



The Swedish Climate Strategy

Summary Gov. Bill

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1 The purpose of the Bill

The purpose of the Bill is to put forward a strategy, i.e. to present a concerted picture of current climate policy activities in Sweden, in the EU and on the international plane. The problem, as everyone appreciates, is supremely manifold, but, as the Bill shows, there exist a diversity of policy instruments for solving it. An immense political and administrative machinery has now started up and is accelerating. It is not the purpose of the Bill to present a list of new policy measures and to say exactly what emission reductions will result from every measure taken.

Here targets are set for climate policy.

Swedish emissions of greenhouse gases are to be at least 4 per cent lower in 2010 than they were in 1990.

This aim is to be achieved without any compensation for uptake in carbon sinks or by use of Flexible Mechanisms. At the checkpoint in 2004 the Government intends, as an adjunct, to consider a target which incorporates the Flexible Mechanisms.

This is a substantial *unilateral* commitment over and above what Sweden needs to do under the Kyoto Protocol to the United Nations Framework Convention on Climate Change. When the Protocol has entered into force, the European Union as a whole shall reduce its emissions by 8 per cent during the period ending in 2010, counting from the base year of 1990. This reduction target, however, has been divided between the countries in such a way that some will have to achieve heavy reductions while a few will be entitled to increase their emissions. Sweden, which has relatively low per capita emissions and which had reduced its emissions a great deal before 1990, became enti-

tled to increase its emissions by up to 4 per cent.

The Government Bill, then, means Sweden *reducing* by 4 per cent instead of *increasing* by 4 per cent. Other countries have also announced stricter targets than they are legally committed to under the Kyoto Protocol and the agreement within the EU. The greenhouse gases affected are carbon dioxide, methane, nitrogen oxide, HFCs (hydrofluorocarbons), sulphur hexafluoride and perfluorocarbons. They are to be calculated as indicated in the Kyoto Protocol and by the UN Intergovernmental Panel on Climate Change. Strictly speaking, the target here is not 2010 but the average of the years between 2008 and 2012, because a single extreme year (in meteorological terms, for example) must not be made decisive.

Swedish climate policy and the national target are to be continuously followed up. If emissions do not diminish according to the target, the Government may propose further measures or if necessary review the target. Account shall be taken of the competitive strength of Swedish industry. Checkpoints are proposed for 2004 and 2008.

Sweden shall act internationally to prevent the concentration of greenhouse gases exceeding the equivalent of 550 ppm (parts per million) carbon dioxide equivalents. By 2050, emissions of greenhouse gases in Sweden should total less than 4.5 tonnes or carbon dioxide equivalents per capita per annum and emissions should continue to decrease thereafter.

Limitation of climatic impact shall be achieved through an active climate policy integrated with the entire community. Each individual must assume his share of responsibility. This applies to both national and local authorities as well as to business undertakings, organisations

and individual persons. The policy instruments to be used are economic instruments (such as environmental taxes, subsidies, removal of subsidies), legislation, voluntary agreements and a dialogue between the state and business enterprise.

Sectorial responsibility needs to be developed, i.e. clarification as to which authorities are responsible for climate policy in a sector of society (e.g. in the sectors of transport, industry, power and heating, buildings and regional policy). Inter-sectorial working methods are also to be developed, including environmental management systems, environmental declarations, environmental labelling, development of environmental technology and environmentally appropriate procurement.

To achieve the goals, the Government proposes a number of measures to be launched at the earliest possible opportunity, namely:

- Information to raise the level of knowledge concerning the climate issue.
- Climate measures in local investment programmes. Several billion crowns have already been invested through these programmes in projects yielding both environmental benefits and employment, but in future these are to focus predominantly on climate-related measures.

- Promotion of alternative fuels, for example ethanol.
- Promotion of electricity from renewable power production sources, through compulsory quotas under what are termed green certificates (in accordance with an impending Government Bill).
- The Environmental Objectives Council - as provided in the Environmental Objectives Bill - will be tasked with co-ordinating the work of national authorities in the climate sector.

