



# Lyse

## Green Financing Second Opinion

November 27, 2020

**Lyse is a Norwegian industrial group focusing on energy, infrastructure and telecommunications.** Through its subsidiaries, Lyse works to develop a varied and complete infrastructure network of power, bio- and natural gas, district heating and cooling, and fiber-optic broadband. The vast majority of Lyse's business operations are located in Norway, while some broadband services are also provided to Denmark.

**Projects financed under this framework will contribute to Norway's electrification, decarbonisation and digitalisation trajectories** by expanding the provision of electricity, heating and cooling with low grid emissions factors, as well as more efficient fibre-optic cables that replace copper cables. The majority of proceeds are expected to be directed toward energy efficiency through expanding and upgrading transmission networks and district cooling systems, as well as laying fibre-optic cables. Lyse's district heating systems use surplus heat from the Forus Energigjenvinning waste incineration plant and some biogas, and are therefore considered climate neutral, however, we note that this may contribute to skewed incentive structures that maintain waste levels that are not aligned with a 2050 ambition.

**The fibre-optic networks included in this framework are considered enabling technologies,** as opposed to directly contributing to climate mitigation, which makes it difficult to quantify direct climate and environmental benefits. This places higher importance on ensuring that environmental impact and life cycle assessments are conducted in a thorough manner. CICERO Green encourages Lyse to implement more systemised approaches for conducting these assessments, as well as to increase their ambition in demanding products and services that are more climate-friendly within their general procurement policies.

**Lyse demonstrates a solid engagement with environmental and climate factors, including assessing and mitigating climate risk and aiming to fully decarbonise company operations by 2030.** However, we note the lack of quantitative interim climate and environmental targets. Furthermore, Lyse does not plan to discontinue the sale of natural gas to their customers by 2030, but is engaging with their gas customers to encourage a switch to renewable biogas.

Based on the overall assessment of the eligible green assets under this framework and governance and transparency considerations, Lyse's green financing framework receives a **CICERO Dark Green** shading and a governance score of **Good**. In order to improve the framework, Lyse could work to systemise processes around sustainable procurement policies and environmental life cycle assessments. Lyse would also benefit from implementing quantitative short- and long-term climate targets to track progress on their route to decarbonisation.

### SHADES OF GREEN

Based on our review, we rate the Lyse's green financing framework **CICERO Dark Green**.

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



### GREEN BOND / GREEN LOAN PRINCIPLES

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





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# 1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated November 2020. This second opinion remains relevant to all green bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

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

## Expressing concerns with 'shades of green'

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

### CICERO Shades of Green



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



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



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



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

### Examples



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



Bridging technologies such as plug-in hybrid buses



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



New infrastructure for coal

Sound governance and transparency processes facilitate delivery of the client's climate and environmental ambitions laid out in the framework. Hence, key governance aspects that can influence the implementation of the green bond are carefully considered and reflected in the overall shading. CICERO Green considers four factors in its review of the client's governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.



## 2 Brief description of Lyse's green financing framework and related policies

Lyse is a Norwegian energy, infrastructure and telecommunication group based on the west coast of Norway. Lyse is owned by 14 municipalities in the Rogaland region, and has subsidiaries in the business units of energy, power grid and telecommunications, through which the company works to develop a varied and complete infrastructure network of power, bio- and natural gas, district heating and cooling and fiber-optic broadband. In 2019, natural gas delivery made up 2% of Lyse's total income. The vast majority of Lyse's business operations are located in Norway, while some broadband services are provided to Denmark. Lyse is also developing fibre cable connections with Europe.

The company is currently the sixth largest renewable energy manager in Norway, producing an average 6.1 TWh of renewable energy annually over the past 10 years, or around 5% of total Norwegian production. Following a recent merger with Hydro's RSK facilities, Lyse Kraft DA will have a production capacity of 9.5 TWh starting in 2021, which will make Lyse the third largest hydropower producer in Norway. The merger will bring the installed capacity from 1759 MW to 2379 MW from 2021 and depending on seasonal precipitation levels, Lyse will going forward be able to annually produce an estimated 8900 GWh, an increase from 5900GWh.

Lyse's electricity transmission grid network distributed 4914 GWh of electricity to its 155 000 customers in Rogaland in 2019. Lyse Elnett is responsible for the expansion, operations and maintenance of both district and regional electricity grids in 9 communes in Rogaland. The provision of electricity on the grid is controlled and regulated by Norges vassdrags- og energidirektorat (NVE).

