

| # | Type of policy instrument | Name of instrument | First year of application | Operator | Impact on utilisation of industrial excess heat | Description | Relevant facts | References |
|-------|---|---|---------------------------|--|---|--|---|---------------|
| I.1 | Taxes | Energy and environmental taxes on energy | 1975 | Department of Finance / Energy fund | Medium | The energy taxes apply to electricity and fossil fuels. They have evolved through time and are dependent on energy carrier, end use and geographical location of the user. CO ₂ taxes and sulphur taxes were introduced in 1991, as well as and NOx taxes in 2008. | | [1], [2] |
| I.1.1 | Taxes | Electricity taxes | 1975 | Department of Finance / Energy Fund | Low | There is a specific tax on all electrical power supplied in Norway, also for the power that the network companies or manufacturers make for their own use. The rates for 2018 are 16.58 øre (0.017 EUR) per kWh and 0.48 øre (0.00050 EUR) per kWh when the reduced rate applies. The main tax rate applies to households, non-industrial business activities and administrative buildings in industry. The reduced rate applies to industrial and mining production, production of district heating, all business activities in Finnmark and some municipalities in North Troms, data centers with outputs over 0.5 MW and shipping industry. There is an electricity tax exemption for power delivered to given power-intensive processes, greenhouse industry, propulsion of rail transport and households and public administration in Finnmark and some municipalities in northern Troms. | The electricity taxes were rather low until 2000 after the "Energy Commission" worked on the "the energy and power balance to 2020" and recommended a dramatic increase in electricity taxes to stabilise the electricity use. Since a number of locations and energy-intensive industry sectors are exempted and the tax levels are relatively low for the industry, especially compared to the rest of Europe, the electricity taxes are considered to have little impact on excess heat use in the industry. | [1], [2] |
| I.1.2 | Taxes | CO ₂ taxes (in addition to CO ₂ EU ETS) | 1991 | Norwegian Environment Agency | High | Norway was one of the first countries in the world to implement in the oil & gas sector a specific tax on emissions from fossil fuels combustion. The rate for 2018 for the CO ₂ tax is 1.06 NOK (0.11 EUR) per Sm ³ gas or liter oil. For combustion of natural gas, this corresponds to 453 NOK (47.36 EUR) per ton of CO ₂ . For methane emitted to the air, the rate is 7.16 NOK (0.75 EUR) per Sm ³ of methane. The oil & gas sector represents about a quarter of Norway's CO ₂ eq emissions. Norway kept the CO ₂ tax for oil & gas sector also after the sector was finally included in the CO ₂ EU ETS in 2008, maintaining overall CO ₂ tax rates as high as before. | Approximately 50 % of Norwegian emissions are included in the EU Emission Trading Scheme. The following sectors of industry are included: pulp & paper, district heating, gas power plants, gas terminals, offshore oil & gas production, refineries, non-metallic minerals, steel production, aluminium production, ferroalloys, chemical industry. In total, 137 companies were included in the system in 2016. Impact evaluation: The Norwegian GHG emissions from enterprises in the EU ETS system were reduced by 0.5 million tons from 2015 to 2016, especially due to lower emissions from petroleum activities, oil refineries and production of fertilizers. The emissions were 25.15 million tons in 2016 which is at the same level as in 2014. | [1], [2], [3] |
| I.1.3 | Taxes | Sulphur and NOx taxes | 1991/2008 | Norwegian Environment Agency | Low | Sulphur and NOx taxes have been introduced in 1991 and 2008, respectively. The NOx taxes are collected to form the NOx Fund, which has granted support to over 1000 applications to NOx-reducing measures with about 4000 MNOK (420 MEUR) total. A new NOx Agreement for the period 2018-2025 will further reduce Norway's NOx emissions. | Sulphur and NOx taxes have greatly contributed to lower both SO ₂ and NOx emissions, however they had little effect on the level of excess heat in the industry. For example, only about 13% of the reported NOx-reductions are due to energy efficiency measures. | [4], [5], [6] |