The climate objectives are to be cost-effectively achieved. The strategy comprises the energy and transport policy decision now in force, the Government Bill on a sustainable transport system and an Energy Bill to be introduced by the Government in the spring session of the Riksdag (parliament) in 2002. Further measures and definitions may become necessary. Monitoring, accordingly, is an essential part of the strategy.

The Government proposes that the Riksdag give it a mandate to recognise the Kyoto Protocol on condition that the EU has made a binding decision on mutual and location of emissions within the EU and ratification takes place together and simultaneously with the EU and its other Member States.

2 The question and its preparation

The climate problem is global by nature. Sweden has signed and ratified the UN Framework Convention on Climate Change which was adopted at the UN Conference on Environment and Development in Rio de Janeiro in 1992. Since that Convention entered into force, the parties have held regular conferences. At the Third Conference of Parties, in Kyoto in 1997, a Protocol was adopted, setting out times and quantitative targets for reducing emissions.

The text of the Convention itself includes the express aim of stabilising emission in the industrialised countries at their level in 1990. Sweden resolved, through a Riksdag resolution in 1993, to make this its objective, in the sense of emissions of carbon dioxide (the most important greenhouse gas) from fossil sources being stabilised at the 1990 level by 2000 at the latest and being reduced thereafter.

A target resolved on by the Riksdag previously, in 1988, to stabilise emissions at “the present-day level”, on the other hand, was elevated as an effect, because emissions in 1990 were lower than they had been in 1988. This decision led to the introduction of the world’s first significant carbon dioxide tax, in 1991. The 1993 Riksdag resolution stressed that climate policy should be framed in an international perspective and by comparison with measures in other industrialised countries, so that Sweden would not assume a significantly heavier economic burden than the countries we have to compete with.

The Riksdag resolution on energy policy, passed in 1997, laid down guidelines for a climate strategy in the energy sector. Those guidelines call for Swedish emissions of carbon dioxide in the energy sector to be limited as far as possible, having regard to competitive strength,

employment and welfare. In the energy sector, the guidelines also mean that the climate strategy is to be framed against a background of comparisons with measures actually taken by other countries, so as to avoid imposing a substantially heavier burden on Swedish industry than the competitor countries impose on theirs.

The Environmental Objectives Bill, passed by the Riksdag in April 1999, established that the objective of Reduced Climate Impact means that international activity should focus on stabilising the concentration of carbon dioxide at less than 550 ppm, and on concentrations of other greenhouse gases not increasing. It is also stated that initiatives in other countries will be crucial to the attainability of the objective.

In its Bill Transport Policy for Sustainable Development, the Government judged that by 2010 emissions of carbon dioxide from transport should have been stabilised at the 1990 level. To achieve this intermediate objective, a strategy is needed for improving the efficiency of transport systems, coupled with leaner vehicles and the introduction of renewable fuels.

In April 2000 the Parliamentary Climate Committee presented its final report, and the Government Bill is to a great extent based on that report and the comments received on it.

In its work on the Bill, the Government has also given the National Environmental Protection Agency three assignments to shed light on carbon dioxide emissions from cars in relation to transport capacity, the effect of land-fill sites on global warming, and instruments for minimising emissions of fluorinated greenhouse gases.

The proposals in the Government Bill have been framed in co-operation with the Left Party.

3 The climate system and the impact of greenhouse gases

The climate issue – a global challenge

The climate issue is one of the greatest global environmental problems and affects all sectors of society. Climate changes can have major and adverse effects on agricultural, urban development, culture, the economy and ecosystems. Every long-term decision, therefore, must be made in the light of these risks. The caution principle must apply. The way in which the climate issue is handled will be of great consequence for the whole of social development. To restrain climate changes, changes need to be made to our social system. The industrialised countries bear a large part of historical responsibility for the growing concentration of greenhouse gases in the atmosphere, and they account for more than half of present-day emissions. The USA releases 21 tonnes of greenhouse gases per capita annually, Europe 8, Sweden 6 and Africa 1 tonne per capita.

