

Climate Strategy

The Norwegian Confederation of Trade Unions (LO)



Climate Strategy

LO's Climate Strategy

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'The greatest and most difficult challenge is to cut global emissions and contributions to global warming. Norway must take a leading role in this field but real results can only be achieved if many countries commit themselves through international cooperation.

The world is facing a number of environmental challenges. The consequences of climate change are becoming ever clearer. It is therefore necessary to produce and consume more sustainably. The link between global, regional and local environmental challenges must be made clearer. The utilisation of natural resources must not exceed nature's critical loads and thus threaten future generations' welfare.

LO's Programme for Action 2005 - 2009

Introduction

Last year, concerns about climate change got prominent media coverage. The immense attention paid to climate change is due to clear indications of permanent change evident in melting glaciers and extreme weather conditions, and drought and floods all over the world. There is now broad political agreement in Norway that we implement stringent climate measures in the coming year.

The climate challenge is a symptom of far-reaching questions linked to sustainable global development. The issue now triggers discussions on how industrialised countries have organised their consumption, a discussion which speeds up a process that would have taken place regardless. Social developments in the Western world are not sufficiently based on sustainable use of natural resources. Many of the improvements we have seen in the environmental field in recent years are more than neutralised by our ever-increasing consumption. Despite the adoption of international conventions on greenhouse gases, chemicals, waste etc., that are a step forward in certain areas - increased production and consumption pose increasingly greater challenges to the environment and to people's health.

The development in the so-called BRIC countries (Brazil, Russia, India and China) is also challenging. These economies are estimated to be the largest in the world by 2050. Their share of climate change emissions is increasing. For instance, China is now the world's largest emitter of CO₂, and is expected to account for 39% of total climate change emissions by 2030, provided development continues at the current rate. This will have considerable repercussions for the global environment in general, and the climate in particular, unless mechanisms are launched to phase in green technology as an integrated part of industrial developments and energy production.

Climate change has already had serious economic and social impacts on many poor countries. By way of example, this year's extreme rain and drought have year had fatal consequences for cattle breeding and agriculture in several parts of Africa. Paradoxically, Africa has the lowest emissions per person, yet the continent suffers the greatest strain as a result of climate change. In the industrialised world the situation is the opposite – the level of greenhouse gas emissions is higher but the impact not nearly as dramatic in the short run, as these countries' direct dependency on natural resources for subsistence is much lower. These also have the means to assist those most exposed to climate change.

Assisting developing countries in dealing with the consequences of climate change is a daunting challenge –with regard to transfer of technology as well as their adaptation to the environmental changes that have already taken place.

As a significant social actor, nationally and internationally, the trade union movement must contribute actively to focusing on climate change. The trade union movement's concept of solidarity will form the basis of the actions required. This is the time for the trade union movement to be proactive. The trade union movement is one of few organisations actively involved in three fields influencing or influenced by climate change: the environmental, social and economic fields.

LO's climate strategy is an internal document that describes the challenges, sets the goals and describes fields in which it is important for the trade union movement to be involved in order to limit climate gas emissions in Norway and internationally.

Background

There is considerable uncertainty about temperature increases over the next decades if stricter limits on climate gas emissions are not launched. Many of the most prominent climate researchers in the world form part of the so-called Climate Panel (the Intergovernmental Panel on Climate Change, IPCC). The latest IPCC report deems it very likely that man-made greenhouse gas emissions have caused most of the observed increases in the global mean temperature since the mid-20th century. The IPCC points out that out of the 12 last years, 11 are ranked as the globally warmest. By using the expression *very likely*, IPCC researchers declare that they are more certain about their scenarios in this report than what they were in the previous main report, published in 2000.

There is a natural greenhouse effect that keeps the earth's mean temperature approximately 34 C higher than what it would have been without this effect. The natural greenhouse effect is caused by water vapour (H₂O), clouds, carbon dioxide (CO₂), methane (CH₄), laughing gas (N₂O), and ozone (O₃) in the atmosphere. Since pre-historical times the concentration of CO₂ in the atmosphere has increased by about 30%. During the same period concentration of metha-

ne has increased by 145 % and laughing gas by about 15 %. Despite some variations over time, today's concentrations of these gases exceed by far the variation field for the past 220,000 years.

For the most important greenhouse gas, CO₂, this means, in concrete terms, that the atmosphere today contains about 380 ppm (parts per million) CO₂ – compared to about 275 ppm before the industrial revolution. The EU aims at a maximum two degrees temperature increase compared to the pre-industrial level. To achieve that, the CO₂ level should be stabilised at less than 450 ppm. There is scientific agreement within the IPCC that a temperature increase of more than two degrees will have serious consequences for the resource needs and habitat of animals and fish, both locally and globally. Several experts believe it is no longer possible to stabilise the temperature increase at this level.

The consequences of a temperature increase were assessed in the Stern report published in October 2006, which stated that man-made climate change is priced at 4,600 billion NOK if we fail to cut greenhouse gas emissions within the next decade. The report warns that if we do not cut our emissions, the consequences will be grave:

- Drought may produce several hundred millions “climate refugees”.
- Nature will change dramatically; as many as 40% of the world's species may become extinct.
- Melting glaciers may lead to water shortage for one in six persons on earth.

The Stern report also warns against the risk of a global economic recession unless necessary measures are launched in the short run. The cost of cutting emissions in an early phase is estimated to be 5 to 20 times less than if we do so at a later stage. The latest IPCC report supports this reasoning.

International processes

The Kyoto protocol's objectives on emissions cuts are insufficient to limit the global average temperature increase to two degrees. In order to stabilise at this level, emissions must be cut far beyond the Kyoto obligations. During the 12th round of climate negotiations in Nairobi in November 2006, under the auspices of the UNFCCC (the UN's climate convention), it became evident that international greenhouse gas negotiations have reached their limit. Although only the UN can lead this work, there are too many unsolved issues, one of the most important being: Who will be bound by a future climate agreement? Developing countries demand that industrialised countries finance the former's climate measures, and several have refused to set specific caps, while other countries – such as the US and Australia – demand that all countries must cut their emissions if ratifying a climate agreement is to have any effect at all.