| I.2 | Financial, Information/ Education/ Training | Norwegian industrial energy efficiency network | 1989 (-2002) | Norwegian Water Resources and Energy Directorate (NVE) | Medium | The Norwegian Industrial Energy Efficiency Network (IEEN) is an industry-driven energy efficiency programme financed by the Norwegian Water Resources and Energy Directorate (NVE), and membership is free to companies. Companies can get the following membership benefits: <ul style="list-style-type: none"> • Technical and financial support to initiate energy efficiency measures. • Investment support for purchasing equipment necessary for energy monitoring. • Information on current news and results of efficient energy use from Norway and abroad. • Energy statistics to allow comparison of own energy use with that of others in the same industry sector. | As of 1 January 2002, the IEEN had in total 786 industry members, representing a total energy use of ca. 40 TWh in 2001, which is approximately half of industry's total energy use in Norway. | [1] |
| I.3 | Investment support scheme / Information | ENOVA SF | 2001 | ENOVA SF | High | Enova SF is owned by the Norwegian Ministry of Petroleum and Energy and contributes to reduced greenhouse gas emissions, development of energy and climate technology and a strengthened security of supply. Enova SF contributes with up to 50 % CAPEX to stimulate the implementation of relevant projects. In 2015, Enova has set new goals to accomplish its mission: <ul style="list-style-type: none"> • More efficient and flexible use of energy • Increased use of energy carriers other than electricity, natural gas and fuel oil for heating • Increased use of new energy resources, including energy re-utilization and bioenergy • Introduction and development of new energy and climate-technologies and solutions in the market • Well-functioning markets for efficient and environmentally friendly energy solutions • Increased general knowledge in society regarding the possibilities for utilizing efficient and environmentally friendly energy solutions • Reduced emissions in the transport sector. Enova plays a key role in achieving Norway's energy policy goals, through the promotion of financial instruments and incentives to stimulate the stakeholders and the development of energy savings measures to households and private sector. Enova administrates the Energy Fund levied from the mandatory energy taxes. | Each year, Enova SF invests more than 2000 MNOK (210 MEUR) of public resources in solutions that help build a green Norway for tomorrow. Since its establishment in 2001, ENOVA has supported more than 7000 projects (including private households) representing more than 22 TWh in energy savings. | [7], [8] |
| I.3.1 | Information | ENOVA's industry network | 2001 | ENOVA SF | Low | The industry network is a national network for Norwegian industry. The network provides the background for reference energy measurements and different analyses which again provide the basis for reporting, advising, best practice and effective basis of comparison. Any industry company can become a member of the network and have access to anonymous benchmark analyses for different business sectors, as well as company reports. | | [1], [7] |
| I.3.2 | Information / Investment support scheme | Energy management - companies in networks | 2003 | ENOVA SF | High | The energy management program aims at small and medium sized companies with an annual energy consumption of at least 0.5 GWh. Companies or concerns working in project networks can apply for support to energy audits and energy management systems. The grant is individually evaluated and will not exceed 50 % of total approved project costs. The projects have to result in an energy saving of at least 10 % of the total energy consumption or conversion to new renewable energy sources. The companies have to sign a contract with a quantified energy saving/conversion. | This programme is a follow up of "Norwegian industrial energy efficiency network". | [1], [7] |

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| 13.3 | Investment support scheme | Support for introduction of new technology for renewable heating and cooling plants | 2001 | ENOVA SF | High | <p>The program aims at supporting:</p> <ul style="list-style-type: none"> • Establishment of infrastructure and associated power plant based on renewable energy sources. • Extension and reduction of existing district heating plants and district cooling plants. • Conversion to renewable energy production in existing heating plant based on non-renewable energy sources. <p>Infrastructure for district heating and district cooling includes transmission facilities and distribution facilities up to the measurement point for heat and / or cooling. Any heat exchangers, power lines and customer centers can be included.</p> | 2139 MNOK (223.5 MEUR) were allocated to projects since 2001 for a total contractual energy result of 4.2 TWh. | [9] |
| 13.4 | Investment support scheme | Support for introduction of new technology for renewable power plants | 2001 | ENOVA SF | High | <p>The program aims at supporting:</p> <ul style="list-style-type: none"> • Establishment of infrastructure and associated power plant based on renewable energy sources. • Conversion to renewable power production in existing power plant based on non-renewable energy sources | 2511 MNOK (262.4 MEUR) were allocated to projects since 2001 for a total contractual energy result of 3.3 TWh. | [10] |