Emissions are unevenly distributed, and it is probably the poor countries which are worst hit by climate changes. For this reason, according to the Framework Convention, the industrialised nations¹ must set an example. In the long term, however, emissions also need to be restrained in the developing countries.

Sweden's carbon dioxide emissions are among the lowest capita in the OECD countries, and in proportion to GDP (a measure of industrial carbon dioxide intensity) Sweden accounts for roughly 0.2 per cent of global emissions. This is not to say that what Sweden does is of no importance. For one thing, Swedish climate policy can contribute towards the development of techniques and policy instrument combining reduced emissions with growing prosperity, high employment, good competitive strength for Swedish enterprise and good development for the poor countries.

Long-term reductions of greenhouse gas emissions and consideration of global justice

Whereas the affluent countries will have to reduce their emissions, the poor countries may need to increase their use of fossil fuels for some time to come. But it is also supremely important that the developing countries should have the possibility of investing in ecologically sustainable solutions. This can be achieved through transfers of technology and know-how. The UN Commission for Sustainable Development maintains that the decisive challenge lies in increasing the supply of energy and transport for the developing countries without the environment suffering as a result.

The Intergovernmental Panel on Climate Change (IPCC) has described a number of scenarios of future emissions of greenhouse gases which illustrate how much will have to be done if unduly drastic climate change is to be avoided. The medium term scenario points to a rise in the carbon dioxide concentration to 550 ppm, twice the pre-industrial level, which was 270 ppm, and worth comparing with the present-day (2000) level of 368 ppm. According to the Committee on Climate, 550 ppm carbon dioxide would mean excessively great risks, and it therefore proposes that the objective be made to equal 550 ppm, also including the effect of the other greenhouse gases. This means that global emissions of carbon dioxide will have to be reduced from 4.8 tonnes per capita today to 3.2 or 3.6 tonnes in 2050. Sweden, as mentioned earlier, releases about 6 tonnes per capita annually. The distribution of this reduction is a question of justice.

Patterns of emission differ a great deal from one country to another. Sweden's emissions declined heavily during the 1970s and 1980s, above all as a result of the policy of reducing dependence on oil. Sweden has small emissions from electricity pro-

¹ For the purposes of the Framework Convention, the industrialised nations comprise the so-called Annex 1 countries: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, the Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Spain, Sweden, Switzerland, Turkey, the Ukraine, the United Kingdom and the USA.

duction, whereas many other countries have a great deal of coal-fired power production.

The greenhouse effect

The growing concentration of greenhouse gases in the atmosphere means that more heat from solar irradiation is trapped in the earth's atmosphere, rather in the way that a teapot with a tea cosy keeps a higher temperature than a teapot without one. This has the effect of raising the earth's average temperature, which in turn changes the patterns of precipitation, winds and marine currents.

There is also a natural variation of climate, but if we wait until we can definitely distinguish increased greenhouse effect from natural variations, it will be too late for serious effects to be prevented. We are therefore thrown back on model calculations. These have been performed since the 1980s and the method has been improved since then, resulting in a convergence of model predictions and observed data and, accordingly, more dependable predictions.

The greenhouse effect also existed before human activity started to impact on climate. Water vapour, carbon dioxide, methane and Nitrous oxide have made the earth a great deal warmer than it would have been without these gases. As a result of human activity, however, the concentration of these gases has increased, and industrial gases have been added which never existed previously.

The earth's climate is affected by many factors apart from greenhouse gases. Particles from volcanic eruptions can cause temporary cooling, as can emissions of sulphur and particles from industry and traffic.