The positive aspect of the negotiations is that several countries, states (e.g. California) and cities now assume responsibility for inspiring or pressing for clearer, long-term objectives for emissions cuts.

The EU Commission presented on 10 January 2007 'An Energy Policy for Europe'. The paper outlines concrete proposals for combining climate- and energy-policy goals with the goal of cutting climate change emissions by 20 % within 2020, or 30 % if other industrialised countries do the same. This depends on the adoption of an international climate agreement as of 2012. The EU will achieve this reduction of climate change emissions by:

- increasing the share of renewable energy from 6 to 20 % (binding commitment for the member states);
- making energy use 20 % more efficient;
- increasing the share of bio-fuel to at least 10%.

In addition, several EU states have stipulated considerable independent cuts on their emission cuts. England will cut 60 % by 2050. Sweden has stipulated a 4 % reduction within the Kyoto period, despite the protocol permitting an increase of 4%. Considerable global cuts of climate change emissions will depend on achieving a new and more comprehensive international agreement when the Kyoto protocol expires in 2012. The 13th round of climate negotiations in December 2007 will be key to starting such negotiations in time. The signals from the G8 Spring meeting in 2007 are seen as positive.

Work on a new climate agreement post 2012 is in progress at several levels. Participation of the US will be decisive for the success of international negotiations on further commitments. The US has ratified the climate convention – thus recognising the climate challenge but, like Australia and other countries, it has refused to ratify the Kyoto protocol, which regulates the commitments to greenhouse gas cuts.

Norwegian objectives

In April 2007 Prime Minister Jens Stoltenberg announced an expansive Norwegian climate policy towards 2050. Norway will comply with its share of the Kyoto protocol by increasing its Kyoto commitments by 10 % by 2012. Norway will also commit to cutting its emissions within 2020 by the equivalent to 30 % of Norway's total emissions and by 2050, the equivalent of 100 % of the country's emissions. The objectives will be reached through domestic policies and in cooperation with other countries by using flexible mechanisms as provided for in the Kyoto protocol.

The Government proposed in spring 2007 a system for allocating industrial emission quotas for the period 2008 – 2012. In general, this proposal is in line with the EU quota system, except that quotas will not be allocated to new enterprises during the period.

The proposed Norwegian strategy for sustainable development (June 2007) outlines seven priority topical fields. One of them is 'the Climate, the Ozone Layer and Long-Range Transported Air Pollution'. The strategy clearly affirms that climate issues are of the utmost importance to sustainable development, and climate change has therefore been devoted much space in the strategy.

A report by the Norwegian Pollution Control Authority (SFT) (June 2007) describes the potential of technical measures that can cut Norwegian emissions towards 2020, assessed in relation to costs and feasibility. Today, climate change emissions stand at 53.7 million tons. If all measures are implemented – including the most costly and difficult – carbon emissions can be cut by almost 20 million tons by 2020, representing a reduction of 22 % compared to 1990 levels. If measures costing less than NOK 600 per ton are implemented – irrespective of their feasibility – emissions will be cut by 14.4 million tons by 2020, i.e. 11 % of the 1990 emissions. If only measures costing less than NOK 200 per ton are implemented – measures considered highly feasible – emissions will be cut by a mere 2.5 million tons.

On 22 June 2007, the Government presented its Report to the Storting (the Norwegian Parliament) no. 34 (2006 – 2007) 'Norwegian Climate Policy' – the so-called climate white paper. Based on the Government's stated climate targets, the paper proposes a three-pronged strategy for Norwegian climate efforts:

- 1) A better international climate agreement.
- 2) Norwegian contributions to reducing emissions in developing countries and in countries with swiftly growing economies.
- 3) Intensified efforts to cut emissions in Norway.

Based on SFT's analysis of measures, the climate plans of action and existing means, the Government considers cutting Norwegian emissions by 13–16 million tons CO₂ equivalents by 2020 a realistic goal. This means that, till 2020, around 50-75 % of Norway's total emission cuts must be made domestically.

The Government's white paper outlines plans of action for the petroleum and energy, transport, industry, primary industry and waste sectors. The main purpose of these plans is to identify instruments for cutting emissions cost-effectively for each sector – cuts that will not be achieved with current instruments. The plans chart the following cuts towards 2020:

Objectives for capping emissions by 2020 in million tons CO₂ equivalents:

	2020 Objective	Current emission level
- Petroleum and Energy	3 – 5	16
- Industry	2 – 4	15.4
- Transport	2.5 – 4	15.6
- Primary industry/the waste sector	1 – 1.5	6.9

The climate report outlines a number of measures for cutting Norwegian emissions to be implemented or launched in the short term. Among the most important are:

- Banning deposits for decomposable waste as of 2009.
- Banning the installation of oil burners in new buildings as of 2009.
- New subsidies system for converting oil burners to renewable heat.
- Increasing the Basic Fund for Energy Economising and Renewable Energy by up to 10 billion NOK within 2012.
- Establishing a pilot programme for developing and introducing new, renewable energy technologies offshore, including the development and testing of new sea windmill technology.

- Increasing the Gas Technology Fund in order to enhance the development of cleaning technologies.
- Stimulating bio-energy development by up to 14 TWh within 2020.
- Improved public transport by strengthening the railway and other means of transport.
- Intensifying green transport efforts, and assessing the need for a separate body, Transnova.
- Considering whether all or parts of the transport sector should be covered by a quota system.
- Working to include international aviation in future climate agreements.
- Considering instruments for industries that are not subject to quota obligations or duties, including a quota obligation for all or parts of industries, and/or voluntary agreements.
- The largest cities will be invited to collaborate on reducing local climate gas emissions, particularly from road transport, heating and waste treatment.
- The 2004 tax level will be maintained but environment and climate duties will be increased, while other taxes and duties will be correspondingly cut.