District heating and cooling facilities have an installed capacity of 106 MW and 40 MW respectively, as well as 43 MW for direct heating.

The telecommunications business unit consists of the wholly owned digital TV and internet provider Altibox AS, as well as ownership in a number of fibre companies in Norway. Lyse now provides network and content services to close to 700,000 customers in Norway and abroad.

### Environmental Strategies and Policies

Lyse has reported on its emissions connected to its most pollutive sources, which totalled 9801 tonnes CO<sub>2</sub> in 2019. The majority of these emissions (87%) arise from local gas heating, and the remainder from fuel use and business travels. The company has a strategy to become climate-neutral in their company operations by 2030<sup>1</sup>. Despite not having developed quantified interim targets to reach this goal, Lyse has identified areas where decarbonisation can be achieved. They plan to cut scope 1 emissions from natural gas for direct heating, and cut leakage of SF<sub>6</sub> in high voltage wires. From 2022, they will stop investing in transformer stations using SF<sub>6</sub> gas in insulation. They are also gradually electrifying their vehicle fleet. They will cut scope 2 emissions through increasing electricity use and reducing the share of natural gas-powered direct heating. Lyse also plans to contribute to emission reductions through the project portfolio.

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<sup>1</sup> Lyse uses the term "climate-neutral" for transparency, since surplus heat is not defined as renewable in the Renewable Energy Directive. Lyse confirms that they will achieve full emissions reductions through absolute reductions in their own operations, and not through carbon-offsetting.



The company is aware of the climate risks they are exposed to, and have implemented some measures to mitigate these; hydropower facilities will receive upgrades and extensions in preparation of higher precipitation levels, the poles in the transmission and distribution grids will be made of a non-wood material composite, glass-reinforced polyester (GRP)<sup>2 3</sup>, to mitigate risk from lightning strikes, and the positioning of new infrastructure will account for changes in sea-level rise and other natural hazards such as mudslides.

In 2019, 99.2% of energy produced by Lyse from power and thermal production was renewable, where 96% was from hydropower and 4% was thermal power. Lyse has additionally given out 721 CO<sub>2</sub> credits. The company builds and operates important infrastructure for the electricity grid, currently comprising 15,000 km of lines and cables. Additionally, Lyse is one of four owners in the NorthConnect interconnection project between Norway and the UK, which is expected to significantly reduce greenhouse gas emissions. Under its brand, Smartly, Lyse also offers further energy efficiency and energy management solutions, primarily for housing companies and commercial buildings, including photovoltaics together with battery packs, electricity charging and control of local energy production adapted to customers' energy consumption.

In 2019, Lyse delivered a total gas volume of 519 GWh, of which 92% was natural gas, and 8% was biogas over its 600km long gas network. Lyse receives biogas from the IVAR treatment plant in Mekjarvik and Grødaland, where it is produced from sewage sludge and wet organic waste and is delivered to Lyse's gas network and mixed with natural gas. The gas mix is delivered to customers in greenhouses, dairies, porcelain production, animal food production and heating for buildings. Heating for buildings currently makes up about one-fifth of total volume of gas delivered. Lyse has a strategic initiative to phase out natural gas from their own operations by 2030, including their recent project to connect one of their largest direct heating facilities, Urban Sjøfront, to the district heating system. Lyse is also developing a plan for decarbonisation alternatives for direct heating facilities that are located too far away to be connected to the district heating system. After 2030, Lyse will continue to sell natural gas to their customers, however, they are engaging in dialogue with their gas customers to encourage them to switch to renewable biogas. Lyse has also partnered with IVAR and Felleskjøpet RA to establish a company, Jæren Biopark, to convert animal manure to biogas.

60% of Lyse's delivery of heating services comes from district heating, which is based on surplus heat from waste incineration (95%), biogas (5%) and electricity. The partially-owned waste incineration plant at Forus has a capacity of 110 000 tons of waste per year, which translates to 225 GWh for district heating and 50 GWh for electricity. The remaining 40% of heating services comes from direct heating, based on natural gas (61%) and biogas (39%). The provision of district heating therefore forms part of Lyse's efforts to reduce emissions, by replacing decentralized direct heating units. The environmental management of Lyse's district heating system is certified under ISO 14001.

Within the telecommunications, Lyse has completed the construction of a subsea fibre-optic connection between Norway and Denmark, and is developing a further connection to England. This will encourage large, energy-intensive data centers to establish in Southern Norway, where the grid emissions factor is lower compared to other European countries. Further, Lyse is expanding fibre-optic connections on Norway's mainland. Lyse aims to reduce the environmental impact of laying the new fibre-optic cables by prioritising laying cables at the same time as other municipal works, such as water and sewage works, or if this is not possible, by digging with the micro-trenching technique. In some cases, Lyse will need to resort to conventional ditch digging and laying.

