

ENOVA

Annual Report 2020

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Time to think outside the box

The transition to the low-emission society was well under way when the corona pandemic suddenly struck the entirety of Norwegian business and industry. Nevertheless, 2020 still gives rise to optimism on behalf of the transition.

The unprecedented year 2020 posed major challenges, even for active enterprises which considered themselves solid and robust as they started the year. We embarked upon 2020 with a dawning climate optimism after a period of increasing activity and growing interest in developing and utilising new climate technology. When Norway largely shut down in March, thus putting activity in the private sector on hiatus, concerns were on the rise, both for the consequences of the coronavirus for Norwegian health and jobs, and for whether the pandemic would delay the crucial transition process toward the low-emission society.

Every company and industry had its own unique circumstances to handle during the crisis. I'm impressed with everyone who also spent this time thinking outside the box. Because while

one might presume that climate projects would be one of the first things put on hold in a year like 2020, Norwegian business and industry have shown few signs of shelving their climate ambitions. After a quiet period in the spring, activity ramped up substantially later in the year, and in some market areas we actually had a busier year than usual.

In 2020, Enova's funding commitments totalled about NOK 3.3 billion, distributed across 3 852 projects. These figures are encouraging. We've also approved grants to homeowners for more than 9 000 measures through the Enova Subsidy, which reimburses them for parts of their expenses for investing in energy-smart solutions in the home.

Nothing would be better than being able to combine the necessary emission cuts we're facing with new value creation, and Norway therefore has significant opportunities within industry and the maritime sectors, with their unique and valuable expertise. It is encouraging that the thematic efforts where we encouraged industry to implement activities through

simple measures and quick climate cuts received particularly good responses. As regards the larger and far more complex technology developments, our experience was that some projects were pushed back somewhat, primarily as a result of delays and postponements – not cancellations. This means that we are confident that several of these industrial endeavours will be triggered in 2021.

Despite the maritime industry feeling the effects of both a low NOK exchange rate and low oil price in 2020, we are experiencing a clear mobilisation in the sector to develop new technology. The Topeka company's upcoming two hydrogen vessels, which we supported with NOK 219 million, is a good example of this. These vessels will not only be running on liquid hydrogen, but will also transport the same emission-free fuel to hubs along the coast. This is an important contribution to increasing both access to and use of hydrogen in the maritime sector. In recent years, we also had the opportunity to contribute to the impressive development in the use of battery solutions at sea, and by facilitating the demonstration of hydrogen solutions for ship types and routes where batteries alone cannot cover the energy need, the sector is taking a substantial and important step closer to emission-free maritime transport. This is promising both for the potential for emission reductions and Norwegian value creation.

Hydrogen efforts are also on the rise in Europe, and over the course of the year, Enova was tasked with administering Norway's participation in a European collaboration for hydrogen technology. This collaboration can hopefully bolster the development of hydrogen technology in Norway and simultaneously increase the likelihood of succeeding in exporting the solutions we develop. Enova was also tasked with administering Norway's participation in the EU's new innovation fund, which will manage EUR 10 billion over the upcoming decade. This will provide even more avenues to create results from the innovation taking place in Norwegian business and industry.

Enova's funds must be spent on good climate projects alongside the market. We have standing cooperation with the industrial players on major leaps in technology, but we must also reach the full range of the private sector to ensure that new climate technology is utilised quickly enough and to an adequate extent. Enova must therefore remain close to the market and have processes that are efficient both for us and those utilising our services. This is why we are now automating support programmes where we can. The support rates for electric delivery trucks are now also automated, updated daily and adapted to individual makes and models. On the maritime side, we have started automatic project portfolio management for support for installing battery and onshore power systems, which has made it both easier and quicker for fishermen and fish farmers, among others, to receive support to electrify their vessels. We intend to continue such adaptations.

The road to the low-emission society requires broad adaptation within all sectors of society. Enova is a key instrument for this transition and our job is to shepherd the viable changes needed to build the green Norway of tomorrow. We have now completed a four-year-long contract period. Since 2017, we have contributed to realising projects with expected climate results of more than 1 million tonnes of CO₂ equivalents in facilities not subject to emission credits, contributed to expected energy results of more than 6.6 TWh, reduced peak demand results exceeding 600 MW and we have helped trigger more than NOK 10 billion in innovation capital for projects small and large. These are indications that Norwegian players and the private sector both can and will keep taking steps toward the low-emission society. The effect of these projects, the market change they lead to, are what will take us toward the low-emission society. Enova's largest funding commitment so far is the billions in support for Equinor's offshore wind project Hywind Tampen in 2019, which is a good example of how predictable policy instruments and long-term collaboration can contribute to important projects for Norway and the low-emission society.

In parallel with the day-to-day work of realising the good projects, it is important that we ensure predictable policy instruments and frameworks that make us a relevant partner for the market moving forward. This is why we are very pleased by the signing of a new four-year agreement with the Ministry of Climate and Environment, starting from 2021. The new agreement further refines Enova as a climate policy instrument within late-phase technology development and early-phase market development.

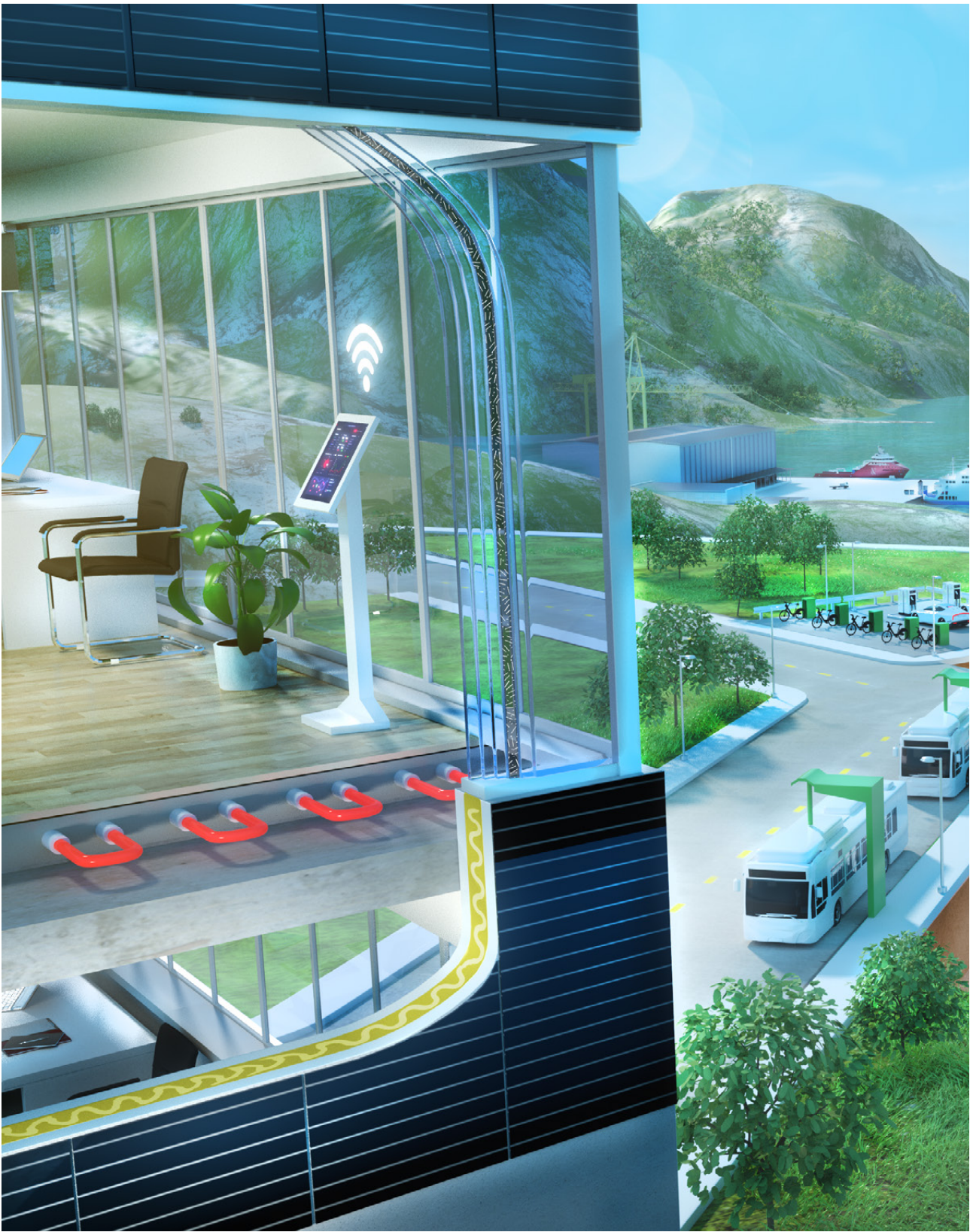
Climate change is the defining challenge of our time. Although Norway accounts for a small share of total greenhouse gas emissions, we can still play a significant role in the global climate effort. Norway has unique and valuable expertise within several areas for developing energy and climate technology that can benefit the entire world. Exporting this technology can also generate substantial values for the Norwegian welfare state. There are opportunities here, ripe for the picking by Norwegian players and the private sector. There is still a way to go to solve the world's climate challenges, and time is running out. This emphasises the need for continuing the transition with unabated vigour.

Here at Enova, we are impressed with the work that is done by the players in the various markets. We will continue the good dialogue with all of you and contribute to ensure that the new thoughts and ideas are realised in climate projects that can accelerate the vibrant change toward the low-emission society.



Nils Kristian Nakstad

Chief Executive Officer (CEO)



PART II

INTRODUCTION TO THE ORGANISATION AND KEY FIGURES

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Social mission

Enova SF is a state enterprise located in Trondheim. Enova SF is owned by the Ministry of Climate and Environment (MCE).

The Ministry of Climate and Environment (MCE) is responsible for the totality of the Government's climate and environmental policy. The MCE issues Enova's assignment letter and receives our reporting.

The four-year agreement between the State and Enova applies for 2017–2020 and sets the framework for the social mission. The agreement will ensure that the resources from the Climate and Energy Fund are managed in accordance with the goals and preconditions at the foundation of the Climate and Energy Fund. A new agreement was entered into in late 2020 for the 2021–2024 period.

The purpose of Enova and the Climate and Energy Fund for the 2017–2020 period was to contribute to reduced greenhouse

gas emissions and strengthened security of supply in energy, as well as technology development that also contributes to reduced greenhouse gas emissions in the longer term.

During the 2017–2020 agreement period, Enova shall promote:

- a. Reduced greenhouse gas emissions that contribute to fulfilling Norway's climate commitment for 2030.
- b. Increased innovation within energy and climate technology adapted to the transition to a low-emission society.
- c. Strengthened security of supply through flexible and efficient demand and energy consumption.

Enova will establish instruments with the aim of achieving lasting market changes. The ultimate goal is that efficient energy and climate solutions should be preferred without support. The activity can be aimed at all sectors.

Enova's vision is *Vibrant change*

Our values:

Market-oriented

Bold

Always learning

Thorough

Ethical guidelines

Our ethical guidelines and fundamental values are Enova's rules of conduct for behaving ethically and in a socially responsible manner.

- We have goals, values and ethical guidelines that describe the founding philosophy and actions which will characterise our organisation.
- We exercise corporate governance principles where we emphasise openness, transparency, responsibility, equality and long-term perspectives.
- We demand high integrity standards, which for example entail that we do not tolerate any form of corruption, and that we promote free competition.
- We must be open, honest and responsive in communication and contact.
- We do not discriminate based on gender, sexuality, religion, nationality, ethnicity, societal group or political opinion.





From the left; Nils Kristian Nakstad, Astrid Lilliestråle, Tonje Foss and Øyvind Leistad

Management

Nils Kristian Nakstad

Chief Executive Officer (CEO)

Nils Kristian Nakstad has been the enterprise's CEO since 2008. He is a chartered engineer from the Norwegian University of Science and Technology (NTNU) and has extensive experience from research and industry, including from Sintef, Hydro, ReVolt Technology and participation in the seed capital and venture community. As of 2020, Nakstad is also chairman of the board for the Norwegian University of Science and Technology (NTNU).

Astrid Lilliestråle

Director of Enterprise Management

Astrid Lilliestråle started at Enova as marketing manager for the transport area in May 2019 and has been Director of Enterprise Management since September 2020. She is a chartered engineer from Uppsala University in Sweden. Lilliestråle has previous experience from research and consultancy activities, including from Sintef, McKinsey & Company and PwC.

Tonje Foss

Director of Strategy

Tonje Foss has been Director of Strategy since February 2020. She is a chartered engineer from the University of Stavanger. Foss has extensive experience from the oil industry, including from Kværner, Schlumberger and Aker BP. She also has experience from the IT industry as regional director in Atea. Foss has directorships in SpareBank 1 SMN and Salmar ASA.

Øyvind Leistad

Director of Marketing

Øyvind Leistad has been the Director of Marketing since 2018, and has held a number of executive positions in Enova. He was hired as a senior adviser in 2005. From 2007–2012, he was the Director of the Energy Production Department and from 2013–2019, he was the Director of the Development Department. Leistad has an educational background in resource economics, financing and investment from the Norwegian College of Agriculture (now the Norwegian University of Life Sciences) and worked for the Ministry of Petroleum and Energy from 1998 to 2005.

Organisation

Enova has an important social mission and manages considerable resources on behalf of society at large. This sets very high standards for the organisation, both for solving the assignment efficiently, and that this is done within the framework of good stewardship. Our most important criterion for success in delivering on the objective is our employees; our shared knowledge and expertise, ability and willingness to cooperate both internally and with the markets, as well as the continuous focus on development and tailored management, are crucial for attaining this goal over time. This is why we are working actively and in a targeted manner to ensure that we always have the right expertise at the right level to solve the assignment.

Enova supports the individual's strengths and willingness to perform at one's peak. We call it values-based management because we seek to integrate our values in all parts of the workday, in connection with decisions, behaviour, priorities and participation. It should feel meaningful to work for Enova. We challenge each other by having high ambitions for developing the organisation. Enova is in the middle of implementing a multi-year project for comprehensive enterprise management and organisational development. We are in the process of extracting gains from the project in the form of solving tasks more efficiently using digital solutions, automation, new systems and new work processes.

2020 was a different year, including for us in Enova. As a result of the pandemic, our employees spent most of their time in home offices. Despite the workday changing radically in an instant, Enova never lost confidence in the organisation's ability to handle this situation. Digital tools have been utilised rapidly and productivity has been maintained. We have been challenged and experienced our ability and willingness to deliver on goals, practice flexibility and try out new forms of working. We have

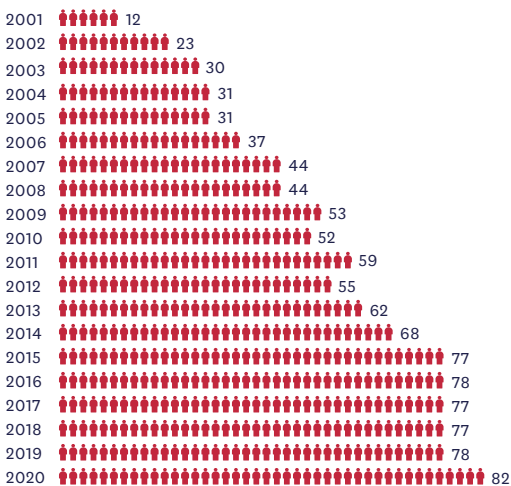
undertaken facilitation as regards equipment to ensure good working conditions in home offices. The situation has placed new demands on management. A survey to map the employees' experience with the new workday was carried out and followed up throughout the year.

In 2020, employees both left their positions at Enova, while others have joined us, and at the end of the year, Enova had 82 permanent employees; 40 women and 42 men. The education and work experience varies within a number of disciplines. Enova sees the value of gender equality and diversity in the workplace, and believes this strengthens our ability to think broadly and take on different perspectives.

The enterprise is organised in three departments, each with special tasks and responsibilities:

- The **Marketing** Department communicates Enova's services to the market, provides advice and handles questions concerning financing and client contact. This department develops programmes, processes and follows up supported projects.
- The **Enterprise Management** Department develops and manages Enova's ambitions and principles for e.g. digital transformation, new work processes and management and control of the organisation. This department handles support functions within finance, IT and HR.
- The **Strategy** Department works on the overarching framework conditions for the activities, the long-term strategy for delivering on the assignment, developing Enova as a policy instrument agency and communication with our stakeholders.

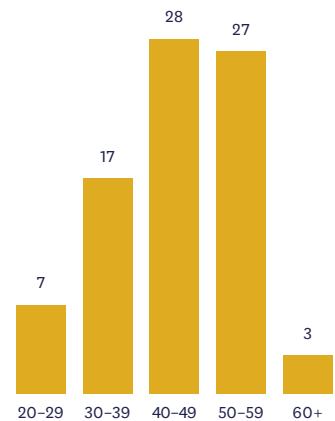
Development in number of employees



49% Women
51% Men



Age composition



Key figures

Key figures for Enova SF

Key figures for Enova SF were prepared based on the standard for public enterprises. Because Enova SF is a state-owned enterprise which follows other accounting standards and has a different financial model, the key figures will not be directly comparable with corresponding key figures for central government agencies.

Key figures	2020	2019	2018	Description
Full-time equivalents	79.8	72.1	73.5	Full-time equivalents includes all permanent and temporary employees, summer students and contracted capacity from staffing agencies. Full-time equivalents are reduced where employees have reduced hours, have resigned during the course of the year, are on unpaid leave, family leave or have been on long-term sick leave.
Total allocation (NOK million)	161.7	152.6	146.2	Total allocation consists of administrative remuneration, as well as earned equity at 1 Jan.
Utilisation rate	96%	104%	100%	The utilisation rate is calculated as total operating expenses as a percentage of the administration contribution.
Administration contribution (NOK million)	139.8	126.9	124.0	The MCE stipulates a framework for administrative remuneration for Enova SF. The framework is entirely financed with contributions from the Climate and Energy Fund. Amounts do not include Value Added Tax.
Percentage of wages in administration contribution	72%	73%	71%	The percentage of wages in administration contribution emerges as payroll costs and costs for contracted capacity from staffing agencies, as a percentage of the administrative remuneration. Payroll costs include all social costs (incl. pension costs).
Payroll costs per full-time equivalent (NOK)	1 269 171	1 293 086	1 204 587	Payroll costs per full-time equivalent consist of wage costs and costs for hiring capacity from staffing agencies, divided among the number of completed full-time equivalents. Payroll costs include all social costs (incl. pension costs).
Percentage of consultants in administration contribution	6.1%	10.8%	9.7%	The percentage of consultants in the administration contribution consists of purchase of consultancy services, as a percentage of the administrative remuneration.

Key figures for the Climate and Energy Fund

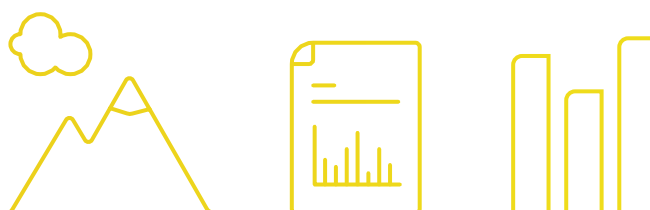
Key figures	2020	2019	2018	Description
New commitments (NOK million)	3 747	5 815	2 326	New commitments shows how much Enova has allocated from the Climate and Energy Fund to support projects, contractual activities and administrative remuneration.
Disbursed from the Climate and Energy Fund (NOK million)	2 977	2 026	2 356	Disbursed from the Climate and Energy Fund shows how much has been disbursed to projects, contractual activities and administrative remuneration. Disbursements made during the year to projects adopted during the period 2009–2020.
Added to the Climate and Energy Fund (NOK million)	5 276	3 283	2 792	The key figure shows how much was added to the Climate and Energy Fund through allocations via the Fiscal Budget, parafiscal charge on the grid tariff and interest.
No. of projects	3 852	1 484	987	Number of projects allocated support from the Climate and Energy Fund, except measures funded through the Enova Subsidy.
Number of disbursements from the Enova Subsidy	9 115	20 789	14 487	Shows the number of implemented measures that have received a disbursement from the Enova Subsidy.



PART III

ACTIVITIES AND RESULTS FROM THE YEAR

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PART III A | Reporting on Enova SF

Enova must be a flexible and adaptable organisation that manages state resources in the most efficient manner possible. This also means that operation of Enova and administration of the Climate and Energy Fund must be as cost-effective as possible, ensuring that resources are used to the greatest possible extent to realise new energy and climate technology projects in line with Enova's mission.

As support in assessing to what extent we are administering the Fund in a cost-effective manner, we have prepared four indicators for each year and a perspective over time.

Beyond investment and feasibility study support for projects, funds from the Climate and Energy Fund are allocated to other contractual activities and administrative remuneration. The framework for administrative remuneration is stipulated by the Ministry of Climate and Environment in annual allocation letters to Enova.

Figure 3.1 shows that costs associated with administration of the Climate and Energy Fund have displayed positive development measured against the consumer price index for the period, and that there has been a reduction in cost level. The cost level in 2020, in isolation, has followed the consumer price index.

Figure 3.1

Development in costs for administrative remuneration and other contractual activities in relation to the development in the consumer price index

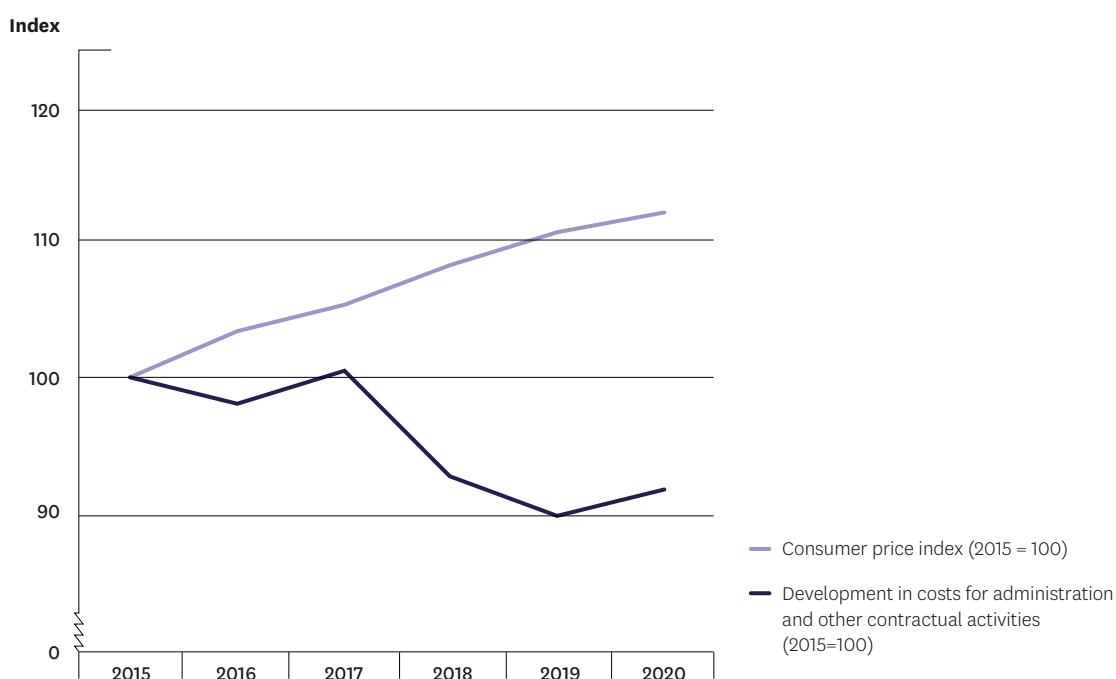


Figure 3.1: The figure shows the development in costs for administration and other contractual activities in relation to the development in the consumer price index during the 2015–2020 period. (2015 = 100).

In recent years, Enova has focused significant efforts on digitalisation and automation of our work processes, which provides more efficient project portfolio management and the necessary capacity to handle an increasing number of applications. In several of the programmes launched, we have fully or partially automated administrative processes.

Figure 3.2 shows costs for administration and other contractual activities distributed by number of applications received. Decisions associated with the Enova Subsidy are not included in this presentation.

The figure shows that the average cost per received application has been reduced by 75 per cent since 2015.

Figure 3.3 shows the ratio of the overall appropriated resources in the Climate and Energy Fund allocated for administration and other contractual activities. During the years prior to 2019, the ratio was around 8 per cent. 2019 saw a sharp decline in the ratio, among other things caused by the substantial award to Hywind Tampen totalling NOK 2.3 billion. Even adjusted for this award – as shown by the broken line in Figure 3.3 – the ratio dropped significantly in 2019 and the ratio in 2020 remained at this level.

Figure 3.2

Development in costs for administrative remuneration and other contractual activities per application received

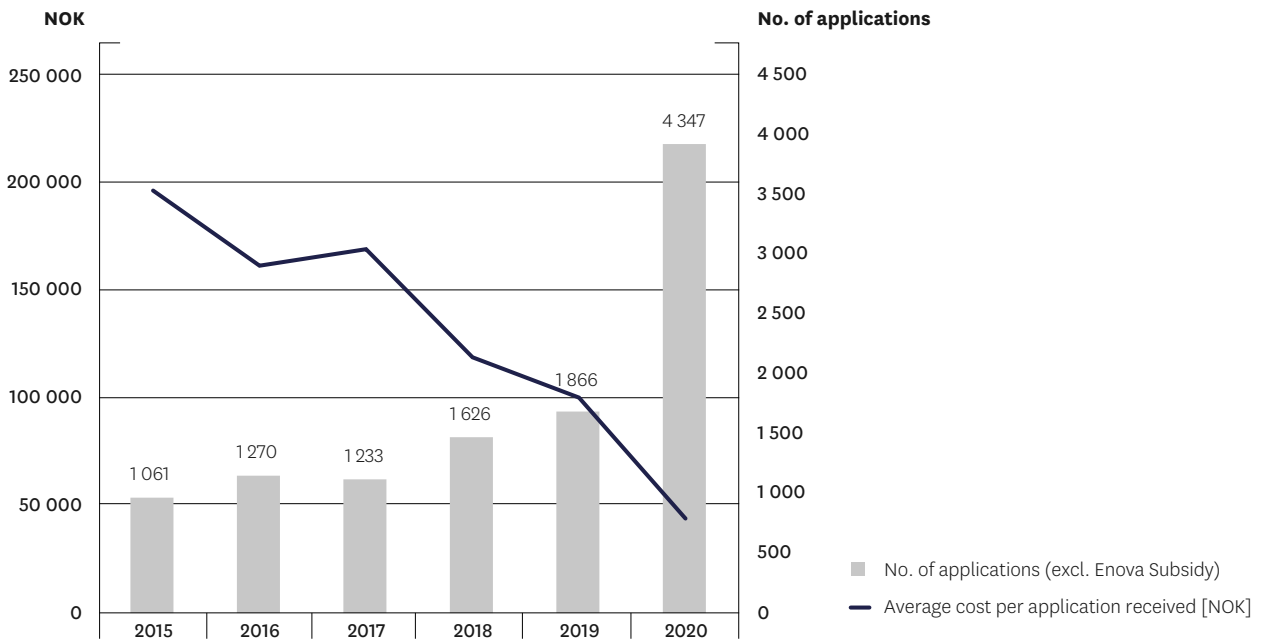


Figure 3.2: The figure shows the development in average costs for administration and other contractual activities per application received during the 2015–2020 period. The figure also shows the number of applications received during the same period. The Enova Subsidy is not included.