The increasing greenhouse effect concerns the atmosphere closest to us, up to an altitude of about 10 kilometres. In the next stratum, the stratosphere, the greenhouse effect can result in cooling. Returning to our simile of the tea cosy, it is colder on the outside of a tea cosy than on the outside of a tea pot without a cosy – the heat is trapped. This is disquieting, because it is with the stratosphere at its coldest that "ozone holes" develop. True, emissions of ozone-destructive CFCs have diminished, and their concentration in

the actual stratosphere is now also starting to decline. Cooling of the stratosphere can mean the ozone layer taking longer to recover.

In what way is the world's climate liable to change?

Even with vigorous counter measures, the concentration of greenhouse gases will go on increasing, but the increase can be restrained.

During the twentieth century, the global average temperature rose by approximately 0.6°, which is probably the greatest warming rate to have occurred in the past 1,000 years.

According to the IPCC Third Assessment Report (TAR) for 2001, globally averaged surface temperature will increase by 1.4-5.8°C in a hundred years. The span is mainly due to a variety of assumptions and to a lesser extent to uncertainty inherent in the model.

Warming will be unequally distributed over the years. Precipitation too is expected to be redistributed, with some regions becoming more arid and others receiving much heavier rainfall. A drastic climatic change of this kind is liable to have serious social, economic and ecological consequences.

Some of the consequences will be abrupt rather than gradual. Certain models point to the possibility of the Gulf Stream being brought to a complete standstill in the long run if warming continues for any length of time.

Animal and plant species which are unable or do not have time to migrate can be eliminated, as can perhaps entire ecosystems.

Special and biotopes which are now protected through national parks may, for example, have difficulty in both remaining and migrating.

Changed conditions for agriculture and forestry, as a result of more frequent flooding and the wider extent of tropical diseases, may have direct economic consequences.

The carbon cycle

Carbon is present in the soil, in living animals and plants, stored as fossil fuels in the earth's crust, and in the atmosphere and the oceans. In the natural carbon cycle, carbon uptake by plants is balanced through photosynthesis, by an equal

amount of carbon dioxide being emitted from degradation.

This carbon cycle has been disrupted by the combustion of fossil fuels, but also by deforestation. According to the IPCC, combustion of fossil fuels yields an increment of 6.3 billion tonnes of carbon annually, deforestation 1.6 billion tonnes. Of this, 2.3 billion tonnes are absorbed by growing biomass and the same quantity by the oceans, leaving a net increase of 3.3 billion tonnes of carbon, the equivalent of 12 billion tonnes of carbon dioxide.

There are several points of uncertainty about these estimates and even greater uncertainty regarding non-carbon greenhouse gases.

The IPCC points out that increased carbon uptake in so-called carbon sinks - for example, through afforestation - can be an important adjunct to emission reductions.

Greenhouse gases

The Kyoto Protocol lists six greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (FCs) and sulphur hexafluoride (SF₆). Ozone-degrading gases (CFCs) can also have an impact on climate, but these are being phased out under the Montreal Protocol.

As an easy way of comparing the climatic impact of different gases, reference is made to their GWP (Global Warming Potential). Most often this is calculated in a 100-year perspective.

Table 3.1 GWP (100-year) values of certain greenhouse gases

Gas	GWP (100 years)
Carbon dioxide, CO ₂	1
Methane, CH ₄	21
Nitrous oxide N ₂ O	310
HFC 134a (a hydrofluorocarbon)	1,300
CF ₄ (a perfluorocarbon)	6,500
Sulphur hexafluoride, SF ₆	23,900

Carbon dioxide

Carbon dioxide is the most important of the six gases. Emissions in Sweden totalled 56.3 million tonnes in 1999, as compared with 55.9 in 1990. Preliminary data suggest that emissions in 2000 were lower than for 1999. If so, the Riksdag reso-

lution to stabilise emissions in 2000 at the 1990 level has been accomplished.

What has happened is that emissions from heating have declined, while those from transport and industry have increased.