Research and development projects also form part of company activities, including an ongoing research project, Elnett21, which is a collaboration across sectors including aviation and shipping to develop solutions to meet the

<sup>2</sup> The use of GRP poles more than doubles the lifetime of the poles compared to wood, steel and concrete alternatives. They are also more lightweight than alternatives, so more poles can be transported at once.

<sup>3</sup> <https://www.melbye.com/no/produkter/energinett/energinett-1/linjemateriell-transmisjon-36-kv/master/komposittmaster/>



growing demand for power in society. The company also engages in investments in early-stage companies and funds in technology and renewable energy, offering their expertise and experience in these areas.

All suppliers must sign a Code of Conduct committing to follow national environmental and social regulations, as well as Lyse's own policies. Environmental factors in the Code of Conduct include committing to align company operations with sustainable strategies, working towards achieving energy efficiency, and minimising harmful pollution and waste from a life cycle perspective. Lyse has a strategy to be leaders in choosing sustainable options within procurement, and prioritises choosing suppliers that fulfil higher environmental criteria, such as options that have a lower carbon footprint, e.g., prioritising electric cars over fossil fuel-driven cars. However, Lyse does not currently have a systemised process for conducting environmental assessments for their supply chain.

Furthermore, Lyse will implement an internal sustainability reporting framework in 2020, which they will aim to align with GRI standards. This reporting framework is expected to include multiple environmental factors relevant to Lyse's operations such as energy produced, biodiversity, emissions, environmental compliance and supplier environmental assessments. Climate risk and procurement practices will be included in the financial reports.

### Use of proceeds

The net proceeds of the green financing issued by Lyse will be used to finance or re-finance eligible assets and projects that have been evaluated and selected by Lyse in accordance to this Green Financing Framework. According to current investment plans, proceeds are expected to be allocated to projects within the categories: energy efficiency (50%), green digital solutions (30%), renewable energy (15%), and pollution prevention and control (5%).

Projects will include energy efficiency measures to regional and distribution grids, extension of fiber-optic networks, rehabilitation and upgrading of existing hydropower plants, and the extension of district heating and cooling infrastructure in the Stavanger and Sandnes area.

Lyse is not able to exclude certain customers (e.g., those in the fossil fuel industry) as the company is legally obliged to offer grid connection to all clients. However, Lyse has specified that they will not use green finance proceeds to connect facilities and clients involved in the exploration, production, refining and transport of fossil fuels, should such a request be put forth in the future.

Refinancing of eligible projects will have a look-back period of no longer than 3 years from the time of issuance.

### Selection

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

Lyse has established a green financing committee to oversee the selection process and ensure projects are aligned with eligibility criteria detailed in the framework. The committee consists of representatives from the Group Treasury, Group ESG and Business Units, and decisions require unanimous consent. Lyse has specified that the representatives from the business units have the necessary experience and expertise in enforcing environmental and social regulations, and includes conducting mandatory concrete environmental impact and risk assessments for approval by NVE (the Norwegian Water Resources and Energy directorate). Where necessary, external experts



will be consulted for such aspects as conducting specific analyses on biodiversity, conservation areas, emissions and cultural heritage sites.

The company's existing Code of Conduct and procurement policies, as described earlier, will apply for projects financed under the framework.

There is a documented three-step procedure for selecting and evaluating projects that includes proposals by business units or group treasury, evaluation of eligibility and subsequent screening of projects, and verification and approval by the Green Finance Committee.

### **Management of proceeds**

CICERO Green finds the management of proceeds of Lyse to be in accordance with the Green Bond and Green Loan Principles.

Lyse will establish a green finance register to monitor the Eligible Assets and Projects and the allocation of the net proceeds from green financing to eligible assets and projects. Proceeds will be allocated in a portfolio of disbursements. Lyse will, over the duration of the outstanding green financing, build up and maintain an aggregate amount of assets and projects in the green finance register that is at least equal to the aggregate net proceeds of all outstanding Lyse green financing. The Green Finance Register will form the basis for the impact reporting.

Any temporarily unallocated proceeds will be held in accordance with Lyse's Finance Strategy and the balance will be publicly disclosed. These proceeds will not be invested in assets or financial instruments connected to fossil fuel-related industries.

### **Reporting**

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society.