Figure 3.3

Ratio of costs for administrative remuneration and other contractual activities by total allocated funds in the Climate and Energy Fund

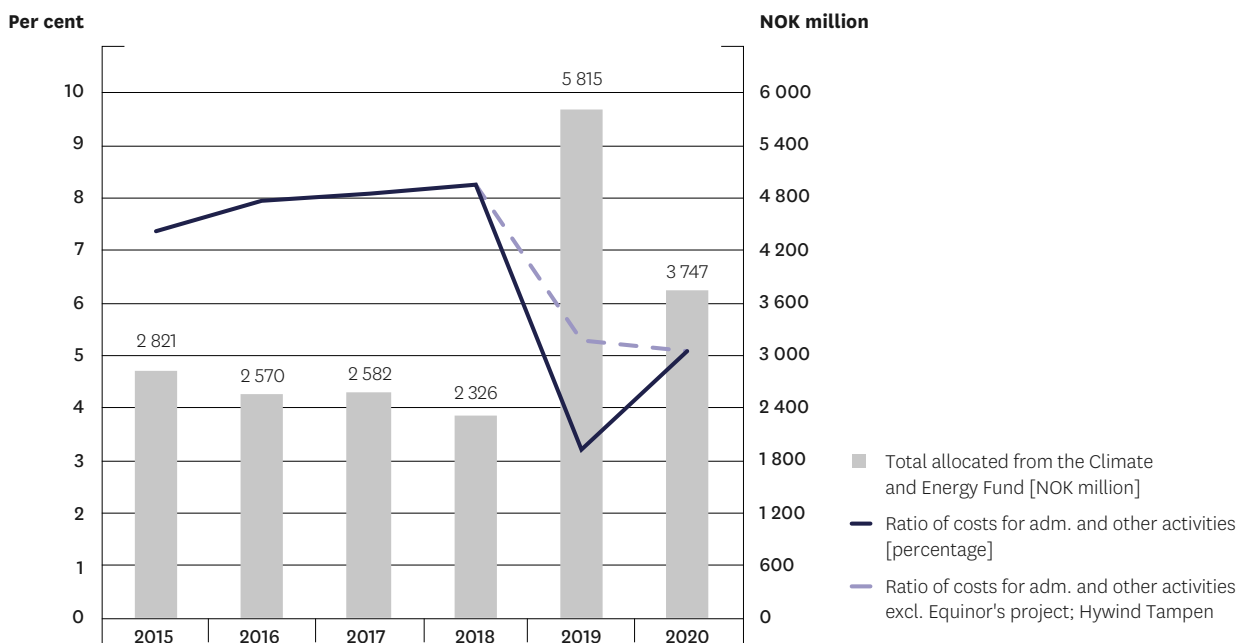


Figure 3.3: The figure shows the ratio of costs for administrative remuneration and other contractual activities of the total allocated funds from the Climate and Energy Fund 2015–2020. Equinor's project, Hywind Tampen, was given a funding commitment of NOK 2.3 billion in 2019. The figure shows the ratio of costs with and without this project.

Targeted efforts to streamline the standard application processes have also been under way for the Enova Subsidy, alongside a substantial increase in the number of applications for a period. The figure below shows the development in number of measures processed per full-time project portfolio manager equivalent, and the average amount per case. The number

of measures processed per full-time equivalent has declined from 2019 to 2020. This is a result of the phasing out of several measures that require little project portfolio management due to market maturity or the introduction of statutory requirements, alongside an increase in measures that require more extensive project portfolio management.

Figure 3.4

The number of measures processed in the Enova Subsidy per full-time caseworker equivalent

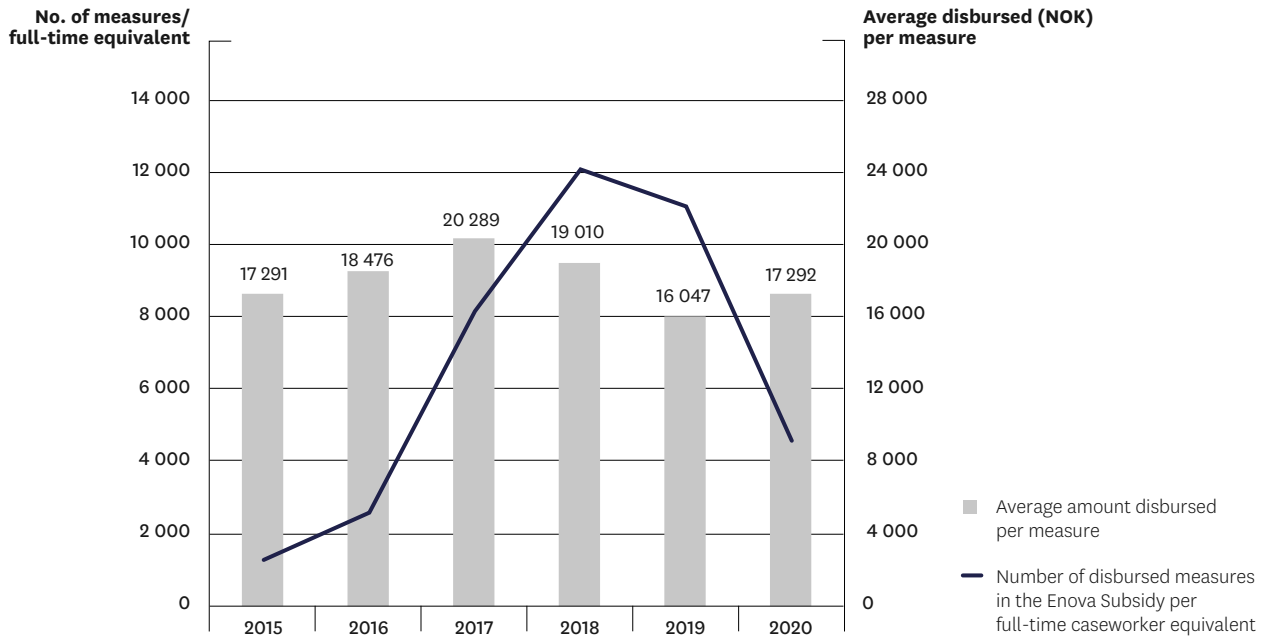


Figure 3.4: The figure shows the average number of measures processed per full-time equivalent versus the average amount disbursed per measure in 2015–2020.

PART III B | Reporting on the Climate and Energy Fund 2020

Objectives

Climate-friendly products and services will not necessarily be successful on the market on their own. New technologies or solutions that can take us toward a low-emission society are often not in either sufficient demand or supply. This could be because they are not sufficiently tested, because they are unknown on the market, because they are not profitable, or simply because they have not yet been invented. Enova's job is to advance development and hasten the necessary changes by triggering actions that otherwise would not have occurred so quickly or even at all, and ensure that these changes take hold in the market. This is what we call lasting market change. This means that how a project contributes to market change becomes just as important as the individual project's quantifiable results in the form of reduced greenhouse gas emissions, increased innovation, reduced energy consumption or reduced peak demand.

Secondary goal 1:

Reduced greenhouse gas emissions that contribute to fulfilling Norway's climate commitment for 2030

Enova shall prioritise projects that yield reduced greenhouse gas emissions. The transport sector represents about one-third of Norwegian greenhouse gas emissions, and is not included in the EU Emissions Trading System. The sector will therefore be particularly important to Enova in the work on adapting to the low-emission society. Within the sector subject to emission credits, the EU's credit market is the primary policy instrument for reducing emissions.

Secondary goal 2:

Increased innovation within energy and climate technology adapted to the transition to a low-emission society

Enova shall prioritise its efforts where the possibilities for influencing the development are greatest, and towards technologies and solutions that are adapted to the low-emission society. When designing policy instruments, Enova facilitates global

dissemination and subsequent emission reductions also outside Norway. Through consultation and financial support, we reduce the risk that players take and increase the pace of the energy transition towards more climate-friendly, energy-efficient and competitive sectors.

Secondary goal 3:

Strengthened security of supply through flexible and efficient peak demand and energy consumption

Enova will stimulate a faster pace of innovation and a development that supports and bolsters security of supply. We shall contribute to increased energy efficiency, as well as measures that lower electricity consumption, and that yield increased flexibility in the demand for electricity.

The secondary goals are linked

Reduced greenhouse gas emissions and energy supply are closely correlated factors. Even in a society where nearly all emissions have been eliminated, we will continue using energy. We must use this energy efficiently and it must be renewable. Efficient energy consumption and a reliable, renewable energy supply are therefore important prerequisites for reduced greenhouse gas emissions.

Another important prerequisite for the adjustment to a low-emission society where we still have high value creation and welfare, is the development of new technology. In order for the Norwegian society to succeed with such an adjustment, we must find cheaper and more efficient ways of solving our needs. Enova shall contribute to market changes by allowing fossil-free solutions to outcompete fossil options, based on performance, quality and price. Then we will know for sure that we are moving towards a low-emission society that is also financially sustainable.

What has Enova achieved in 2020?

Transport



The road to emission-free transportation is long and requires a broad scope of efforts. Enova's efforts are aimed at both battery-electric solutions, hydrogen, biogas, infrastructure, energy efficiency measures and logistics solutions.

Develop technology and mature hydrogen solutions for demonstration

Hydrogen-based solutions are attractive alternatives for the transport sector and some industrial processes that currently

use fossil energy carriers. In order for hydrogen to transition from a potential solution to a mature alternative on the market, both technology and cost developments will be needed.

In 2020, we have seen a marked increase in both players who want to use hydrogen as fuel, as well as players who want to offer green hydrogen for this market.

Enova supported two projects in 2020, totalling NOK 260 million, to realise three hydrogen ships. These are Norled's hydrogen ferry on the Finnøy connection, where Enova has also supported the onshore infrastructure, and the Topekas two cargo ships that will operate a regular service between Bergen and Stavanger. The Topeka ships will run on liquid hydrogen. Enova has also supported the shipping company Østensjø's four offshore service vessels, which have been prepared for hydrogen. This shows that there is significant willingness in the industry to utilise and demonstrate new hydrogen solutions, and Norway is establishing itself as a leader in this technology development. These projects are contributing to reduce important barriers for further demonstration and use of hydrogen as fuel in the maritime sector. We expect this development to continue in 2021.

Several consortiums have also been awarded support through Pilot-E – a collaborative funding scheme from the Research Council of Norway, Innovation Norway and Enova – to develop and mature concepts using hydrogen as an energy carrier in the maritime sector. Through this policy instrument, we are seeing that more players than before are showing an interest in ammonia as a zero-emission fuel for ships.

Functioning market for battery electrification at sea

Battery-electric solutions are still the primary alternative to fossil fuels within maritime transport, and are in the process of establishing a foothold within several vessel groups. The further development will depend on cost reductions throughout the value chain, as well as maturing battery technology that will open new segments for the solution.

Increasing the number of projects utilising batteries will further mature the value chain for battery-electric solutions, reduce costs, increase beneficial effects and reduce risk, thus allowing battery-electric solutions, over time, to be utilised in the market without support.

In 2020, Enova awarded NOK 440 million in support for 74 vessels with batteries, 4 of which had particularly innovative solutions. This is an increase from 35 vessels in 2019. Over the last year, Enova has also awarded NOK 39 million in support for infrastructure to electrify two ferry connections and two express boat connections. The fact that battery-electric solutions are now also becoming relevant for smaller express boats shows that the technology is constantly developing.

The number of supported vessel projects with batteries is higher than in 2019, while adopted support is at about the same level as 2019, if one disregards particularly innovative projects. This means that there was an increase in the number of smaller vessels in 2020, particularly within the aquaculture sector. The number of applications associated with the passenger transport, freight and bulk vessel segments declined in 2020 compared with 2019, which is presumed to be linked to economic factors surrounding Covid-19. However, our experience is that many players in local shipping are in the process of considering fleet upgrades, and are assessing battery solutions in connection with this. And even new, innovative technology in some cases. Further growth in green solutions within these segments is expected over the next few years.

Within offshore, we are experiencing a lasting interest in installing battery and onshore power systems in the vessels. However, several shipping companies within this segment are struggling financially, which is challenging for the funding of green investments and opportunities to award support through the state aid regulations.

The greatest growth in the number of projects and nominal support funds is within the aquaculture sector, where battery solutions in both work boats, various service vessels and fish carriers are becoming increasingly popular. We are also seeing a demand for solutions in aquaculture which include charging for feed fleets, which could make battery solutions even more relevant. In 2020, Enova also supported multiple combination solutions with batteries and onshore power for feed fleets. This will help facilitate fully-electric operation of aquaculture locations and vessels operating in connection with them.

Costs for batteries are still higher than for fossil solutions, and there will still be a need for support moving forward. We expect the cost of battery solutions to drop once the supplier value chain can develop further and shipowners can increase both expertise and experience. Strengthening the value chain by stimulating the demand for maritime battery solutions is also key in order for it to be possible to require low-emission solutions in the near future. The Government's announced requirement for low-emission vessels within not only public transport services such as ferries and express boats, but also within aquaculture, is expected to result in more rapid escalation of demand within this area.

A greater extent of mass production within smaller vessel types with battery solutions could also, over time, contribute to reduced additional costs associated with green choices. One example is Moen Ship Management, which in just one Enova-supported project is building 10 service vessels with batteries for aquaculture. Equivalent mass production can also be expected within smaller fishing vessels with batteries once demand grows sufficiently.

As a supplement to existing support programmes for vessel electrification, Enova launched a simplified Support programme in November 2020 for installing battery and onshore power systems for selected vessel types within aquaculture, fisheries and offshore. This programme is based on fixed support rates, a simple application process and an automated administrative process, so the applicant will get a response within 1–5 days. The programme has been very well received. With this simplified programme, Enova is positioning itself for an increased volume of applications linked to battery electrification of vessels, and over time, the plan is to add additional segments and vessel groups to the scheme.

In late January 2020, Enova launched a reconfigured focus on onshore power, which aims to both contribute toward better coordinated investment decisions across ports and ship-owners, a professionalisation of the range of players that want to offer onshore power, and increased awareness surrounding business models and pricing. This focus involves both a support programme for implementing front-end engineering projects for infrastructure, investment support for infrastructure and support for the vessel side for installing onshore power systems on board. Support for front-end engineering for onshore power systems will give players the opportunity to work thoroughly on individual business cases and collaborate with relevant players such as other ports, shipowners, power grid companies and suppliers. Enova awarded support to 26 front-end engineering projects in 2020.

The revised investment support programme for onshore power requires the applicant to be able to document letters of intent with potential customers. This support programme is based on competition, where the players must fulfil a set of criteria, but they also compete on price, split between a weighted ratio between a historical potential for sales of onshore power and letters of intent for future sales of onshore power. Eleven projects were awarded more than NOK 100 million in investment support in 2020. The demand for onshore power is also stimulated through a simplified support programme for installing onshore power in existing vessels, based on fixed support rates and automated project portfolio management. Support has also been adopted through this programme for more than 30 vessels within bulk, freight, fisheries, aquaculture and offshore.

Innovative individual projects contribute to further technology development. Østensjø's projects Edda Wind I–IV, which Enova has supported with a total of close to NOK 100 million, demonstrates battery solutions in combination with innovative energy recovery. The vessels will also be prepared for future conversion to a zero-emission solution with fuel cells, so that this can be implemented later once the technology is considered to be sufficiently mature. Regulations for hydrogen in vessels are being developed in parallel with this project, which will pave the way for future increased introduction of battery-electric vessels in combination with other alternative fuels.

Functioning market for onshore battery electrification

Norway is at the forefront of the electrification of light vehicles, and could also stake out a position as an early-phase market and test laboratory for heavier zero-emission vehicles and construction machinery. Enova is contributing to expediting the demand for vehicles and experience in their use.

In order to realise the objectives in the National Transport Plan as regards phasing in zero-emission vehicles and construction machinery in the Norwegian market, Norway will depend on international manufacturers increasing their range of models. Gaining operating experience with heavier zero-emission vehicles could have an effect on production volume in this segment.

Enova has been working on fast-charging infrastructure for electric vehicles in areas with underdeveloped infrastructure. Funding commitments were issued for 25 fast-charging points in Troms og Finnmark county. Seven of these charging points had already been established by the end of the year. A competition was announced for Nordland county and the Namdalen region in September 2020.

In 2020, Enova supported a charging infrastructure project for electric city buses. This project means that Ruter AS will be able to use exclusively electric buses in the central Oslo area with charging infrastructure serving 146 electric city buses. The major cities are taking the lead here, and most large public transport companies are now including electric buses in the tender phase. One precondition for this positive development is a well-developed supplier value chain abroad, which can supply mass-produced electric city buses in large numbers.

Enova awarded support for 34 electric lorries in 2020. This is a significant increase from one project the previous year. Several manufacturers are now offering smaller series of vehicles in Norway, including electric lorries for transporting masses. In 2020, Tom Wilhelmsen AS received support for three electric tipper lorries, thereby becoming the first player to provide fully-electric tipper lorries for mass transport in Norway. The substantial growth in volume and models of heavy electric vehicles is expected to start in 2021.

As regards construction machinery, a number of heavy electric excavators have been utilised in recent years. The multiple projects under way will build the experience the rest of the industry can benefit from in further development. One segment where we are seeing a higher volume of applications for support for electric construction machinery (both with batteries and directly connected to the power grid) is the part of the construction sector that involves tunnels, where the focus on noise and exhaust fumes favours these types of solutions.

Mass-produced versions of lighter electric excavators and wheel loaders are currently available, but as of yet, there is no mass

production of heavier electric excavators, and the norm is still retrofitting existing fossil models, and this is the reason for the continued substantial price difference between electric and fossil solutions. As far as we know, none of the major international suppliers have any plans for mass production, but we can see that, with an increased volume, there is a form of "mass retrofitting" of existing fossil technology. One positive development from the technology having been demonstrated is that this allows for zero-emission construction site requirements, where we have seen the City of Oslo taking the lead.

Efficient logistics systems enable the transition to zero and low-emission solutions

New technology has contributed to a reduction in emission intensity in the transport sector, but an increased scope of transport means that overall emissions have not declined. There is therefore a need to develop technology and solutions to streamline the overall scope of transport. Digitalisation and autonomy will enable a transport system with a better connection between means of transportation, infrastructure and users. This will be important for coordinating the transport system and will yield results in capacity utilisation and efficiency in existing transport. Enova will contribute to the demonstration of new efficient logistics solutions and building knowledge that can contribute to efficiency in future transport systems, as well as knowledge about what they will require as regards changes to established practices, collaboration and coordination between stakeholders.

In 2020, Enova supported a pilot project for new logistics solutions for Bærum municipality, with the aim of establishing a digital collaboration platform for utilising locally produced surplus materials from infrastructure and construction projects. This streamlines transportation and yields significant climate and environmental gains.

Functioning market for biogas and biofuels

Sustainable bioresources with good climate effect are, and will remain, a scarce resource. This is why it is important to utilise bioresources as efficiently as possible in the effort to transition to a low-emission society. The use of sustainable bioresources could potentially yield considerable reductions in emissions from industry and transport, and could also provide a basis for new industries.

Enova has contributed to technology development to produce advanced biofuels and stimulated further development of the value chain for biogas by supporting biogas production facilities and purchasing commercial vehicles with associated filling infrastructure.

NOK 98.2 million in support was awarded to two biogas production facilities in 2020. Support was also awarded to a biogas filling station and 87 lorries, generally tractor units running on liquid biogas. The increasing number of projects in biogas lorries is producing more knowledge about the benefits and challenges associated with using the vehicles. We are experiencing an increase in the number of available vehicles on the market, and that vehicle delivery is no longer a barrier.

Industri



In a low-emission society, industrial production will have to be emission-free, based on renewable energy and use significantly less energy per manufactured unit than is the case today. Some of this can be realised by utilising known technology, but much will also depend on developing and qualifying new technology for the market.

More than a gradual technology development will be needed in order for industry to be able to reduce its emissions toward zero. Several sectors are dependent on technological revolutions that radically change production processes.

Demonstrate technologies for low and zero-emission process industry

As process industry reduces its emissions leading up to 2050, this will have to take place by implementing both new process technology and with efficiency measures and the use of new fuels. Zero-emission industry will also require establishing infrastructure to transport and store CO₂ where there are no zero-emission alternatives, such as in the production of cement.

Enova is prioritising the development of new process technology that does not lead to greenhouse gas emissions, as well as process technology that enables renewable input factors where carbon is a necessary part of the process.

In 2020, Enova awarded a total of NOK 141.9 million in support for 5 projects in this category. These projects will result in more experience and knowledge, in addition to an increased focus on zero-emission technology both from the companies themselves as well as the technology suppliers. Four of the projects were covered by our support programme for pilot-testing new energy and climate technology. This support programme was revised in early 2020 and can now provide an increased support percentage based on cooperative partnerships and spreading knowledge. The support recipients in 2020 include Hydro Energi AS, which was awarded NOK 43.6 million for a project associated with efficient recycling of materials from car batteries, as well as Coast Center Base AS, which, along with ZEG Power AS, was awarded NOK 77.4 million in support to establish a pilot facility for hydrogen production with CO₂ capture.

Technology development timelines in industrial process technology are long and capital-intensive. This is particularly the case where new processes must be developed or where greenhouse gas reductions entail a considerable intervention in the production process. Enova therefore does not expect a high number of projects each year, but we nevertheless found activity in 2020 to also be lower than desired.

Demonstrate and introduce energy-efficient technologies and solutions for renewable energy consumption in industry

The development of automation and digitalisation technology are strong drivers for energy-efficient technologies and solutions for renewable energy consumption in the industry, and enable the emergence of new products, value chains and business models. Heat pumps are being used at increasingly higher temperatures, and we are seeing a rising trend in the direction of electrification or using renewable fuels in new areas.

In 2020, Enova supported 16 projects that will contribute to demonstrate energy-efficient technologies and solutions for renewable energy consumption in industry, with support totalling NOK 242.8 million. Five of these were front-end engineering projects that will lay the groundwork for future investments, while the rest are both pilot, demonstration and full-scale projects within a broad range of sectors. Examples include the NOK 37.3 million in support to Washington Mills in Orkanger to demonstrate a new industrial process to produce high-purity silicon carbide, as well as NOK 96.8 million in support for Salmon Evolution to establish an energy-efficient onshore aquaculture facility and thereby contribute to increase the number of realistic energy solutions for future onshore facilities.

The projects within energy-efficient technologies and solutions for renewable energy consumption in industry help trigger major investments in industry to bolster the focus on energy-efficient technology projects. This also provides a boost in competence within efficiency measures supported by digitalisation both within industry, as well as on the part of technology suppliers and the consultant industry. In addition to the process industry, the Norwegian food industry, including the aquaculture industry, can be showcased as particularly forward-leaning as regards these innovative and energy-optimised solutions.

The number of applications has declined since 2019, which can most likely be attributed to the corona pandemic. However, there are several indicators pointing toward mere postponement, and that the projects will simply show up later than originally planned.

Enova can also contribute to more rapid cost development and awareness in the market for selected and more familiar technologies with the potential to reduce and replace fossil fuels through support for market introduction via thematic efforts in our support programme for energy and climate efforts in industry. In 2020, Enova had thematic efforts associated with the utilisation of waste heat, as well as phasing out fossil energy for heating purposes, electrification of mechanical work processes and energy supply for feed fleets in the aquaculture industry, the latter with focus on battery solutions and interaction between new onshore power and batteries.

As a result of the corona crisis and the extra funds Enova received through the Government's green transition package, Enova reinforced its focus on emission cuts in industry through the low-threshold thematic efforts. The increased number of deadlines, multitude of themes and also an opportunity to apply for support for studies, has led to the establishment of a significant number of projects, totalling 162.

Within waste heat utilisation, Enova supported 29 projects which collectively supply 61 GWh of heat and reduce greenhouse gas emissions by 12 700 tonnes of CO₂. Within aquaculture, Enova supported 62 projects for various energy solutions for feed fleets, which will help phase out an annual consumption of 5.2 million litres of diesel and reduce greenhouse gas emissions by 14 000 tonnes of CO₂. The development Enova has contributed to has led to considerable engagement both with aquaculture companies and suppliers. This is likely to contribute to further cost reductions, which will facilitate full electrification of the aquaculture industry over time. Support has also been granted for 42 study projects, which all aim to study energy and climate projects with the potential to become future investment projects. Utilisation of waste heat is the most popular theme in these projects, which indicates a significant interest in these types of measures and an adequate volume of future projects.

Energy system



A well-functioning market and solutions for flexibility

The world's energy consumption is the greatest contributor to global greenhouse gas emissions. If we are going to reach our climate goals, increased electrification in additional sectors will be important. In order for this to occur rapidly, in

a socio-economically beneficial and sustainable manner, the energy system will have to be renewable, flexible, robust and efficient. A well-functioning market and solutions for flexibility will increase the efficiency in the energy system. Increasing demand consumption challenges the power grid, particularly where the need for electrification increases the most. Enova

contributes to increased innovation and technology development throughout the energy value chain. For example, this includes support for solutions that reduce the costs of floating offshore wind, new marketplaces for flexibility, microgrids in interaction with the power grid, local resource utilisation through power/energy generation, storage solutions and digitalisation projects through smarter management systems.

Enova implemented changes to the pilot programme in 2020 in an effort to contribute toward increased innovation and technology development through actual testing. The market has responded positively and 6 projects were granted support in the energy sector. One example is Skagerak Energipartner AS, which received NOK 13 million in support for a mobile energy solution for emission-free construction sites. This project connects construction clients, contractors and suppliers in order to verify that mobile battery solutions can be used for emission-free construction sites. Another example is Ren Røros AS, which along with Equinor Energy AS, Volue AS and TrønderEnergi AS, received NOK 10.9 million in support to demonstrate smart power solutions aimed at increasing security of supply, as an alternative to costly grid investments in Røros.

Under the support programme for full-scale innovative energy and climate technology, Enova awarded a total of NOK 48 million to 4 energy system projects. This support programme helps the market utilise solutions and technologies that replace fossil input factors in the energy supply, optimise resource use and utilise resources from deep thermal wells. One example is Coop Norge SA's CLog Energi project, which takes a comprehensive look at the energy flows in the logistics centre, where heat loss from cooling and freezer plants is used for district heating purposes, greenhouse gas emissions from conventional solutions are avoided, use of new energy sources such as hybrid solar cells and use of batteries and dynamic load management using virtual measurements. Enova supported the project with NOK 28.3 million.

Naturally enough, flexibility is also about utilising different resources for heating purposes. For example, the resources could be derived from waste heat that would normally otherwise be lost, from heat in the ground, from biofuel or from solar thermal collectors. District heating players utilise these resources in order to shed loads in the power grid. Four competitions were announced under the support programme for district heating in 2020. The total allocation amounted to NOK 206 million distributed across 26 projects. Enova is experiencing that the industry is taking clear steps in how new solutions can increase the value of district heating. One example is Oslofjord Varmer AS' project, which connects heating plants from different buildings into a shared grid in an innovative way.

The support programme for concept assessments is aimed at early market introduction for innovative technologies and solutions. This programme targets players in the early phase of planning concrete and ambitious climate and energy projects. Making the wrong choices in an early phase could lead to several years of tied-up investments, where today's short-term solutions end up as tomorrow's challenges. This is why Enova facilitates players from different sectors meeting at an early stage on concrete issues to make smart and big-picture choices collectively on the road to the low-emission society. 45 project studies received a total of NOK 36 million in support in 2020. One of these is ASKO Fornybar AS, which received support to study hydrogen production for transport purposes, where solutions using waste heat are utilised in innovative ways.

Technology for floating offshore wind is now in a pre-commercial phase. Costs are still high compared with, for example, fixed foundation technology. This is why Enova supports innovative solutions that contribute toward reducing the energy cost of offshore wind. In 2020, Enova provided funding for two front-end engineering projects within floating offshore wind with a total of NOK 20 million.

Buildings and homes



Buildings is the sector in mainland Norway that uses the most energy, and existing buildings have a considerable potential for conversion to renewable energy sources. Reduced energy and demand consumption in buildings can reduce the need for new power generation and transmission capacity that would otherwise be needed to electrify sectors such as transportation and industry. Direct emissions from the operations phase for non-residential buildings and property are very low in Norway. However, the sector accounts for considerable emissions in construction processes, as well as significant indirect greenhouse gas emissions through the production of new building materials and waste disposal.

A well-functioning market for climate-friendly construction processes and materials

In order to reduce direct and indirect greenhouse gas emissions in the construction sector, it is important to ensure that newly produced building materials have a low carbon footprint, that reuse of building materials becomes more common, and that the construction process is emission-free.

Enova wants the market to choose climate-friendly materials, both in new construction and rehabilitation. This means that the climate-friendly alternatives have to be cheaper, customers have to request climate-smart buildings and it must be possible

to document emission reductions in each construction project. This requires new work processes, business models and marketplaces, continued digitalisation and extensive collaboration.

