure to climate risk. Full granular data, however, is not always available on investments or revenues.

The structure and design of the final product is crucial to reach our goal of easily communicating climate risks to investors and companies. During the preliminary study we designed two-page company climate briefs.

Page 1 of the climate risk fact sheets that are depicted features a brief company description, together with an identification of the industry and regions where the company is active at the top. Subsequently, the most visual part of our analysis, the shading of investments and revenues follows. The share of investments/revenues are shaded according to our methodology and the percentage is

represented with a respective bubble size (see chapter 2 for more details on the methodology). After the shading, the climate risk fact sheet lists a set of key analyst questions regarding governance and activities of the company. Investors' feedback led us to include these questions on page 1 as they are a vital tool for the direct communication between investors and companies. The last box on page 1 includes key issues of the sector/industry and the company itself. Page 1, therefore, already provides a first thorough overview of the company's forward-looking climate performance.

Page 2 goes into more depth by highlighting the company's climate risk awareness and management in an understandable and easily digestible way. Here, key considerations around the use of scenarios, immediate physical climate risks, awareness of climate regulations, transparency and risk management are highlighted. In addition, some key metrics have been identified to reflect on the general companies' performance regarding climate risks as well as sector specific metrics to allow for benchmarking within the sectors. Part of a larger study will be to further identify general and sector specific key metrics that promote climate risk awareness and management. The expanded research phase should eventually lead to time resolved metrics.

Through our constant engagement with stakeholders it was possible to reshape our CICERO climate risk factsheet in the most helpful and impactful way. Future research phases will engage in continuous adaptation to the needs of financial actors. Going forward we will also work to improve the design elements of the climate risk fact sheets to enhance readability and develop a software based process to automate the creation of the fact sheets.

Note that one of the factsheets is written in Norwegian to accommodate stakeholder requests for information in the local language.

1.4 Aker Holding ASA

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Aker ASA (2017-2018)

Aker ASA is a Norwegian industrial investment company listed at the Oslo Stock Exchange. Aker's ownership interests are concentrated in the oil and gas, maritime assets and marine biotechnology sectors. The company's industrial holdings comprise Aker's ownership interests in Aker BP, Aker Solutions, Akastor, Kvaerner, Ocean Yield and Aker BioMarine. The vast majority of Aker's revenue comes from oil and gas.



Industry (sector)
Diversified Financials
(Financials)

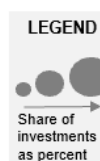
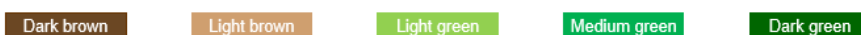
Regions
Norway

Shading investments and revenue

The Shade of Green or Brown allocated to a revenue stream or investment is a reflection of how aligned the underlying activities are to a low-carbon and climate resilient future. See notes and methodology section for further details on shading.

2017 investments

No investment data available. See notes



2017 revenue* (activities)



* For the purpose of this analysis Aker ASA's revenue is defined over the ownership shares multiplied by the total revenue of holdings

Aker ASA is a holding company invested mainly in the oil & gas sector. While Aker's revenue mainly results of dividends and other ownership related incomes, the analysis shades the revenues generated by Aker ASA's industrial holdings that can be attributed to Aker ASA via its ownership share in the companies. 99% are shaded dark brown, since the holding companies do not distinguish revenue streams from oil, gas and non-fossil fuel assets. Aker ASA holds 100% of the shares of Aker BioMarine, which is medium green, as the company takes ambitious steps, but, e.g., trawlers are still operated with conventional fuel technology.

KEY ANALYST QUESTIONS

1. Does Aker have climate risk strategies and climate targets in place?
2. Does Aker ASA track and analyze potential new regulations aimed at promoting renewable energies and CCS?
3. Can Aker provide data of R&D investment related to sustainability, other green investment data Aker defines as green as well as investments and revenues related to offshore-wind and CCS?
4. Does Aker have segregated data of revenue in gas service infrastructure, oil, and renewable energy?

Key issues: Burning of fossil fuels is a major source of green house gas (GHG) emissions. Aker ASA as an investment company does not report climate related investments and revenues for their holdings. The holdings partly also do not report on revenues and investments related to environmental impact. As long as they can't be distinguished, a light brown or a green shading for certain natural gas or offshore wind related investment/revenue cannot be assigned. Aker's holdings are mostly involved in the oil & gas sector, except for Aker BioMarine, which was shaded medium green. Despite still utilizing conventional fuel technologies, Aker BioMarine has strategies in place to reduce emissions, conducts extensive research, risk assessments and has scrutiny processes in place to document its compliances.

Climate change is recognized as a strategic risk, especially around changed regulations and taxation. More transparency on investments, revenues and governance is needed to reliably distinguish different shades of brown/green, risks and resilience. Aker ASA has four principal areas of ESG focus: society, people, integrity and the environment.

Climate risk awareness and management

Scenario analysis is used to analyze how different future states can impact a business. In the context of climate risk, scenario stress testing is useful for analyzing some risks and timeframes. To prepare for transition risk and long term physical impacts, investors should consider a range of scenarios from 2°C to 4°C. Elaborate scenario testing is not needed to prepare for physical climate change over the next 10-20 years.

Use of scenarios

- 1. Conducts climate scenario analysis of own activities?
- 2. Conducts climate scenario analysis largely in line with TCFD recommendations
- 3. Is transparent and coherent in its scenario assumptions?