Lyse will seek to provide the same type of allocation and impact reporting to green bond investors and green loan lenders. The CFO will have responsibility for annually publishing a report on the allocation and impact of green bonds issued under this framework. Allocation and impact reporting for green loans will be provided to institutions participating in the loan. Where relevant Lyse will seek to align the reporting with the latest standards and practices as identified by ICMA and the guidelines in the Nordic Public Sector Issuer's Position Paper on Green Bond Impact Reporting. The impact report will, to the extent feasible, also include a section on methodology, baselines and assumptions used in impact calculations.

The allocation report will include a list of all projects financed, descriptions and case studies of selected eligible assets and projects, as well as a breakdown of amounts invested in each category and the relative share of financing vs refinancing. The impact reporting will be linked to each individual bond and based on multiple factors relevant to the project categories. If actual impact is not observable, estimates will be reported. Methodology for relevant indicators will also be included. Calculations involving emissions factors will be based on the Norwegian grid emissions factor.

The Green Bond allocation report will be verified by a third party on an annual basis, until full allocation has been achieved.



### 3 Assessment of Lyse’s green bond framework and policies

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

#### Overall shading

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

#### Eligible projects under Lyse’s green bond framework

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

Category	Eligible project types	Green Shading and some concerns
<b>Renewable Energy</b>  	Includes expenditures on: <ul style="list-style-type: none"> <li>Rehabilitating and upgrading existing hydropower plants to ensure a high technical standard and extend the lifetime of the asset.</li> <li>Extension of existing hydropower plants to increase annual power generation with the existing available hydrological resources.</li> </ul>	<b>Dark Green</b> <ul style="list-style-type: none"> <li>✓ Hydropower is a clean, renewable energy source, which contributes to Norway’s low grid emissions factor. It is an important enabler of digitalisation and the transition to a low-carbon society.</li> <li>✓ Hydropower plants are planned to be upgraded to increase capacity and adapt to the projected wetter climate.</li> <li>✓ Large hydropower facilities and associated construction/renovation projects can have outsize impacts on the surrounding environment and its biodiversity.</li> <li>✓ Lyse has informed CICERO Green that all new construction and expansion follows national regulations to conduct environmental impact assessments. All larger projects must be approved by public authorities following robust procedures.</li> </ul>



		<ul style="list-style-type: none"> <li>✓ Lyse has specified that they emphasise maintaining good dialogue with stakeholders in the affected area.</li> <li>✓ There are currently no plans to finance new facilities under the framework.</li> </ul>
<p><b>Energy Efficiency</b></p> 	<p>Includes expenditures on:</p> <ul style="list-style-type: none"> <li>• Extension of the electricity distribution network to support electrification of economic activities and transport, as well as connecting hydropower plants to the grid, <ul style="list-style-type: none"> <li>○ Lyse will not use green finance proceeds to connect facilities and clients involved in the exploration, production, refining and transport of fossil fuels, should such a request be put forth in the future</li> </ul> </li> <li>• Upgrades of transformer stations in the regional network to increase their capacity and reduce losses.</li> <li>• Assets which are part of a district-cooling systems using pumped-seawater, including temperature exchangers, pumps and pipe networks.</li> </ul>	<p><b>Dark Green</b></p> <ul style="list-style-type: none"> <li>✓ Transmission networks will be limited to regional and district networks in Rogaland, where the grid emissions factor is low in comparison to Norwegian (and European) counterparts.</li> <li>✓ Lyse is legally obliged to offer grid connection to all clients, and is therefore not able to exclude certain customers (e.g., those in the fossil fuel industry). However, the company has specified that any extensions of network for “brown” industry customers will not be included in financing.</li> <li>✓ District cooling systems are 100% powered by renewables, including the pumps, which are electrically powered.</li> <li>✓ Lyse has calculated that their seawater pumping technology is 10 times more efficient compared to conventional cooling machines, and reduces the need for harmful chemicals.</li> <li>✓ The issuer recognises that the construction of district cooling systems will have an environmental impact, and strives to minimise this through screening of suppliers, as well as through optimising logistics with other municipal works and cable laying.</li> </ul>
<p><b>Pollution Prevention and Control</b></p> 	<p>Includes expenditures on:</p> <ul style="list-style-type: none"> <li>• Extending the district heating network using surplus heat from waste incineration plant.</li> <li>• Investments in waste-incineration facilities are excluded.</li> </ul>	<p><b>Medium Green</b></p> <ul style="list-style-type: none"> <li>✓ All new infrastructure investments will go toward district heating that is powered 95% by excess heat, with a 5% share of biogas. Lyse’s other activities in local direct heating, which are more carbon intensive, are not included in the framework.</li> <li>✓ The surplus heat for district heating arises from the Forus Energigigvinning facility, which receives waste from the</li> </ul>



neighbouring IVAR recycling facility. The IVAR facility has a recycling rate of 75%.<sup>4</sup>