There is currently a lack of knowledge surrounding emissions from material consumption on both the supply and demand sides. It is resource-intensive to compare the climate impact of different materials in order to make more climate-friendly material choices in construction projects, both as regards costs, procurement, implementation, availability and quality requirements. There are no current regulations incentivising the selection of building materials with a low carbon footprint. At the same time, the current Construction Products Regulation is a key barrier for more cost-effective reuse of existing building materials.

Lack of knowledge and data on emissions from material use means that it is difficult to know which alternative building materials will yield an actual reduction in greenhouse gases in individual construction projects. This is why, in 2020, Enova established and published an extensive knowledge base. On assignment from Enova, Asplan Viak reviewed the potential for emission reductions in Norway through the use of more climate-friendly materials, and which barriers prevent the use of such materials.

In 2020, Enova supported a project aiming to test a new business model for reusing building materials, with the objective of establishing digital marketplaces for this. Enova has also previously supported two similar concepts based on different business models. We are already seeing several examples of these marketplaces being used. Another project that received support in 2020 aims to develop and test a new business model for reusing concrete, where the objective is to make this profitable on an industrial scale.

Enova also stimulates the market to explore opportunities for choosing new climate-friendly materials or reusing existing building materials through support for concept studies. Such studies give players in the construction industry a better basis for choosing climate-friendly materials and future-oriented energy solutions.

Greenhouse gas emissions from construction processes generally come from construction machinery and building heating driven by fossil fuels. In a low-emission society, the construction of buildings and infrastructure will have to be carried out with emission-free solutions. Support from Enova has increased the amount of emission-free construction machinery in Norway. Electrification of major construction sites will require new infrastructure solutions in order to provide enough power for machinery and equipment.

A well-functioning market for services that trigger demand and energy measures in buildings

The potential to reduce energy consumption in buildings is considerable, but measures that are both available and profitable nevertheless remain unrealised. A lack of energy expertise

with building owners and modest financial gains, combined with the fact that rehabilitations and renovations often lack a comprehensive plan for the building's energy quality, are barriers that must be reduced in order to trigger the energy savings potential.

This potential can be triggered by developing a service market where third-party players provide energy savings measures as a service. This presumes an increased willingness for innovation among players, and new business concepts, contract forms and models for cooperation.

In order to contribute to this development, where multiple stakeholders cooperate and develop new business models, support was awarded in 2020 to seven projects representing a broad spectrum of services.

In an effort to contribute to highlighting the energy savings potential and cost-effective measures for building owners, Enova also provides support for comprehensive energy mapping. The mapping is carried out by an external advisor and provides building owners and tenants with a better basis for investing in energy measures. The support has been aimed at housing cooperatives and commercial buildings, and aims to contribute toward a more well-functioning market for energy consulting.

High energy ambitions are normal when buildings are rehabilitated

The potential for energy efficiency measures in existing buildings is considerable. Enova aims to motivate market players within rehabilitation, retrofits and extensions (ROT) to raise energy ambitions both as regards building structures and future operations.

As regards non-residential buildings and housing cooperatives/condominiums, Enova has supported selecting the best available technology in upgrades of existing buildings. Stringent requirements are set for energy efficiency, and the objective has been to make the best products and solutions the default choice on the market, both in supply and demand.

Funding commitments were given to about 1 500 measures in 2020, distributed across 214 projects for best available technology in existing commercial buildings and housing cooperatives/condominiums. The two most popular measures were improving building insulation properties and establishing a system for detailed energy follow-ups. It has generally become more common to utilise the best available technology for energy and climate measures in existing buildings. This provides a basis for winding up the programmes Enova has aimed at this market in 2021.

As regards support for innovative energy, load and climate technologies in buildings and areas, Enova has noted that the innovative technologies it supports are more frequently associated with the energy system in general. This involves advanced control and regulation of the technical installations, storage solutions, etc. One example of this is Eikeli Upper Secondary

School, where Enova has granted support for a project where surplus energy from the school's solar cells is stored in saltwater batteries that will also be used actively to reduce loads and impact on the grid.

The number of private small homes with high energy ambitions has been increasing every year since 2013. In 2020, a total of 727 homeowners received grants to hire consulting expertise to create an energy plan for their rehabilitation project, and 567 households received support for comprehensive building structure upgrades. This corresponds to an increase of about 30 per cent from 2019. Enova has contributed to the existence of a market for energy consulting and an increase in both the scope and quality of energy upgrades. Results from 2020 indicate that the market is now changing, but there will be a need for further

development to ensure a lasting impact on the market and that the market starts to account for greenhouse gas emissions from both the construction process and material choices.

Commercial maturity within exhaust air heat pumps and air-water heat pumps was considered to have been achieved in 2019, in addition to a need to reduce support rates for electrical generation, solar thermal collectors and balanced ventilation as of 2020. The corona pandemic resulted in Enova choosing to postpone its planned changes, initially due to delays from suppliers, then due to general uncertainty in the economy, which affected both the supply and demand sides. Overall, fewer projects were supported within most housing measures in 2020 compared with previous years.

Goal indicators

– contributions from the 2020 results

2020 was a demanding year for many of us. Covid-19 had a major impact on Norwegian society, and every single day was a challenge for many businesses and households. Nevertheless, Enova's activity has mainly been within the norm, and results have been satisfactory. Enova invests in projects that, based on what we know today, are best suited to stimulate the desired market changes. In 2020, Enova received more than NOK 5.3 billion and has granted support amounting to more than NOK 3.3 billion to about 3 800 energy and climate projects. We have also supported more than 9 000 individual measures in Norwegian homes with close to NOK 160 million through the Enova Subsidy. The Enova Subsidy is a rights-based subsidy scheme for private households that aims to give private individuals an incentive to carry out measures to improve energy consumption in their own homes.

Enova's management agreement uses select goal indicators as one of multiple criteria to assess goal achievement. The

following level is presumed for the performance indicators for the agreement term 2017–2020:

- climate results corresponding to 1 million tonnes of CO₂ equivalent in sectors not subject to emission credits
- energy results corresponding to 4 TWh
- reduced peak demand results corresponding to 400 MW
- innovation results corresponding to triggered innovation capital of NOK 4 billion

In 2020, Enova recorded a climate result of 0.28 million tonnes of CO₂ equivalent, 1.65 TWh in reduced energy consumption, 179 MW in reduced peak demand and NOK 1.6 billion in triggered innovation capital. Enova assesses its 2020 results to be good. The contractual levels were achieved for all performance indicators specified for the 2017–2020 agreement term. Table 3.1 shows the development in results for the four performance indicators throughout the agreement term.

Table 3.1
Measurement indicator results 2017–2020

Performance indicator	2017	2018	2019	2020	Total
Climate result (ktonnes CO ₂ equiv.)	279	214	253	279	1 024
Energy result (GWh)	1 601	1 426	1 955	1 649	6 630
Reduced peak demand (MW)	135	123	174	179	612
Triggered innovation capital (NOK million)	1 643	1 169	5 726	1 620	10 158

Table 3.1: The table shows results for the four measurement indicators, defined in the agreement with the Ministry of Climate and Environment, for projects awarded support during the 2017–2020 period. The figures have been corrected for cancelled and final-reported projects as of 2020.

The Climate and Energy Fund

– allocation 2020

New funds are added to the Climate and Energy Fund every year. The revenues come from appropriations via the Fiscal Budget, a mark-up on the grid tariff and interest income from the resources in the Fund. These revenues amounted to more than NOK 5.3 billion in 2020, of which NOK 2 billion was allocated through the Government's green transition package.

Enova can also allocate funds transferred from previous years, as well as returned funds from cancelled projects. These items constituted just under NOK 1.3 billion in 2020. Enova thus had an overall framework of NOK 6.6 billion in 2020. In addition, Enova has been able to grant funding commitments totalling up to NOK 400 million beyond the available resources in the Climate and Energy Fund, pursuant to the commitment authorisation.

Figure 3.5
Allocation of Climate and Energy Fund grants 2020

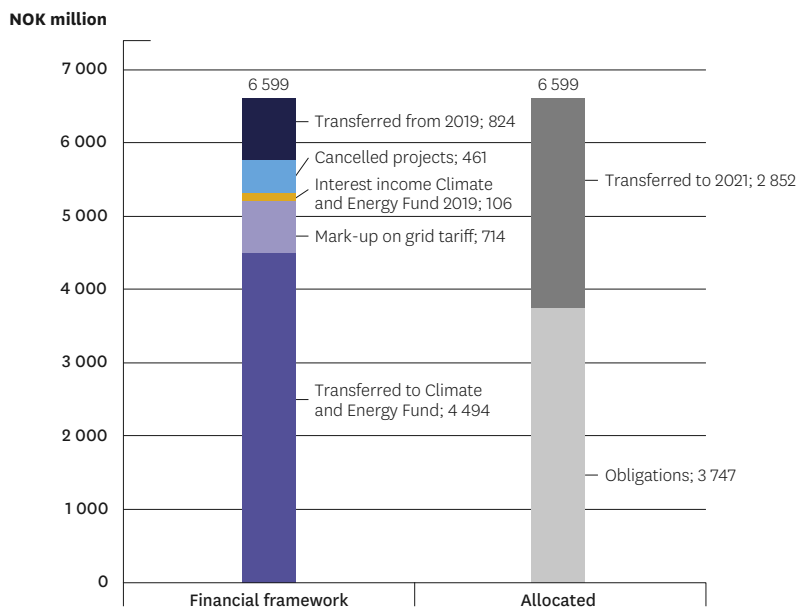


Figure 3.5: The figure is a presentation of the Climate and Energy Fund's various sources of revenue and how revenue is managed. Projects approved and cancelled in 2020 are not included in liabilities and cancelled projects.

The financing of the Climate and Energy Fund provides both market players and Enova with predictability in the long-term work of realising the transition towards a low-emission society.

Enova's ability to transfer unused funds from one year to the next is one of Climate and Energy Fund's strengths. This provides a flexibility that is particularly important for major, capital-intensive individual projects. These are projects where Enova normally maintains a close dialogue with the players for a long time prior to an application, but where it is often difficult to predict with any certainty when the projects are ready for a support decision. Major energy and climate projects often have a long project development timeline. The opportunity to transfer

funds gives the projects assurance that the time of application and decision will not impact the outcome of the case processing.

Appropriations to the Climate and Energy Fund amounted to NOK 2.7 billion for the present contractual term. The Fund received an extra NOK 2 billion in 2020 through the Government's green transition package. NOK 1 billion was also appropriated to the Climate and Energy Fund for the 2018–2020 period through the supplemental agreement, earmarked for establishing a zero-emission fund for commercial transport. Figure 3.6 shows a comprehensive overview of allocated funds during the 2017–2020 agreement term.

Figure 3.6

Allocations and available funds in the Climate and Energy Fund 2017–2020

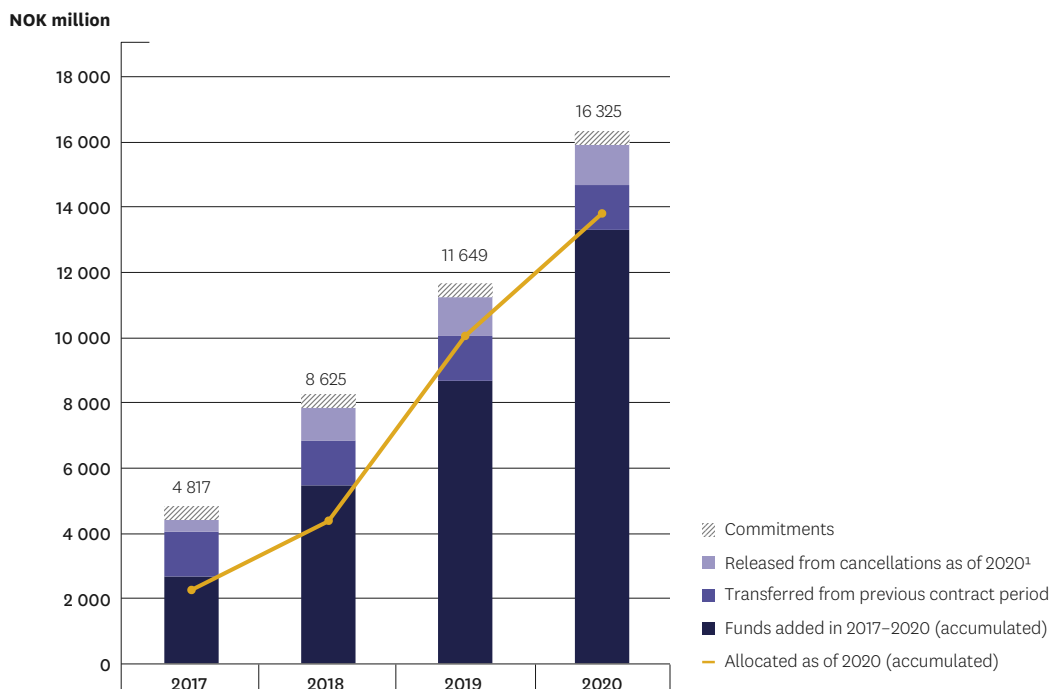


Figure 3.6: The figure shows an overview of allocated funds from the Climate and Energy Fund in 2017–2020, as well as the development (cumulative) in available funds in the Climate and Energy Fund during the 2017–2020 period.

¹ Funds released from cancelled projects approved in previous contract periods.

Enova has granted funding commitments amounting to NOK 3.5 billion to projects in 2020. These projects are expected to trigger just under NOK 7 billion from the market. This will yield a total investment of about NOK 10.5 billion in projects approved in 2020.

Support totalling about NOK 2 billion was allocated for 3 154 projects within the transport sector in 2020. This amounted to 57 per cent of the total allocations. The high number of transport projects is chiefly a result of the subsidy scheme for purchasing electric vans which was launched in 2019. Transport is the sector with the greatest potential for implementing climate measures outside the sector subject to climate credits. Transport projects account for about 75 per cent of the total climate results in 2020, and also contribute good results within energy and innovation.

Support totalling more than NOK 652 million was awarded to 188 industry projects in 2020, which amounted to 19 per cent of overall support. The industry projects supported in 2020 contribute particularly well toward the performance indicator for triggered innovation capital. The sector also provides a significant contribution to climate and energy results.

In 2020, support totalling NOK 369 million was awarded to 224 projects which contribute to further development of the energy system. This accounted for just over 10 per cent of total allocated funds. These projects represented more than 90 per cent of the reduced peak demand in 2020. The sector also provided a good contribution to the achieved energy result. Support for many district heating projects helps bolster Norway’s security of supply by reducing peak demand from the power grid on the coldest winter day.

Within non-residential buildings and property, Enova supported 280 projects with NOK 316 million. This amounted to 9 per cent of Enova’s support in 2020. The majority of this support was used to upgrade to the best available technology in existing buildings. The individual building projects are small, but results here provide a contribution to the achieved energy and climate results.

Households and consumers is an important sector for creating broad-based involvement and a focus on implementation of energy and climate measures. It is also important in an energy system perspective to develop the interplay between energy system, transport and buildings. This sector is characterised by

many small projects, and contributes both energy and climate results. The most important work here is the Enova Subsidy, which constitutes about 5 per cent of allocated funds in 2020. In 2020, this rights-based subsidy scheme supported the implementation of more than 9,000 energy measures in homes with subsidies totalling NOK 158 million. The number of grants is substantially lower than last year. This was primarily caused by the considerable volume of applications associated with phasing out oil burners before the prohibition came into force in 2020.

A fully-digital application process makes it easy for homeowners to register measures and receive subsidies. User surveys show that users are very satisfied with the programme.

About NOK 280 million is linked to annual administrative remuneration for Enova for management of the Climate and Energy Fund and other contractual activities.

Table 3.2

Climate and Energy Fund's allocations

Sector/activity	2017	2018	2019	2020	Total
	NOK million	NOK million	NOK million	NOK million	NOK million
Industry	385	394	1 048	652	2 479
Transport	878	671	893	1 970	4 413
Energy system	190	157	2 862	369	3 579
Non-residential buildings and property	391	389	300	316	1 396
Households and consumers	165	275	334	158	931
International	2	4	1	3	11
Consultation and communication	53	44	47	38	183
External analyses and development measures	38	19	28	53	139
Administrative remuneration	157	155	159	187	657
Total	2 259	2 109	5 672	3 747	13 786

Table 3.2: The table shows funds allocated from the Climate and Energy Fund during the 2017–2020 period distributed by sector as well as other contractual activities and administrative remuneration. The figures have been corrected for cancelled and final-reported projects as of 2020.

Overview of activities

Table 3.3 shows an overview of all applications in 2020, including the Enova Subsidy. A total of 13 173 applications were received in 2020, and 12 967 projects were supported. These figures reflect a decline of about 40 per cent from the previous year. This decline is linked to the Enova Subsidy.

In certain instances, there could be more decisions than applications for a programme over the year. This is because applications that are received at the end of the year could be fully processed in the following year.

When applications do not receive support, this is usually due to one or more of the following causes:

- The projects are too profitable to receive support.
- The projects are too expensive to receive support.
- The projects do not fulfil the criteria for support.
- The projects are not sufficiently documented.

Table 3.3

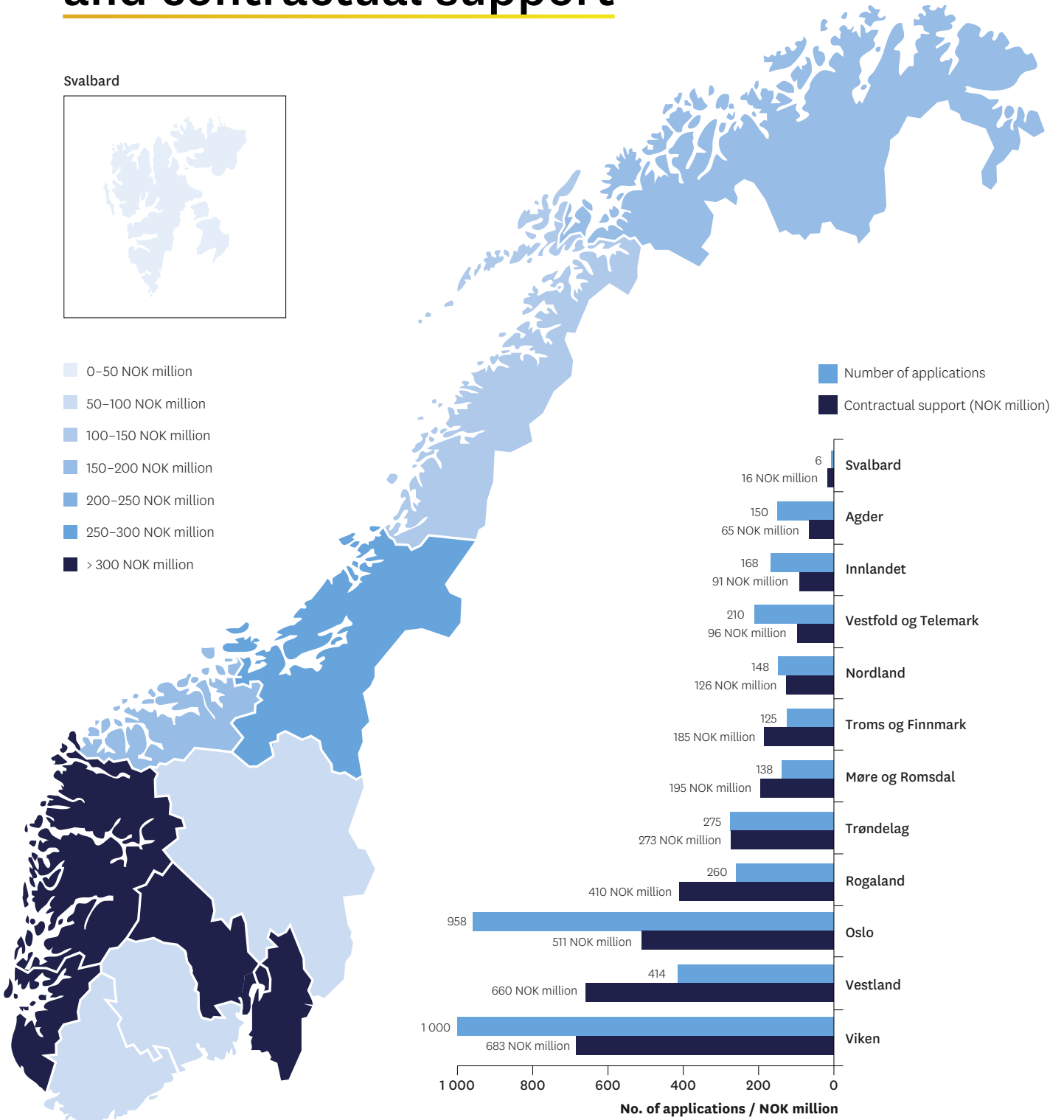
Activity overview for the Climate and Energy Fund 2020

Sector	No. of applications	No. of projects supported	Contractual support
			NOK million
Industry	300	188	652
Demonstration of new energy and climate technology	3	2	44
Full-scale innovative energy and climate technology	12	6	194
Pilot-testing of new energy and climate technology	19	9	189
Climate and measures in industry	246	162	178
Pre-project support for new energy and climate technology in the industry	20	9	48
Transport	3 348	3 154	1 970
Batteries in vessels	25	18	92
Demonstration of new energy and climate technology	1	0	0
Electrification of maritime transport	60	35	240
Pre-project support for power infrastructure for port stays and charging	28	26	10
Full-scale innovative energy and climate technology	18	10	389
Installing low-voltage onshore power systems in existing vessels	39	33	12
Investment support for power infrastructure for port stays and charging	17	11	105
Zero-emission fund for electric vans	2 779	2 749	592
Zero-emission fund – charging for electric vans	188	189	1
Area development of charging infrastructure for electric cars	5	3	65
Pilot-testing of new energy and climate technology	8	1	5
Support for energy and climate measures in ground transport	169	73	246
Support for infrastructure for municipal and county authority transport services	6	5	165
Support for production of biogas and biofuel	5	1	49
Energy system	317	224	369
Demonstration of new energy and climate technology	2	0	0
Full-scale innovative energy and climate technology	7	4	48
District heating and district cooling	54	26	206
Concept studies for buildings and areas	76	44	35
Pilot-testing of new energy and climate technology	23	6	43
Heating plants	155	144	37
Non-residential buildings and property	377	280	316
Best available technology in existing buildings	270	214	245
Comprehensive mapping of buildings	54	42	10
Innovative solutions in the Energy service market for buildings	27	11	9
Introducing new technology in buildings and areas	19	9	44
Commercial testing	6	4	9
New technology for buildings of the future	1	0	0
Households and consumers	8 826	9 115	158
Enova Subsidy	8 826	9 115	158
Internationally	5	6	3
IEA Main Project	1	3	2
Project establishment support for the EU Innovation Fund	4	3	1
Total sum	13 173	12 967	3 468

Table 3.3: The table shows an overview of the number of applications received and number of projects approved for support¹, as well as funds awarded within Enova's programmes in 2020. The table only shows support for eligible programmes, and not allocations for other contractual activities in the Climate and Energy Fund. As of 2019, the programme Support for concept assessment in new construction and areas is reported under the Energy system sector (previously reported under non-residential buildings and property).

¹ Number of projects approved for support has been corrected for cancellations. This applies to 62 projects for the 2020 portfolio.

County distribution of projects and contractual support



In 2020, Enova supported more than 3 850 projects with a total of NOK 3.3 billion¹. An overview and more information about these projects can be found at www.enova.no

¹ The Enova Subsidy is not included in the overview.

Status of project portfolio

When Enova decides to award support for projects, the amounts are earmarked in the Climate and Energy Fund as commitments. The relevant amount is then disbursed in arrears based on actual project costs. When a project has progressed to the point where disbursement from Enova starts, it will have passed many critical decision points and the risk of the project being cancelled declines substantially.

Figures 3.7 and 3.8 show the status of the project portfolio measured in number of projects and support granted, respectively. Figure 3.7 shows that 23 per cent of the projects supported in 2020 have already been completed, and have submitted final reports to Enova.

However, Figure 3.8 shows that the approved support for these projects constitutes a small amount, less than 2 per cent of the overall support approved in 2020. This is natural, since it is the smallest projects that can be completed during the same year that they received support from Enova.

Some of the projects that receive support are cancelled, often due to changed preconditions during the period from when the application was submitted until the start-up decision. A certain number of cancellations is both expected and desired because Enova must take certain risks, but avoid overcompensating projects, which means that some projects naturally will not be realised. We must expect that cancellations will occur in the portfolio in the upcoming year as well. The support earmarked for the project is then released for use in new projects.

Casting a glance at previous years in the agreement term reveals that the majority of projects in 2017–2019 have been concluded. The smallest projects are completed the quickest. This is illustrated by the fact that the 14 per cent of projects from the 2017-portfolio that are still active, account for 65 per cent of awarded support, corrected for cancellations. As regards the 2018 and 2019-portfolios, the projects that are still active represent 83 and 98 per cent, respectively, of annual awarded support.

Figure 3.7
Status of project portfolio, measured in number of projects

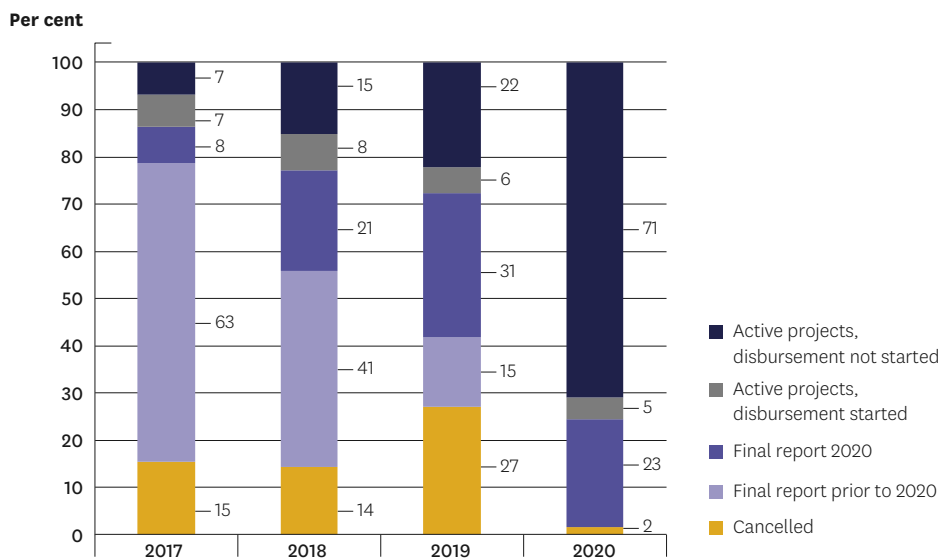


Figure 3.7: The figure shows the percentage of final-reported, active and cancelled projects at the end of 2020, measured in the number of projects. The figure also shows the percentage of active projects where disbursement has started.

Figure 3.8
Status of project portfolio, measured in contractual support

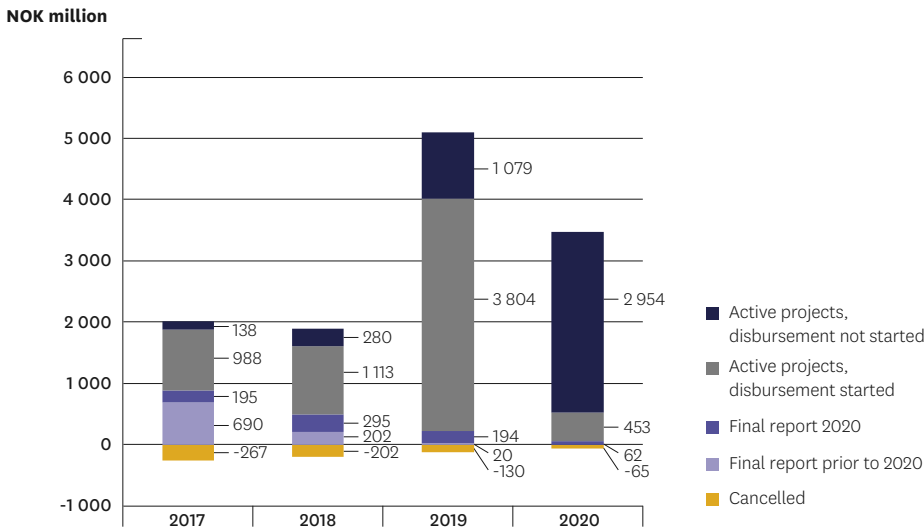


Figure 3.8: The figure shows final reported, active and cancelled projects at the end of 2020, measured by awarded support.