The NOUN (Norwegian Public Report) 2006:18 'A Climate-friendly Norway' outlines how Norway can cut emissions by two thirds within 2050. The appointed committee concludes that this is necessary, feasible and not financially unattainable, and proposes 15 principal measures based on prior art. The committee's proposal is based on the assumption that if no action is taken, Norwegian emissions will add up to 60 million tons CO₂ equivalents by 2020; a 20 % increase over 1990 (Norway's commitments are + 1%). With the proposed measures, emissions will come to approximately 42 million tons CO₂ equivalents – that is 16% lower than in 1990. The committee anticipates distributing the cuts as follows:

- CO ₂ capture and storage by gas/carbon energy and industry	6 million tons
- Low-emission cars and boats	2 million tons
- Bio-fuel	3 million tons
- Energy efficiency in buildings	1 million ton
- Electrification of the Norwegian NCS	3 million tons
- Other measures	3 million tons

Some challenges ahead

According to the Kyoto protocol, Norway's emission target is set at a maximum 1% increase compared to the 1990 level – an objective which the Government now wishes to surpass by 10 %. It is important that Norway both comply with and surpass its commitments, but as Norway's share of global emissions comes to a mere 2 ‰ (per mille), large emission cuts are arguably not Norway's most important contribution to climate improvement. Nevertheless, many countries find themselves in the same situation; national emissions are small in a global context.

The theory about the tragedy of the common land thus applies: Freedom in the common land leads to everybody's ruin. But a contribution perhaps equally important to this common land – as Earth may be considered in a climate context – is Norway's potential as a pioneering country in the development of green technologies, products and services, in aid to developing countries that are poorly equipped to meet climate challenges, and the opportunities provided by changing people's attitudes and consumption patterns in one of the decidedly richest countries in the world. Although Norway, relatively speaking, is a small polluter, we have – with a total profit of 2,000 billion NOK on oil and gas products – a moral duty to contribute to technologies and to implement measures that can cut greenhouse gas emissions both nationally and globally.

As with most environmental objectives, the test lies in translating good intentions into real actions. Long-term objectives and visions are necessary in order to solve the climate question but targets are worthless unless followed up by plans and milestones making it possible to realise them. But most important of all are real measures and action.

Setting ambitious climate targets for 2020 or 2050 will necessarily have to be based on a great degree of uncertainty about technological and economic developments. Specific instruments and measures that really are possible to implement, both in the short and long terms, must therefore be agreed on. Political agreement on objectives and instruments will be decisive. Equally important is a national acceptance of the need to cap emissions – that this becomes a national effort where everybody participates, where costs are shared, and where the least resourceful are not most adversely affected.

Information and raising public awareness are important. If we are to establish a basis for substantial emission cuts, people must understand why the different instruments are used. If people are motivated, even small increases of subsi-

dies or duties can lead to desired changes of conduct. However, in order to achieve behavioural changes, real economic and practical options are needed.

A comprehensive process around the use of measures in Norway is needed. In order to cut climate gas emissions to the extent necessary to halt temperature increase, a restructuring of technologies, production and consumption is needed. This will influence people's daily life and will therefore require a combination of political courage, appropriate measures and changes in people's attitudes.

The existing plans, strategies and objectives are just the beginning of a considerable process which lies ahead of us. This process will influence everybody and it will unavoidably affect both individuals and society at large. A conscious attitude to green production and consumption will limit the impact on our standard of living. By increasing public awareness of these issues, our quality of life can even improve in some respects.

LO's strategy

LO recognises the conclusions of the UN climate panel (IPCC) and fully supports the Government's objectives for cutting greenhouse gas emissions. Contributing to ensure that the Government's Climate Report is followed through with concrete measures within the various sectors is an important task for LO.

LO, through its work in the European Trade Union Confederation (ETUC), has previously supported the EU climate objectives. Both the ETUC and LO believe that these objectives must be seen in the context of the distribution of burdens, employment and tripartism. The cuts must be distributed over several sectors – that is, industry, public and private consumption. In its reply to the public consultation round, LO supported the main conclusions of the Low Emission Committee's report, as well as its recommendations. LO emphasised, inter alia, that "LO wants to identify areas, processes and partners in order to enable the joint promotion a low emission society. Concrete plans of action for how the global community, nations, local communities, industry, enterprises and organisations can help cut climate change emissions are now necessary. As an important actor in society, LO will contribute to creating greater public involvement for climate measures."

The present climate strategy will be a tool for LO's contribution to limiting climate change.

The seriousness and the scope of the climate issue require the trade union movement to prioritise this field. It is vital that LO and its affiliates involve themselves in the climate challenge also through individual initiatives and projects, in order to ensure that the perspectives of the trade union movement inform their actions. A climate strategy must identify fields where we can achieve real emission cuts. Cost-efficient measures are important, but cannot always be a prerequisite for environmental improvements. LO will be a pioneering organisation and proactive in new measures and solutions. This work will only have an impact if it is done in collaboration with other organisations and actors.

In the following, fields, processes and objectives for such work are described. The strategy offers an introduction to fields and issues and, consequently, it does not provide exhaustive facts. A closer look into the various fields will be needed.

Green technology

Norway applies the EU's broad definition of green technology as 'all technology that creates values and welfare, reducing environmental strain, and it encompasses cleaning technology, improved processes, administrative routines and more environment-friendly products.' The Government also considers the development of green technologies as important in order to help satisfy the need of developing countries for economic growth without correspondingly increasing the strain on the environment.

Norway's share of the green technology market is falling – and this is the fastest growing international market. In our neighbouring countries, considerable public aid and other means are used to increase green technology exports. This has national consequences: e.g., in 2004, increased export of green technologies created 3,000 new jobs in Sweden. More systematic investments in this field would create new market opportunities and employment in Norway as well. However, in order to achieve this, active research and industrial policies and environmental requirements must be applied, combined with regulations and green taxes.

Industry has now initiated promotion of Norwegian green technologies. The recently established 'Green Business Norway' network aims to focus on market supervision, promoting the sector internationally, innovation management and resource banks for enterprises.

The Governments Soria-Moria Declaration of October, 2005 states that *'through strategic investments, the Government aims to help Norwegian industry take a lead in environmental improvements. That will afford our industry an advantage and new marketable products when international requirements with regard to BAT (best available technology) are increased, and when the markets for environment-friendly energy and products grow.'* The Government also signals that Enova, in cooperation with Innovation Norway and the Research Council of Norway, will pay greater attention to introducing green technologies and equipment for technologies that are not ripe.

Concrete proposals for cooperation have now been presented by the institutions in a separate document (April 2007), including an annual increase of 200 million NOK on investments in green technologies, and asking for funds for cooperation between these institutions to be made available. Efficient dialogues with researchers, industry and other authorities are emphasised.