| 13.5 | Investment support scheme | Energy and climate measures in industry and facilities | 2003 | ENOVA SF | High | <p>The program is aimed at Norwegian industry and at process-related industrial installations (e.g. aquaculture, water and sewers, swimming-pool and ice skating halls, energy recovery plants).</p> <p>Companies can get support for physical installations for:</p> <ul style="list-style-type: none"> • Energy measures affecting power use: efficiency, energy recovery, conversion and production. • Climate measures to either reduce CO₂ emissions through reduced use of fossil fuels or measures that reduce greenhouse gases other than CO₂. <p>The project must result in reduced energy consumption, use of surplus energy and / or conversion to renewable energy of at least 100 MWh / year. Alternatively, greenhouse gas emissions equivalent to at least 30 tons CO₂ equivalents per year.</p> | 21 projects were supported for the period 2012-2016 for a total contractual support of 2795 MNOK (292 MEUR) and contractual energy result of 497 GWh saved. | [1], [10], [11] |
| 13.6 | Investment support scheme | Pre-project support for new energy and climate technology | 2011 | ENOVA SF | Low | <p>The program is aimed at established companies that conduct industrial production in Norway and / or in the Norwegian economic zone. The applicant should be the one who will make use of the measure. The company can receive support for the investigation of a concrete energy measure that is already known.</p> <p>The investment project will have an expected energy output of 5 GWh or more per year, due to efficient energy use, efficient and renewable energy production, energy recovery or use of energy sources other than electricity, natural gas and oil for heating purposes.</p> <p>The aid may amount to up to 50 % of approved documented costs, but is limited to 1 MNOK (100 KEUR).</p> | Only 7 projects were supported for the period 2012-2016. | [12] |
| 13.7 | Investment support scheme | Support for introduction of new technology in industry | 2011 (-2016) | ENOVA SF | Low | <p>The program is aimed at established companies that conduct industrial production in Norway and / or in the Norwegian economic zone. The applicant should be the one who will make use of the new technology and aim at significant energy savings.</p> | Only 9 projects were supported for the period 2012-2016. | [10] |
| 13.8 | Investment/loan support scheme | Pilot, demonstration and full-scale innovative energy and climate technologies | 2016 | ENOVA SF | N/A | <p>Enova can provide financial support to test, demonstrate at pilot or full-scale innovative technology for industry's manufacturing processes or improve energy or climate performance compared to existing solutions. The results and experiences of such a pilot will contribute to further development and to reduce the risk of using the technology at full-scale. The technology or solution must be innovative and must have a significant and realistic potential for being able to be used even outside the company.</p> <p>This measure consists of several programmes addressed either to established industries, technology developers or entrepreneurs. The support could be financial as an investment grant or an advantageous loan up to 60 % of the project's approved costs.</p> | Most of these measures have been implemented since 2016 and their impact cannot be yet established. | [13] |
| 13.9 | Information/Education | Support to the introduction of energy management in industry and equipment | 2012 | ENOVA SF | High | <p>ENOVA SF can provide financial support for analysis and establishment of action lists in industry and construction companies. The support is aimed at small and medium-sized energy users using 1-50 GWh per year.</p> <p>ENOVA SF can provide financial support for mapping, studies and analysis, including the introduction of measurement equipment and tools necessary for the establishment of action lists and a systematic follow-up of the company's energy use. Projects must be anchored in the management of the applicant and have the ambition to contract a minimum energy target of 10 % related to specific energy use.</p> | 139 projects were supported in 2016 for a total contractual support of 68 MNOK (7.1 MEUR) and about 2 TWh of contractual energy saving. | [14] |