Climate regulations

- 1. Has an understanding of potential future climate-related regulations
- 2. Has a process for analyzing impact of potential regulations
- 3. Disclosure of climate related risks and management

Key immediate physical risks



Strong winds and intense tropical storms can damage offshore infrastructure or onshore refineries



Flood events can damage infrastructure and disrupt supply chains



As a majority of oil & gas infrastructure in Norway is situated on the coast, sea level rise can worsen impacts of flooding and extreme weather

Risk management

- 1. Has an understanding of which extreme weather events are likely in its area of operations
- 2. Has a process to identify the exposure of its facilities to physical risk
- 3. Includes physical risk exposure into the design of its physical assets
- 4. Analyses potential physical risk impacts on external suppliers

General metrics

2017

Green Innovation	Green R&D / Total R&D	< 10%
Green Transformation	Green investments / total new investment	N/A
Green Growth	Green revenue / total revenue	N/A
Green Financing	Green bonds / total outstanding bonds	N/A

Sector specific metrics

2017

Renewable Energy Capacity Installed	<u>Installed capacity in MW</u>	N/A
Emissions Intensity	GHG emissions / revenue	N/A
TBD	TBD	TBD

Targets and transparency on Climate risk

✓No public targets related to climate change

- Disclose in annual report
- Sustainability reporting
- Other: CDP report

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3.4 Johan Giskeødegård AS (In Norwegian)

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Johan Giskeødegård AS (2017-2018)

Johan Giskeødegård AS (JG) er en bedrift innen fiskerisektoren i Norge. Selskapet foredler fersk fisk til saltfisk, tørrfisk og klippfisk. Bedriften ble stiftet i 1938 (AS etablert i 1981). JG har 20 ansatte og er lokalisert i Møre og Romsdal. I 2018 var omsetningen NOK 115 Mill i hovedsak som eksport til Sør og Mellom Amerika og Sør Europa. Salg er gjennom egne and eksterne salgsselskaper. Innkjøpskostnadene for solgte varer (fersk fisk som råvareinput i hovedsak fra Barentshavet) var NOK 88 mill.



Industri (sektor)

Fiskeforedling
(Konsumvarer)

Region

Norge.

Grader av grønt - vurdering av selskapets aktiviteter

En klassifisering, eller "Shading" av "grønnhet" eller "brunhet" i inntektsstrøm og investeringer reflekterer hvordan de underliggende aktivitetene er tilpasset et lavutslippssamfunn og en klimarobust fremtid. Se noter og metode for videre detaljer.

2017 investering



2017 inntekter



Bærekraftig høstet fisk som råvareinput vurderes som en del av 2050-løsningen. Sertifisert høstet fisk, f.eks. gjennom MSC-sertifisering, vurderes som mørke grønn. På grunn av usikkerhet rundt ikke-sertifisert fisk, f.eks. økt risiko for brudd på kvotebestemmelser mm, vurderes ikke-sertifisert fiske som lysegrønn. Se noter for videre detaljer.

NØKKELSPØRSMÅL

STRATEGISTYRESETT
AKTIVITETER

1. Vurderer dere miljø/ klimarelaterte aspekter når dere velger leverandører? For eksempel - bruk av nullutslippsfartøyer / utslipp pr kg råvare?
 2. Har dere opplevd endringer i etterspørsel/kunder i retningen av mer miljøvennlige fiskeprodukter?
 3. Kan du gi ett estimat på transportavstand /drivstofforbruk til markedene, for eksempel pr kg solgt?
 4. Har dere noen klima eller miljøstrategi?
 5. Forventer dere endringer etterspørsel eller tilgang til råvare på grunn av klimaendringer og / eller klimatilpasning?
 6. Har JK strategier eller rutiner for håndtering av fysiske klimarisiko (endring i sjøtemperatur og konsekvenser i fiskebestand/arter, ekstreme værforhold, stigning i havnivå, osv.)
 7. Har dere oversikt over potensielle miljø/klimapolitikk som kan påvirke virksomheten?
1. Hvor mye energi (fossil og fornybar) og drivstoff (fossil og fornybar) brukte JG til drift i 2017? Har dere for eksempel beregnet klimagassutslipp fra driften?
 2. Hvilke kvantitative indikatorer mener du er best til å sammenligne klima og miljøprestasjon i deres sektor?

Viktige hensyn: Fiskeindustrien er en viktig kilde til næringsstoffer og proteiner for mennesker. Verdikjeden representerer betydelig energibruk og klimagassutslipp, dvs. i fiske med bruk av (fossile) fiskeskøyter, transport til prosessanlegg, bearbeidning og håndtering, fryseri, lagring og (fossil) transport til kundene. I tillegg til energiforbruk og utslipp er det en rekke viktige miljøhensyn knyttet til overfiske, bifangst, tapt utstyr og skade på havbunnen. For mer informasjon om miljøforvaltningen av norsk fiskeri, se: <http://www.miljostatus.no/tema/hav-og-kyst/fiskeri/>

Klimaendringer er ikke ansett som en strategisk risiko hos JG, og lite ressurser benyttes for slik vurdering. JG vurderer lønnsomhet i investeringer som mest relevant, basert på f.eks. endret energiintensitet i produksjon.

KLIMARISIKO HÅNTERING

Klimaendringer representerer klimarisiko, som en ny finansiell risiko for bedrifter og samfunn. Mange fysiske virkninger som forskere opprinnelig forventet over en mye lengre tidshorison, blir observert allerede i dag. Dette er tilfellet for havnivåstigning, og samspeillet mellom dette og økt ekstremvær som sterkere stormer, stormflo og flom. I tillegg er det regulatoriske, juridiske og tekniske risikoer knyttet til overgangen til et lav-karbon-samfunn.