Figure 3.9 shows a distribution of the project portfolio according to the size of support granted. Most projects are awarded less than NOK 1 million, and the smallest projects make up a relatively small share of allocated funds. Throughout the agreement term, 82 per cent of projects were awarded less than

NOK 1 million, and these only account for just over 8 per cent of total awarded support. Just under 3 per cent of projects adopted during the 2017–2020 agreement term were awarded more than NOK 10 million in support. Nevertheless, these projects constitute about 65 per cent of total support.

Figure 3.9
Projects 2017–2020 distributed by contractual support

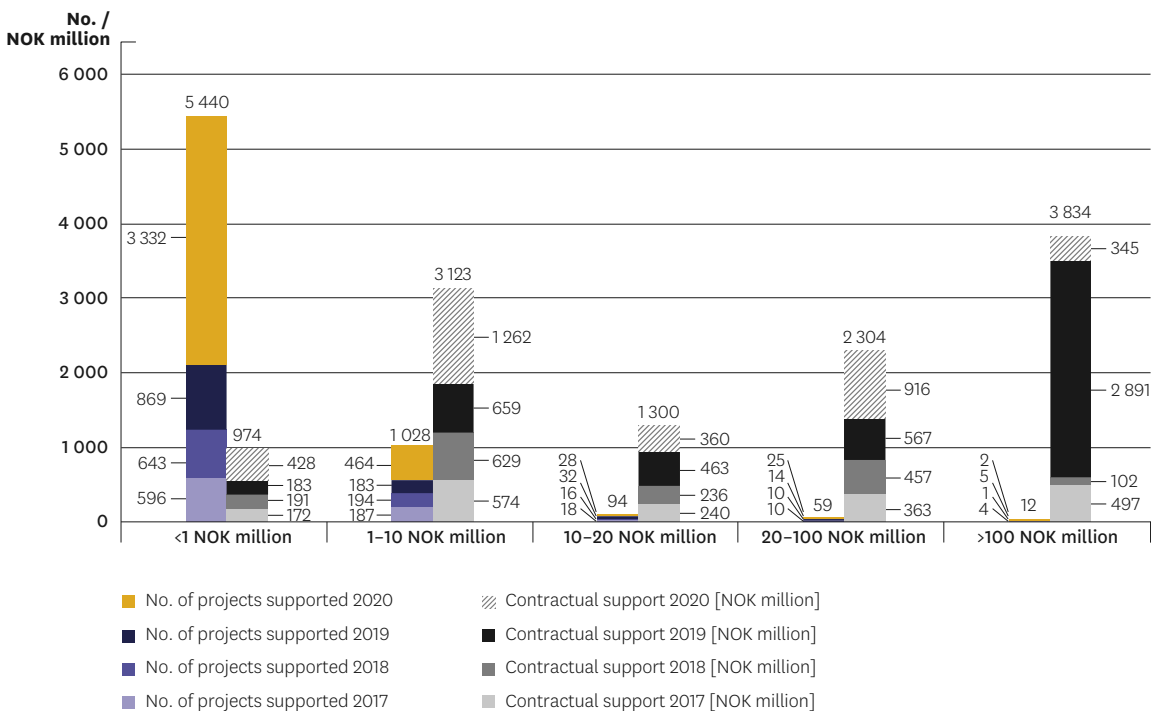


Figure 3.9: The figure shows a distribution of projects that were granted support in 2017–2020 grouped according to funding level. The Enova Subsidy is not included in this overview.

Figure 3.10 shows a distribution of the project portfolio according to contractual end date. There is a correlation between the size of the project and its implementation time. Small projects normally have a much shorter implementation time than large projects. Small projects are usually related to smaller measures in buildings and industry or procuring vehicles, while the large projects involve significantly more engineering and investments

in physical measures. Naturally, these require more time to complete. Enova is concerned with ensuring that projects that receive support follow a set and realistic schedule for project implementation. The implementation time can affect the risk of external factors associated with the project changing, and thus affecting the risk associated with implementation.

Figure 3.10
Projects 2017–2020 distributed by contractual end date

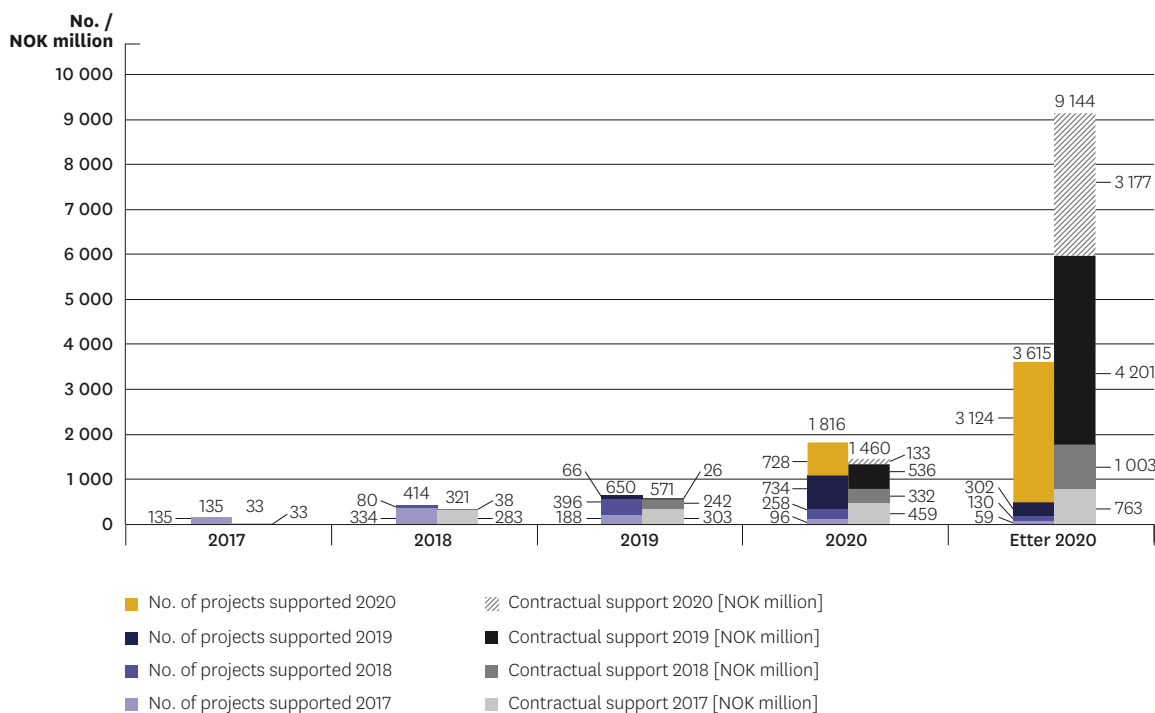


Figure 3.10: The figure shows a distribution of projects started in 2017-2020 distributed according to contractual end date for the projects. The Enova Subsidy is not included in this overview.

Activities

The Enova Subsidy

Support was awarded to 9 115 projects through the Enova Subsidy in 2020. Electricity generation was the individual measure that received the most grants, with almost 18 per cent of all grants. The generation of electricity in households is mainly linked to installing solar cells on the home. Nearly as many grants, 17 per cent, were given to install balanced ventilation.

Heat pump solutions and water-borne heating were also among the most popular measures, despite exhibiting a slight decline compared with previous years. This could be linked to the fact

that, through 2019, homeowners received grants to remove oil burners combined with purchasing a different renewable heating source, such as a heat pump. As of 2020, it is prohibited to use fossil oil to heat homes and buildings, and Enova's support programmes for phasing out oil burners have been discontinued. Overall, these measures represented just over one-third of the measures supported in 2020.

The most extensive and energy-conserving single measure is upgrading the building structure. 566 such grants were disbursed in 2020, which is a 30 per cent increase from 2019.

Figure 3.11

Number of grants within the Enova Subsidy, distributed by measure

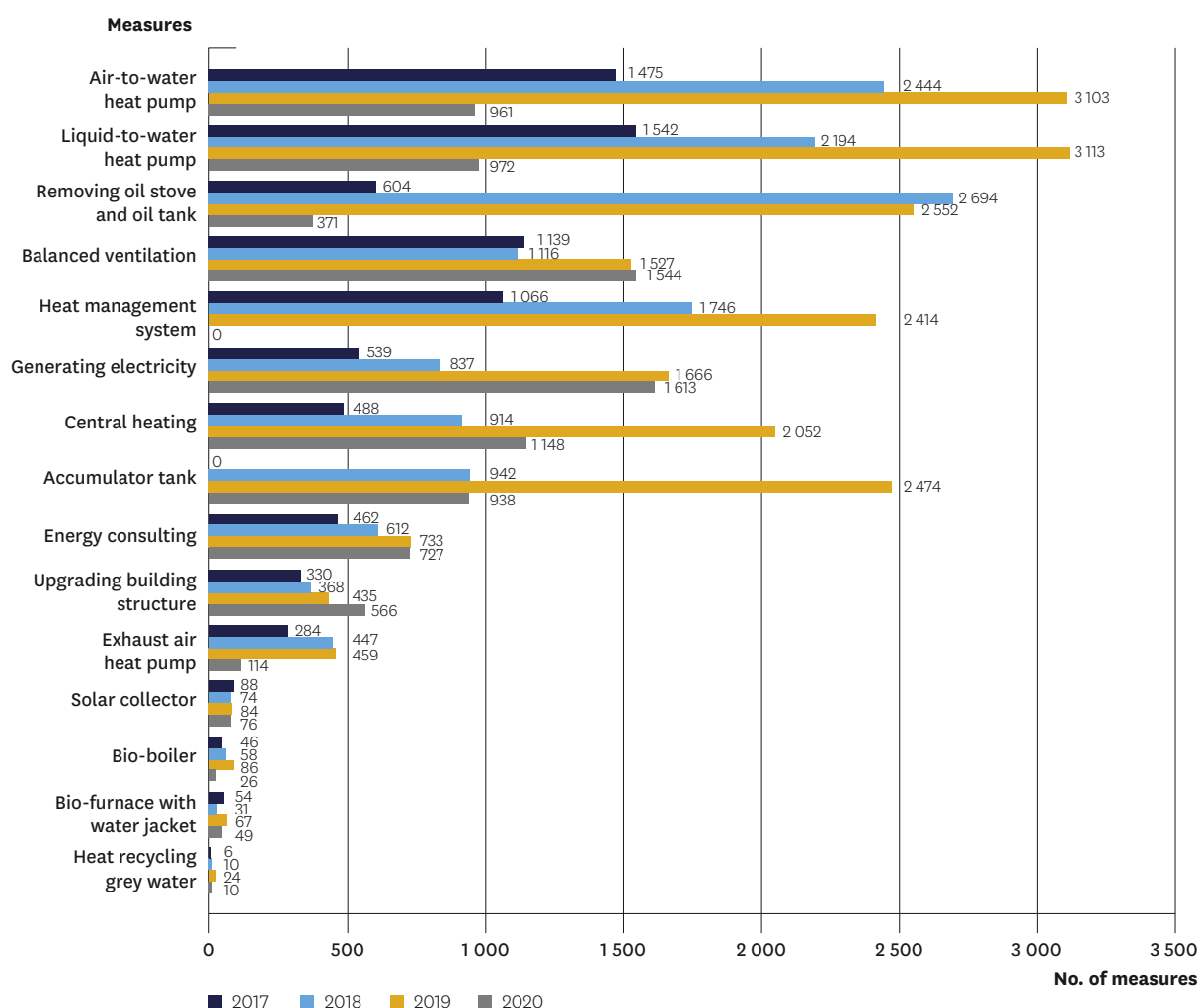


Figure 3.11: The figure shows the number of subsidies within the Enova Subsidy in 2017–2020, distributed according to measure. 347 households that received reimbursement for conversion to a heat pump, bio-boiler or bio-furnace also received subsidies for removal of oil boilers and tanks in 2020. These are reimbursements delivered in 2019, but where disbursement took place in 2020. Grants for removing oil boilers and tanks were discontinued as of 2020. The corresponding figures for 2017, 2018 and 2019 were 1 044, 2 588 and 2 848, respectively.

Nationwide information services

Table 3.4

Nationwide information services

Activity	Purpose of activity	2017	2018	2019	2020
Ask Enova		58 609	79 805	62 398	35 580
Private individuals	Nationwide information and consultation via telephone, e-mail and online chat to support the objectives of the Climate and Energy Fund.	43 573	64 754	48 942	20 985
Commercial players		15 036	15 051	13 456	14 595
Enova.no (page views per day)		9 681	11 737	10 901	7 790
Enova Subsidy (private market)	Information about Enova's services and consultation concerning energy and climate measures.	3 754	6 807	6 368	2 976
Commercial share		5 927	4 930	4 533	4 814

Table 3.4: The table shows the number of inquiries to Ask Enova and number of page views per day for Enova's website in the 2017–2020 period.

Enova provides advisory services for both commercial players and private individuals. For private individuals, there is a focus on the need to acquire information at an early stage in the decision phase before a project, as well as assistance with the actual application process. The advisory services are provided through a dedicated website and through the Ask Enova service.

Ask Enova received just over 35 000 inquiries in 2020. This is a decline of 43 per cent compared with the previous year. The discontinuation of grants to phase out oil burners is an important reason for this decline. Furthermore, a low electricity price throughout the year, in addition to the Covid-19 pandemic, as well as streamlining of the service through the establishment of question-and-answer services (FAQs) for the most frequently

asked questions, contributed to a reduction in the number of inquiries. Table 3.4 shows that inquiries from private individuals have declined; they have been reduced by more than half, both in the form of inquiries to Ask Enova and as page views on Enova.no. However, the number of inquiries from commercial players has increased, both for Ask Enova and on Enova.no, by about 9 and 6 per cent, respectively.

Enova safeguards the operation and development of the Energy Certification Programme and programme for energy assessment of technical facilities. The goal of the programme is to provide relevant and well-facilitated information about energy standards and potential energy efficiency measures. The programme aims to be a useful tool for players in the construction sector.

Performance indicator for climate

Enova shall promote reduction of greenhouse gas emissions that helps fulfil Norway's climate commitment for 2030. **The climate result** is the sum of changes in greenhouse gas emissions not subject to carbon credits as a result of various measures in the projects which Enova has supported.

The calculation uses emission coefficients for the different energy carriers involved as a basis. The climate result is measured in tonnes of CO₂ equivalents per year. The conversion to tonnes of

CO₂ equivalents takes place using internationally recognized GWP factors (*Global Warming Potential*).

In 2020, Enova supported projects that are expected to reduce emissions not subject to carbon credits by about 279 000 tonnes of CO₂ equivalents annually. Throughout the 2017–2020 agreement term, Enova has achieved a climate result of 1 024 million tonnes of CO₂ equivalents as a result of the supported projects.

Figure 3.12

Development in climate results 2017–2020

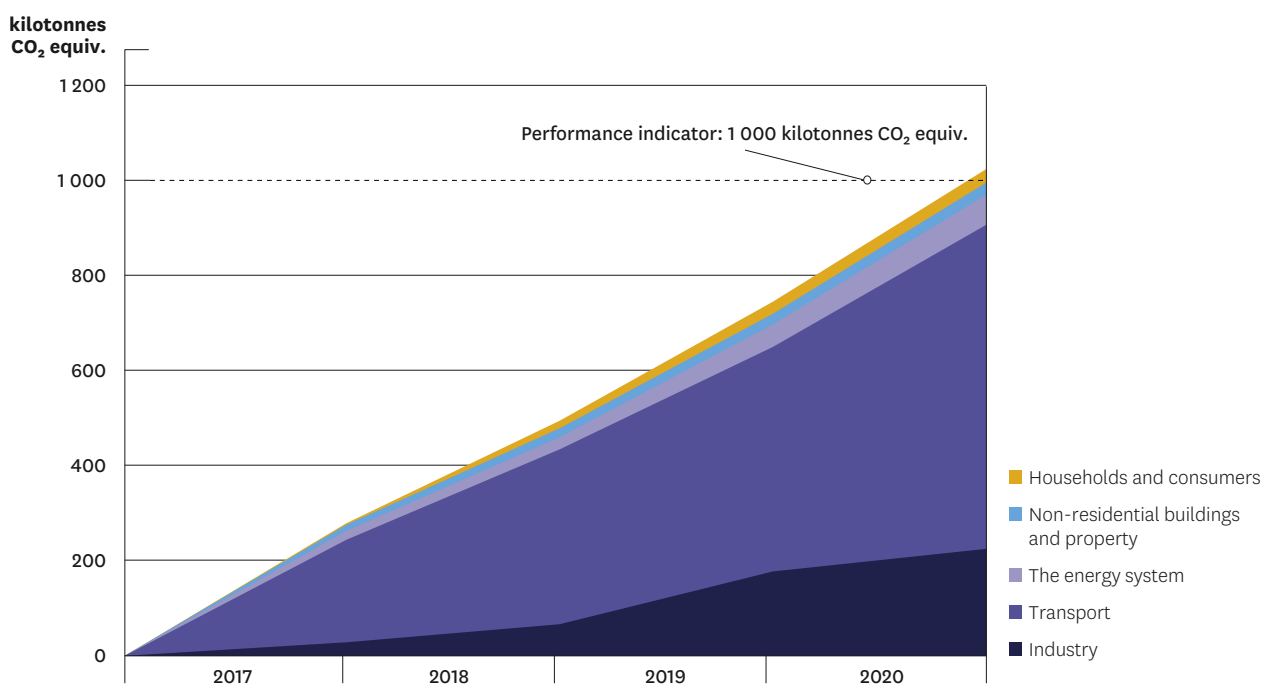


Figure 3.12: The figure shows expected climate results (kilotonnes CO₂ equiv.) in projects receiving support from the Climate and Energy Fund in the 2017–2020 period. The results have been corrected for cancelled and final reported projects.

The objective of the agreement, which was increased in 2019 from 0.75 to 1 million tonnes of CO₂ equivalents as a result of the establishment of the Zero-emission fund for commercial transport, has thus been achieved.

Industry projects account for greenhouse gas reductions totalling 48 000 tonnes of CO₂ equivalents in 2020, distributed across about 110 individual projects. The majority of projects and the majority of the climate result come from the "Energy and climate efforts in industry" programme. Over the last year, this programme has directed its thematic efforts toward the utilisation of waste heat, in addition to phasing out fossil energy for heating purposes, and electrification of mechanical work processes and energy supply for feed fleets in the aquaculture industry.

In the transport sector, climate results are distributed across a far higher number of projects. Enova has supported more than 3 200 projects that are expected to reduce emissions by 212 000 tonnes of CO₂ equivalents. Support for electric vans over the Zero-Emission Fund represents the bulk of the volume, accounting for far more than 90 per cent of all projects and 55 per cent of the climate result. Good climate results were also achieved in 2020 from support for infrastructure for municipal and county authority transport services and electrification of maritime transport. Ten projects within full-scale innovative energy and climate technology also contributed to the climate result, several of which within emission-free shipping.

Climate results have also been achieved from projects within Energy system, Non-residential buildings and property, as well as Households and consumers. The other climate results are largely related to the conversion of fossil heating in buildings.

Table 3.5

Climate results

Sector	2017	2018	2019	2020	Total
	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.
Industry	28	39	111	48	225
Transport	216	153	102	212	683
Energy system	19	3	24	14	60
Non-residential buildings and property	11	9	2	4	27
Households and consumers	5	9	14	2	29
Total	279	214	253	279	1 024

Table 3.5: The table shows the climate result (CO₂ equiv.) from projects in facilities not subject to carbon credits that were granted support in the 2017–2020 period. The results are distributed according to sector. The results have been corrected for cancelled and final reported projects.

Table 3.6 shows that results can change after contracts are signed. This can occur either as a result of the projects not being completed or that changes in assumptions occur that affect result achievement. The expected climate results for the agreement term have been reduced by about 95 000 tonnes

of CO₂ equivalents as a result of cancellations. The projects' estimated results are updated upon final reporting, which may lead to increases or reductions in the results. These updates have led to a modest reduction in climate results, to 1 024 000 tonnes of CO₂ equivalents.

Table 3.6

Development in climate results 2017–2020

Sector	Original result	Result corrected for cancellations	Result corrected for final reported results
	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.	ktonnes CO ₂ equiv.
Industry	246	229	225
Transport	766	697	683
Energy system	57	52	60
Non-residential buildings and property	32	27	27
Households and consumers	29	29	29
Total	1 130	1 035	1 024

Table 3.6: The table shows the development in expected climate results (CO₂ equiv.) measured from the expected result at the time of approval, result corrected for cancelled projects and result corrected for final reported projects.

Enova also supports measures that contribute to security of supply and innovation in facilities that are subject to carbon credits, and climate results from these measures are calculated. As regards the 2020 portfolio, such measures are expected to contribute to a reduction of 11 000 tonnes of CO₂ equivalents annually. In the short term, reduced emissions in one location could be offset by increased emissions at another location, since

the total emissions are determined within the carbon credit system. The emissions covered by a carbon credit requirement within the EU Emissions Trading System are therefore not included in Enova's climate results. Table 3.7 shows the number of projects, approved support and reduced greenhouse gas emissions at facilities not subject to carbon credits for 2020.

Table 3.7

Emission reductions that are subject to carbon credits

Subject to carbon credits (EU-ETS)	Sector	No. of projects	Contractual support	Climate result
			NOK million	ktonnes CO ₂ equiv.
Subject to emission credits		11	77	11
	Industry	10	71	11
	Energy system	1	6	0
Not subject to carbon credits		3 876	3 231	278
Total		3 887	3 308	289

Table 3.7: The table shows the number of projects in 2020 where Enova supported measures at facilities subject to emission credits¹ in accordance with the EU Emissions Trading System (EU ETS), as well as support granted and climate result (CO₂ equiv.). The Enova Subsidy is not included in the overview (9 115 measures totalling 1.6 ktonnes of CO₂ equiv.).

¹ <https://www.norskeutslipp.no>

The Zero-Emission Fund

Since 2019, Enova has managed a Zero-Emission Fund for commercial transport funded over the Fiscal Budget. The Zero-Emission Fund aims to bolster the market for vessels and vehicles based on zero-emission technologies that have been tested and can be delivered in large volumes. One of the focus areas is to move the private sector over to electric vans, among other

things through a subsidy scheme characterised by an automated application process. Table 3.8 shows the plan for how funds for the Zero-Emission Fund will be provided and allocated. Beyond the framework for the Zero-Emission Fund for 2018, Enova also allocated NOK 250 million for energy measures in ships and ground transport this year.

Table 3.8

Awards and allocations in the Zero-Emission Fund

	2018	2019	2020	Total
	NOK million	NOK million	NOK million	NOK million
Zero-Emission Fund framework	50	534	542	1 127
<i>Allocations:</i>				
Electrification of maritime transport	-	359	240	599
Support for energy and climate measures in ships	50	-	-	50
Batteries in vessels	-	-	92	92
Installing low-voltage onshore power systems in existing vessels	-	-	12	12
Support for energy and climate measures in ground transport	-	24	246	270
Support for purchasing electric delivery trucks and chargers	-	25	593	618
Total	50	408	1 183	1 641
Under/over consumption in relation to funds added	-	127	-641	-514

Table 3.8: The table shows funds added in connection with establishing the Zero-Emission Fund, as well as allocation of these funds. Any unallocated funds at the end of each year are added to the framework for the Zero-Emission Fund in the following year. Allocations beyond the framework for the Zero-Emission Fund are prioritised disbursements from the general framework of the Climate and Energy Fund.

Projects related to infrastructure

Enova shall contribute to the development of fuel infrastructure for emission-free ground and maritime transport, including electric and hydrogen. We also provide support for area development for charging infrastructure for electric cars.

In 2020, we supported 5 projects with a total of NOK 165 million associated with infrastructure for municipal and county authority transport services. NOK 125 million of this was awarded to Ruter as support to establish charging infrastructure to electrify the bus service in Oslo. Other projects were associated with charging

infrastructure for ferries and high-speed crafts. Support was also awarded to 11 projects for infrastructure for power for port stays and charging. These projects included three major awards to electrify cruise terminals, in addition to charging and onshore power intended for other coastal traffic. The total support for such projects amounted to NOK 105 million.

NOK 65 million in support was also granted to 3 projects for area development for charging infrastructure for electric cars in Troms og Finnmark county.

Table 3.9

Fuel infrastructure for emission-free ground and maritime transport 2017–2020

Programme	2020				2017–2020			
	No. of projects	Contractual support	Energy result ¹	Climate result ¹	No. of projects	Contractual support	Energy result ¹	Climate result ¹
		NOK million	GWh	CO ₂ equiv. (ktonnes)		NOK million	GWh	CO ₂ equiv. (ktonnes)
Onshore power	-	-	-	-	48	339	170	45
Investment support for power infrastructure for port stays and charging	11	105	27	7	11	105	27	7
Support for infrastructure for municipal and county authority transport services	5	165	91	22	26	707	324	83
Hydrogen infrastructure	-	-	-	-	2	11	-	-
Area development for charging infrastructure for electric cars	3	65	-	-	3	65	-	-
Support for charging infrastructure for electric cars	-	-	-	-	69	19	-	-

Table 3.9: The table shows the number of projects that were granted support within Enova's programmes aimed at emission-free ground and maritime transport in 2017–2020. Energy and climate results are not calculated for Hydrogen infrastructure and Support for charging infrastructure for electric cars. The results have been adjusted for cancelled and final reported projects.

¹ For onshore power, an annual theoretical energy and climate potential is calculated based on the port's call statistics, the vessels' average capacity demand and potential connection time at port.

Performance indicator for innovation

Enova shall promote increased innovation within energy and climate technology adapted to the adjustment to the low-emission society. **Innovation results** are recorded from projects that contribute to increased innovation within energy and climate technology, and these results are measured in triggered capital in NOK. Triggered capital means the part of the project's investment costs that is triggered through Enova's support,

i.e. investment costs less support from Enova and other public players.

The goal of the technology projects is to harvest experience that contributes to knowledge development, innovation and dissemination of technology both nationally and internationally.

Enova awarded a total of around NOK 1.1 billion to projects within new energy and climate technology in 2020. We have found the response to the programmes to be satisfactory and that there is a willingness to innovate and develop technology in the market. This support is expected to trigger about NOK 1.6 billion in the form of innovation capital in the market. Over the course of the agreement term, Enova's support for innovation and technology

development projects triggered innovation capital totalling more than NOK 10 billion.

In connection with the performance indicator of NOK 4 billion, Enova reports innovation results which exceed the indicator for performance achievement during the agreement term by a comfortable margin.