- ✓ 80% of waste for the incineration plant is household waste, while the remaining 20% is industrial waste. All waste originates from the Rogaland region, where Lyse is based. Transport emissions are therefore reduced.
- ✓ Waste-to-energy projects should strive to avoid the incineration of plastics to the extent possible as these energy rich materials should be recycled to a large extent in a 2050 perspective.
- ✓ The incineration plant, Forus Energigjenvinning, adheres to its local air and water pollution allowance as set by the Norwegian Environmental Protection Agency.

**Green Digital Solutions**

Includes expenditures on:



- Expanding fibre-optic networks with minimal environmental impact to replace more energy intensive alternative networks.
- Proceeds will also partly finance the first direct fiber-optic connection between Norway and Denmark. This could be an incentive for data centres to choose Norway as a location, where their electricity and cooling demand can be met with renewable energy.

**Medium to Dark Green**

- ✓ Digital solutions are expected to be an important enabling technology for climate mitigation and adaptation strategies. However, we note there are trade-offs on emissions and energy use from increasing demand for data centres, while reducing emissions in other sectors. The extent of material climate benefits from digitalisation and expanding networks is still disputed.
- ✓ Lyse has specified that financing in this category will be limited to costs associated with laying cables, which includes related infrastructure and nodes, as well as the fiber-optic connection between Norway and Denmark. The production of cables is not included, neither is the subsea connection between Norway and the UK.
- ✓ Fibre optic cables have an energy demand that is 90% lower than conventional copper wires.<sup>5</sup>
- ✓ Note that Lyse does not currently conduct systematic environmental

<sup>4</sup> <https://www.ivar.no/ettersorteringsanlegg/>

<sup>5</sup> Aleksic, Slavisa & Lovrić, A.. (2010). Power consumption of wired access network technologies. 147 - 151.



- impact assessments beyond energy efficiency improvements. Scope 3 emissions from varying energy-intensive end uses (data centres, streaming etc.) are not currently included in Lyse's assessments. Further impacts could include construction emissions, where Lyse plans to reduce impact in laying cables by employing micro-trenching techniques and/or combining logistics with other municipal work.
- ✓ The issuer is encouraged to work with its supply chain in order to lower emissions. The boat used to lay the international cable between Norway and Denmark is fossil-fuel powered, in line with what is available in the market.

Table 1. Eligible project categories

## Background

In February 2020, Norway released updated targets for 2030 to cut emissions by 50-55% from 1990 levels<sup>6</sup>. Norway is projected to miss its 2020 emissions reductions target by around 4.5 million tCO<sub>2</sub>e, and needs fast action to reach the new 2030 goal. The government has outlined necessary steps to achieve this through the 'Klimakur 2030' document.<sup>7</sup> This document covers 60 emissions reductions measures in multiple sectors including energy, transport and industrials that will together lead to a 50% emissions reduction by 2030. The electrification measures will make up 34% of total emissions reductions between 2021-2030 in Norway. This includes the electrification of personal and commercial vehicles, and concurrent investments in charging infrastructure and battery technology, as well as the electrification of industry.

Norway's electricity supply is primarily composed of pump and storage hydropower (95%), with some wind power (2.6%) and natural gas (2%). The Rogaland county, where Lyse has its energy operations, produces 10.2% of Norway's total power and 9.8% of total hydropower.<sup>8</sup> Meanwhile, 0.2% of Rogaland's energy production arises from thermal power plants. This means that the grid emissions factor in Norway, and in Rogaland, is low relative to its European counterparts.

Power demand is estimated to increase by 5.8TWh to account for the electrification of many sectors towards 2030. In 2018, Norway produced 147 TWh of electricity and total consumption amongst all sectors was 136 TWh, while in 2030, it is total expected consumption will increase to 159 TWh. Taking into account expansions in generation capacity from e.g., wind and hydropower, this will be well within Norway's expected generation capacity of 174 TWh. Electricity generation is expected to increase until 2022 due to investments in offshore wind power. Electrification measures will also require the rapid extension of grid and charging infrastructure. This additional renewable energy capacity contributes to greater grid decentralization and localization, which enhances grid flexibility and resilience.