Overgangsrisiko

Klimaregulering/forskrifter mm kan påvirke JG på flere måter. Den norske fiskeflåten vil sannsynligvis oppleve strengere utslippsregler. Hurtige teknologiske fremskritt gjøres også i frakteflåten. Økninger i karbonskatt eller prissetting kan øke kostnadene ved transport til kunder, særlig på flyfrakt. Økt politiske risiko og risiko for økonomiske rystelser kan for eksempel gi endring av priser og tilbud/etterspørsel i verdikjeden. Kilde <https://klimastiftelsen.no/hvordan-mote-klimarisiko/>

Umiddelbare fysiske risikoer



Endringer i sjøtemperaturer vil føre til bevegelser i fiskebestander, for eksempel forventes torsk å bevege seg nord og øst



Flomhendelser kan skade infrastruktur og føre til brudd eller forsinkelser i forsyningskjeder



Ekstremvær kan påvirke produksjonen og JGs forsyningskjede. Havnivåstigning kan forsterke virkning på infrastruktur langs kysten.

Klimapolitikk

1. Har oversikt over potensielle fremtidige klimarelaterte forskrifter
2. Har en prosess for å analysere virkningen av potensiell klimapolitikk
3. Kommuniserer klimarelaterte risikoer og håndtering

Risikohåndtering

1. Har oversikt over typer ekstremvær som er kan påvirke bedriften
2. Har en prosess for å identifisere eksponeringen til anlegg for fysisk risiko
3. Inkluderer fysisk risikoeksponering i eiendomsstrategi
4. Analyserer hvor eksponert leverandører er for fysiske risiko

Indikatorer

2017

Grønn transformasjon	Grønne investeringer / totale investering	100%
Grønn Vekst	Grønn inntekt / totalinntekt	90%

Sektorspesifikke indikatorer

2017

Andel sertifiserte produkter (MSC)	90%
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Selskapsspesifikke indikatorer

2017

Strømforbruk pr kg tørket fisk	0,57 kW
---------------------------------------	---------

Klimarelaterte mål og transparens

JG har ingen offentlige klimarelaterte mål

- Omtalt i årsrapport
- Bærekraftsrapporting
- Annen: CDP rapportering

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3.5 Nabobil

°CICERO

Nabobil (2018)

Nabobil is a car-sharing service with over 165 000 members. Since founding, the service has facilitated over 100 000 rentals. The company has an innovative technology platform that includes the option of keyless transactions, and facilitates shares through a user-friendly app. The company has an insurance agreement and insurance is included in all rentals. Nabobil allows users to filter for eclectic or hydrogen vehicles.



Industry (sector)
Transportation
(Industrials)

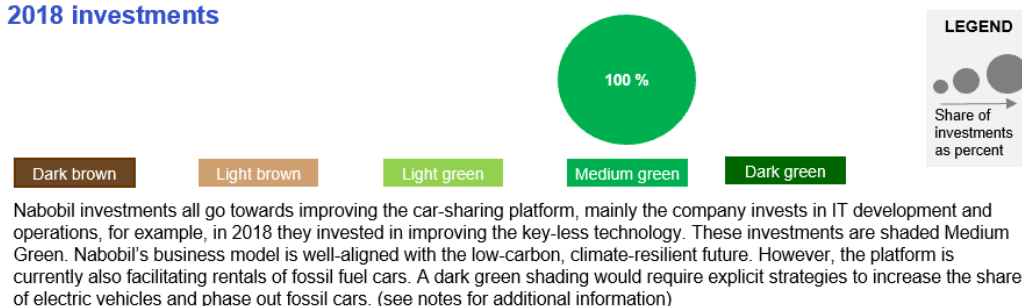


Regions
Norway (200
municipalities)

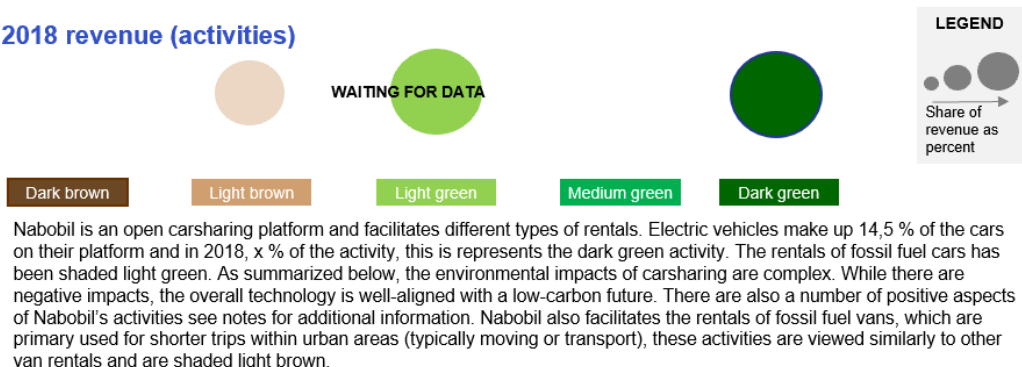
Shading investments and revenue

The Shade of Green or Brown allocated to a revenue stream or investment is a reflection of how aligned the underlying activities are to a low carbon and climate resilient future. See methodology page for further details on shading.

2018 investments



2018 revenue (activities)



KEY ANALYST QUESTIONS

1. Does Nabobil consider implementing climate-related goals and strategies, specifically how will Nabobil contribute to the shift towards electric vehicles?
2. How does Nabobil's customer base behaviors or attitudes, as well as their driving habits / car ownership look like? How is Nabobil contributing to shifting opinions on private car-ownership?
3. Does Nabobil consider disclosing any information on climate-related risks and management?
4. The integration with public transit is seen as positiv for this analysis, is this a one-off or a strategic area? In what other ways does Nabobil ensure that it's service enhances public transport instead of replacing it?
5. Does Nabobil have a break-down of the purpose of rides or where (urban – rural)?