Chapter 3, 'Environment and Value Creation', of the governments white paper on 'Environment Protection Policy and the Nation's Climate Condition' (no. 26 of 2006 – 2007), states that there is great potential for increased value creation linked to an active and future-oriented environmental policy, including increased efforts on developing green technologies. The Government aims to:

- Consider strengthening the work of the Research Council of Norway in order to promote and profile green technologies in prioritised programmes.
- Consider strengthening Innovation Norway's work to promote and profile green technologies.
- Link R&D to the development of national and international regulations, and inform Norwegian industry early on about possible amendments, so that Norway can be at the forefront when regulations enter into force.
- Invest in developing new technologies that can limit emissions from gas-fired power plants.
- Help increase demand for green technologies, by:
 - Improving integration of green technologies in development efforts and export investments.
 - Focusing even more on green requirements in public procurement cf. chapter 4 on environment and consumption.
 - Promoting consumer-oriented measures such as green label schemes and education on environmental strain caused by consumption, cf. chapter 4 on environment and consumption.

In June 2007, SFT presented a sub-report on the green technology project 2005 – 2007: 'Environmental technologies – how can Norway become a pioneering country?' The report seeks to find the key to how Norway can become a pioneering country in green technologies. The salient feature of today's pioneering countries is their political prioritisation of the development of green technologies, their adaptation of framework conditions, and their generous public funding for developing, commercialising and promoting new technologies. The Ministry of Trade and Industry is preparing Norway's first Report to the Parliament on innovation (spring 2008). The paper aims to show how the State can contribute to innovation and a competitive industry. The foundation necessary for developing green technologies should be given an important place in this white paper.

Norway is a leading producer of green technologies in several fields, e.g. the maritime and the marine sectors, waste and water. Ambitious objectives are linked to further developing petroleum and energy technologies, such as carbon capture and injection, and to developing hydrogen as an energy carrier.

The potential gains of the green technology field should be exploited through political decisions and real action. In order to ensure dialogue and user participation, a broadly composed body should be established with representatives from the users, the social partners and the authorities.

LO will encourage the authorities to mobilise resources from, amongst other sources, the annual national budgets, to fund to research, development and the production of Norwegian green technologies. A "green technology council" should be established to provide a forum where politicians, governmental bodies, research groups and main technology industries can hone the competitive edge of Norwegian green technologies and the supplier industry's competitive edge in this field.

Carbon-based energy sources

Access to energy is essential, both for developing the welfare society further and for economic and social developments in poor countries. The International Energy Agency (IEA) estimates that global energy consumption will increase by approximately 50% by 2030 – with power production accounting for half of this increase. Energy carriers based on carbon-based energy sources (oil, gas, carbon) will account for about 80% of the total increase.

Until 2030, energy use will become even more carbon-intensive, since carbon-based power will increase its market shares over gas-based power. Developing countries account for 75% of the emission increase during this period in a 'business as usual' scenario.

The expected global increase of carbon-based energy consumption can only be solved through large-scale capture and storage of CO₂. Norway must take a leading position in developing capture/cleaning technologies for CO₂ in gas- and coal-fired power plants, and in the industry. Putting cleaning technologies in place in coal-fired power plants in China, for example, will be particularly challenging. Norway must be a driving force in this work.

Putting CO₂ to industrial uses will increase its value and help to create a market where carbon capture is profitable, as well as a carbon value chain – from its capture via transport until storage or injection. A large part of Norwegian value creation takes place in the petroleum sector which, at the same time, is responsible for a large share of emissions. Since much of Norway's wealth is built on exporting oil and gas, the country has a particular responsibility for developing cleaning technologies for CO₂.

Norwegian CO₂ emissions are mainly caused by the production of energy for petroleum extraction. New installations must apply emission-free energy solutions. Research is needed to identify possibilities for supplying installations on the Norwegian Continental Shelf (NCS) with power through cables from the mainland, sea windmills, or through gas-fired power plants and CO₂ capture on the platforms. It will also be interesting to see whether, in future, larger power plants on the NCS can supply power to the mainland. If platforms are supplied with power through cables, mainland power production must also be emission-free, that is, have its source in new, renewable energy or gas-fired power plants with CO₂ handling. Increased power production will be a prerequisite for avoiding the transfer of power from the mainland to the NCS to come at the expense of users on the mainland.

Less far-reaching measures for cutting climate gas emissions include optimising existing power production processes by improving turbine and compressor outputs, coordinating power supply between installations on the NCS by cable, and exploiting exhaust gas from gas turbines for heating and/or other power purposes.

The Soria-Moria Declaration states that the State will help fund infrastructure for carbon capture and transport through a state-owned company. Consequently, in the summer of 2007, Gassnova SF was established for this purpose. The Petoro and Gassco companies are well-suited to create carbon value chains and infrastructure. Licensing is the most important arena for technical and economic insight into the oil and gas fields on the NCS. As an important partner in the licenses, Petoro possesses unique knowledge about business opportunities for using CO₂ in oil fields and can advocate the use of carbon in the individual licences and through cooperation between several partnerships in one field. Gassco is well positioned as a partner for erecting and operating the CO₂ infrastructure.

Norwegian investments in carbon capture must aim at strengthening Norwegian technological developments, and arrangements must be made to stimulate Norwegian skills development and the qualification of Norwegian technologies. Investment in CO₂ handling in Norway should aim at making Norwegian capture technologies market leaders. This must be followed up in the annual national state budgets. Guarantees for supporting CO₂ handling infrastructure, relevant projects and R&D must be made.

LO will be proactive in making Norway a leader in cleaning the emissions of carbon-fired power plants and of other large industrial sources of CO₂. Norway must get internationally involved. Existing plans for developing emission-free gas-fired power plants must be extended and implemented. Arrangements must be made for future emission-free petroleum production.

Renewable energy

General Measures

Although much of the effort is aimed at developing green technologies for cleaning CO₂ caused by fossil energy carriers such as gas and carbon, it is important to invest in research and further development of renewable energy sources. Public aid should aim to kick-start good projects.

Schemes to promote the commercial use of renewable energy are essential and energy-saving measures should be rewarded, e.g. extending aid for new stoves and heat pumps.