<sup>6</sup> <https://www.regjeringen.no/no/aktuelt/norge-forsterker-klimamalet-for-2030-til-minst-50-prosent-og-opp-mot-55-prosent/id2689679/>

<sup>7</sup> <https://www.miljodirektoratet.no/globalassets/publikasjoner/ml625/ml625.pdf>

<sup>8</sup> <https://www.ssb.no/energi-og-industri/statistikker/elektrisitet/aar>



On a global level, the IEA Sustainable Development Scenario estimates a required energy efficiency improvement rate of 3.2% per year through 2040, which is double the rate in the period 2000-2016, in order to be in line with the SDS scenario.”<sup>9</sup> Energy efficiency investments, such as smart technology aimed at reducing energy consumption, are key to reducing emissions. Smart grids and grid upgrades are necessary to manage and increase the share of intermittent and decentralized renewable energy. Starting in January 2019, all Norwegian buildings were required by law to switch to digital electricity meters/smart meters that collect consumption data and deliver it to the centralised system run by Statnett. This contributes to a more efficient energy market, and help customers to gain information about when energy prices are lower and shift their energy consumption accordingly.

The gross generation of energy in Norway’s district heating plants was 7 TWh in 2019. This energy is largely delivered as heat, while smaller fractions are converted to electricity.<sup>10</sup> The fuel mix of district heating plants contains fossil fuels, woodchips and other wood materials, bio-oils, waste-heat, electricity and waste.<sup>11</sup> Waste stood for an average of around 50% of all district heating generation (GWh) in Norway between 2009 – 2019. The next largest source of district heating generation is wood chips and other wooden natural products. The precise share of plastics left in the waste after some fractions of plastics have been separated for recycling is currently unknown. District cooling systems offer highly efficient processes leading to more than 40% of energy efficiency improvements and 20% lifecycle cost savings compared to conventional air conditioning systems.<sup>12</sup> Traditional air conditioning systems create 50%-70% of the peak energy demand in a building, while district cooling systems enable greater flexibility and avoidance of peak power demands. District heating and cooling systems are most efficient in dense, urban areas.

Fibre optic cables have been largely found to reduce environmental impact, compared to conventional alternatives. In addition to acting as an enabling technology for digitalization, which is a key part of the low carbon transition, plastic and glass-based fibre optic cables are direct substitutes for copper wire cables, which contribute to significant emissions from mining. Furthermore, the demand for data and digital services is expected grow exponentially over the coming years, with global internet traffic expected to double by 2022 to 4.2 zettabytes per year (4.2 trillion gigabytes), where the vast majority of internet traffic goes through data centres.<sup>13</sup> While data transmission networks have felt significant (annual 10-30%) improvements in energy efficiency in recent years, the IEA predicts that increase in data demand from such technologies as machine learning, blockchain, 5G and virtual reality will likely outstrip efficiency gains of current technologies.<sup>14</sup> To reduce the risk of rising energy use and emissions, investments in R&D for efficient next-generation computing and communications technologies are needed, alongside continued efforts to decarbonise the electricity supply. GHG emissions arising from data centres depends heavily on local grid emissions factors, and type of technology used.

## EU Taxonomy

The EU Taxonomy is a multi-lateral effort to standardise thresholds and metrics to aid the green transition, and provides signposting for investors and bond issuers to aid in their decision-making and project selection processes<sup>15</sup>. The Taxonomy is not yet finalised, but will include specific thresholds for economic activities relevant to Lyse’s Green Finance Framework, in operation of hydropower, district heating and cooling systems, and transmission and distribution of electricity.

<sup>9</sup> <https://www.iea.org/reports/energy-efficiency-2019>

<sup>10</sup> <https://www.ssb.no/energi-og-industri/statistikker/fjernvarme>

<sup>11</sup> <https://www.ssb.no/statbank/table/04730/tableViewLayout1/>

<sup>12</sup> Dincer, I., Abu-Rayash, A., 2020. Community Energy Systems: District cooling systems. *Energy Sustainability*. Available at:

<https://www.sciencedirect.com/topics/engineering/district-cooling-system>

<sup>13</sup> <https://www.iea.org/reports/data-centres-and-data-transmission-networks>

<sup>14</sup> <https://www.iea.org/commentaries/the-carbon-footprint-of-streaming-video-fact-checking-the-headlines>

<sup>15</sup> EU Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, March 2020.