Key issues: Several studies have attempted to quantify the environmental impacts of car sharing, but the interactions leading to changes in greenhouse gas emissions are complex and not fully understood. The local context, and especially the availability of public transport, will influence the impact. In addition, there are difference between a "free-floating" model and "round-trip" models as Nabobil. With these caveats, international studies can still provide useful perspectives. Positive effects have been found for the majority of households joining car-sharing schemes: the increase in emissions by gaining access to cars is small, while the decrease in emissions by getting rid of vehicles and driving less is large. This result is dependent on that households entering the sharing schemes to some degree sell their cars and travel less by car than before. Emissions are reduced by mode shifting and avoided travel, but also by saved parking infrastructure and reduced fuel consumption. However, there are also counterproductive effects. For example, there could be a strong rebound effect. The size of the rebound effect depends on how the transportation saving is spent. In a Norwegian setting, one study found that the rebound effect is small if savings are spent uniformly across non-transport items, while the rebound effect is larger than any emission reductions if savings are spent on air travel. (see notes for sources and additional details)




Climate Risk Awareness and Management

Climate risks have become financial risks. Many physical impacts that scientists had originally anticipated over a much longer time horizon are being observed today across the globe. This is the case for sea level rise, which is also complicated by interactions with extreme weather events like windstorms, sea-surges, floods, droughts and heat waves. In addition, there are regulatory, legal and technology risks related to the transition to a low carbon society.

Transition risks

Norway has the highest share of electric vehicle ownership in the world, with EVs having a market share of close to 30 % (Norsk Elbilforening, 2019). The Norwegian government has an comprehensive policy package aimed at growing the EV share, with the goal of an emissions free personal car fleet by 2025 (Samferdselsdepartementet, 2017). The capital city of Oslo has implemented additional policies aimed at restricting use of all personal vehicles (Oslo Kommune, 2019).

Key immediate physical risks

-  Heavy rainfall can lead to flash flood and urban run-off, potentially damaging vehicles
-  Extreme weather events, including storms and hail have the potential to increase damages and insurance claims
-  Sea level rise can worsen impacts of flooding and extreme weather

Climate regulations

- 1. Has an understanding of potential future climate-related regulations
- 2. Has a process for analyzing impact of potential regulations(*)
- 3. Disclosure of climate related risks and management

Risk management

- 1. Has an understanding of which extreme weather events are likely in its area of operations
- 2. Has a process to identify the exposure of its facilities to physical risk (**)
- 3. Includes physical risk exposure into the design of its physical assets
- 4. Analyses potential physical risk impacts on external suppliers

*Nabobil works with the industry organization Abelia to track and react to relevant regulations

** Nabobil owns no infrastructure. The main way physical climate risk can impact Nabobil is through changes in insurance conditions.

Metrics

General metrics		2017	Company specific metrics		2017
Green Transformation	Green investments / total new investment	100%	Green rides	Share of rides with EV	?
Green Growth	Green revenue / total revenue	100%	Shared rides	Number of shared rides facilitated	48 000
Sector specific metrics		2017			
Electric Share	Share of EVs compared to fossil fuel	14,5 %			

Targets and transparency on Climate Risk

Nabobil has informed us that they view their key impact in the shorter term to extend the lifetime of the existing carpark (and as such reduce the overall lifecycle impacts of these cars) and in the longer term as contributing to changing consumer perception around car ownership. Nabobil is positioning itself to be car for weekend trips, the current medium rental length is just over 2 days. This could potentially enable urban families to forego car ownership or choose electric vehicles. Nabobil has a strategic partnership with NSB, the Norwegian Rail company to integrate it's services with public transportation. The goal is to increase the use of public transport by allowing riders to use the car-sharing services for the final legs of longer trips.

✓ No public targets related to climate change



3.6 Otovo

°CICERO

Otovo (2018)

Otovo is the leading provider of turnkey rooftop home solar solutions in Norway. The company was founded in 2016 and has operations in its home market of Norway, as well as in Sweden and France. The expansions to other European markets is planned, and main activities in 2019 will take place outside of Norway. Otovo functions as a developer and planner of each project. Panels are procured from large scale suppliers and shipped directly to third party installers. The company is owned by its founders and employees, as well as by institutional investors. Otovo has 30 employees working in Oslo and Stockholm.

In addition to the rooftop solar product, Otovo is testing to operate as a supplier of renewable electricity to private households in Norway. In this capacity, Otovo matches demand from its customers with renewable electricity from Otovo home solar customers and purchased electricity from the power exchange. It is unclear whether this activity will be continued given the international expansion of the home solar core activity.

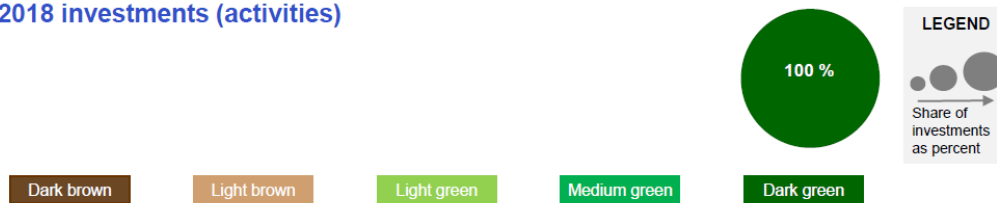
Industry (sector)
Renewable energy

Regions
Europe with main activities in Norway.