LO will push for increased allocations to research and research clusters on renewable energy.

Hydropower

Norway must examine how upgrading and a careful development of existing hydropower plants can generate more power. Hydropower plants must be upgraded and modernised by using state-of-the-art technology, in order to more fully exploit their potential. In addition, operating expenses can be cut and safety increased. For instance, fall loss may be reduced by extending the waterways and making cross sections in tunnels larger. Newer turbine and generator technologies may help increase outputs. Careful expansion of existing plants should be considered, e.g. pumping water from other catchment areas, expanding existing or establishing new impounding dams, increasing the hydraulic gradient or increasing turbine capacity in order to increase output.

According to the Norwegian Water Resource and Energy Directorate (NVE), upgrading and enlarging existing plants, combined with new power production in plants over 10 MW, could produce some 15 TWh - an important contribution to bridging Norway's energy gap. Some have argued that upgrading often is too cost-intensive compared to the added value created by increased energy production. But measures that result in increased production capacity will have positive socio-economic and environmental impacts.

Hydropower plant owners must also ensure the best possible resource management. Through active ownership, public and private owners have the possibility to and the responsibility for influencing both energy supply and energy use. Owners must allocate sufficient reserves to ensure continuous upgrading and modernisation, investing in energy-efficient technologies.

LO will actively promote the overhauling and continuous upgrade of existing hydropower plants.

Bioenergy

Using the right energy for the right purpose is vital. Norway devotes a large part of its energy to heating. Heat is low quality energy and should be produced by combustion (e.g. bioenergy and waste), rather than electricity. There is an important distinction between renewable heat – including waste recycling and exploiting industrial surplus heat – for heating purposes, and the use of exclusive energy commodities, i.e. electricity, for industrial purposes. Of the 37.4 TWh used on direct heating in the 1990s, only a little more than 40% came from new, renewable energy sources.

A comprehensive development of infrastructure for bioenergy will be an important contribution to cutting greenhouse gas emissions in Norway. By replacing 3 TWh of fossil-fuel based electricity with bioenergy, emissions can be cut by approximately 3%, and free up electricity for industrial processing purposes, reducing, at the same time, the need for further developing carbon-based energy sources.

Energy restructuring requires large-scale investments in infrastructure development. Restructuring costs will therefore have to be shared between the energy sector and the State. There will be a need for long-term aid to production and investments in the large-scale development of long-distance heating networks. Furthermore, aid schemes for buildings

that switch from electricity to water-supplied heating and supportive investments for water-based teleheating in new buildings will also be needed.

Norway has vast access to timber and great potential for making use of felling waste and other bio by-products, and to exploit woods that otherwise contribute to an overgrown culture landscape.

It is important to sustainably expand bioenergy production capacity in order to ensure that the land used for energy production does not adversely affect other sectors, such as food production and timber conversion – both domestically and internationally. Norway must contribute to establishing an international certification arrangement for sustainable bioenergy.

LO will promote increased use of bioenergy in Norway and ensure that arrangements are made for continued research, technology development and industrial investments in the field.

Wind energy

Of all the European countries, Norway enjoys the best natural conditions for wind power exploitation, but its aid levels of NOK 00.8 per kWh are among the lowest in Europe and production stands at a mere 0.9 TWh - less than 1% of Norway's total energy production. It is unlikely that the Parliament's objective of 3 TWh of wind-based power will be reached. Many players that have expressed an interest in developing wind power have now backed out, arguing that projects are insufficiently profitable compared to the investment costs and power prices. The eolian industry estimates the potential of land-based, seabed-based and floating windmills to be 15 TWh.

A modern windmill can supply 1,000 households with electricity. According to Norwegian anemometric, wind power production fluctuates with the seasons: production will be highest in winter and lowest in summer. This ties nicely in with other electricity production, partly because eolian power production peaks with demand, and partly because wind power counter-phases with the flow of water to hydropower plants.

Support to wind power projects should be increased. Eolian energy production will become increasingly competitive in a future where oil will be in short supply and carbon cleaning and storage costs will be reflected in energy prices. Like all other industries, eolian plants may cause land-use conflicts but the energy is clean and renewable.

LO will work to ensure that increased public aid schemes trigger good, relevant wind power projects.

Solar energy

Natural sunlight in Norway could produce approximately 1,500 times more energy than today's consumption. That is an enormous, unused potential, even if current technologies clearly limit large-scale usage.

There are many ways of exploiting solar energy. So-called passive solar heating is the most widely used in Norway. Proper architectural designs and choice of building materials can considerably cut heating needs, even in harsh climates. Solar energy contribution currently covers 10-15% of Norway's heating needs - equivalent to 3-4 TWh/year, or 2-3% of the country's fixed energy consumption. The potential for using a more solar energy as passive energy is great.

Active solar energy exploitation requires sun capture technologies that absorb solar energy, a heating storehouse and a grid. Current technology allows solar energy to be used for heating buildings, tap water, and processing heat. About 6,000 m² solar energy capturers are currently installed in Norway for indoor and/or tap water heating purposes. These plants produce about 1.5 GWh heat per year. The potential is theoretically very large but in today's buildings it is only practically possible to install about 3.6 TWh/year.

In solar cells, solar energy is directly transformed into electric energy. Solar cells are appropriate for supplying energy to remote buildings or technical installations. Norway has become a pioneering country developing the solar cells market. There are about 80,000 solar cell installations in Norway, most of which are in leisure buildings.

Solar energy is a rapidly growing sector internationally. Considerable research and development is taking place in order to make solar energy more area- and cost-efficient. Norway is about to get a foothold in the global market and several Norwegian enterprises are investing heavily in this market. Norwegian R&D development in this field should increase.

LO promote increased R&D allocations to solar energy.

Energy supply and grids

Power plant owners must ensure the best possible exploitation of energy resources. Through active ownership, public and private owners have the possibility to and responsibility for influencing both energy supply and energy use. Owners must reserve sufficient funds to ensure continuous upgrading and modernisation of power plants and grids, investing in energy-saving technologies. Legal amendments should make the use state-of-the-art technology mandatory.