Figure 3.13

Development in triggered innovation capital 2017–2020

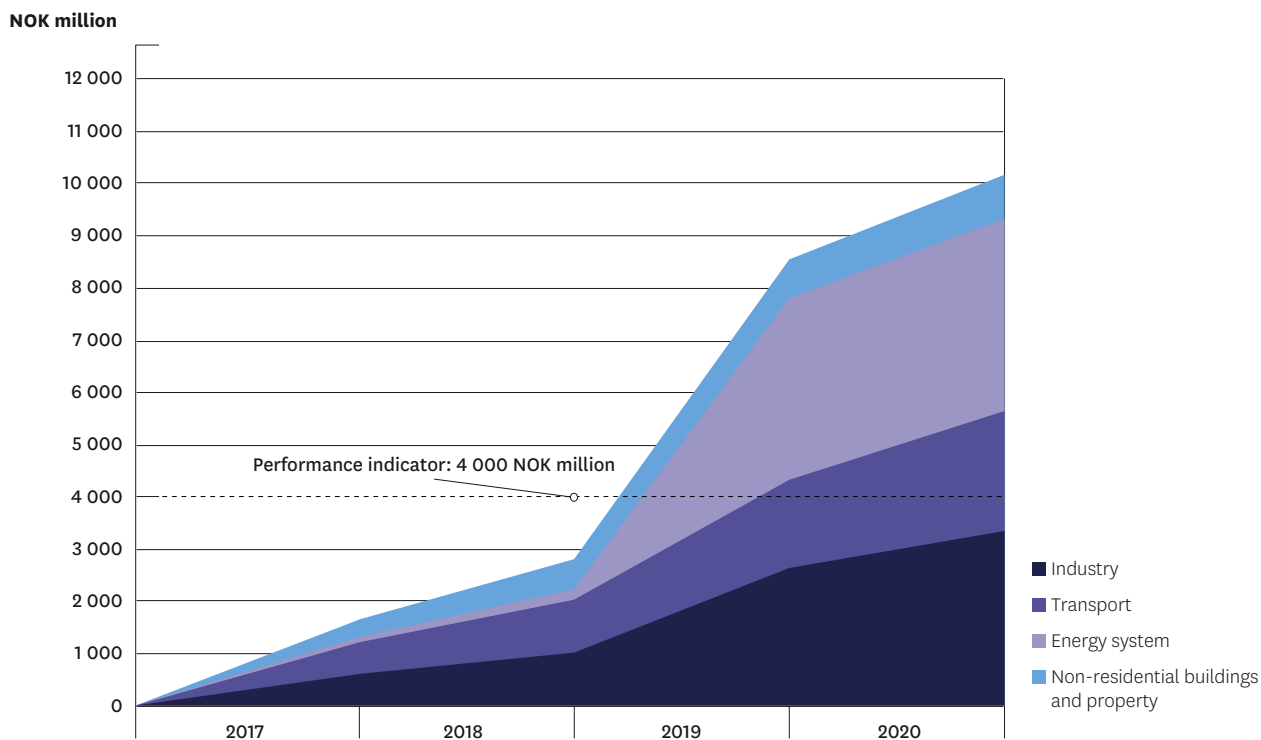


Figure 3.13: The figure shows expected triggered innovation capital (NOK million) in new energy and climate technology projects that were granted support from the Climate and Energy Fund in 2017–2020. The results have been corrected for cancelled and final reported projects.

Projects within industry triggered the most innovation capital in 2020. These account for 43 per cent of the innovation result, followed by transport projects with 38 per cent. Projects within The energy system account for about 12 per cent of the result.

Innovation results fluctuate significantly from year to year as a result of variation in the number of technology projects and the

size of individual projects. Results in 2020 have been reduced to one-third of those in 2019. The primary cause is linked to Equinor's major offshore wind project, which was supported with NOK 2.3 billion and provided a strong contribution to the innovation result in the previous year.

Table 3.10

Triggered innovation capital

Sector	2017	2018	2019	2020	Total
	NOK million	NOK million	NOK million	NOK million	NOK million
Industry	599	406	1 641	700	3 346
Transport	614	406	658	619	2 297
Energy system	124	82	3 269	192	3 667
Non-residential buildings and property	305	275	158	109	848
Households and consumers	-	-	-	-	-
Total	1 643	1 169	5 726	1 620	10 158

Table 3.10: The table shows expected triggered innovation capital (NOK million) in projects that were granted support in 2017–2020, distributed by sector. The results have been corrected for cancelled and final-reported projects as of 2020.

Table 3.11 shows that cancellations, particularly within transport, have reduced the expected triggered innovation capital somewhat. Final reporting of completed projects have partially

offset this reduction, so the overall effect of cancellations and final reporting is relatively modest.

Table 3.11

Development in triggered innovation capital 2017–2020

Sector	Original result	Result corrected for cancellations	Result corrected for final reported results
	NOK million	NOK million	NOK million
Industry	3 404	3 335	3 346
Transport	2 434	2 275	2 297
Energy system	3 559	3 553	3 667
Non-residential buildings and property	844	812	848
Households and consumers	-	-	-
Total	10 240	9 975	10 158

Table 3.11: The table shows the development in expected triggered innovation capital (NOK million) measured from result at time of approval, corrected for cancelled and final reported projects.

Enova's technology programmes shall contribute to reducing technological risk and the technology cost of new innovative technology, so that the technology is assisted from the development stage and out into the commercial market. Technology is matured in stages through piloting, demonstration and full-scale testing. These are generally challenging projects, requiring a lot of effort on the part of the players to implement and which depend on support for realisation.

The largest individual innovation result in 2020 came from Topeka AS' full-scale project involving two hydrogen-electric vessels for scheduled traffic in Western Norway. This project was awarded NOK 219 million in support from Enova, funds coming in addition to the project owner's own capital contribution to realise the project.

26 technology projects within industry received support, and the lion's share of support funds were awarded for either pilot or full-scale projects. The largest award was given to a full-scale project for energy-efficient land-based salmon farming. Other major projects supported include a pilot facility for emission-free production of hydrogen and a full-scale project for liquid biogas. In total, NOK 474 million in support was awarded for technology projects in industry in 2020.

The largest number of supported projects is found in the Energy system. A total of 54 projects received support, the majority of which were projects of a smaller scope for concept studies within new construction and areas. The largest individual award within Energy system was for a full-scale technology project associated with expanding the Coop Logistics centre (CLog) at Gardermoen, where the aim is to realise multiple innovative technologies and system solutions.

Table 3.12

Support for new energy and climate technologies

Sector	2020		2017-2020	
	No. of projects supported	Contractual support	No. of projects supported	Contractual support
		NOK million		NOK million
Industry	26	474	98	1 861
Pilot-testing of new energy and climate technology	9	189	22	368
Demonstration of new energy and climate technology	2	44	7	287
Full-scale innovative energy and climate technology	6	194	47	1 079
Pre-project support for new energy and climate technology in the industry	9	48	22	128
Transport	11	394	32	966
Pilot-testing of new energy and climate technology	1	5	3	18
Full-scale innovative energy and climate technology	10	389	29	948
Energy system	54	126	180	2 841
Demonstration of new energy and climate technology	-	-	1	5
Full-scale innovative energy and climate technology	4	48	18	2 480
Pilot-testing of new energy and climate technology	6	43	8	46
Large-scale demonstration and pilot project unit	-	-	8	210
Support for concept assessment in new construction and areas	44	35	145	100
Non-residential buildings and property	24	62	111	453
Support for new technology for the future's buildings	-	-	4	3
Commercial testing	4	9	14	32
Innovative solutions in the Energy service market for buildings	11	9	20	16
Introducing new technology in buildings and areas	9	44	46	186
Support for energy-efficient new buildings	-	-	27	217
Total	115	1 056	421	6 121

Table 3.12: The table shows the number of projects and contractual support (NOK million) within new energy and climate technology during the 2017-2020 period, distributed by sector and programme. The figures have been corrected for cancelled and final-reported projects as of 2020. As of 2019, the programme Support for concept assessment in new construction and areas is reported under the Energy system sector (previously reported under non-residential buildings and property).

Table 3.13 shows a few examples of projects within new energy and climate technology that Enova supported in 2020.

Reference is made to Enova's website (enova.no) for more information.

Table 3.13

Examples of projects within new energy and climate technology 2020

Project owner/ Project	Sector/ Programme	Contractual support (NOK million)	Description/innovation
Topeka: High-frequency hydrogen-electric overnight route	Transport/ Full- scale innovative energy and climate technology	219	<ul style="list-style-type: none"> The project aims to develop two vessels with liquid hydrogen as the primary energy carrier. The vessels will be used for scheduled traffic in Western Norway to distribute hydrogen, base-base transport and other cargo, and will relieve E-39 with emission-free maritime heavy transport. <p>Innovation: Develop and demonstrate liquid hydrogen solution for larger vessels and greater distances (3 MW – 750 km) and emission-free heavy transport solution.</p>
Coast Center Base AS: Establishing a pilot facility for emission-free hydrogen production at CCB Energy Park	Industry/ Pilot-testing of new energy and climate technology	77	<ul style="list-style-type: none"> In this project, Coast Center Base, along with ZEG Power, will engineer, build and operate a pilot facility for the production, distribution and delivery of carbon-neutral hydrogen. The pilot facility will have a capacity of 1 MW (30 kg H₂/hour). <p>Innovation: Scaling up and realising technology for carbon-neutral production of hydrogen from gas with demonstration and test operation of the pilot facility, verification of high system efficiency and carbon capture.</p>
Hydro Energi AS: Increased material recycling and reduced energy consumption by recycling used electric car batteries	Industry/ Pilot-testing of new energy and climate technology	44	<ul style="list-style-type: none"> The project comprises the establishment of a pilot facility to develop more efficient technology to recycle electric car batteries and other large lithium-ion batteries, for example from ferries and stationary energy storage facilities. <p>Innovation: Significantly increased material recycling from a new recycling process for large lithium-ion batteries, significantly reduced energy consumption as a result of increased material recycling and considerably reduced emissions from the new recycling process for lithium-ion batteries.</p>
Coop Norge SA: CLog Energi	Energy system / Full-scale innovative energy and climate technology	28	<ul style="list-style-type: none"> Innovative measures at Coop Norge's logistics centre at Gardermoen with the aim of becoming Norway's first energy-positive logistics centre. <p>Innovation: Increased utilisation of waste heat in buildings and delivery of waste and solar heat to the district heating grid in order to transition to low-temperature grids, innovative solar cell installation on façades and roofs and batteries with virtual measurement for load balancing and as compensation for transformers.</p>

Table 3.13: The table shows examples of projects within new energy and climate technology approved in 2020. For a more detailed overview of these projects and other climate and energy technology projects approved in 2020, please see Enova's website, www.enova.no.

Performance indicators for energy and demand

Enova shall promote strengthened security of supply through flexible and efficient demand and energy consumption. Enova records **energy results** for the projects it supports. Energy results measure what the projects deliver per year, either through more efficient consumption of energy, increased production and/or use of renewable energy. Energy results are measured in kilowatt-hours (kWh). Enova can also record **reduced peak demand results** for projects that result in a reduced peak demand and increased flexibility in the power

system. This includes measures that can limit winter loads and reduce short-term peaks. Reduced peak demand results are measured in kilowatt (kW).

Security of supply means that society has secure access to the energy it requires – the desired quantity at the correct time at a predictable and sustainable cost. There are many aspects to security of supply. Over the long term, we want access to energy sources that ensure sustainable growth and welfare – energy

security. In the shorter term, elements related to electricity are emphasised, based on a desire for securing good delivery quality and that sufficient capacity is available. As a society, we want to avoid interruptions in the electricity supply, because this could entail major societal costs. In the low-emission society, it is presumed that oil and gas production must largely be replaced by other value creation, for example land-based power-intensive industry, to be able to maintain the prosperous welfare level in our society. A safe, efficient and renewable energy supply is crucial for achieving this.

Improvement of the long-term security of supply is measured in the form of energy volume (kWh), while we measure improvement of the short-term security of supply in the form of reduced demand in the power grid (kW). In 2020, Enova supported projects that are expected to yield just over 1.6 TWh in energy results and 179 MW in reduced peak demand results.

Energy results

The energy result of 1.6 TWh is considered to be good in the context of the performance indicator of 4 TWh for the agreement term. Including contributions from the annual energy result, the agreement term's overall result amounts to 6.6 TWh.

Figure 3.14

Development in energy results 2017–2020

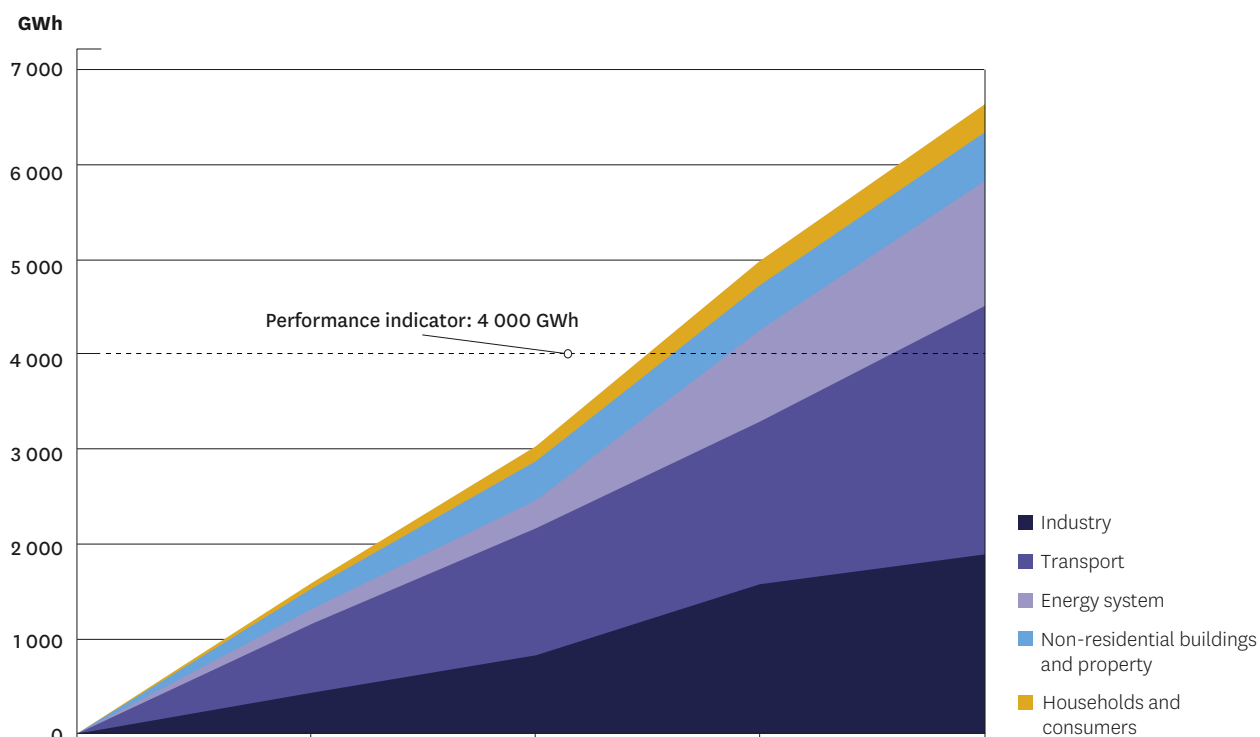


Figure 3.14: The figure shows expected energy results (GWh) in projects that received support from the Climate and Energy Fund in 2017–2020. The results have been corrected for cancelled and final reported projects.

Well over half of the energy result in 2020 was delivered by projects within the transport sector. The largest individual results are linked to zero-emission solutions within shipping, in addition to a biogas production plant.

Projects within industry and the energy system contribute about 20 per cent each. The ten largest projects within the Full-scale innovative energy and climate technology and Energy and climate efforts in industry programmes provided 202 GWh, or more than 60 per cent, of the energy results within the industry sector. Within the Energy system, the majority of the energy result came from district heating projects. Two projects

within Full-scale innovative energy and climate technology also distinguished themselves with major individual contributions to the energy result.

The construction sector (Non-residential buildings and property, as well as Households and consumers) contributed nearly 5 per cent of the annual energy results. Within Non-residential buildings and property, projects associated with best available technology in existing buildings were the greatest contributor. The energy result within Households and consumers comes from about 9 000 measures for which support was disbursed through the Enova Subsidy.

Table 3.14

Energy results

Sector	2017	2018	2019	2020	Total
	GWh	GWh	GWh	GWh	GWh
Industry	435	399	735	329	1 898
Transport	729	599	389	898	2 614
Energy system	166	127	677	344	1 315
Non-residential buildings and property	219	214	43	36	512
Households and consumers	52	87	110	42	292
Total	1 601	1 426	1 955	1 649	6 630

Table 3.14: The table shows expected energy results (GWh) in projects that received support in 2017-2020, distributed by sector. The results have been corrected for cancelled and final-reported projects as of 2020.

The expected energy results have been reduced as a result of both cancellations and final reporting. Table 3.15 shows that cancellations have generally reduced the energy results by close to 7 per cent. Upon final reporting, industry projects reduced

the energy results by just under 4 per cent, while other sectors saw smaller changes. The overall effect of final reported energy results is a reduction of just under 2 per cent.

Table 3.15

Development in energy results 2017–2020

Sector	Original result	Result corrected for cancellations	Result corrected for final reported results
	GWh	GWh	GWh
Industry	2 084	1 968	1 898
Transport	2 943	2 663	2 614
Energy system	1 319	1 300	1 315
Non-residential buildings and property	590	522	512
Households and consumers	292	292	292
Total	7 228	6 744	6 630

Table 3.15: The table shows the development in expected energy result (GWh) measured from result at time of approval, corrected for cancelled projects, and finally, corrected for cancelled and final reported projects.

The projects supported by Enova can be divided into four categories; production, energy efficiency, distribution and conversion.

Production projects include all projects where electricity or renewable heating is produced, either for sale or internal use. Establishment and expansion of district heating plants involves development of new infrastructure, and these projects are categorized as distribution projects.

Conversion projects involve changing energy carrier from electricity or fossil energy carriers to renewable energy carriers, for example based on bio-energy. One project that converts from one energy carrier to another often comprises both conversion and increased energy efficiency. One example is electrification

within transport, where diesel is replaced with electricity. An electric motor has a higher efficiency than the diesel engine. Enova therefore calculates an energy result related to the conversion from diesel, and an energy result from increased energy efficiency when an electric motor is used instead of a diesel engine.

The largest energy results in 2020, came from energy efficiency measures, followed by conversion projects. The transport sector was the most important contributor to results in both of these categories, but the industry sector also provided a sizeable contribution within energy efficiency measures. Other energy results, distributed by project category and sector, are listed in Table 3.16.

Table 3.16

2020 energy result distributed by project category

Sector	Energy efficiency measures	Production	Distribution	Conversion
	GWh	GWh	GWh	GWh
Industry	217	54	-	60
Transport	590	33	-	274
Energy system	22	28	227	67
Non-residential buildings and property	34	1	-	1
Households and consumers	16	7	-	19
Total	879	123	227	421

Table 3.16: The table shows energy results (GWh) in 2020 distributed by project category and sector. The figures have been corrected for cancelled projects.

Figure 3.15 shows the overall distribution among project categories for the 2017-2020 agreement term. We are seeing that

energy efficiency measures have been by far the largest project category measured in energy results during the period.

Figure 3.15

2017–2020 energy result distributed by project category

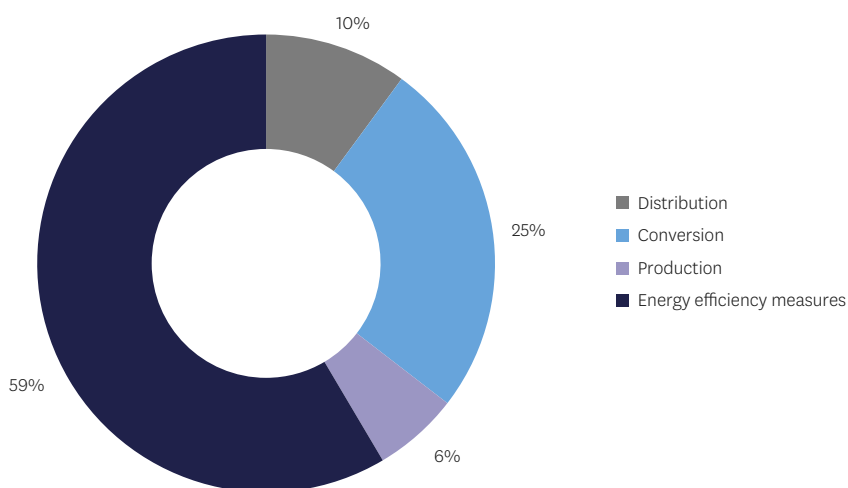


Figure 3.15: The figure shows the distribution of expected energy results (GWh) in the 2017-2020 period distributed by project category.

Table 3.17 shows the energy result from production, distribution and conversion distributed by renewable energy carriers that Enova has supported. This amounts to an energy result of 771 GWh.

Electricity accounted for the largest share of energy deliveries in 2020, with 266 GWh. The next energy carriers are bioenergy, heat pumps, waste heat and hydrogen. Other energy carriers had more modest contributions in 2020.

Table 3.17

Energy result within production, distribution and conversion, distributed by energy carrier

Energy carrier	Energy result
	GWh
Electricity	266
Bioenergy	231
<i>Chips</i>	82
<i>Pellets and briquettes</i>	78
<i>Biomass</i>	53
<i>Biogas</i>	18
<i>Other bio</i>	-
Heat pump	119
Waste heat	71
Hydrogen	29
Other renewables	23
Free cooling	11
Geothermal	10
Waste	10
Solar	1
Total	771

Table 3.17: The figure shows the energy result within production, distribution and conversion distributed by energy carrier.

Reduced peak demand results

The reduced peak demand result of 179 MW is considered to be good, compared with the goal indicator of 400 MW. The total reduced peak demand result for the four-year agreement term

is 612 MW. This exceeded the result target for the period by more than 53 per cent.

Figure 3.16

Development in reduced peak demand results 2017–2020

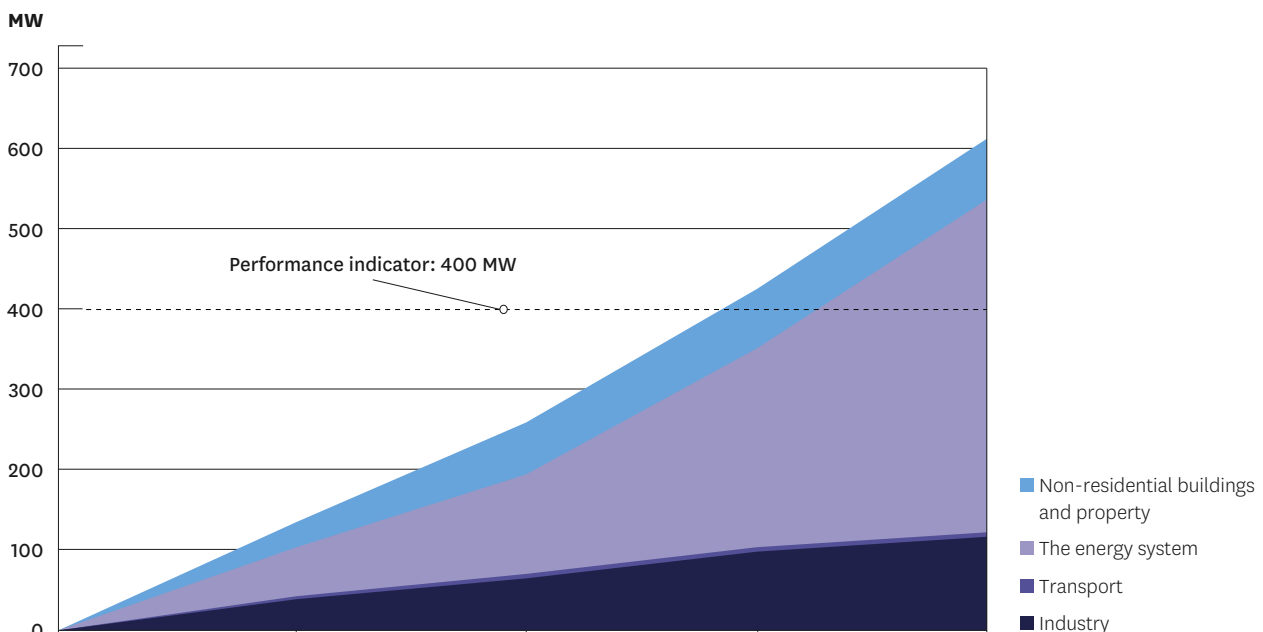


Figure 3.16: The figure shows expected reduced peak demand results (MW) in projects that received support from the Climate and Energy Fund in the 2017–2020 period. The results have been corrected for cancelled and final reported projects.

Table 3.18 shows that the energy system sector contributed the majority of reduced peak demand results in 2020, with nearly 93 per cent. A significant share of this comes from district heating projects, which help to free up electricity for heating in homes and commercial buildings. The reduced peak demand effect of district heating is particularly significant on cold winter days, so these projects are particularly successful in the context of

the energy supply-related purpose behind Enova's goals for peak demand reduction. The largest individual project in 2020, excluding the energy system, was an industry project within Full-scale innovative energy and climate technology, with the aim of achieving a process efficiency measure within the wood processing industry. This project alone contributed a reduced peak demand of 11.4 MW.

Table 3.18

Reduced peak demand results

Sector	2017	2018	2019	2020	Total
	MW	MW	MW	MW	MW
Industry	39	25	42	12	117
Transport	2	3	-	-	6
Energy system	62	63	124	166	414
Non-residential buildings and property	32	33	8	2	75
Households and consumers	-	-	-	-	-
Total	135	123	174	179	612

Table 3.18: The table shows expected reduced peak demand results (MW) for projects that received support during the 2017–2020 period, distributed by sector.

Table 3.19 shows the effects of cancellations and final reports on reduced peak demand. The development over the agreement

term shows that these adjustments only have a minor impact on reduced peak demand results.

Table 3.19

Development in reduced peak demand results 2017–2020

Sector	Original result	Result corrected for cancellations	Result corrected for final reported results
	GWh	GWh	GWh
Industry	128	125	117
Transport	11	10	6
Energy system	396	391	414
Non-residential buildings and property	86	80	75
Households and consumers	-	-	-
Total	621	606	612

Table 3.19: The table shows the development in expected climate results (MW) measured from result at the time of approval, result corrected for cancelled projects and result corrected for final reported projects.

PART III C | Reporting on the Climate and Energy Fund 2012–2016

Energy results and allocations

2012–2016

Table 3.20 shows the allocation of funds from the Climate and Energy Fund and total energy results from the period 2012–2016, updated at the end of 2020, distributed by markets and year. These projects were assigned during the previous agreement term. In the event that projects are cancelled, the energy result is corrected for the year the contract was originally signed and recorded. The contractual support amount is released and returned to the Climate and Energy Fund for investment in new projects. NOK 75 million was released in 2020 from cancelled and

final reported projects. These projects entail that the expected energy result for the 2012–2016 period has been reduced by 17 GWh since the status reporting at year-end 2019.

Enova granted just under NOK 10 billion in support for energy projects during the 2012–2016 period. The total investments that this support aims to trigger amount to about NOK 25 billion. The size of Enova's subsidy varies from market to market.

Table 3.20

The Climate and Energy Fund's energy results and allocations 2012–2016

	2012		2013		2014		2015		2016		Total	
	GWh	NOK million	GWh	NOK million	GWh	NOK million	GWh	NOK million	GWh	NOK million	GWh	NOK million
Renewable heating	222	223	342	375	321	327	155	208	164	202	1 203	1 335
Renewable power	3	5	6	13	0,5	1	3	19	7	12	19	50
Industry	554	484	392	254	1 025	2 063	570	826	2 576	587	5 118	4 213
Transport	-	-	-	-	-	-	165	248	649	791	815	1 039
Non-industrial plants and facilities	5	3	12	34	32	29	63	66	22	20	134	153
Non-residential buildings	402	438	356	538	259	333	301	401	289	412	1 608	2 123
Residential buildings	24	76	26	104	18	51	90	136	41	119	200	487
International projects	-	3	-	6	-	2	-	3	-	3	-	17
Consultation and communication	-	56	-	65	-	55	-	53	-	61	-	289
External analyses and development measures	-	32	-	27	-	31	-	23	-	36	-	149
Administration	-	98	-	110	-	129	-	148	-	151	-	635
Total	1 210	1 417	1 134	1 526	1 655	3 020	1 347	2 131	3 749	2 394	9 096	10 489
Of which:												
Ordinary energy projects	1 203	1 183	1 080	1 176	1 520	1 110	1 071	948	3 581	1 678	8 455	6 095
Projects within new technology	7	45	54	142	136	1 693	276	957	168	466	642	3 304

Table 3.20: The table shows aggregated energy results and funds allocated from the Climate and Energy Fund during the period 2012–2016, corrected for cancelled and final-reported projects as of 2020. Projects within the programmes for new energy and climate technology are distributed in the respective markets. From 2015, the Support for biogas and biofuel programme is reported under the Transport market.

Table 3.21 shows the contractual energy result for the 2012–2016 period distributed by market and year, before and after correction for cancelled, final-reported and realised results. Projects corresponding to about 14 per cent of the original contractual energy result were cancelled. The contractual energy result

(corrected for cancellations) for the markets as a whole changes marginally when corrected for final reported and realised results. We see the largest change within industry, where energy results have increased by 7 per cent upon final reporting, and once realised results are measured.