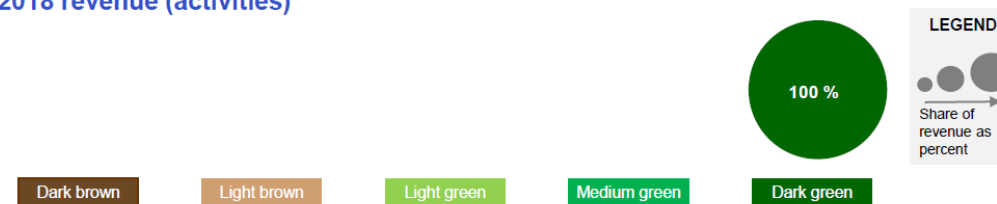
Shading investments and revenue

The Shade of Green or Brown allocated to a revenue stream or investment is a reflection of how aligned the underlying activities are to a low carbon and climate resilient future. See notes and methodology page for further details on shading.

2018 investments (activities)



2018 revenue (activities)



Reporting on revenues and investments is not available at this point. However, all of Otovo's activities further renewable energy and distributed supply. This is seen as part of a low carbon society

KEY ANALYST QUESTIONS

1. Which public support schemes are Otovo and its customers eligible for in the different markets?
2. If public support schemes exist, what would be the likely effects if these schemes were terminated?
3. Does Otovo track regulatory developments of financial support schemes and if so, how is this tracking organized?
4. How does Otovo assess future electricity demand and supply in its markets?
5. What kind of requirements does Otovo apply regarding the environmental and climate footprint of solar panel suppliers?
6. Does Otovo use life-cycle emissions data of panels to choose suppliers?
7. What kind of policies does Otovo have regarding the environmental and climate footprint of local contractors for the installation of panels?
8. Does Otovo have any targets regarding the environmental and climate footprint of its upstream and downstream supply chain?
9. How does Otovo assess the risk of damage to installed solar panels from physical impacts of climate change (e.g. extreme winds)?

Climate Risk Awareness and Management

Climate risks have become financial risks. Many physical impacts that scientists had originally anticipated over a much longer time horizon are being observed today across the globe. This is the case for sea level rise, which is also complicated by interactions with extreme weather events like storms, sea-surges, floods, droughts and heat waves. In addition, there are regulatory, legal and technology risks related to the transition to a low carbon society.

Key immediate transition risks

Home solar units can be grid competitive without subsidies in markets with net metering and high retail electricity prices. However, the degree of profitability for the owners of such units and the overall demand for home solar units would be sensitive to a winding down of existing subsidies and incentive schemes.

Key immediate physical risks



Extreme weather like cloudburst events could damage infrastructure and cause delays or disruptions in supply chains.

Strong winds can impact installation costs as more robust installation material would be required.

Climate regulations

- 1. Has an understanding of potential future climate-related regulations
- 2. Has a process for analyzing impact of potential regulations
- 3. Disclosure of climate related risks and management

Risk management

- 1. Has an understanding of which extreme weather events are likely in its area of operations
- 2. Has a process to identify the exposure of its facilities to physical risk N.A.
- 3. Includes physical risk exposure into the design of its physical assets N.A.
- 4. Analyses potential physical risk impacts on external suppliers

General metrics

2018

Green Innovation	Green R&D / Total R&D	100 % (5mNOK)
Green Transformation	Green investments / total new investment	100 %
Green Growth	Green revenue / total revenue	100 %
Green Financing	Green bonds / total outstanding bonds	0 %

Sector specific metrics

2018

Renewable Energy Capacity Installed	Installed capacity in MW	8MWp / ~8GWh/yr
Emissions Intensity	GHG emissions / revenue	N/A
TBD	TBD	TBD

Targets and transparency on Climate Risk

✓ Targets for installed MW or sold MWh have not been quantified

- Disclose in annual report
- Sustainability reporting
- Other: CDP report

°CICERO

3.7 Yara International AS

°CICERO

Yara (2017-2018)

Yara International ASA was the first and is the world's largest producer of mineral nitrogen fertilizer. The company also encompasses the production of nitrates, ammonia, urea and other nitrogen-based chemicals. The company is listed on the Oslo Stock Exchange and has its headquarters in Oslo. The company has around 13,000 employees, production sites on six continents, operations in more than 50 countries and sales to about 150 countries.



Industry (sector)

Chemicals
(Materials)

Regions

Global with production sites on six continents

Shading investments and revenue

The Shade of Green or Brown allocated to a revenue stream or investment is a reflection of how aligned the underlying activities are to a low carbon and climate resilient future. See notes and methodology page for further details on shading.

2017 investments

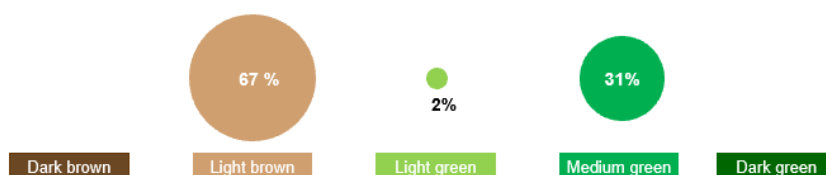
No investment data available. See notes on company factsheets



LEGEND



2017 revenue (activities)



LEGEND



Yara is a fertilizer producing company that has made ambitious steps toward substantially reducing emissions from NPK (a fertilizer type containing nitrogen, phosphorus and potassium) and nitrate production. The resulting activities from Yara can be seen as a bridging activity and the respective revenue is shaded medium green. Yara's light green activities are environmental services that reduce emissions but are not themselves part of a 2050 solution. The rest of Yara's activities are shaded light brown as they result into significant emissions due to fertilizer production as well as application of the end-product. (see notes for additional details)

KEY ANALYST QUESTIONS

1. Which scenarios/assumptions does Yara use to assess climate risks?
2. Does Yara take into account changes in sold products due to climate change?
3. Can Yara provide data of R&D investment related to sustainability or other green investment data?
4. What are the investments toward promote/increase the share renewable energy/fuels used for production?
5. What are the emissions per product/product group?