Net annual energy losses currently stand at more than 9 TWh. The grid has not been upgraded and developed to the extent necessary to ensure flexibility in energy production and supply. The situation in Mid-Norway is a good example. As a result, Norway may have to use mobile fossil fuel-based power plants, whose substantial carbon emissions are disproportionate to their energy output. Upgrading the grid is a national responsibility that must be prioritised. The Norwegian Water Resources and Energy Directorate (NVE) must amend its grid regulation to ensure that grid modernisation is profitable. Today regulations do not reward these investments.

LO will propose solutions that stimulate energy producers to continuously modernise and upgrade existing plants and power grids.

Energy-intensive industries

Norway is about to become a net importer of electric energy. Basing Norway's future energy needs on imports is not a sustainable policy. The need for stable energy supplies to the industry, increased energy consumption in the development of oil and gas resources, and the need to cut emissions from the NCS all require increasing energy production in Norway. In the short term, this power deficit can only be covered by increasing the number of gas-fired power plants in conjunction with an early development of renewable energy sources, and other measures for a more efficient energy use.

The Norwegian power-intensive industry is one of the most environment-friendly in the world and its products are and will be in demand. It would be an admission of failure to close down this industry – only to see that production is relocated to other countries that do not have the same environmental requirements. However, this argument must not be an excuse to relax. Strict Norwegian environmental requirements will continue to be an incentive for developing this industry through a high level of skills and world-leading technologies. The possibility for additional emission cuts in the power-intensive industry lies in R&D. The aluminium sector is a good example of how substantial greenhouse gas emissions cuts have been achieved with the active support of shop stewards.

In 2004, the power-intensive industry consumed 33.4 TWh, equivalent to 28% of the total Norwegian energy production, in addition to substantial quantities of carbon and coke. While energy is an important input factor, industrial processes also generate substantial amounts of surplus heat and waste gas. Increased investments in energy efficiency and recycling, and in cleaning the energy-intensive industry's carbon emissions will help to limit total climate change emissions.

LO will promote cutting carbon and other greenhouse gas emissions from power-intensive industries by advocating that new production capacity be based on more environment-friendly technology and products, and by facilitating the rational consumption of energy and heat, including measures for energy saving and recycling.

Flexible mechanisms

A quota system for trading emission rights is an efficient instrument for reducing emissions and it signals that climate gas emissions and price are linked. 'The polluter pays' principle is an important tool in modifying behaviour and in financing environmental measures.

Norway must exploit this possibility through the Kyoto protocol, since it cuts emissions where the cost per measure is lowest, thus offering greater cuts per NOK invested. As many countries and sectors as possible must form part of a quota trading system. Norway is thus right in implementing the EU quota trade directive, affording Norwegian enterprises the same fair framework conditions as their European competitors.

The quota system must be sensibly designed in order to ensure the funding of real improvements – e.g. investments in long-term environment-friendly production – and to avoid its simply becoming a fiscal duty. The question of free quotas, sale or auctions must take this dilemma into account, as must the debate on the design of a European quota system post 2012.

One of the requirements for a new global climate agreement after the Kyoto period 2008 – 2012 will probably be industrialised countries' ability and willingness to launch national measures to cut climate change emissions. Accordingly, industrialised countries can not rely on unlimited international quotas as their primary means of cutting emissions.

LO will promote the broadest possible post 2012 quota system, that comprises as many countries as possible, and which includes international shipping and aviation.

Transport

The transport sector is the largest source of climate change emissions, accounting for nearly 1/3 of total emissions. Greenhouse gas emissions from the transport sector increased by 29% in the period from 1990-2004. Road traffic alone represents about 19% of Norway's emissions. Reliable statistics on emissions from aviation are lacking since international aviation is not regulated by the Kyoto protocol. Inland aviation in Norway contributes only with approximately 2% of the emissions and if we include the Norwegian share of international aviation, the figure rises to about 7%. High altitude CO₂ emissions have 2-4 times the impact of emissions near the ground.

In recent years, car and airplane engines have become more efficient and CO₂ emissions have thereby been cut considerably. Technical innovations are therefore an important tool for limiting carbon emissions. Nevertheless, these cuts are more than offset by the growth of road transport. Climate challenges can thus apparently not be solved solely by increasing innovations in the transport sector or by shifting to more environment-friendly forms of transport.

Hopes for sustainable transport therefore require several instruments – both facilitating schemes and regulations. The institutional framework conditions must accommodate investments in roads and public transport. Road projects are to a large extent financed by earmarked grants from the State, while public transport depends on general State grants to the county municipalities, and thus competes directly with other sectors such as health, welfare and education. Consequently, conditions for public transport are determined by factors other than environmentally correct and sustainable development.

Planning and physical measures will be important in the coming years. So far, the dominant form of physical measures in the transport sector has so far been the construction of more roads, tunnels and bridges. Measures aimed at limiting motoring through geographical constraints on permits for building residential areas, shopping centres, workplaces etc. have had minimum impact. On the contrary, again we see that large shopping centres are built far away from the residential areas – after the shopping centre ban was lifted.

In Norway - as in most other countries – transport is a fundamentally important sector for economic progress and social needs. Norway's geographical and residential characteristics contribute present special and varied challenges for the transport sector. A wide range of instruments must be combined if one hopes to achieve substantial climate change gas emission cuts from this sector. The government must contribute with financial incentives that promote green transport, develop infrastructure and assist transporters.

Distinguishing transport growth from economic growth is vital. Planning infrastructure and transport cannot uncritically be based on trend forecasts of increased motoring and aviation. These analyses force short-term solutions instead of long-term goals. The different transportation authorities must coordinate their plans to a much larger extent than has hitherto been the case.

Ill-timed subsidies of road transportation and the pricing of public transportation must also be closely examined. Transportation and infrastructure are subsidised through different regimes. There is reason to believe that several of these subsidies are unfortunate from a climate perspective. Reviewing these arrangements in the light of their effect on total emissions in the transport sector would be a step forward.

Considerable resources should be devoted to public transportation, such as rail, trams, undergrounds and bus lanes, as well as the building of thoroughfare high speed bicycle lanes. Road pricing should be GPS-based and congestion taxes introduced in the major cities. Employers must stimulate their employees to use public transportation or bike to work.