Year-on-year comparisons are made difficult by certain years being warmer or yielding more hydropower than others.

Methane

Methane comes mostly from agriculture and landfill sites. Emissions in 1999 totalled 6.2 million tonnes carbon dioxide equivalents, 0.6 million less than in 1990, due mainly to a reduction of landfill emissions.

Nitrous oxide

Nitrous oxide is emitted from combustion processes, from farmland and manure and from the production of artificial fertiliser. Emissions in 1999 totalled 7.2 million tonnes carbon dioxide equivalents, which was roughly the same as in 1990

Fluorinated gases (HFC, FC and SF₆)

The three fluorinated gases accounted in 1999 for 0.8 million tonnes carbon dioxide equivalents, as against 0.5 million in 1990. HFCs are used mainly as a CFC substitute in refrigeration plants, and use of this kind has increased. SF₆ is emitted, for example, from high voltage switches. FC comes mainly from aluminium production and declined during the 1990s.

Breakdown of greenhouse gas emissions

Sweden's emissions of the six gases in 1999 totalled 70.7 million tonnes, a slight increase on 70.5 million tonnes for 1990. Corrected, however, for a normal year, emissions declined somewhat between 1990 and 1999.

The biggest sources of greenhouse gases are "energy", above all heating, which contributes nearly half, transport (nearly 30 per cent), agriculture (about 10 per cent) and process industry etc. (about 8 per cent).

International shipping and aviation are not included in the national commitment but are separately accounted for all the same.

4 International climate policy

Global co-operation

The UN Framework Convention on Climate Change was negotiated in Rio de Janeiro in 1992. At the First Conference of Parties (COP-1) in 1995, the parties resolved to negotiate a legally binding Protocol setting quantified limitation and reduction objectives for action by developed countries according to specified time-frames. It was also resolved not to introduce any new commitment for developing countries during the initial period.

A Protocol of this kind was negotiated in Kyoto in December 1997 and signed by 84 countries, Sweden among them.

In this Protocol, the industrialised nations pledged themselves to reduce their emissions by an average of 5.2 per cent, but variously distributed. The EU commitment is –8 per cent, USA's –7 per cent and Japan's –6 per cent.

At Kyoto the EU expressed its intention of reapportioning its commitment between the Member States.

Many questions could not be resolved at Kyoto. The Sixth Conference of Parties in The Hague, in November 2000, failed to solve them, but when this conference was resumed in Berlin in July 2001 agreement, to the delight of the participants, had been reached on all the big issues, and at the Seventh Conference of Parties in Marrakech, in November 2001, a Protocol was finally achieved, ready for ratification.

Great drama ensued after the USA, having ratified the Framework Convention on Climate Change and signed the Protocol, pulled out of the process in April 2001. The agreement will not enter into force until it has been ratified by at least 55 countries representing, between them, 55 per cent of greenhouse gas emissions from the industrialised countries. Since the USA accounts for about roughly 25 per cent of the world's emissions and a far greater share of emissions from the industrialised nations, the

agreement required endorsement by practically the whole of the industrialised world.

The main question on which unity was sought and finally achieved at The Hague, Berlin and Marrakech were:

- conditions and rules for Flexibility Mechanisms,
- rules for the use of carbon sinks,
- support for the developing countries and tools for co-operation between industrialised and developing countries, and
- the development of rules on sanctions and other consequences in the event of a party failing to fulfil its obligations.

These terms are explained further on in the text.

The agreement reached applies only to the first commitment period, 2008-2012, but, according to the Protocol, negotiations for the next period, 2013-2017, are to be opened not later than 2005. In the Government's opinion, long-term and much more far-reaching reduction target will have to be established.

The Government also takes the view that the developing countries should in some way participate in post-2012 commitments. This shall be done as part of a concerted approach contributing towards development and the fight against poverty in the developing countries. Both within the EU and as representing an individual country, the Government will work for a return of the USA to the negotiating table.