Key issues: Today, agriculture causes about one quarter of global greenhouse gas (GHG) emissions, with land use change originating from agricultural expansion being the main culprit. The manufacturing of mineral fertilizers contributes to GHG emissions, but they are also vital in limiting the need to expand farmland.

Climate change is recognized as a strategic risk by Yara, with implications for regulations, markets and operations. Yara's most significant initiative to reduce GHG emissions so far is the development and installation of N₂O catalyst technology at its nitric acid plants. This technology removes about 90% of the N₂O emissions in Yara's plants, and is also commercially available to third parties. Due to the significant reductions in GHG emissions from catalyst technology, Yara can offer low-carbon nitrate fertilizers. Use of nitrogen fertilizers represents both a substantial part of the indirect energy consumption and the potential environmental impact of farming. The production of other fertilizers and industrial chemicals are posing a climate risk – they involve greenhouse gas emissions in the production and in the application of the product due to soil emissions from microbe metabolism.

Climate Risk Awareness and Management

Scenario analysis is used to analyze how different future states can impact a business. In the context of climate risk, scenario stress testing is useful for analyzing some risks and timeframes. To prepare for transition risk and long term physical impacts, investors should consider a range of scenarios from 2°C to 4°C. We do not need elaborate scenario testing to prepare for physical climate change over the next 10-20 years.

Use of scenarios

- 1. Conducts climate scenario analysis of own activities?
- 2. Conducts climate scenario analysis largely in line with TCFD recommendations
- 3. Is transparent and coherent in its scenario assumptions?

Climate regulations

- 1. Has an understanding of potential future climate-related regulations
- 2. Has a process for analyzing impact of potential regulations
- 3. Disclosure of climate related risks and management

Key immediate physical risks



Strong winds and intense tropical storms can damage infrastructure



Flood events can damage infrastructure and disrupt supply chains



Droughts: Access to water is essential in the production process.

Risk management

- 1. Has an understanding of which extreme weather events are likely in its area of operations
- 2. Has a process to identify the exposure of its facilities to physical risk
- 3. Includes physical risk exposure into the design of its physical assets
- 4. Analyses potential physical risk impacts on external suppliers

General metrics		2017
Green Innovation	Green R&D / Total R&D	TBD
Green Transformation	Green investments / total new investment	TBD
Green Growth	Green revenue / total revenue	TBD
Green Financing	Green bonds / total outstanding bonds	No green bonds
Sector specific metrics		2017
Emissions intensity	GHG emissions / total sold products	0.42 (tonnes CO2wq/ tonnes of products)
Emissions Intensity	GHG emissions / revenue	0.16 (tonnes CO2wq/ 1000 NOK)
TBD	TBD	TBD

Targets and transparency on Climate Risk

- ✓ Yara has a climate change strategy
- ✓ Yara has set emission intensity targets
- ✓ Yara has not yet conducted scenario analysis
- ✓ For its European facilities Yara is covered by the EU ETS and operates with an internal price on carbon

- ✓ Disclose in annual report
- ✓ Sustainability reporting
- ✓ Other: CDP report

°CICERO

3.8 Notes on company factsheets

Aker Holding ASA

Notes on Shading Revenue

For the purpose of this analysis Aker ASA's revenue is defined over the ownership shares multiplied by the total revenue of holdings. The dark brown shading is allocated to revenue from crude oil and refined products. Due to the lack of information, revenues from other likely sources, such as natural gas, natural gas liquids or offshore wind cannot be identified and, therefore, not receive a possible light brown shading or green shading. Aker ASA does not report on revenue from renewables and associated activities. Aker's holdings are mostly involved in the oil & gas sector, except for Aker BioMarine, which was shaded medium green (1% of the revenue). Despite still utilizing conventional fuel technologies, Aker BioMarine's strategies in place to reduce emissions, conducts extensive research, risk assessments and has scrutiny processes in place to document its compliances. Aker ASA informed us that they have other, yet smaller, assets which are not involved in the oil and gas sector.

Notes on Shading of Investment

No investments have been shaded due to a lack of information.

Notes on climate scenarios

No scenario analysis is currently conducted. Aker ASA informed us that they commenced the process of developing scenario analysis.

Notes on physical climate risks

Extreme weather events have been identified as a key risk for Norwegian owned oil and gas infrastructure

Notes on Metrics

Note that Aker's R&D expenditure on new energy solutions is less than 10% of its total R&D expenditure.

Johan Giskeødegård AS

Notes for Shading av inntekt

Det opplyses om at 90% av inntektene er fra MSC sertifisert råvare. MSC sertifisering representerer bærekraftig fiske og betyr at nok med fisk blir igjen i havet, at fiskens livsmiljø respekteres og bevares, og at fremtiden for mennesker som er avhengige av fiske for sitt levebrød beskyttes. MSC sertifisert inntekt vurderes å være Mørk grønn. Øvrig inntekt vurderes som Lys grønn på grunn av usikkerhet og risiko for at kvotebestemmelser og bærekraft ikke respekteres.

Bærekraftig høstet fisk som råvareinput vurderes i dag som en del av 2050-løsningen. Den produserer noe mer utslipp enn enkelte jordbruksprodukter, men bidrar med diversifisert protein som substitutt for kjøtt.

Noter for Shading av investeringer

Selskapet opplyser at de investerte i fem nye elektriske trucker i 2017, med en innkjøpsverdi på ca. kr 400.000,-. Denne investeringen vurderes som mørk grønn.