Table 3.21

Energy results 2012-2016 distributed by markets

Market	Gross contractual result	Contractual result	Contractual corrected for final reported result	Contractual corrected for final reported and realised result
	GWh	GWh	GWh	GWh
Renewable heating	1 454	1 191	1 203	1 207
Renewable power	56	20	19	19
Industry	5 231	4 773	5 118	5 096
Transport	971	819	815	815
Non-industrial plants and facilities	159	135	134	133
Non-residential buildings	2 150	1 769	1 608	1 591
Residential buildings	340	206	200	205
Total	10 361	8 913	9 096	9 065

Table 3.21: The table shows the contractual energy result (in GWh) distributed by markets, both before and after correction for cancelled, final-reported and realized projects. The “Contractual result” column shows the energy result at the end of 2020 corrected for cancellations.

Figure 3.17

Percentage of final-reported projects approved during the 2012–2016 period

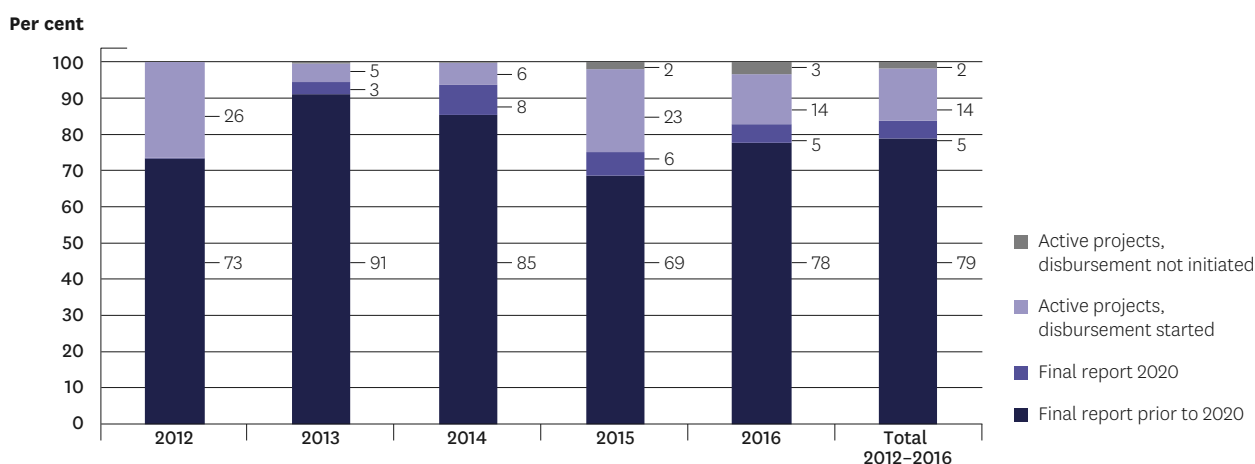


Figure 3.17: The figure shows the percentage of final-reported and active projects at the end of 2020, distributed by approval year and overall for the period. The figure also shows the percentage of active projects where disbursement has started. The percentages are calculated according to the projects’ energy results.

Figure 3.17 shows the percentage of final-reported projects for 2012–2016, measured according to the projects’ energy results. Overall, 84 per cent of the energy result from the period was final reported as of the end of 2020. The ratio of final-reported projects generally increases with age; this is shown for the 2013–2016 period. As regards the 2012 projects, close to 99 per cent of the projects have submitted final reports, but the last percentage point accounts for 26 per cent of the results.

The figure also differentiates between active projects where disbursement has started and active projects where disbursement has not started. The risk of a project being cancelled has turned out to be significantly lower when disbursement of support has started. Less than 2 per cent of the result is

associated with projects where disbursement has yet to start. This is a decline of about 1 percentage point compared with the status at the end of 2019. As of the end of 2020, none of the years have more than 4 per cent of their results associated with projects for which disbursement has not started.

Enova actively follows up the projects’ progress and completion. Systematic and good follow-up will contribute to ensuring the projects are carried out in line with the agreements signed. In those cases where projects will not be implemented for various reasons, close monitoring ensures that the funds will not be unnecessarily stuck in projects with no progress. In 2020, just under 380 GWh has been finally reported from projects that were approved in 2012–2016.

PART III D | Stories – Enova's impact

Stories – Enova's impact

The following pages will present a few stories as examples of Enova's impact:

- Market-driven development of fast chargers for electric cars
- High-temperature heat pumps have been developed and introduced on the market
- New technology returns runaway energy to production
- The Norwegian aquaculture industry has started its journey toward a fully electric future
- Ship electrification – the technology has been introduced and is experiencing further development and growth
- Strengthened competitiveness for battery-electric ground transport

Market-driven development of fast chargers for electric cars



The transition to electric vehicles will help reduce emissions in large parts of the transport sector. This represents a considerable technological shift, meaning that new value chains must be developed for necessary products and services. Critical components in this electrification include access to batteries and charging infrastructure.

Electrification of personal vehicles is well under way in Norway. At the end of 2019, 9 per cent of passenger cars registered in Norway were fully electric. In 2020, zero-emission vehicles achieved a market share in new vehicle sales of 54.3 per cent, an increase of more than 10 per cent from the previous year.

Enova's contribution toward electrifying personal vehicles has been to support a comprehensive and otherwise market-driven development of infrastructure for fast charging. So far, Enova has contributed to the establishment of first-generation

infrastructure for fast charging along national transport corridors and in municipalities with low or no coverage.

We are also in the process of contributing to the establishment of fast and rapid charging in regions where the traffic basis and percentage of electric vehicles are too low to justify development on commercial terms.

In 2020, we issued funding commitments for the development of 25 fast and rapid charging points in Finnmark and northern Troms. Overall, Enova has granted support to 568 fast and rapid charging points since 2015. The rest of the market appears to be growing and developing in a positive direction, driven by increased demand and commercial considerations. The number of fast charging points in Norway has increased from about 700 in 2015 to 5 200 in 2020.

Number of fast and rapid charging points per county

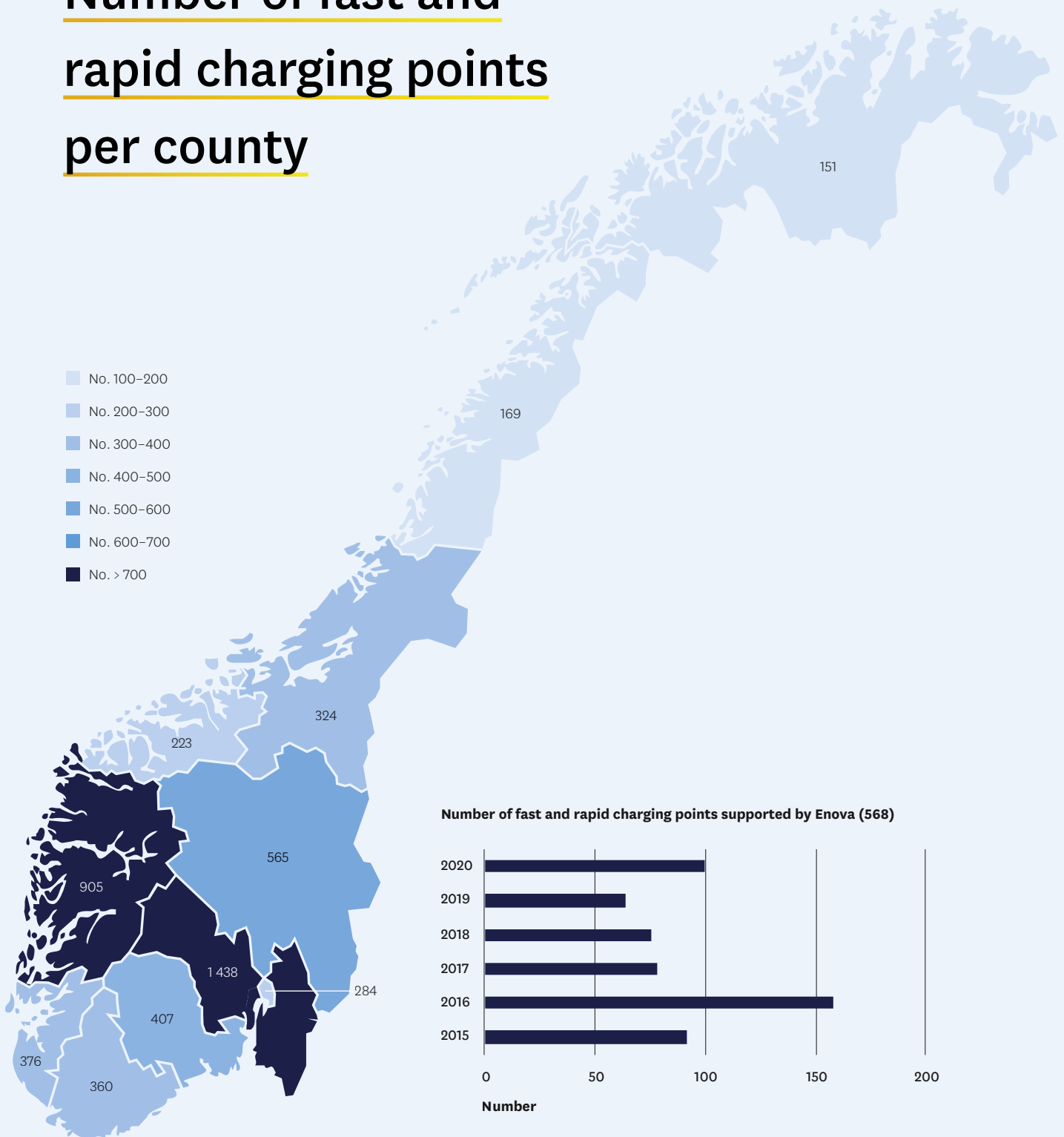


Figure 3.18: The map shows an overview of fast and rapid charging points built per county as of 31 December 2020, as well as the number of fast and rapid charging points supported by Enova during the 2015–2020 period.
Source: Nobil and Enova

High-temperature heat pumps have been developed and introduced on the market



In 2019, energy consumption in the less energy-intensive part of Norwegian mainland industry totalled around 15 TWh, corresponding to just over 18 per cent of mainland industry's overall energy consumption. Use of oil and gas for heating purposes is the primary source of greenhouse gas emissions in these enterprises.

Industries that need steam or hot water and have high demands for load regulation have traditionally used oil and gas, as well as some electricity for process heat. Over the last fifteen years, the use of oil and gas for heating purposes has remained relatively stable at around 4 TWh – approx. 30 per cent of total energy consumption in the sector. Rather than choosing other renewable alternatives, the trend has been to transition from oil to gas. In 2003, oil accounted for around 83 per cent and gas about 17 per cent of this fossil energy consumption, while gas currently accounts for just over 62 per cent. This is the landscape where high-temperature heat pumps have found their place as an emission-free alternative and an important part of the solution.

Heat pumps have long been unsuitable for this type of heat production due to the lack of suitable cooling mediums and low efficiency at high temperatures and temperature lifts, but technology development over time has resulted in heat pump systems that can handle increasingly higher temperatures and temperature lifts.

While oil, gas and electricity are characterised by relatively low investment costs and high operating costs, the situation is reversed for heat pumps. A commercial breakthrough for high-temperature heat pumps requires lower investment costs and higher efficiency.

High-temperature heat pumps have e.g. been utilised in Norwegian dairies and other food industry. Enova has supported a number of heat recovery projects in dairies at different temperature levels, and is now seeing a clear decline in costs for these projects. We expect this development to continue with increasing commercial access to technologies. At the same time, we are now also seeing increasing attention from the marine ingredients industry, which could contribute to a further increase in temperature limits. This is an industry that can help to make the technology more relevant in the more traditional process industry.

Enova considers high-temperature heat pumps to be an important solution on the road to a low-emission society, but it is still challenging to achieve profitability in projects and a sufficient volume to ensure that the technology can stand on its own in competition with familiar solutions. Solutions are currently being studied and demonstrated by multiple players, and a diversity of competing suppliers and solutions will help in bringing prices down. After supporting the development and use of heat pumps for a time, we eventually expect to see the same development in industry that we have seen within building heating, where heat pumps are now a competitive solution in multiple segments.

Figure 3.19
Fossil energy sources over time

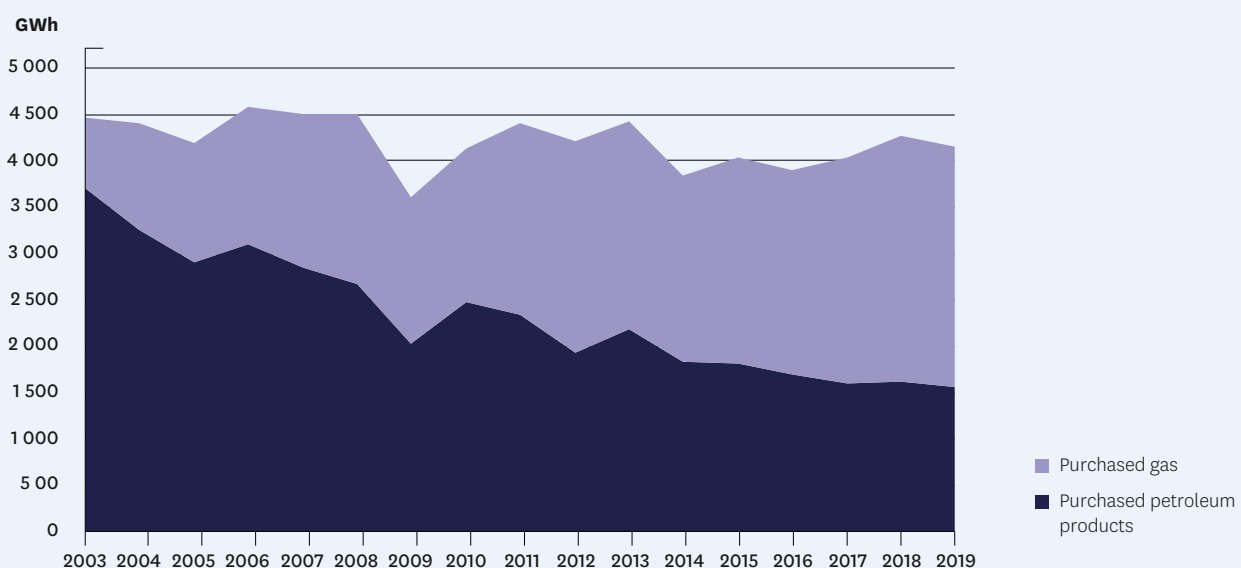


Figure 3.19: The figure shows the distribution between fossil energy sources used for heating purposes in the industry in 2003–2019 measured in GWh.
Source: Statistics Norway

New technology returns runaway energy to production



Norwegian industry and mining¹ have an annual energy consumption in excess of 80 TWh. This includes nearly 46 TWh of electricity, and the remainder mainly from various fossil energy sources² whose main applications are, in turn, directed towards heating needs at different temperature levels. Significant volumes of energy end up as waste heat – lost to the surroundings via water, steam, air or exhaust gases at higher than ambient temperatures. Multiple studies have shown that these are extremely high numbers^{3,4,5}, on the order of 20 TWh per year.

Greater utilisation of waste heat will contribute to achieving climate objectives through reduced need for fossil fuels, but also by freeing up electricity and peak demand for purposes that would otherwise be covered by fossil fuels.

Even with years and years of focus on the topic, there is a stated need both nationally and internationally for better and more cost-effective commercially available technology in order to truly grasp and exploit this resource. Heat pump and heat exchanger solutions are available at lower temperature levels, but as soon as there is a need for higher-temperature industrial heating, for upgrades to district heating, or for process heat or power generation based on low-temperature heat sources (lower than 60–70 °C) there is still a ways to go.

Enova has had its eyes on waste heat since the beginning and over the years has supported efforts ranging from heat recovery from exhaust air in chicken barns, utilising surplus heat from refrigeration and freezing units and centralised compressed air systems, to advanced process integration in the wood processing industry and power recovery in the smelting industry.

Close to 250 projects have received support and have contributed to the recovery of more than 2.2 TWh of energy. We continue to see a significant potential for further exploitation of waste heat, but where access to suitable technology presents a barrier.

The degree to which the waste heat resources can be utilised depends on factors such as the quality of the waste heat resource (temperature level, output, accessibility, etc.). It also depends on technology for conversion to useful heat or electric energy that also solves challenges posed by potential pollution (particles, dust/gasses, corrosive elements), as well as a customer base for exploitation either internally or externally (need, infrastructure).

The temperature level largely determines which technology is relevant, and thus also the potential relevant customers:

- 25–40 °C: Direct use in aquaculture and geothermal heat may be relevant, and the waste heat could be a heat source for heat pumps.
- 40–60 °C: Direct use for low-temperature district heating may be relevant, and the waste heat could be a heat source for heat pumps with good performance coefficients.
- 60–140 °C: Power recovery with an ORC system or Stirling engine may be relevant, in addition to direct use for district heating.
- >140 °C: Power recovery with installation of a steam turbine may be relevant, in addition to an ORC system/Stirling engine as well as direct use for district heating. Fuel gas is also included in this category.

The activities Enova has contributed to have helped to move both the technology and the expertise front forward. For example, the opportunity to conduct complex power recovery projects in the smelting plants with support from Enova has also contributed to develop robust Norwegian expertise. An actor such as Norsk Energi, which both Elkem and Finnjord have included in their power recovery projects, was subsequently given the assignment of participating in the work to draw up a new national standard for recovering waste heat in Chinese heavy industry in 2012.

A number of Norwegian technology suppliers have qualified their solutions, step by step, through Enova's efforts. From collecting waste heat up to relatively conventional temperature levels to now approaching ultra-high temperature solutions.

Enova sees great opportunities for projects going forward, particularly technology projects that can turn waste heat into a profitable resource. An industry such as wood processing, which is actually very renewable in terms of its primary energy consumption, has exhibited substantial abilities when it comes to developing its processes and how it utilises energy so that less and less energy is wasted. The smelting plants still have considerable high-temperature waste heat resources that can likely be exploited to generate power. Several actors within the biomarine process industry are studying opportunities for technology linked to ultra-high temperature heat pumps based on waste heat as a solution for their energy supply. And more and more attention is being paid to business models for exchanging waste heat between different actors. There are still challenges to resolve, most of the potential Enova mapped back in 2009 remains intact.

¹ Excluding e.g. the oil and gas activities, the aquaculture industry, plant nurseries, laundries and data processing centres

² <https://www.ssb.no/energi-og-industri/statistikker/indenergi/aar>

³ Enova report: Utilising waste heat from Norwegian industry – a study of potential, 2009

⁴ <https://docplayer.me/16187432-Spillvarme-i-eydebedriftene.html>

⁵ <https://www.nve.no/nytt-fra-nve/nyheter-energi/stort-potensiale-for-mer-effektiv-oppvarming-og-bruk-av-spillvarme/>

Figure 3.20

Volume of available waste heat in different sectors (GWh)

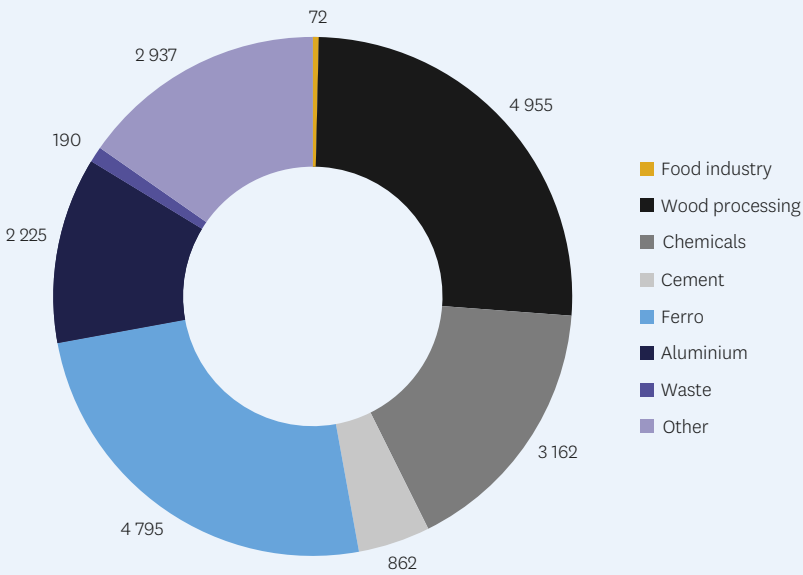


Figure 3.20: The figure shows the volume of available waste heat (measured in GWh) from Norwegian industrial enterprises distributed by industry.
Source: Enova (2009)

Figure 3.21

Volume of available waste heat at different temperature levels (GWh)

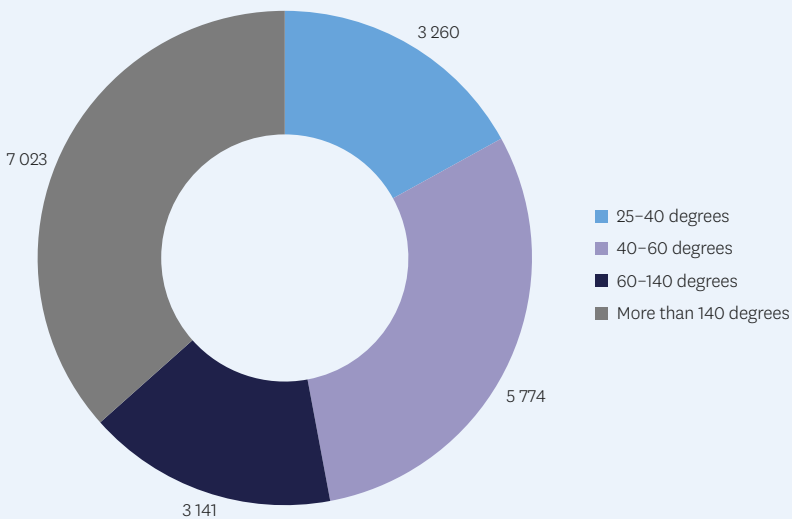


Figure 3.21: The figure shows the volume of available waste heat (measured in GWh) at different temperature levels.
Source: Enova (2009)

The Norwegian aquaculture industry has started its journey toward a fully electric future



The Norwegian aquaculture industry is a sector that has been experiencing continuous growth over a number of years, and this is expected to continue in the years to come. The seafood industry, and particularly fish farming, aspires to be one of the major players in the future Norwegian economy. Considering the growth ambitions announced leading up to 2050, the industry's overall need for power for marine and mainland activities will approach the level of the current metal industry.

In 2020, the Norwegian seafood industry had an overall export value of NOK 105.7 billion – of which fish farming accounted for NOK 74.2 billion⁶. This corresponds to 25 per cent of the export value of the collective Norwegian oil and gas production for the same year⁷ and also exceeds the total Norwegian metal exports. In a 2050 perspective, the aquaculture industry projects that production could increase from the current level of 1.45 million tonnes to 5 million tonnes.

The vast majority of current production of table fish takes place at sea – distributed across about 1 000 locations. The extension of this production also includes a considerable number of vessels that carry out work and service operations, transport, and various operations tasks. Energy supply has traditionally been solved using diesel – to operate vessels and to generate electricity in feed fleets. This diesel consumption results in considerable direct emissions of CO₂. Certain locations have also been connected to the onshore power grid from the start – to the extent this has been practical and prudent from a cost perspective.

In addition to the marine activity, there is currently extensive hatchery fish production on land, which is also in the process of being supplemented by a significant increase in table fish production on land. This production is operated using electricity from the power grid.

The most important measure to cut greenhouse gas emissions from fish farming will be the electrification of fish farming facilities and vessels. Emission reductions can be achieved by avoiding diesel consumption and converting to battery-electric operations, for example through onshore power for locations (feed fleets and net cages) and replacing diesel engines with battery-electric propulsion systems.

And once the feed fleets are electrified, they can also act as an energy hub for vessels that can charge or be connected to power at the net cages.

The aquaculture industry has taken significant steps toward electrification over the last few years alongside Enova. This has occurred through the realisation of onshore power projects and through battery-hybrid solutions both for the industry's vessels and the feed fleets. Nevertheless, challenges remain as regards the remaining localities and emissions. And the fact that increased production cannot necessarily occur under the existing structure, and must take place further out in exposed locations without access to onshore power, or on land with significantly higher pressure on the power system. For the exposed localities, this involves new technology and local energy generation solutions. As regards the land-based facilities, the challenge is in the capacity of the energy system and thus the need to develop technology and installations with a low need for both electricity and output.

In addition to energy consumption and emissions associated with the actual fish growth phase, the industry also has greenhouse gas emissions associated with feed production with associated procurement of raw materials for feed. At the same time, the industry also has considerable residual resources in the form of by-products and slurry that can be used for both energy and other purposes, which in turn could yield reduced greenhouse gas emissions.

Over the 2017–2020 period, Enova granted a total of NOK 670 million in support for projects directly associated with the industry's various activities. About NOK 300 million of this has gone to 210 projects that help electrify vessels or aquaculture localities and which aim to reduce the industry's emissions by more than 60 000 tonnes per year.

With the industry's growth ambitions and the significantly increased energy consumption this will trigger, it is important to maintain activity and the focus on development and the use of zero-emission solutions. Despite the considerable progress, Enova will continue to contribute toward the development of energy and climate-efficient solutions throughout the seafood industry, and we are seeing that low and zero-emission solutions could become the standard within more segments and parts of the industry.

⁶ Norwegian Seafood Council, 2021

⁷ Norwegian Petroleum, 2021

Figure 3.22
Support for projects in the aquaculture industry 2017–2020

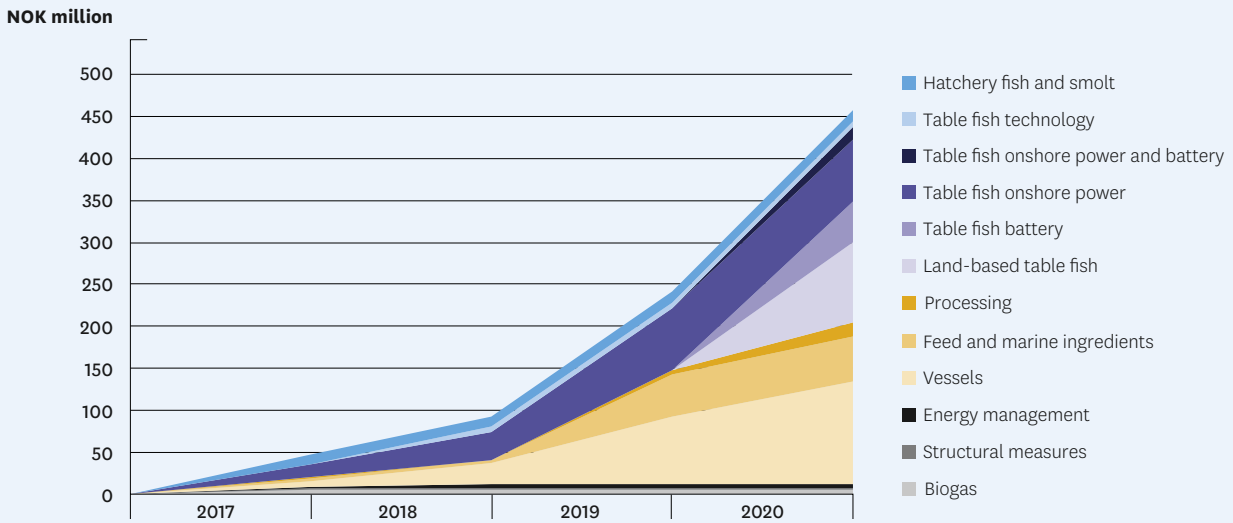


Figure 3.22: The figure shows Enova's accumulated support (NOK million) for projects in the aquaculture industry during the 2017–2020 period distributed by type of project.