Decision on mechanisms

The Conference of Parties at Kyoto in 1997 established the three Flexible Mechanisms:

- Joint implementation, i.e. one developed country carrying out projects in another and being credited with the resultant reduction of emissions.

- Clean Development Mechanism, i.e. a developed country carrying out a joint emissions reduction project with a developing country and being credited with the emission reductions.
- Emissions trading between developed countries, in such a way that a country which reduces emissions reduction in excess of its commitment can, but need not, sell emission rights to a country which has difficulty in meeting its target.

The purpose of these mechanisms is to lower the cost of emission reduction (all three), and to provide technology transfer from affluent developed countries to poorer developed countries (joint implementation) and to developing countries (clean development).

Joint implementation

The emission reduction with which the investor country can be credited are deducted from the host country's emission rights. In most cases accounting presents little difficulty. The Protocol does, however, foresee one situation, namely that of the host country's statistics being inadequate. If so, stricter accounting of the project is required, with independent scrutiny. In this way one single country's inadequate accounting can be prevented from wrecking the whole system.

According to the Protocol, the host country itself may decide what contributes to that country's sustainable development. Nuclear power projects, however, are excluded.

Emission reductions may be credited from 2008.

Clean Development Mechanism

The Clean Development Mechanism (CDM) exists for investments by developed countries in developing countries. Emission reductions from 2000 onwards may be credited.

Projects are to be approved by an independent body, which will pre-examine project activities and verify the emission reductions actually achieved. A share of the proceeds from these

certified project activities will go towards adaptation costs in countries particularly vulnerable to the adverse effects of climate change.

Afforestation projects are permitted during the first commitment period.

Nuclear power projects are not permitted.

Small projects are to be given special treatment under simpler rules.

An executive board of the Clean Development Mechanism was elected at the Conference of Parties in Marrakech.

Emissions trading

Trading shall be recorded so that all transactions can be traced. The national records are to include the quantity of emission rights which the country has according to the Protocol, with additions and deductions for joint implementation and clean development projects. Countries having such a record may trade with each other. Trading is expected to begin in 2007 at the earliest.

At the end of the commitment period, each party shall give an account of compliance with its commitment. If its emission reductions have exceeded its commitment, it may sell the surplus or carry it over to the next period.

Governments may authorise business undertakings to trade emission rights with each other, according to principles of their choosing. On the other hand a Government can never divest itself of responsibility for meeting its commitments. The role of business enterprise, accordingly, is not addressed in the Protocol.

Flexible mechanisms – principles, rules and guidelines

At the Conference of Parties in Marrakech, rules were laid down for the calculation of mechanisms and sinks, other than sinks in CDM, and on the extent to which they can be carried over to subsequent periods after 2012. In practice this imposes few limitations on a country like Sweden.

Decision on sinks

Growing forests absorbs carbon dioxide, i.e. acts

as “sinks” for carbon dioxide. When the Kyoto Protocol was adopted in 1997, the participant countries agreed that it was to include sinks, but that only directly anthropogenic carbon dioxide uptake in sinks was to be counted. This may, for example, be due to good forest management. Since then the EU and Sweden have been trying to limit sinks, in view of the great difficulty in quantifying the carbon dioxide uptake resulting from human activities. Sinks involve other problems as well. For one thing, swiftly implemented afforestation projects can lead to depletion of biodiversity and other natural qualities. For another, sinks can reduce motivation for reducing emissions, added to which there are awkward questions of liability involved in the event of forests being damaged by fire or pest attacks.

Other countries, however, regarded sinks as a precondition for ratifying the Protocol. The Protocol knows two types of sink. One of these is concerned with a distinct change in land use, such as afforestation and deforestation, visible from satellite images. These sinks have to be accounted for if they have a negative impact on the carbon balance, for example if a forest is felled so that the land can be used for grazing cattle.