Selskapet opplyser at når det gjøres investeringer i fabrikk eller produksjon tas det hensyn til energibruk, men at lønnsomhet er viktigste beslutningskriteria. Selskapet har tidligere gjort større investeringer i energieffektivitet. I 2016, investerte de i en ny og mer energieffektiv fabrikk (investeringsverdi kr 30 millioner), samt energisyringssystemer, varmepumpe og varmegjenvinning (investeringsverdi kr 600.000,-), utskifting til LED lys med mer. Disse investeringene opplyses å ha halvert energibruken i fabrikk pr omsatt krone, i en marginalbetragtning mellom 2015 og 2017.

I tillegg opplyses om økt fokus på gjenbruk og avfallshåndtering.

I næringskjeden utgjør transport den største utslippkilden, fra fangstleddet til markedet.

Noter for klimarisiko

Selskapet opplyser at de har lite fokus direkte på klimarisiko.

Noter til måltall

JG har lite offentlig tilgjengelig rapportering, de rapporterer hverken energi, utslipp eller nøkkeltall. Selskapet fører ikke oversikt over direkte eller indirekte utslipp (Scope 1-3), men opplyser om god og detaljert internkontroll og styring på energibruk i de ulike industrielle prosessene.

Nabobil*Notes on key issues*

Several studies have attempted to quantify the environmental impacts of car sharing, but the interactions leading to changes in greenhouse gas emissions are complex and not fully understood (Frenken and Schor, 2017). There are almost no comprehensive studies of its impact. The local context, and especially the availability of public transport, will influence the impact. In addition, there are difference between a “free-floating” model and “round-trip” models as Nabobil. With these caveats, international studies can still provide useful perspectives. A common belief is that sharing is less resource intensive as less goods may be needed (Schor, 2014). However, sharing is also influencing the economy leading to different indirect and complex effects. If sharing of goods and services leads to less production of new products and possibly less and/or more sustainable use compared to private ownership, the sharing economy may assist a shift towards a low-carbon-emissions society (Cohen and Kietzmann, 2014). Skjelvik et al. (2017) recently did a literature review on sharing in a Nordic context and focused on four sharing segments: Transportation, housing/accommodation, services, and other, smaller capital goods. Their mapping found that the largest emission reduction potential is in transportation, while renting of smaller capital goods can also lead to emission reductions. The Swedish Environmental Research Institute IVL estimates that the second-hand market in five European countries reduced CO2 emissions by 12.5 million tons in 2015 in their “best case” scenario where they assumed that buying an used item replaced buying a new corresponding product (Schibsted, 2016).

Most of the recent studies on the carbon effects of sharing is on car-sharing. Positive effects are found for the majority of households joining car-sharing schemes: the increase in emissions by gaining access to cars is small, while the decrease in emissions by getting rid of vehicles and driving less is large (Martin and Shaheen, 2011). This result is dependent on that households entering the sharing schemes to some degree sell their cars and travel less by car than before, as the sharing

scheme help people that otherwise would not have access to cars. Firnkorn (2012) found that the effect of Daimler's car2go service reduced the total number of cars, which might imply a potential for reductions in carbon emissions. A survey in the Netherlands found that car sharing leads to 30% less car ownership and 15% to 20% fewer car kilometers than prior to car-sharing. The reduction in CO2 emissions related to car ownership and car use was estimated to be between 13% and 18% (Nijland and van Meerkerk, 2017). Chen and Kockelman (2016) found that car-sharing members in the US reduced their individual transportation emissions by 51% upon joining a car sharing organization. Emissions are reduced by mode shifting and avoided travel, but also by saved parking infrastructure and reduced fuel consumption. However, when they account for indirect rebound effects, almost half of the reduction is counteracted. The size of the rebound effect is depending on how the transportation saving is spent. In a Norwegian setting, Briceno et al. (2005) find that the this rebound effect is small if savings are spent uniformly across non-transport items, while the rebound effect is dominating over any emission reductions if savings are spent on air travel. Druckman et al. (2011) investigated how large the rebound effect could be for UK households. For average spending of money, the rebound effect was estimated to be 51% for savings in food consumption and 25% for savings in travel. The average of three cases were 34%. Depending on what goods and services the re-spending go to, the rebound effect can be as small as 12% or much larger than the initial emission reduction. Given these counterproductive effects, Demailly and Novel (2014) ask if more sharing means consuming more, and call for more studies on the environmental effects of the sharing economy, which is also asked for by Frenken and Schor (2017).

Notes on Shading

As illustrated above, the climate impact of carsharing is not straightforward, and several factors impact the overall environmental impact. One of the key factors is the alternative transportation that car-sharing is replacing, and here the key is to avoid displacing public transportation. Nabobil has informed us that they are positioning themselves to be car option used for weekend trips, typically to areas where public transportation is not currently an option. Norwegians have a high rate of cabin ownership and these could be in remote areas with poor public transportation and limited EV infrastructure. The current medium rental length is just over 2 days, a good indication of this strategy. In the long term, the platform could potentially enable urban families to forego car ownership or choose electric vehicles. Also positive, is Nabobil's strategic partnership with NSB, the Norwegian Rail company. This partnership has the potential to increase the use of public transport by allowing riders to use the car-sharing services for the final legs of longer trips.

Car-sharing could contribute to shifting consumers views on car-ownership. In the long term we expect less private car ownership in urban areas. We also expect the phase out of fossil fuel cars.

Nabobil is an open platform and does not own any infrastructure or vehicles. This increases flexibility and will allow the company adapt to these changes as they happen. For a darker green shading, Nabobil will have to show that they are driving change and more actively contributing to the transition.

Otovo

Notes on Shading Revenue

Reporting on revenues is not available at this point. However, all of Otovo's activities further renewable energy and distributed supply. This is seen as part of a low-carbon society.