Figure 3.23
Expected climate results from projects supported in the aquaculture industry 2017–2020

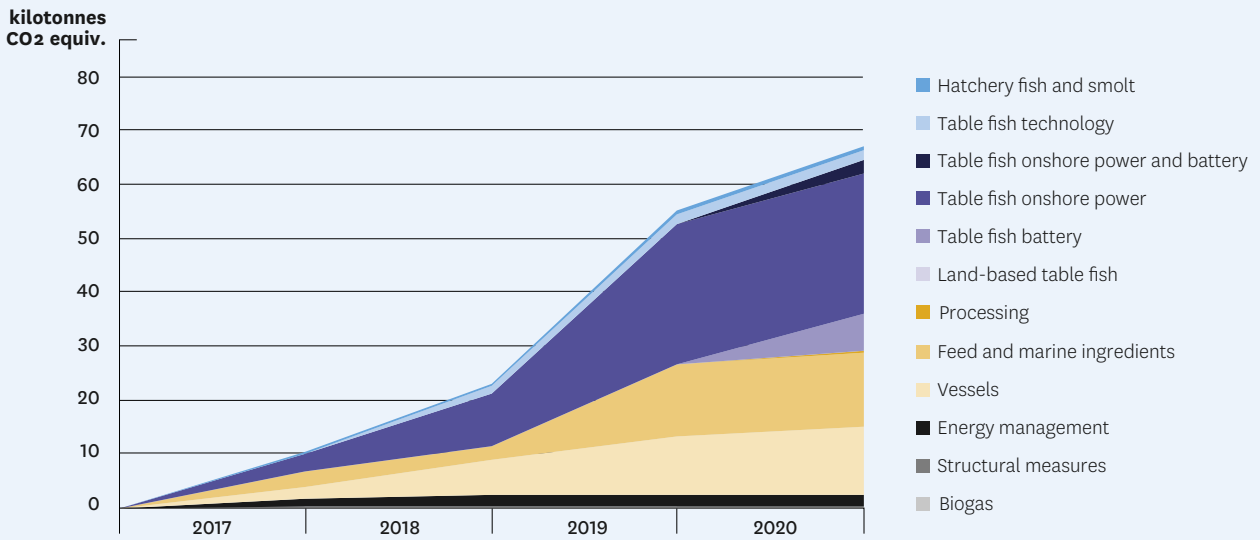
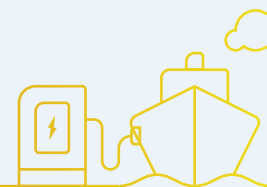


Figure 3.23: The figure shows accumulated expected reduced greenhouse gas emissions (CO₂ equiv.) from projects supported by Enova during the 2017–2020 period distributed by type of project.

Ship electrification – the technology has been introduced and is experiencing further development and growth



Norway has a large maritime industry with stakeholders throughout the value chain from technology development and ship design to shipowners and stakeholders requesting various forms of maritime freight and maritime operations. This provides a good starting point for electrifying Norwegian shipping and developing a value chain to support such a technological shift.

Support is currently needed for both technology development and market introduction. However, this development shows that parts of the market have undergone a considerable market maturation and that solutions are constantly being developed and demonstrated in new segments. Batteries for propulsion are now emerging as an option for all vessel segments. According to Maritime Battery Forum's ship registry, which is shared via DNV GL's Alternative Fuels Insight platform, by the end of 2020, there are more than 350 vessels with batteries in operation – and close to half of them are operating in Norway⁸.

So far, Enova has supported battery installation and other energy efficiency measures in about 155 vessels with more than NOK 1.4 billion, in addition to a small number of fully-electric vessels. 120 vessels have received support to install onshore power systems. At the same time, we have organised nine tender competitions between 2015 and 2020 to support 100 onshore power projects in more than 65 Norwegian ports with more than NOK 700 million.

Oil service is one of the markets that have shown an interest in electrification, primarily hybridisation where batteries are combined with existing diesel-electric propulsion systems. Profitability can vary considerably from ship to ship, and hybridisation being profitable on its own is still a ways off. Nevertheless, this is a measure that an increasing number of players are deciding to implement, driven by e.g. a desire to stay competitive and position oneself for future contracts where emission requirements could be set.

The ferry segment has made the most progress as regards electrification. Enova has contributed to the development of infrastructure enabling county authorities to demand low and zero-emission ferry services. In turn, this has led to the present development of the construction and use of ferries with a high ratio of battery-electric propulsion. Overall, Enova has awarded more than NOK 920 million in funding commitments for electrification of 43 ferry connections with 54 associated ferries. Despite electric ferry operation not emerging as profitable today, it is in the process of establishing itself as a standard in the market, and in 2022 there will be about 80 Norwegian battery-hybrid ferries. In 2020, Enova also awarded support to Rogaland County Authority to establish charging infrastructure for 2 high-speed craft connections, which will be electrified with 3 associated high-speed craft.

Interest from new segments such as fisheries, aquaculture and transport vessels shows that electrification – preferably hybridisation – is recognised as a suitable technology and a preferred solution among an increasing number of options. We have also achieved demonstration of fully-electric vessels in some segments, which shows that zero emissions is also within our grasp.

The interest and activity Enova is seeing in the market yields increased demand and latitude for additional stakeholders on the supply side. This helps establish the value chain needed to make electrification a sustainable solution both financially and commercially. Norway has a substantial supplier and shipyard industry that both manufactures and assembles the equipment needed for electrification, and several battery manufacturers have established local activities in Norway. Environmental technology is already an important source of revenue for the supplier market, and is expected to become increasingly important moving forward. Sales of emission-reducing technologies in the maritime industry in 2018 amounted to about NOK 28 billion, and both revenues and investments have multiplied in recent years⁹.

⁸ *Alternative Fuels Insight*, DNV GL accessed 14 January 2021.

⁹ *Green maritime – Status of sales, export, employment and industry*. Menon publication 66/2019.

Figure 3.24

Battery installations on ships

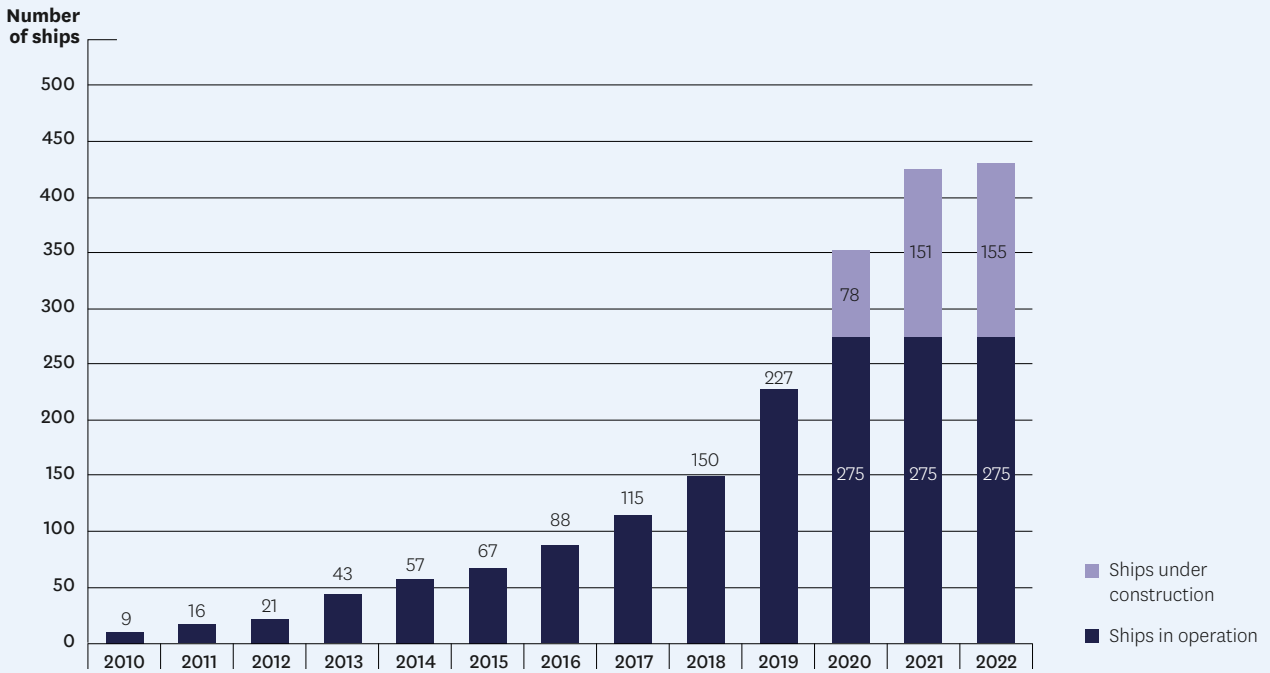


Figure 3.24: The figure shows the development in ships with battery installations distributed by ships in operation and ships under construction.
Source: DNV GL, Alternative Fuels Insight

Figure 3.25

Type of battery installation

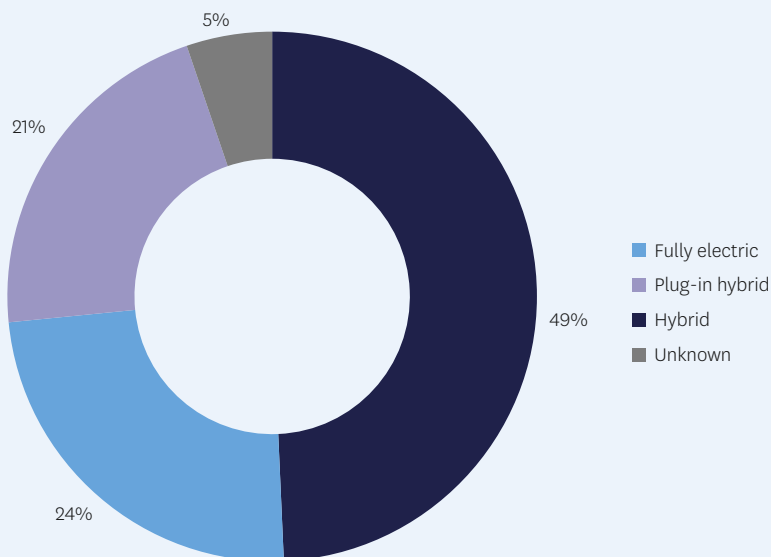


Figure 3.25: The figure shows the distribution of types of battery installations in ships.
Source: DNV GL, Alternative Fuels Insight.

Strengthened competitiveness for battery-electric ground transport



Enova's support for zero-emission vehicles and construction machinery aims to contribute toward more rapid growth in the scope of and market for commercial applications than what would be the case without support. The goal is for zero-emission solutions to be the preferred choice without support, leading to reduced emissions and a more energy and climate-efficient ground transport on the road to a low-emission society.

Enova is now seeing a significant increase in activity within zero-emission solutions for ground transport. The market for zero-emission solutions is evolving, triggered by a number of drivers. A lot has happened in a short amount of time, especially for the heavier road vehicles, despite substantial variation in volume and technological maturity across different groups of vehicles. While the market for electric city buses has experienced good development and achieved a considerable volume in mass production with a broad range of Asian and European manufacturers, by early 2020, Enova had only awarded pilot support for two electric lorries. The additional investment is still too high for a significant share of the technologies and solutions.

Road vehicles

In recent years, the market for new vans has been around 35 000 vehicles sold, but 2020 saw a decline to 30 050 vans sold.

Despite the general drop in van sales, the sale of electric vans rose from 2 030 vehicles in 2019 to 2 505 electric vans in 2020. Enova gave funding commitments for a considerable number of electric vans in 2020, a total of 16 325. It remains to be seen how many will actually use this support and how many electric vans will be delivered and registered next year, but the groundwork is laid for substantial growth.

The diversity in different vehicle models is on the rise, and according to the JATO car database, there were 13 car brands offering 110 different electric van models on the Norwegian market in early 2021. The cars' technical specifications and ride quality have also evolved.

Until recently, the market for electric lorries was in late-phase technology development. The first projects with support from Enova yielded important operational experience and several early adopters have gone on to procure electric vehicles for their fleets. The step up from electrifying light to heavier vehicles has been dependent on deliveries from international manufacturers, experience and competence-building as regards service and maintenance, as well as good logistics and infrastructure solutions for vehicle operations. 2020 marked the transition to small mass production of battery-electric heavier vehicles, with multiple suppliers on the market and relevant

areas of application. We are also currently in an early-phase market introduction for electric lorries and the major international vehicle manufacturers have reported delivery of large lots of mass-produced electric lorries to the European market in 2021. This will result in a gradual increase in market volume, which expands the supply side in the market and provides a basis for further development and better competitiveness.

In 2020, Enova gave funding commitments to support 34 electric lorries. The market appears to benefit from Norway's early electrification of its private car segment, and electric vans are considered to be well on the way toward becoming a competitive alternative, while the heavier vehicle segments are lagging somewhat behind. Further developments in the market will depend on the delivery capacity of international manufacturers and suppliers and a decline in excess cost compared with the fossil alternative.

The first electric coaches have been introduced on the Norwegian market

Over the last two years, Enova supported 59 electric coaches, compared with the registration of approx. 185 new coaches overall in 2020. Experiences so far from the first operational coaches are positive, both among drivers and passengers. With overnight charging, the coaches have a sufficient range of 350–400 km per charge and operating expenses are significantly lower than for fossil coaches. The companies are thereby positioning themselves to comply with requirements for zero and low-emission solutions from public and private procurers. In 2020, Enova also provided support to electrify Class 3 coaches, so-called low-floor buses that set high requirements for technical specifications and standards. These projects require close follow-up, testing and cooperation with factories and importers based in the Asian market. No European manufacturers have delivered buses to Norway in this segment so far, but they are also expected to enter the market eventually with additional models outside the city bus segment.

Projects with support from Enova allow for a significant extent of verification during operation of electric coaches under Norwegian conditions. Some of the coaches are also intended for operations in Arctic conditions. Verification and operating experience are important in order to reduce risk and to transition from late-phase technology development to early market introduction. The projects will therefore be decisive, both for competence-building and a broader willingness to invest in a fragmented industry with few major and many minor stakeholders.

Construction machinery

The market for electrification of heavier construction machinery is still in a phase where substantial technology development is necessary. The number of electric excavators and wheel loaders with support from Enova has increased from 12 in 2019 to 67 in 2020. Lighter electric excavators and wheel loaders are currently available in mass-produced versions, but the transition from refurbishment to delivering mass production for the heavier segments has so far not been announced by international manufacturers and the suppliers.

Further technology development and plans for mass production for the heavier construction machinery will be a precondition for

increased market introduction. Greater market introduction of electric construction machinery will also be dependent on good system solutions. Charging and operation of electric construction machinery depends on a functioning energy infrastructure at the construction site. Individual components are currently available to electrify the construction sector, but there are few examples of satisfactory system solutions, services or available package solutions for electrification. In this area, the road to a well-functioning market will depend on further development and innovation within system integration, technology, work processes and business models, which Enova will support in addition to further market introduction as technologies mature.

Figure 3.26

Heavy electric vehicles and construction machinery with support from Enova

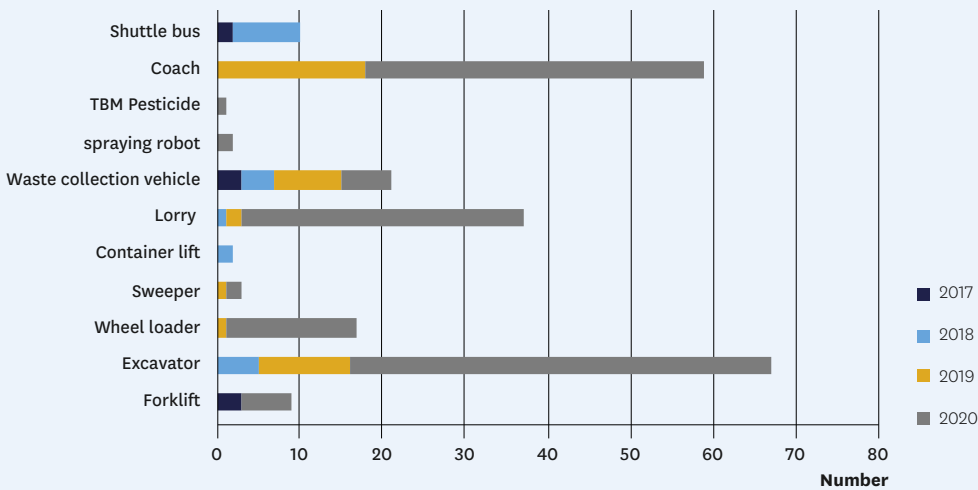


Figure 3.26: The figure shows the number of vehicles and construction machinery supported by Enova during the 2017–2020 period. In the same period, Enova gave funding commitments to support the procurement of 18 028 electric vans.

Figure 3.27

Electrification of ground transport in Norway

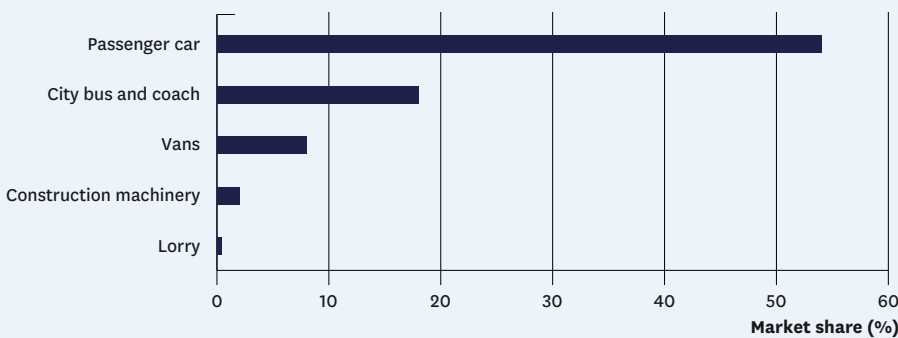


Figure 3.27: The figure shows the market share of new registrations in Norway in 2020. As regards lorries, buses, vans and passenger cars, the share is measured based on the total registered vehicles in 2020. As regards construction machinery, the share is based on the number of supported vehicles.



PART IV

MANAGEMENT AND CONTROL IN THE ORGANISATION

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- 64 Enova's policy instruments
- 65 Key elements in case processing



Management and control in the organisation

Enova manages the Norwegian state's resources on behalf of our society. Enova's tasks must be performed in an orderly and professional manner, and the management of the Climate and Energy Fund must take place in accordance with objective and transparent criteria.

State aid

In the majority of instances, Enova's policy instruments will fall under the EEA Agreement's definition of state aid. This means that Enova must have a legal basis in state aid law for its programmes in order to be lawful. By definition, state aid distorts competition and is therefore in violation of the EEA Agreement. The basic principle is that state aid can nevertheless be used as a policy instrument if the good cause of the support outweighs the negative effect on competition. In order to achieve a shared objective for effective energy consumption, reduced greenhouse gas emissions and security of supply, one may provide incentives to the market which lead to climate-friendly technology being chosen in lieu of less environmentally friendly alternatives. The assumption that state aid must be lawful and appropriate, is that the support is decisive for the environmentally friendly investment being carried out. In other words, the support must only be awarded to projects that otherwise would not be carried out. The support must also be linked to the added costs associated with the environmentally friendly choice as opposed to what the investor would otherwise choose.

All our programmes are described in more detail at enova.no/esa.

Management of goals

Enova follows a goal management model designed to help Enova achieve its strategic goals. The model is used in addition to traditional accounting and financial management. The model lists goals and key figures concerning results and processes within four perspectives: results/economy, customer/market, internal processes/case processing and organisation/working

environment. Goal achievement and results are systematically followed up by evaluating results in all units in relation to the goals every quarter. This process promotes learning and continuous improvement in the organisation.

Enova evaluates the policy instruments. The support programmes can be evaluated at different stages, and preferably in an early phase and later in the programme's lifetime. The results from these evaluations allow for adjustments, thereby increasing the probability of achieving the desired market change.

Operationalising the assignment

No-one can accurately describe the low-emission society in detail or guarantee which solutions are worth focusing on today. In order for the assignment to succeed, lasting changes must occur in the market. The changes Enova promotes must be relevant on the road toward a low-emission society. We have defined a set of market change goals in the effort to achieve this change. The market change goals are the point of departure for developing policy instruments and our efforts in the markets. We prioritise between market change goals by balancing the consideration for performance achievement in time, performance achievement within the various secondary goals in the management agreement with the MCE, weighting between late-phase technology development and early market development, as well as Enova's appetite for risk and our financial framework conditions. Systematic follow-up of market developments gives us a good starting point for evaluating and further developing our policy instruments. This involves both continuous assessment of which policy instruments will be best suited to contribute to market change, whether our existing policy instruments should be adjusted or changed, whether new policy instruments should be developed, evaluation and development of market work, as well as a need for organisation development. A new strategy with new paramount goals will be established as a result of the new agreement with the MCE from 2021.

Risk and internal control

Risk

Enova has established a policy for risk management and internal control that provides general guidelines for the company. This

policy aims to help Enova reach the goals set, as well as provide sufficient confidence that risk is kept within the framework the Board believes is prudent. The strategy will further ensure that

the activities establish and maintain effective risk management processes tailored to the company's nature, size and complexity. In addition to defining an overarching framework and guidelines, as well as delegating responsibility and authority for risk management, the policy aims to ensure that Enova complies with statutes, regulations and other external requirements and expectations for sound risk management and internal control.

Risk management and internal control is an integrated part of Enova's governance, where the focus on continuous improvement is key in all parts of the process. Among other things, this means that risk management is connected with management by objectives and that risk will be an integrated part of ongoing reporting in the enterprise. Among other things, as a minimum, risk identification is carried out annually at the enterprise and department level, and the risk assessment shall take a point of departure in the company's goals. The process must be forward-looking and must be extensive enough to cover all significant risks the enterprise is facing. The overall risk assessment is submitted to the MCE in accordance with requirements in the allocation letter.

Appetite for risk

In order to describe Enova's boldness in the effort to reach stipulated goals, an appetite for risk has been established to lay out the guidelines for our follow-up efforts and measures to identify risk. Appetite for risk describes the risk the company is willing to accept, and which yields an acceptable balance between risk and expected goal attainment. The Enova Board stipulates the appetite for risk annually.

Important risk factors

Society and Enova are continually changing. The risk of sensitive business information about projects we support going astray is a definite potential risk. Increased focus on technology development and innovation in parallel with an increasing digital threat scenario around the world, sets increasingly stringent standards for secure handling of information. The market must be able to trust Enova to handle business-critical information in a prudent manner, and measures and activities have also been implemented in 2020 to maintain and improve the safety level.

Enova's goal attainment is affected by a number of external risk factors. In order to realise the necessary changes toward a low-emission society, the market must have both the willingness and ability to invest. If technology development is not taking place at our expected tempo, this could affect the number of projects that can be supported. We have a close dialogue with key players in the various sectors, and closely follow technology development and key framework conditions to detect any needs to adjust our policy instruments. By re-prioritising funds, we can adapt to any unexpected incidents in the market, for example reduced willingness and ability to invest, and the consequences this may have for Enova's goal attainment.

The current agreement, strategy and policy instruments establish certain different requirements for Enova employees. This is taken into consideration in our organisation, thus ensuring that we can always utilise our employees' expertise and capacity. A number of efficiency and improvement measures have also been carried out to free up resources. Enova has good experience with utilising the flexibility in our organisation, and encourages internal mobility. Multiple hiring processes in 2020 also allowed us to add new and relevant expertise to Enova.

Enova administers substantial public resources, and we depend on trust to carry out our mission. Enova's management works in a goal-oriented manner to ensure that our ethical guidelines, alongside our values, work as guiding principles to stimulate ethical actions. This is a key element in organisational and management development. All new hires complete a training programme in Enova's ethical guidelines during their introduction period.

The Covid-19 pandemic has also impacted Enova, as well as our organisation, activities and priorities in 2020. We acted early to establish a continuity plan where the primary objective was to describe how Enova can maintain the most important parts of its operations and activities, for example in the event that critical key expertise is absent, or in the event of high absenteeism during the ongoing pandemic.

Enova has followed guidelines and advice from the authorities throughout the pandemic in 2020. This has typically been advice associated with infection control in the workplace, advice on the use of home offices and flexible work hours.

Internal controls

The established control environment and division of labour in Enova provide a good foundation for sound, effective internal control in the enterprise. Different internal control functions have been established with specialised areas of responsibility for following up the project portfolio, awards via the Climate and Energy Fund and operation of the company. Among other things, controls are built into systems and routines for project portfolio management and operations, and the effort to further develop and expand the use of this in portfolio management has remained a major priority in 2020.

In order to ensure that application processing is carried out in accordance with internal and external requirements, Enova has established an administrative process aiming to ensure quality and independence in the process. The decision-making structure in the administrative process is set up with a point of departure in a risk-based approach and must be tailored to case complexity. In addition to establishing a decision committee independent of the line organisation and which makes decisions regarding financial transactions in the Climate and Energy Fund, it also makes financial decisions for the CEO and the Board in accordance with established authorisations.

Enova regularly carries out external quality assurances of basic figures and reporting of results in relation to the goals.

Agreed-upon verification assignments are carried out by an external auditor when necessary for objective and independent assessment of the company. The subjects of these verifications are based on systematic risk assessment throughout year. The results are included in our work on continuous development and efficiency improvement. Agreed audit actions were undertaken in 2020 under the topic of internal control in administrative processes for selected volume programmes. Conscious and systematic efforts are under way to further develop established

frameworks and compliance therewith to ensure continuous development and improvement.

In 2020, Enova received a clean auditor's report for both management of the Climate and Energy Fund and for Enova SF. No significant nonconformities were identified in connection with the internal control in 2020. Based on the results from external controls over time and follow-up from Enova's own internal controls, Enova is considered to have an expedient internal control process for ensuring responsible and efficient management and operations. Continuous efforts are also under way to improve internal controls in Enova.

System support and tools

Enova wants to have system support and tools that safeguard both customers, principals and its own organisation. This sets high requirements for our digital solutions.

In 2020, Enova focused on system support by establishing the first parts of a new digital commerce platform. By increasing the value of existing data and ensuring that new policy instruments are established according to the desired principles and methods, we facilitate Enova's effort to be increasingly data-driven.

The new platform will provide us with new opportunities in our commercial and policy instrument development while simultaneously facilitating agile and efficient collaboration with the market and principal. Enova works continuously and systematically to further develop and improve administrative and support systems.

We focus on reducing paper-based processes, streamlining work processes and utilising shared national IT components where possible.

Enova's policy instruments

Enova's objective has a long-term perspective. As we move closer to a low-emission society, a number of markets will have to change, new ones will be created and others will most likely disappear. We will work to realise market changes where the impact of our expertise and instruments is greatest. When new policy instruments are developed, they are therefore based on an assessment of goals, potentials, drivers and barriers in the different markets.

Enova's foremost policy instrument is financing. By providing investment support, and loans in some cases, we reduce the costs and risk for both the energy and climate solutions and those who demand them. And by highlighting what is possible while simultaneously spreading experience, we reduce the risk and make it easier for the next group to make good energy and climate choices.

The development of new energy and climate technologies is necessary in the transition to a low-emission society, but this demands more than the actual process of development. New solutions will not take us into the future if they are not used.