| 14 | Co-operative measures, fiscal/tariffs | Energy efficiency in industry (Program for energieffektivisering i energiintensiv industri) | 2004 (-2014) | Norwegian Water Resources and Energy Directorate (NVE) | Medium | <p>The programme was in operation for 10 years, from 2004 to 2014. Energy-intensive companies within the pulp and paper industry, chemical reduction processes, metallurgical processes and cement production could apply for participation in a programme for energy efficiency and the approved companies would be given a full exemption (i.e. a zero tax rate) from the electricity tax. These energy intensive companies were offered the possibility to participate in a five-year programme, which required that certain energy efficiency obligations should be fulfilled, and stipulated penalty arrangements in case the obligations were not fulfilled. These commitments were considered to replace the steering effect of the electricity tax, and the companies were therefore granted a full exemption from the electricity tax used in the industrial production process during the programme period.</p> <p>To qualify as an energy intensive company, the following conditions were to be fulfilled:</p> <ul style="list-style-type: none"> • The purchasing costs for energy products and electricity amount to at least 3 % of the company's production value in the baseline year, or • Energy, CO₂ and sulphur dioxide taxes on the energy products and electricity used by the company in the baseline year amount to at least 0.5 % of the company's added value in the same period. <p>The main obligations within two years were:</p> <ul style="list-style-type: none"> • To implement a standardised energy management system that was certified by an accredited certification body. • To carry out an energy audit and identify electricity reducing measures and within five years. • To implement the identified electricity-efficient measures in the production process with a payback time of less than 3 years. | In total 18 pulp and paper companies participated in the programme. Due to close down of factories or other reasons, several companies have withdrawn from the programme and at the end in 2014 there were 10 companies participating. Total electricity savings were about 525 GWh (1900 TJ) and the total savings of the final 10 companies were about 271 MNOK (28.3 MEUR). In total the tax exemption was ca. 182 MNOK (19 MEUR) and the average cost of electricity savings became 0.35 NOK/kWh (0.037 EUR/kWh). | [1] |
| 15 | R&D support | Funding for external R&D support | 1946 | Research Council of Norway | High | <p>The Research Council of Norway serves as the chief advisory body for the government authorities on research policy issues, and distributes about nine billion NOK to research and innovation activities each year. The Research Council works to promote international cooperation and increase participation in the EU framework programme on research and innovation. The Research Council creates meeting places and provides a platform for dialogue between researchers, users of research and research funders.</p> | | [15] |

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| 15.1 | R&D support | EnergiX research funding programme | 2013 | Research Council of Norway | High | <p>ENERGIX is a large research-funding programme of the Research Council of Norway focusing on renewable energy, energy efficiency, energy systems and energy regulations. The programme started in 2013 and will run for 10 years. The ENERGIX programme continues the activities of the Clean Energy for the Future (RENERGI) programme, concluded in 2013.</p> <p>The ENERGIX programme contributes to achieve key energy and industrial policy objectives and is an important instrument in the implementation of the national Energi21 R&D strategy. The programme lays the foundation for a wide range of research activities to open the door to new thinking and innovative concepts.</p> <p>The programme is targeted towards Norwegian companies and research and educational institutions. Projects should enhance long-term competence-building that will further the development of the energy industry and related industries, such as the energy processing industry and the supplier industry.</p> | The largest research project project of EnergiX and whole Norway is HighEFF - Centre for an Energy Efficient and Competitive Industry for the Future, with a budget of 480 MNOK (50.2 MEUR) over 8 years. HighEFF is a Centre for Environment-friendly Energy Research (FME), funded by the Research Council of Norway and industry partners. | [16], [17] |
| 15.2 | R&D support | CLIMIT R&D funding programme | 2004 | Gassnova SF and Research Council of Norway | Medium | CLIMIT is a programme for research, development and demonstration of carbon capture and storage (CCS) technologies. The programme is carried out in cooperation between the Research Council of Norway, which handles CLIMIT R&D, and Gassnova, which handles CLIMIT Demo. The programme has a joint secretariat and Programme Board. Gassnova SF and the Research Council of Norway collaborate on the programme which grants in excess of 200 MNOK (21 MEUR) per year to the best CCS projects. | Though not primarily intended to reduce levels of excess heat in the industry, the programme has contributed to this goal through the process integration of CO ₂ capture in industrial processes. | [18] |