[https://ec.europa.eu/knowledge4policy/publication/sustainable-finance-teg-final-report-eu-taxonomy\\_en](https://ec.europa.eu/knowledge4policy/publication/sustainable-finance-teg-final-report-eu-taxonomy_en)



CICERO Green will not here verify Lyse's framework against the EU taxonomy, but notes that Lyse has calculated that 80% of their installed hydropower capacity has a power density between 5.8 to 20 W/m<sup>2</sup>.<sup>16</sup> The Taxonomy indicates that hydropower facilities operating with a power density above 5 W/m<sup>2</sup> are currently derogated from conducting a greenhouse gas Lifecycle Assessment or PCF. Lyse therefore estimates that at least 80% of production capacity is aligned with the environmental objectives and technical screening criteria in the current version of the EU Taxonomy.

Thresholds that apply for district heating and cooling include ensuring the system meets the EU Energy Efficiency Directive, meaning the system uses at least 50% renewable energy or 50% waste heat or 75% cogenerated heat or 50% of a combination of such energy and heat. Eligibility criteria for electricity transmission and distribution are numerous, including if it connects electricity from a power plant that is on trajectory for full decarbonisation. Based on preliminary assessments conducted by Lyse, they expect that their investments in these categories will align with the environmental objectives and technical screening criteria in the current version of the EU Taxonomy.

Specific thresholds for fibre-optic networks and other ICT solutions are not included in the taxonomy report, although there are preliminary considerations that will require significant lifecycle emissions reductions and energy efficiency improvements from fibre-optic networks compared to conventional alternatives.

In order to qualify projects under the EU Taxonomy, Lyse will also have to comply with the relevant Do-No-Significant-Harm criteria as outlined in the document, including, but not limited to, undertaking the relevant environmental impact assessments, complying with pollution and water regulations, ensuring equipment must comply with ecodesign directives to perform with top class requirements of the energy label. Specifically for existing hydropower plants, this includes implementing measures to promote ecological health and biodiversity as well as following pollution limits and monitoring regulations.

### **Governance Assessment**

Four aspects are studied when assessing Lyse's governance procedures: 1) the policies and goals of relevance to the green finance framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent. Please note this is not a substitute for a full evaluation of the governance of the issuing institution, and does not cover, e.g., corruption.

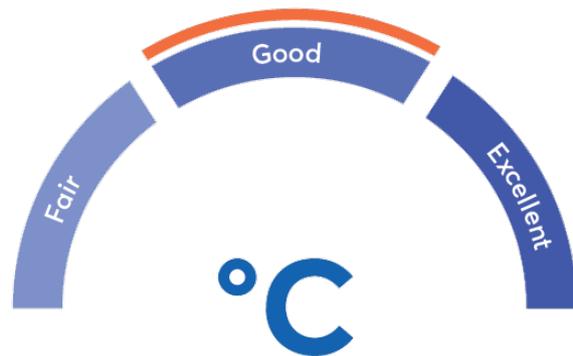
Lyse aims to be climate neutral by 2030, although they have not yet set any concrete targets or interim targets to achieve this goal. The annual and bi-annual report includes information and key figures on social and environmental sustainability factors, including CO<sub>2</sub> emissions and energy production by source for businesses where they have a greater than 50% share of ownership. Starting in 2020, Lyse plans to provide more detailed emissions reporting in the Annual report, including a breakdown of emissions by scope. The issuer has also taken steps to incorporate climate risk and resilience, but does not conduct scenario analysis or stress testing, nor do they report according to TCFD. They are planning to incorporate GRI standards in their financial reporting. The procurement process takes steps to ensure that national social and environmental regulations are followed, as well as some Lyse policies, which have in the past prioritised environmental factors over pricing, however we note a lack of systematization in incorporating environmental factors in this process, e.g., by conducting life cycle assessments related to environmental impact and emissions for each project.

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<sup>16</sup> Installed capacity divided by reservoir surface, based on data from the Norwegian water and energy regulator <https://atlas.nve.no/Html5Viewer/index.html?viewer=nveatlas#>. Calculation does not include hydropower plants from the transaction with Hydro.



Project selection includes a multi-step process that incorporates environmental expertise, and decisions must be unanimously agreed upon. Projects will be subject to life cycle assessments and other environmental analyses where relevant, and external consultants may be employed to support this process. Lyse will also conduct reporting on multiple relevant KPIs for each of the project categories, and both allocation reporting will be externally reviewed while there are proceeds still outstanding.



The overall assessment of Lyse's governance structure and processes gives it a rating of **Good**.