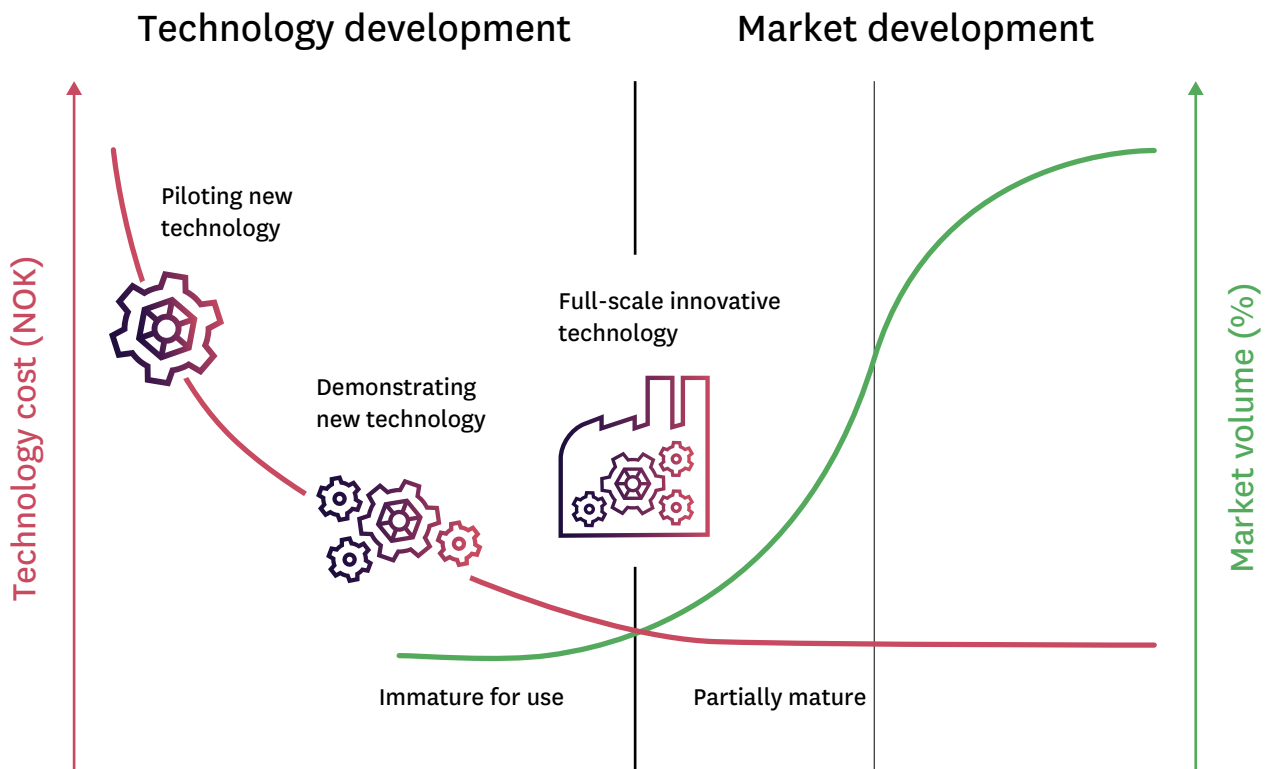
Many of the technologies we will use moving forward are already well-known today, but are not used widely enough. We therefore need goal-oriented measures that satisfy the needs of players at their stage of development, whether this involves the first testing or the last obstacle before the technology is taken up on the market and establishes itself as a standard.

Enova's activity will be aimed at late-phase technology development and early-phase market development. Enova therefore has a broad range of support programmes. We primarily work along two main lines: Technology development and reduced technology cost/increased performance on the one hand, and market development and volume on the other, as illustrated in Figure 4.1.

The technology programmes will contribute to reducing the technological risk and cost of new innovative energy and climate technology, so that more energy and climate technologies are assisted from the development stage and out into the commercial market. The market development programmes will help known technologies that are not yet sufficiently widely used to test the market and contribute to development.

Figure 4.1

Technology development and market development



The time it takes to create lasting changes can vary significantly from sector to sector, and between segments and technologies within a sector. The way in which different markets develop depends both on the players themselves and a number of framework conditions that influence them. In order for the market to choose to focus on sustainable solutions, it must see a long-term potential for value creation in replacing the fossil alternatives with zero-emission solutions. The transition to a low-emission society depends on good interaction between the market, Enova and other public policy agencies. Enova's role is to break down barriers and influence drivers so that the new solutions are demanded and used in the market on a large scale. This means that we can take part in the development process up

to when the market has sufficient momentum to continue driving the development alone or together with regulatory and economic instruments, such as taxes and fees.

Information and advice are Enova's other important policy instruments. Familiarity with and expertise in the different markets allow Enova to provide advisory services and information to players. In small projects, we provide advice through Ask Enova, and through advice and guidance online. In large projects, we work closely with players over time, allowing the projects to benefit from the expertise and experience of Enova employees, which they have gained by managing a portfolio comprising several thousand projects.

Key elements in case processing

Enova evaluates submitted applications related to the offered programmes and follows up projects that have been approved for investment support or a loan.

In the following we will describe a few key methods/elements in case processing associated with applications and project follow up.

Evaluation of immature technologies and innovation



The *Technology Readiness Level (TRL)*¹⁰ and *Commercial Readiness Index (CRI)*¹¹ are vital in the effort to assess the degree of maturity for technologies in innovation projects.

Technology Readiness Level (TRL) is a widely used method for analysing technology maturity. Maturity is assessed on a scale from 1 to 9, where the levels reflect the various development stages that a technology must complete on the road from basic research, via lab testing and demonstration, until the technology is introduced in the market. Although various technologies

could be verified and ready for commercialisation, they could have a different point of departure for competing on commercial market terms, depending on cost and market maturity. This can be highlighted by supplementing the TRL rating with a so-called *Commercial Readiness Index (CRI)*. CRI provides a broader assessment, which includes technology maturity, robustness in cost assessments and financial terms, as well as the market maturity with regard to the player and competitive situation on the supply and demand side. The connection between TRL and CRI is shown in Figure 4.2.

Figure 4.2
Technology maturity

		CRI	
		6	Market-based and "bankable"
		5	Market competition, significant dispersion
		4	Diverse commercial applications
		3	Commercial scale-up
Commercial technology	TRL 9	2	Commercial testing
Market introduction	8		
Demo and pilot	7		
Experimental development	6	1	Hypothetical commercial proposal
	5		
Research and development	4		
	3		
	2		
	1		

Figure 4.2: *Technology maturity.*

Source: NASA, ARENA

Technology development projects are unique, and Enova therefore conducts project-specific assessments of factors such as level of innovation, technological risk and proliferation

potential. Third party reviews are used in the assessments if necessary. Figure 4.3 shows elements emphasised in the assessments.

¹⁰ Developed by NASA – National Aeronautics and Space Administration in the US.

¹¹ Developed by Arena – Australian Renewable Energy Agency.

Figure 4.3
Assessment elements in potential and risk

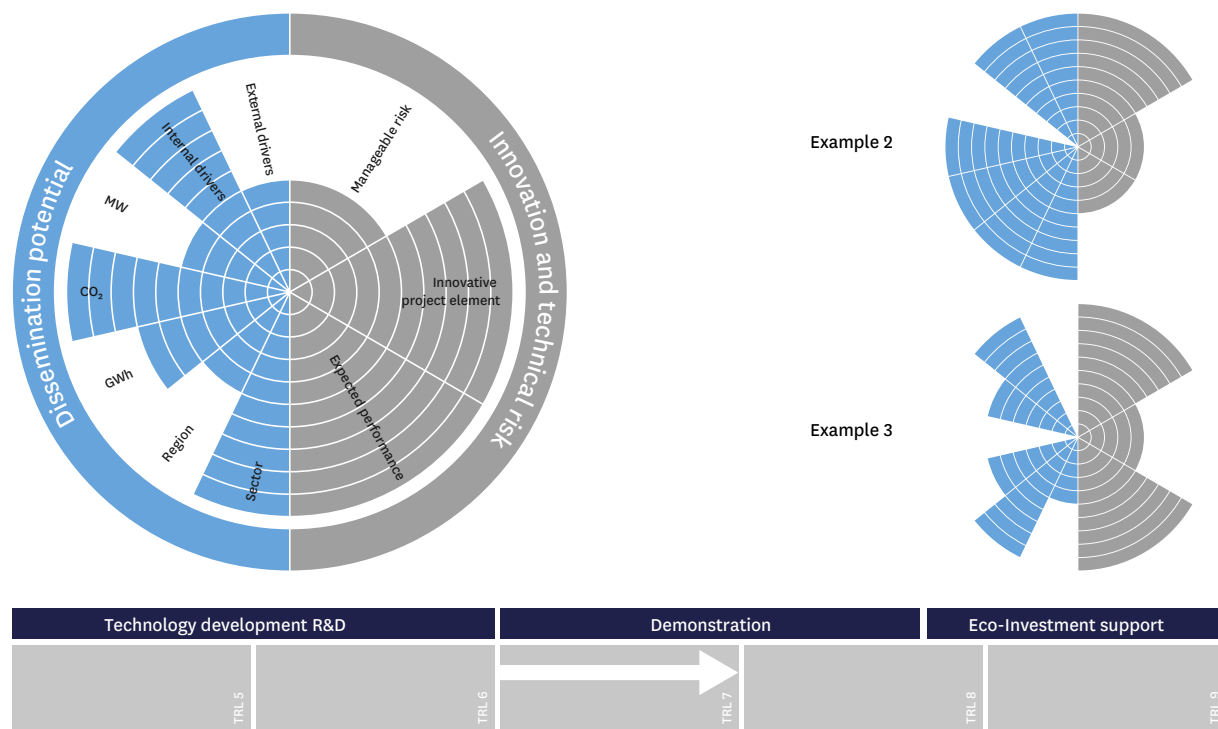


Figure 4.3: The figure shows examples of elements emphasised in the assessments.
Source: Enova

Measuring quantitative results and documentation



In the application for support from Enova, the applicant must describe the result it expects to achieve if the project is implemented. The results can either be **climate results** (in the form of reduced greenhouse gas emissions), **energy results** (in the form of conserved energy or transition to renewable energy) or **reduced peak demand results** (in the form of reduced peak loads in the power grid).

Climate results and energy results are often closely correlated, while this is less the case for reduced peak demand results. The climate result takes a basis in standardized emission factors for the different energy carriers in the project. The results are reported in CO₂ equivalents, which indicate the combined effect of all types of greenhouse gases. Enova deduces and reports such results, in addition to the result that is agreed with the applicant. Technology development projects might have a major potential for energy and climate results, but they are Enova primarily measures **innovation results**, in the form of triggered private capital.

Enova quality-assures the result that the applicant has described as part of the case processing procedure. If established standards exist, they are used. For example, we use a standardised method for calculating energy consumption in buildings as a basis for estimated energy results for programmes within buildings. In other cases, Enova uses empirical data from our extensive project portfolio. In some cases, particularly in connection with large projects, we use a third-party assessment to verify the expected energy result.

The support recipient must report energy results at three stages; upon entering into the contract, upon final reporting to Enova and generally 3 years after the final report is submitted. Upon Enova's request, the subsidy recipient shall cooperate with Enova on performance monitoring and evaluation of the project for a period of up to ten years after the final report is submitted.

Contractual result

Upon entering into a contract, the support recipient pledges that the project will achieve a future result, for example an energy result. This pledge is quantified in the funding commitment letter.

The contractual energy result is an estimate of the expected annual energy result after the project is completed. Completing a project can take several years. Enova records

the results from the project in the year the support is granted, which provides quicker reporting and enables closer follow-up from Enova. The results are then updated as the projects are completed. If the project follows the progress plan, support is disbursed in arrears in accordance with incurred costs. Material deviations from the agreement could result in Enova demanding repayment of all or parts of the support amount.

Final reported result

When the project is completed, the project owner must submit a final report. The final report summarizes the project and contains an up-to-date prognosis of expected realised annual climate, energy or reduced peak demand result. Documentation requirements are contingent on the size of the subsidy. If the subsidy exceeds NOK 1 million, the final

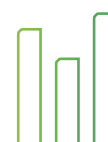
progress and accounting report must also be confirmed by an auditor. Enova assesses whether the final reported energy result is reasonable, and whether documentation is sufficient. The final support amount is disbursed when the final report is approved.

Realised result

Final reported projects must be periodically followed up with measurements and verification of results once the final report is submitted. For a selection of the largest projects, Enova uses third-party assessment to quality-assure the

reported result. While the contractual and final reported energy results are based on expectations, the realised results are also based on observations.

Enova's assessments prior to awarding support



Multiple assessments must be done before Enova awards support, but there are a few principles that are more important than others.

First of all, the project seeking support must fulfil the criteria stipulated in the programme under which support is sought, and the project must be compatible with the programme's objective.

The decisive factor is that Enova's support is a precondition for the project being carried out. The wording used is that support must have a triggering effect. In other words, the support must contribute to the support recipient choosing a more climate and/or energy-friendly project than what would have been the case without support.

This means that Enova cannot support measures that would have been carried out regardless because the applicant had already decided to implement the measure without support. Enova also cannot support measures the applicant is obliged to implement as a result of regulatory requirements.

In addition to the fact that the support must have a triggering effect, the support must be limited to what is necessary to realise the project. The subsidy Enova can provide is limited to a certain share of the added costs associated with choosing a climate and energy-friendly measure rather than a conventional alternative. What constitutes maximum support is governed by the EEA Agreement's rules regarding state aid.

In most instances, Enova also subjects the project to a profitability analysis to ensure that we do not disburse more than what is necessary for the project to achieve a positive present value.

Profitability assessment

The method Enova uses to calculate profitability is a standard net present value assessment, where the project-specific risk is reflected in the cash flows while the required rate of return must reflect the applicant's business risk. This approach forms the basis for most support stipulations Enova undertakes, but the application will vary somewhat depending on the market and project size.

Reasonable returns

In order to ensure the support is sufficient for the projects to be completed, the project owner must consider the gains of the project to be higher than the costs. Given the company's required rate of return, the objective of the support is to contribute toward the project achieving a net present value of zero, thus allowing the company to achieve its required rate of return. The required rate of return thus affects the level of funding needed to trigger projects.

In the assessment of what is a reasonable required rate of return, Enova applies the required rate of return used by the enterprise in other corresponding projects or the requirement that can otherwise be documented as necessary to trigger the

investment. If this information is not available, the required rate of return that is considered normal for the sector in question is used.

In order to determine various sectors' normal rate of return, Enova takes a point of departure in a third-party assessment. Because different sectors have different degrees of associated risk, the reasonable rate of return could vary.

Information asymmetry

When assessing necessary and sufficient support, Enova and the project owner will always have different information. This applies to technical and financial details in the project, as well as knowledge about the market in which the project takes place. Enova seeks to reduce the information asymmetry in the administrative process by obtaining information from the project, but also by sharing knowledge Enova has acquired by working with the project. External third-party assessments are also used if necessary.

Template versus project-specific assessment

Obtaining and assessing details and comprehensive information about technical and financial factors related to individual projects is very costly for both the project owner and Enova. In some markets, the potential volume of measures is significant, but each measure is relatively small. For certain project types, it is more expedient to have programmes that are based on template assessments based on standardised values for a set of measures. In turn, this makes it easier to supply the market, reduces costs associated with documentation and automates case processing to a significant extent.

Major projects

For the largest projects, Enova carries out very thorough analyses of the project economy. This includes sensitivity analyses, assessment of market position and potential strategic assets in the projects. Third party assessments of critical factors for the project economy are also obtained for major projects. This may include perspectives regarding future price development for intermediate goods and products, and a reasonability assessment of the energy result.





PART V

ASSESSMENT OF FUTURE PROSPECTS

72 New agreement provides new opportunities



New agreement means new opportunities

In December 2020, the Ministry of Climate and Environment and Enova signed a new management agreement for the period from 2021 to 2024. The new management agreement amounts to streamlining Enova's purpose as a climate measure, in a balance between short-term emission reductions and technology development that will enable us to cut emissions in a long-term perspective. The new agreement describes Enova's objective as contributing to achieve Norway's climate commitments and contributing to the transition to a low emission society. The agreement makes it clear that Enova shall be an instrument both to promote late-phase technology development and early-phase market introduction. By supporting technology projects approaching commercialisation, Enova will help to step up the pace and the scope of pilots, demo projects and full-scale testing so that new technologies and solutions are developed faster and in a larger scale. At the same time, we contribute to ensuring that green solutions launched in the market are put to use at an early stage and in a sufficient volume, so that over time, they will become the preferred solutions even without support. The four-year management agreement contains expectations for Enova's activity in both the short and longer terms. Through the use of secondary goals, the new objective is framed as contributing both to reduced greenhouse gas emissions that are not subject to emission quotas going towards 2030, and technology development and innovation that can contribute to emission reductions on the road to the low-emission society in 2050. As is stated in the Norwegian Climate Plan¹², presented by the Government in January 2021, it is difficult to predict how rapidly technological development can proceed in various sectors. In light of this, the flexibility that Enova has within the framework of the agreement will be extremely important in the years to come, as this gives Enova the opportunity to prioritise the markets and technologies where the funds will be most beneficial in driving the development.

Necessary changes on the road to the low-emission society

The world does not spew out greenhouse gases for the fun of it. Emissions are the result of activity that we humans rely on, such as manufacture and consumption of goods and transport of both people and goods. No one knows every detail of what a modern, low-emission society will look like, but the basic premise is that the road to that destination is a transition from fossil to renewable solutions. If the world is going to avoid the worst consequences of climate change, emissions of greenhouse gases must be reduced towards, or even below, zero. This is not an impossibility, but it does presume a change the likes of which the world has never witnessed. Such a transition consists of changes large and small;

many of which can be accomplished rapidly, while other changes will require a long-term commitment. Norway also needs to do its fair share, and has committed to cut its greenhouse gas emissions by 50–55 per cent by 2030 as compared with 1990, and by 80 to 95 per cent by 2050. Norway must accomplish this in parallel with creating new values, because the low emission society must be more than just a society with low emissions. If we simultaneously intend to safeguard the current welfare society, we will have to find other ways to meet large parts of our energy needs. That means that the products and services the markets deliver must have substantially lower climate footprints in the future. To achieve this goal, we, the public policy system and the actors in the market, must cooperate and work together as one team.

Enova – working with the market

Enova has been given a key role to play in driving the necessary changes that will take Norway in the direction of the low-emission society. This all derives from a market perspective and requires a commitment across the entire spectrum of Norwegian business and industry. If we want the market to choose a course towards sustainable solutions, the actors must see a long-term value creation potential in replacing the fossil alternatives with renewable solutions. Here Enova will contribute to developing and implementing new climate solutions which, in time, will become the preferred options in the market. Enova will drive change in every way, and can contribute in all sectors. Because we are open to all types of technological innovation, our priorities are not limited to specific technology development paths or areas. In this way, Enova ensures flexibility to contribute to realising the major and important projects when they come along. Enova maintains a good dialogue with key actors in the markets in its efforts to realise its objectives. It also cooperates with other types of policy instrument actors such as the Research Council and Innovation Norway. However, Norway and the world in general are still dealing with the effects of the corona pandemic, and this also has an impact on the markets. The long-term consequences this will have for the transition in business and industry remains uncertain. In the shorter term, we must expect delays in development due to the fact that projects and initiatives may be put on hold. At the same time, we also see examples where the temporary reduction in activity provides more space for innovative thinking, and lifts up and initiates projects that have been left waiting on the drawing board. Moreover, the long-term goals of becoming a low-emission society stand firm. Indeed, both the EU and Norway have increased their ambitions through more ambitious climate objectives over the past year. In other words, the long-term direction is unchanged, and this is also the basis for Enova's continued work.

¹² Climate plan for 2021–2030. <https://www.regjeringen.no/no/aktuelt/heilskapeg-plan-for-a-na-klimamalet/id2827600/>

In 2021, Enova will update its strategy and priorities so as to utilise the opportunities provided in the new management agreement for transition and change towards the low-emission society.

In the following, we will point to some key tasks that will have to be solved in those sectors which have traditionally been important in Enova's work.

Industry

Given current production processes, there are chemical limits when it comes to how low emissions can get. Entirely new production processes are needed if the industry is to become nearly climate-neutral by 2050. The majority of necessary emission cuts can be solved through mature technology, and primarily presume that these technologies will become profitable investments. However, about 40 per cent of the necessary emission cuts depend on developing new solutions that are not yet on today's market, and to some extent, we do not even know that these solutions will look like. Plain and simple – it will not be enough merely to streamline current production processes. Moreover, the innovation processes that will lead to competitive solutions in the market will take a long time. Therefore, if we are to achieve our goals by 2050, it is critical that the necessary innovation paths for the zero emission technologies start right now. The industry must also reduce other greenhouse gas emissions. Important steps towards achieving this include reducing the use of fossil energy carriers to generate heat, and further developing and utilising this technology to exploit waste heat from industrial processes. A number of factors can impact this development. Economic trends and commodity prices affect the industry's willingness and ability to invest. Moreover, national and international framework conditions, such as customs tariffs, import regulations and tariff scales could affect which countries international actors choose to invest in, both as regards technology development and production.

Transport

The transport sector must adapt in the direction of the low-emission society through development and cost reductions throughout the value chain for battery-hybrid and battery-electric solutions. At the same time, there will be a need for more types of technologies and energy carriers such as electricity, hydrogen and biogas. Norway is a major maritime nation in which the entire maritime value chain is represented, including shipping companies, shipyards and equipment suppliers. We have a unique position here from which we can influence global technology development and, over time, change the market for zero-emissions vessels. This is a golden opportunity to create substantial values for Norway by offering the solutions the world needs. Norway has become an International showcase for the transition to emission-free passenger transport, and we must continue to develop this experience. We can take on a similar role within heavier transport, both as regards passengers and goods. Norway has a challenging topography and climate, and showing how zero-emission solutions can also function in the cold north can help influence foreign markets to adopt these solutions faster. While on the maritime

side, Norway has a role to play in building the supply side of tomorrow's solutions, our role on the land side is thus primarily to create demand. Another important prerequisite for implementing zero-emission solutions is that the infrastructure for alternative fuels is economically sustainable, and that well-functioning value chains are in place from production and distribution to consumption. Norway relies on international technology development, particularly for road transport. Changes in the global markets have a considerable impact on the pace of development in the Norwegian transport sector.

Non-residential buildings and property

The construction sector must contribute to the low-emissions society, and it is important that the sector recognises the financial and business opportunities that lie in adopting a comprehensive perspective that includes both climate, energy and power consumption. Contributions from the sector start as early as when materials are selected for construction, and continue through the construction processes, building operation and renovation, and continue through re-use and recycling when the building is torn down. With the goal of limiting climate footprint, the most ambitious innovators must reach even further and utilise the building structure – such as roofs, walls, the property itself with all facilities and outdoor areas – to generate and store energy from local, renewable sources.

Residences and consumers

In the low-emission society, people will live and move about in a manner that is climate-neutral, with minimal strain on the energy system. Therefore, households and consumers also play a crucial role in the transition to the low-emission society. The choices every single household makes when choosing type of residence, transport habits and consumption, all have an impact on national and international greenhouse gas emissions and our energy system.

The energy system

The energy system must support the needs of the other energy sectors regarding reduced greenhouse gas emissions, and increased demand for energy produced from renewable sources. Regardless of which solutions and paths are chosen, the transition to the low-emission society presumes the existence of a flexible and robust energy system as a foundation, which will make the necessary changes possible. For the time being, there is still great uncertainty associated with which technologies and business models will be needed in the energy system of tomorrow, and at what scale. Different solutions will have to be tested on the road to the low-emission society. In the transition to the low-emission society, we need to develop technology based on renewable solutions, including offshore wind. In order for offshore wind to become a resource, it must become competitive and cost-effective compared with other renewable resources. Floating offshore wind has a huge potential, but it is still in a pre-commercial phase. There is a need to test and further develop technologies linked to floating offshore wind, to demonstrate that the technology works, as well as further scale-up to lower costs.



PART VI DIRECTORS' REPORT AND ANNUAL ACCOUNTS FOR ENOVA SF

*This part is not translated,
see Norwegian version at enova.no*





PART VII

ANNUAL ACCOUNTS FOR THE CLIMATE AND ENERGY FUND

*This part is not translated,
see Norwegian version at enova.no*



PART VIII

APPENDIX

79 Definitions and terminology



Definitions and terminology

CO₂ equivalent

The greenhouse effect from CO₂ is used as a unit of measurement to describe the greenhouse effect of different greenhouse gases. The greenhouse effect from other greenhouse gases is converted to CO₂ equivalents in accordance with their global warming potential (GWP) over a given period. The GWP value for a gas is defined as the accumulated impact on the greenhouse effect from a one-tonne emission of the gas compared with a one-tonne emission of CO₂ over a specified period of time, usually 100 years.

Climate and Energy Fund

The purpose of the Climate and Energy Fund is to contribute to reduced greenhouse gas emissions and strengthened energy security of supply, as well as technology development that also contributes to reduced greenhouse gas emissions in the longer term.

The Fund is based on Section 4-4 of the Act relating to amendment of Act No. 60 of 29 June 1990 relating to the generation, conversion, transmission, trading, distribution and use of energy, etc. (Energy Act), cf. Odelsting Proposition No. 35 (2000–2001) and Recommendation to the Storting No. 59 (2000–2001). The Ministry of Climate and Environment (MCE) determines the statutes for the Climate and Energy Fund.

The Climate and Energy Fund is financed through grants in the national budget and a parafiscal charge on the grid tariff for withdrawing power at all grid levels.

Up to and through 2017, the grants to the Climate and Energy Fund mainly consisted of returns from the Fund for climate, renewable energy and energy restructuring. Starting with 2018, the Fund for climate, renewable energy and energy restructuring will be phased out and the transfer to the Climate and Energy Fund will be replaced with an ordinary item of expenditure in the national budget.

Climate result

A climate result is calculated for each project supported by Enova. The climate result corresponds to the total change in greenhouse gas emissions as a result of various measures in the project. The calculation uses emission coefficients for the

different energy carriers involved as a basis. The climate result is measured in tonnes of CO₂ equivalents per year. The conversion to tonnes of CO₂ equivalents takes place using internationally recognised GWP factors (Global Warming Potential).

Contractual result

Contractual result is an annual result expected to be realised in the future from a project, and which is included as part of the contractual basis between the support recipient and Enova. All decisions within a calendar year are included in the calculation of gross contractual result for the year in question.

ESA

ESA is the abbreviation for the EFTA Surveillance Authority. The EFTA Surveillance Authority ensures that the EFTA nations, Iceland, Lichtenstein and Norway comply with their obligations under the EEA Agreement. The EFTA Surveillance Authority also enforces the general ban against state aid, and assesses national support programmes vis-à-vis the EEA rules and has the authority to demand that illegal support be returned.

Energy result

The energy result is a goal for what the projects we support will deliver (per year) through more efficient energy consumption, increased production or increased use of renewable energy. Energy results are measured in kilowatt-hours (kWh) per year.

Final reported result

The final reported result is an updated forecast of a project's expected achieved annual result. Enova undertakes a reasonability assessment of the final reported result from support recipients.

Innovation results

Enova records innovation results from projects that contribute to increased innovation within energy and climate technology. Innovation results are measured in triggered capital in kroner. Triggered capital means the part of the project's investment costs that is triggered through the support from Enova, which is investment costs less support from Enova and other public policy instruments.

Market change

Enova defines market change as the change Enova will help drive within a given market. This entails a permanent shift in supply and/or demand for products that have a place in a low-emission society.

Market change goal

In order to reach Enova's objectives and realise our goals, we must identify concrete changes that must occur on the way. These are concrete changes for a sector, a segment or a value chain. Enova defines this as market changes with an associated market change goal.

Programmes

Enova has chosen to focus the use of policy instruments through programmes. A programme is an instrument directed towards one or more specific target groups, with set application criteria.

Realised result

Realised results are based on measurements or updated estimates once measures have been carried out and an effect of the measure can be observed. It takes time from when the measures are implemented until achieved results can be reported.

Reduced peak demand results

Enova can record reduced peak demand results for projects that result in a reduced peak demand and increased flexibility in the power system. This includes measures that can limit winter loads and reduce short-term peaks. Reduced peak demand results are measured in kilowatts (kW).

Renewable energy

Enova uses the same definition of renewable energy used in the EU's Renewables Directive (2001/77/EC). In the directive, renewable energy is defined as renewable, non-fossil energy sources (wind, solar, geothermal energy, tidal energy, hydro-power, biomass, gas from landfills, gas from cleaning facilities and biogases). Biomass is furthermore defined as biologically degradable fractions of products, waste and agricultural remnants (plant or animal-based), forestry and associated industries, in addition to biologically degradable fractions from industrial and municipal waste.

Triggering effect

As an administrator of public resources, it is important for Enova to ensure that the resources we manage are used in the best possible manner. Support from the Climate and Energy Fund must contribute to realising projects that would not have been realised otherwise. For example, projects with a low cost per generated or reduced kWh will often be profitable by themselves, and therefore do not require support from the Climate and Energy Fund.

Support is also considered to be triggering if it advances a project in time, or if a project has a larger scope than it otherwise would have had.



ENOVA

Enova works to promote Norway's transition to the low emission society. The transition will require us to cut greenhouse gas emissions, safeguard security of supply and create new values. That is why Enova works to bring the good solutions out in the market and contributes to new energy and climate technologies.

Enova's reports can be found at enova.no

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