| 15.3 | R&D support | Regional research funds | 2010 | Research Council of Norway | Medium | <p>The regional research funds are intended to increased R&D efforts and strengthen research for regional innovation and development. The research funds support the region's priority areas and contribute to long-term, basic competence building in relevant research environments. The goal is to develop effective and competitive research environments in all regions. The funds meet the R&D needs of the region through supporting R&D projects initiated by companies, public enterprises, including universities, colleges and research communities.</p> <p>Regional Research Fund aims to:</p> <ul style="list-style-type: none"> • Strengthen research for regional innovation and regional development • Mobilize for increased R&D efforts in the regions • Contribute to increased research quality and development of good and competitive R&D environments in the regions • Create development and learning arenas where regional experiences can be discussed in relation to national and international knowledge and activities • Ensure close interaction between activities in the regions and their relationships with other national and international programs and activities. | A considerable number of companies seem to use the regional funding possibility as a starting point for their research-based innovation processes. All in all, about four out of ten applications were submitted by industry. The evaluation shows that even the projects established by universities and other research institutions have a relatively strong relevance for industrial development and normally involve companies or public institutions as active partners. | [19], [20] |
| 15.4 | Investment support scheme | Innovation Norway | 2004 | Innovation Norway | Low | Innovation Norway is the Norwegian Government's instrument for innovation and development of Norwegian enterprises and industry. Innovation Norway supports companies in developing their competitive advantage and to enhance innovation. | A number of innovations supported by Innovation Norway have contributed to a reduction or better utilisation of excess heat in the industry. However, this is not the specific goal of Innovation Norway. | [21] |
| 1.6 | Financial/ Trading scheme | Electricity certificate market | 2012 | Norwegian Water Resources and Energy Directorate (NVE) | Low | <p>Since 1 January 2012, Sweden and Norway have a common electricity certificate market. The goal of the two countries is to stimulate the development of energy production based on renewable energy sources amounting to 28.4 TWh by the end of 2020. Sweden will finance 15.2 TWh and Norway 13.2 TWh.</p> <p>The Electricity Certificate System is a market-based support system for renewable electricity production. The system is based on the Swedish electricity certificate market started in 2003. Electricity producers receive one electricity certificate unit for each megawatt-hour (MWh) of electricity produced from renewable energy sources (biomass, solar photovoltaic, small-scale hydropower, wind) or from peat.</p> | Studies of the common electricity certificate market between Sweden and Norway evaluated that its impact on industrial excess heat is not as straightforward as expected. For example, an increase in electricity certificate quota favours CHP plants rather than utilizing industrial excess heat. | [22], [23] |
| 1.7 | National energy strategy | Energi21 | 2011 | Ministry of Petroleum and Energy | High | <p>Energi21 is the Norwegian national strategy for research, development, demonstration and commercialisation of new energy technology. It is the Ministry of Petroleum and Energy's permanent strategic body for research, development and demonstration in the energy sector.</p> <p>The main purpose of the Energi21 strategy reports is to provide the Ministry of Petroleum and Energy with recommendations on future strategic priority areas for efforts to develop new climate-friendly, environment-friendly solutions in the energy sphere. The Energi21 strategy documents are drawn up in cooperation with trade and industry, academia and the relevant authorities.</p> | High impact on energy efficiency in industry through implementations through research programme ENERGIX managed by Research Council of Norway. | [24], [25] |

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Notes:

Values in EUR were converted from NOK with valid rate for 2018-05-15