Notes on Shading of Investment

Reporting on investments is not available at this point. However, all of Otovo's activities further renewable energy and distributed supply. This is seen as part of a low-carbon society

Notes on climate scenarios

No scenario analysis is currently conducted.

Notes on physical climate risks

Otovo is communicating to its customers that solar panels have an average life span of 30 years. According to Otovo, solar panels are very durable since they were developed for extreme conditions, e.g. use in satellites. According to Otovo, snow, ice and precipitation do not cause damages to solar panels.

Yara International AS*Notes on Shading Revenue*

1. Calculations based on numbers in 2017 annual report.
2. Revenue from Yara produced NPK and Nitrate are shaded medium green. Yara defines their production in Europe (63% of revenue) in their CDP report as low-carbon products.
3. We have further assumed that 12% of industrial sales are defined as environmental services, such as catalyst technology. These revenues are shaded light green.
4. The rest of Yara's revenues are shaded light brown: The production of other fertilizers and industrial chemicals are posing a significant climate risk –they involve greenhouse gas emissions in the production and in the application of fertilizers due to soil emissions from microbe metabolism. Yara informed us that the current production assets base could change to hydrogen based production in the future when hydrogen is produced in a financially and sustainably viable way, and Yara has commissioned significant research on soil processes to reduce emissions.

Notes on Shading of Investment

No investments have been shaded due to a lack of information. Yara informed us that it is investing in precision farming for farmers, in digital solutions for farmers as well as other emission reduction initiatives

Notes on climate scenarios

Yara has a good understanding of potential risk related to climate change and the transition to a low-carbon, climate resilient future. TCFD is not mentioned in the annual report, but Yara informed us they commenced the process of assessing how to implement TCFD recommendations.

Notes on physical climate risks

Yara is aware of risks from the physical impacts of climate change. Despite the fact that no risk management strategies are mentioned in reporting, Yara has informed us that they have risk management strategies in place. The company monitors water use. Do to Yara's global activities and global supply chains, Yara faces a substantial risk of being affected by climate change induced disruptions and related costs.

Notes on Metrics

Yara informed us that it spends a substantial amount of their investments in R&D related to sustainability. However, due to the deeply entangled nature of the research, the investment data has not yet been segregated

4 Discussion of approach

Through our study we were able to develop a good understanding of the Sustainable Edge project's strengths: [Our methodology has shown to be adaptable across the small sample of companies used in this feasibility study, showing promise for further application.](#) The mix of project partners in the feasibility study included organizations with the complementary skills and resources required. As an interdisciplinary research institute, CICERO houses a broad set of climate science expertise the project can utilize, as well as, experience communicating science to the financial sector. Enova SF's technical sector expertise adds a valuable practical element to the analysis, in addition, to experience engaging with companies. The financial sector partners, SpareBank Nord-Norge, SpareBank SMN, Storebrand and Nysnø were invaluable to the feasibility study. These partners guided the process of connecting an academic approach with the reality of company analysis. An additional success factor was that communication with companies was facilitated by a potential investor, investor or lender.

Our in-depth science-based approach has the potential to work as an effective tool filling an already known gap in the market which is largely comprised of data-driven ESG risks analyses. No current offering specifically focuses on holistic climate risks or features the necessary scientific expertise. However, this is not indefinitely scalable and does not yet include any large data. The result of our research showed that the publicly available data on climate risks from companies is not sufficient for our analysis. For an extended study, data availability and quality will be at the center of our focus as we screen data availability through data bases systematically and identify most useful data for our approach and engage with companies on climate related disclosures.

This feasibility study has shown that a science-based approach can effectively be applied to assess climate risks for companies. The next phase of development would include testing the method against a larger pool of companies, developing sector benchmarks and incorporating quantitative aspects into our qualitative approach. We hope to consecutively develop our approach to substantially support the shift from brown to green investment strategies in Norway and beyond.

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CICERO is Norway's foremost institute for interdisciplinary climate research. We help to solve the climate problem and strengthen international climate cooperation by predicting and responding to society's climate challenges through research and dissemination of a high international standard.

CICERO has garnered attention for its research on the effects of manmade emissions on the climate, society's response to climate change, and the formulation of international agreements. We have played an active role in the IPCC since 1995 and eleven of our scientists contributed the IPCC's Fifth Assessment Report.

- We deliver important contributions to the design of international agreements, most notably under the UNFCCC, on topics such as burden sharing, and on how different climate gases affect the climate and emissions trading.
- We help design effective climate policies and study how different measures should be designed to reach climate goals.
- We house some of the world's foremost researchers in atmospheric chemistry and we are at the forefront in understanding how greenhouse gas emissions alter Earth's temperature.
- We help local communities and municipalities in Norway and abroad adapt to climate change and in making the green transition to a low carbon society.
- We help key stakeholders understand how they can reduce the climate footprint of food production and food waste, and the socioeconomic benefits of reducing deforestation and forest degradation.
- We have long experience in studying effective measures and strategies for sustainable energy production, feasible renewable policies and the power sector in Europe, and how a changing climate affects global energy production.
- We are the world's largest provider of second opinions on green bonds, and help international development banks, municipalities, export organisations and private companies throughout the world make green investments.
- We are an internationally recognised driving force for innovative climate communication, and are in constant dialogue about the responses to climate change with governments, civil society and private companies.

CICERO was founded by Prime Minister Syse in 1990 after initiative from his predecessor, Gro Harlem Brundtland. CICERO's Director is Kristin Halvorsen, former Finance Minister (2005-2009) and Education Minister (2009-2013). Jens Ulltveit-Moe, CEO of the industrial investment company UMOE is the chair of CICERO's Board of Directors. We are located in the Oslo Science Park, adjacent to the campus of the University of Oslo.