There is a huge need to further develop and upgrade existing rail tracks. High speed trains have developed rapidly in recent years, but rail infrastructure has not kept pace and the result is that train speeds in Norway have not increased in the past 30 to 40 years. The main stretches between Oslo and the other major cities in Southern and central Norway are particularly well suited for railway passenger and freight transport, and the travel frequency is high compared to other European stretches. Upgrading existing tracks to accommodate high speed trains and building new high speed tracks with more crossings for freight trains would allow rail to increase its share of both freight and passenger markets. Complete electrification of the rail system should also be an environmental priority.

The transport sector must make greater use of natural gas, especially on ships and in public transportation and thus contribute to effective carbon emission cuts.

Norway must follow up on the EU directive on biofuel that mandates tax exemptions for E85 fuel, lower duties on cars and makes public access to biofuels mandatory for oil companies and petrol stations. Biofuel infrastructure must be developed and an efficient tax policy should be instituted in order to make environmentally friendly cars competitive in the Norwegian market. The transition to biofuels should be thoroughly studied with a view to resource economies and land use.

LO will actively promote and contribute to a national transport plan for the period 2010-2019 that focuses on actions to promote environmentally- friendly transportation.

Tourism

Tourism is one of the fastest growing industries in the world. People chose their destinations depending on climate and weather conditions. Accordingly, climate changes will have a substantial impact on future viable tourism destinations and the type of tourism that can be promoted. In Norway, a winter tourism destination, the disappearance of snow and melting glaciers will have a huge impact.

Our choice of holiday destinations and travel patterns will also have an impact on future's climate. As Norway is vying to attract more tourists and markets itself as one of the best and most attractive experiences in natural and clean surroundings, policies to cut greenhouse gas emissions should be a logical and important part of our tourism strategy.

The tourism industry has many means to cut emissions. The choice of destinations and thus the means of transportation that is to be used is one way. Norway has a well-developed public transportation system and it is relatively easy to set up holiday packages that include public transportation. Charter travel by railroad or bus is a growing market in Europe and should also become an attractive alternative in Norway.

A lot can be done to cut emissions from hotels and overnight accommodations, particularly in the field of energy consumption, by lowering temperatures in vacant rooms, curbing water consumption, avoiding disposable packaging etc. This would require providing staff with timely and adequate training and stable working conditions.

LO will promote the development of a national tourism strategy that affords green tourism a privileged position and encourages the industry to think climate in all contexts when they develop their products.

Consumption and procurement

In a consumer context – i.e. households and private consumers -, Norway may be said to be a super developed country, in the sense that a proportion of the population can afford a high level of consumption of goods and services. Nevertheless, a major part of this consumption is not sustainable, because the products and services are quite energy-consuming throughout their useful life and thus increase pollution levels. Many of the environmental improvements achieved in production and consumption are offset by the increased consumption of polluting products and services.

A good illustration is the consumer footprint. The average Norwegian consumes about 6.1 ha (more than 60,000 km²) of land in his/her lifetime. The world average stands at 2.3, the US topping the list with 10 ha per person and Bangladesh ranking last with 0.5 ha. The world produces only 1.9 ha per person and for Earth to regain its balance using current technology, we would have to cut the world's average consumption. The Western world would have to account for the entire cut and also help other countries, China and India being a case in point, to achieve their welfare goals through less environmentally harmful technologies.

A flight to Southern parts of the world for a family of four leaves the same footprint as the energy consumption of their home over a whole year. The lesson is not necessarily that we change life-styles, but that we become much more conscious in our choice of products and services that pollute less; e.g. offset emissions from international air travel with voluntary climate levies or using public transportation whenever possible.

We cannot assume that innovation and new technologies alone will cut emissions. Environmental improvements in consumer patterns are most of all to do with individual choices. Important tools to encourage green choices are information and guidance through green labels schemes.

Another important area directly related to consumption, is public and private procurement. Norwegian public procurement comes to approx. NOK 280 billion and focusing on environmental aspects during the procurement process is not customary. Public entities acquire 30-40% of all goods and services produced by the construction sector. If the public sector were a more demanding client, the environmental impact on the entire value chain would be substantial.

Although increased knowledge and information to procurement officers in public entities would help to lower the strain of public procurement on the climate, financial concerns will often pull in the opposite direction, particularly in local government. Clear national guidelines for mandatory environmental criteria in public procurement should be adopted. Vendors would thus have more predictable and stable conditions and be better equipped to adapt to increasingly strict requirements. In addition, these solutions may turn out to be substantially more cost-effective.

LO will promote measures that aim to make public and private procurement less environmentally harmful. LO will raise the consciousness of union members in terms of sustainable consumption.

Waste management

Increasing volumes of biodegradable waste are left to rot in waste dumps. Every year, every Norwegian produces nearly one tonne of decomposable waste, more than a quarter of which ends up in municipal waste dumps. Rotting waste produces methane, a greenhouse gas. Methane accounts for 4% of total greenhouse gas emissions in Norway and burdens the atmosphere 20 times as much as carbon does. Methane produced by waste dumps is therefore flared by order of the Government. Methane contains energy that could be exploited instead of flaring the gas, as is currently the case in most of Norway.

Waste heaps keep growing but increased recycling has slowed down the pace at which they grow. More stringent regulations for waste management have increased the useful exploitation of waste as a resource. Still, economic growth generates more waste. Local governments are responsible for collecting and handling household waste, while business has a greater responsibility for handling their own products covered by producer responsibility rules. In many cases, waste is a resource that could be exploited if adequate systems were in place. There are many examples of matter that used to be seen as industrial waste, now being used as raw material for new products and new industrial plants.

Emission cuts in the waste sector carry a relatively low cost and are an important step in the right direction. Organic waste should be exploited as an alternative to oil, a measure that would be doubly profitable in the context of climate change gases. The main goal, however, should be to limit the production of waste. LO has always favoured banning waste deposits. The ban would cut methane emissions by 32% in five years. Capture and exploitation of methane from waste dumps should be studied in detail.

Efficient measures in the waste sector would promote sustainable development by lessening the strain on health and the environment.

LO will promote reducing waste production to a minimum level through mandatory sorting of rubbish according to their source, a ban on waste dumps for biodegradable waste, and facilitating recycling and reutilisation.