### Strengths

Lyse's framework will directly contribute to Norway's electrification and decarbonisation strategy, by expanding the provision of renewable hydropower energy, and climate-neutral district heating and cooling networks. Projects will support emissions reductions through converting the transportation, agricultural and multiple other sectors to being powered and heated by energy with lower emissions factors. The expansion of fibre optic networks will also support remote working and the consequential reductions in business travel, although we note it is currently inconclusive whether the technology will indeed bring a net climate benefit.

Under the renewable energy category, proceeds will likely be used to upgrade existing hydropower assets. This contributes to extending the lifetime of hydropower assets and has the potential to deliver increased capacity by improving the efficiency of systems. Smaller scale restorations and capacity additions to existing sites can be considered positive for the environment and climate as this avoids local impacts and GHG emissions connected to new constructions.

### Weaknesses

CICERO Green finds no material weaknesses in Lyse's framework.

### Pitfalls

Many of the technologies and solutions included in this framework are considered enabling technologies, as opposed to directly contributing to climate mitigation, which makes it difficult to quantify direct climate and environmental benefits. This places higher importance on ensuring that environmental impact assessments and life cycle assessments for e.g., expanding fibre-optic networks, are conducted in a thorough manner, and CICERO Green would encourage Lyse to implement systemised approaches for conducting these assessments. It will be important to ensure that impact reporting and information on the methodologies used are highly transparent.

There is no consensus yet on the extent to which fibre-optic networks will contribute to climate benefits. While it is expected to enable digitalisation and decarbonisation in multiple other sectors, including transport and buildings sector, the IEA reports that increase in demand from developments in energy intensive end uses e.g., in 5G, machine learning, virtual reality, will likely outstrip efficiency improvements from current technologies. This may lead to lock-in effects of less efficient technologies, as the lifetime of the fiber optic networks are likely to be longer than the desired efficiency improvements. Lyse partly mitigates this by choosing a technology that is 90% more energy efficient than conventional alternatives, however CICERO Green would encourage Lyse to ensure these lock-in effects are considered.



Lyse has robust procedures in place to ensure that environmental regulations are followed. Each business unit has employees that specifically conduct environmental screening. However, we note that this approach does not reflect any greater ambition than that which is required by law. CICERO Green would encourage Lyse to build further formalised approaches toward conducting life cycle assessments and environmental impact assessments that go beyond what is required, to contribute to driving the industry forward in their green and climate activities.

The inclusion of district heating from surplus heat from waste incineration is commendable, and contributes to greater energy efficiency. However, there is a risk that waste incineration will incentivise the maintenance of current levels of waste, as opposed to increasing reuse and recycling rates. Waste incineration is therefore best combined with ambitious re-use and recycling policies. The impacts of this are mitigated under Lyse's framework as the waste used at Forus Energigjenvinning is sourced from the IVAR recycling facility, which already implements high rates of plastic recycling practices and reduces the amount of plastic being incinerated by 25%. CICERO Green would encourage Lyse to engage with IVAR to ensure reuse and recycling policies are implemented. Lyse could also ensure that emissions from waste transportation are minimised by optimising logistics and ensuring waste is locally sourced.

While it is commendable that Lyse is engaging with customers to encourage them to switch from natural gas to biogas, it is not certain that this strategy will be effective. CICERO Green would encourage Lyse to develop further policies and concrete targets to reduce their Scope 3 emissions.



# Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Green Financing Framework. Update November 2020	Lyse's green financing framework from November 2020.
2	Lyse Annual report 2019	Annual report for the year 2019
3	Halvårsrapport 2020	Lyse's half-year report from June 2020
4	Lyse – målsetninger for klimanøytralitet og integrering av klimaperspektivet i forretningsutvikling	Document detailing Lyse's goals toward climate neutrality and integrating climate perspective in business strategy.
5	Lyse – Preliminary assessment of Green Financing Framework against the EU Taxonomy (March 2020)	Lyse's evaluation of each project's alignment with the March 2020 version of the EU Taxonomy.
6	Lyse - Leverandørerklæring	Lyse's supplier code of conduct
7	Lyse – integrering av miljøhensyn i innkjøp	Description of environmental considerations in Lyse's procurement policy
8	Difi, 2020. Miljø- og samfunnskriterier for anskaffelser av Varebil.	Document on environmental and social criteria for procurement of commercial vehicles, used by Lyse in assessing their procurement policy.
9	Lyse – anskaffelser	Various documents provided by Lyse to highlight their procurement procedures



## Appendix 2: About CICERO Shades of Green

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

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

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