Tripartite cooperation on innovation and cleaner production

Norwegian business and industry are well positioned to be at the forefront of developments towards a low-emission society – if conditions are provided. Norway must invest in industries and technologies in which we have environmental, financial and social advantages. This will affect individual workers and individual workplaces. Developing a climate-neutral society depends on how knowledge is developed and applied – how knowledge is translated into innovation as the foundation for new, sustainable activities. The combination of high levels of knowledge, skilled workers, involvement, inclusion and tripartite cooperation will make important contributions in this context.

Reorganising operations and production in a more environmentally-friendly, sustainable and ethical direction is usually a decision taken by company management, motivated by the commercial advantage of making strategic choices based on these criteria. Profiling the environment, ethics, health and social responsibility has proved to be more feasible in companies that are accustomed to tripartite cooperation. Accordingly, climate challenges should be included in the work of traditional tripartite bodies (corporate assemblies, tripartite committees and OHS-committees) established by law. Shop stewards, board members representing the employees, safety deputies and individual workers should increasingly use legislation, collective agreements and democratic procedures to convert their workplace into an arena for correct environmental action.

Innovation, creativity and continuous improvement are basic preconditions for capping greenhouse gas emissions. Old technology, processes and products should be replaced. Improvements and innovation entail more than ambitious high-tech novelties. In most workplaces, a number of procedures and tasks could be reviewed in order to make them more efficient and less resource-consuming for employees and for the climate, while at the same time producing gains for the company. In this sense, improvement also includes social and organisational advances directed at new forms of cooperation at the workplace, in the company and between companies. The goal should be to maximise the results of the individual worker's skills and competence and to achieve cooperation at the workplace that continuously improves routines, procedures and products. An environmentally-friendly industrial development can only be developed in an interaction in which management, shop stewards, employees, clients, vendors and government all play their role and pull in the same direction.

There is already a considerable involvement and initiative in environmentally correct operations among employees in Norwegian companies. These examples should be highlighted in order to inspire others. A precondition for success is that employees, shop stewards and company management speak the same language and pursue the same goals. The programme VS 2010 will provide an important vehicle for experience sharing. The programme has increased the ability to innovate and reorganise in companies in which management and employees cooperate on developing specific projects.

LO will become more involved in the conditions for a sustainable industrial development, focusing particularly on tripartite cooperation and employee participation as the foundation for environmental skills, motivation and innovation.

Municipal and regional responsibilities

Local governments have the possibility to influence sectors that are heavy climate change contributors. Local governments are at the same time political agents, service providers, authorities, landowners, and are responsible for planning and providing good places to live to the Norwegian population. Local governments can thus make substantial contributions to cutting greenhouse gases, in their own operations as well as by stimulating others to cut theirs. In particular, local governments can influence emission levels caused by transportation, waste dumps, agriculture and stationary energy consumption.

Climate-friendly industrial development must be based on some criteria for success:

Co-participation	Conditions that welcome involvement, participation and enthusiasm.
Network and cooperation	Networks and cooperation at the local and regional levels between local branches, companies, communities and authorities.
Competence	Highly skilled and knowledgeable workforce.
Ethics and values	Consciousness about the impact on climate of production and consumption in visions and strategic choices.
Innovation/improvements	Pioneering environments in companies and the market
Financial	Financially profitable for the company

An estimated 20% of Norwegian greenhouse gas emissions are related to municipal measures and actions, on the assumption that 25% of all transportation is local transportation. A summary of actions covered by municipal measures in SFT's 2005 climate analysis indicates a potential for emission cuts in the range of 8 million tonnes CO₂ equivalents in 2020.

The total savings potential for the use of municipal measures in land use and transportation is estimated at up to 2 million tonnes CO₂ equivalents in 2020. An essential prerequisite for this aim to be achieved are structural changes in the local communications systems and the car population. A salient feature of this area is that changes must occur at an early stage in order to set up a future-oriented infrastructure, while the largest savings potential will be realised in the long run.

Local and regional government buildings account for one third of total energy consumption in office and industrial buildings. This stationary energy consumption has its greatest potential to cut emissions by replacing fuel-based heating and other fossil energy sources, for example electricity produced in gas-fired power plants that do not have CO₂ handling systems in place. Lowering current levels of electricity consumption would substantially cut emissions indi-

rectly, because of electric power imports. Enlarging the teleheating grid would spawn the largest direct emission cuts.

In the construction sector, the most effective measures are energy saving, less consumption of energy in new buildings, and introducing heating based on biological materials and on solar energy.

All of these measures would produce substantial savings. If all of Norway's local government had implemented simple energy-saving measures in their own buildings, the total savings would amount to more than NOK 500 million in annual energy expenses. Substantial cuts can be achieved in privately owned buildings; consequently, building licensing and planning permissions are important tools.

Agriculture typically requires using local, regional and national measures. If one level is lacking, few measures will be implemented. All of these measures will spin off cuts in other emissions, giving these actions added value. A vital issue is different ways of treating agricultural waste, in the production of biogas or biofuel, possibly in cooperation with municipal or intermunicipal waste treatment plants.

Local governments have the key to applying all of these measures. State ban on dumps for organic waste is a trigger factor. It is primarily the increase in methane flaring from existing dumps that has helped lower emission levels. In the course of a few years, the effect of the waste dump ban will account for the main part of the cuts. Organic waste treatment (composting, recycling and incineration) will, in the long run, be the most important contributing factor to emission cuts in the waste sector.

As a consequence of the reorganisation of existing county municipalities into a so far unknown number of regions as of January 1 2010, the Parliament and the government have decided that environmental policy-making and implementation be transferred from the county municipalities to the new regions. This entails increasing democratic control over environmental issues by subjecting them to debate and decisions in popularly elected local and regional assemblies, a feature that will be further developed in separate plans that will specify responsibilities and funding.

The programme 'Measures for regional R&D and innovation' (VRI) comprise the National Research Council's regional efforts, to be managed by the regions, who will also decide on the areas to be prioritised. VRI will provide a broad focus on innovation in the regions, and should thus attach greater importance to climate issues. These entail the follow-up and possibly also increase of programme grants.

LO will promote the active use of local government powers to accommodate a more climate-friendly local development. LO's district offices will get involved in regional processes that have an impact on the climate.