The other kind of sink is concerned with more normal changes within the framework of normal forestry. In certain years, more timber grows than is felled. In other years the opposite applies. Forest growth is considerable in nearly all developed countries.

To allow for uncertainties in relation to sinks and for the stipulation of only counting uptake resulting from human activity, the participant countries decided at the Bonn meeting that not more than 15 per cent of the carbon dioxide absorbed by growing forest could be credited for the first commitment period. Russia, Canada and Japan, however, were permitted to use more in achieving compliance.

To be credited with forest uptake, the country concerned must, by resolution of COP-7 in Marrakech, have a correct forest inventory. Otherwise the uptake may not be credited. Use

of sinks to meet commitments during the first commitment period is also essentially voluntary.

Decision on consequences

The Kyoto Protocol is legally binding. This applies both to the commitments themselves (that is, not emitting more than one is entitled to), to requirements concerning methods and reporting and also, finally, to the meeting of requirements for taking part in the mechanisms.

For a country which does not meet its commitments during the first period, there will be three consequences. Firstly, the country must present a detailed plan, subject to approval by “the enforcement branch”, explaining how it will meet its target. Secondly, the country will not be able to use the Flexible Mechanisms. Thirdly, it will incur a heavier commitment for the next period, through the addition of 30 per cent “interest” to its excess emissions.

If, then, a country is entitled to release 100 million tonnes carbon dioxide equivalent per annum but emits 110 million, an additional reduction target equalling the 10 million excess plus another 3 million will be enforced in the next period. This is quite a noticeable punishment, since it is reasonable to assume that the right to emit will be reduced for coming periods, e.g. to 95 million tonnes for 2013-2017 in our example. If so, emissions per 5 years will have to be reduced from 110 to 82 million tonnes, which implies a drastic structural change – or the necessity of making some very expensive purchases of emission rights.

Decisions affecting developing countries

Chapter 4 of the UN Framework Convention on Climate Change imposes obligations on the developed countries towards the developing countries, e.g. with reference to capacity build-up (statistics, among other things), technology transfer and adaptation. Adaptation means adjustment to climate changes (e.g. evacuation of people from areas particularly prone to flooding, or supply of water to drought-ridden areas) and adjustment to the new rules applying with the entry into force of the Kyoto Protocol. This

can mean, for example, that they suddenly lose export markets or incur heavy administrative burdens. A special fund has been set up under the UN Framework Convention to finance initiatives in adaptation, technology transfer, energy, transport, agriculture, silviculture, waste management and economic diversification. This last mentioned means that countries particularly dependent on fossil fuels shall be helped to overcome this one-sidedness.

There is also a special fund for the least developed countries.

In addition, a third fund has been set up for adaptation in developing countries. This will be partly financed by a charge on the Clean Development Mechanism.

Furthermore, a number of developed countries have expressed their willingness to contribute a total of 410 million dollars annually, starting in 2005.

The developed countries are also to report on the efforts they are making to meet their commitments in a way which does not adversely affect the developing countries environmentally, economically or socially, and the measures they are taking in order, for example, to reduce subsidies and tax release in sectors contributing towards emissions of greenhouse gases.

EU climate policy

Sweden's climate policy objectives will not only be achieved through measures decided on in Sweden itself, but also to some extent through the EU.

As yet, the "Burden Sharing" within the EU only has the status of a Council Conclusion. To become legally binding it has to be put forward as a legal act. Sweden is under no obligation to share any surpluses with other countries unless this is resolved on in the legal act. Sweden opposes any such "wider solidarity". In such a case it will be futile to do more than one has to, as Sweden has, for example, by reducing its emissions by 4 per cent instead of exercising its right of increasing them.

The EU and emissions trading

The European Commission put forward a draft Directive on emission rights trading in October 2001.

The draft Directive proposes opening up trading for power and heat producers and certain other energy-intensive industries, such as steel, cement and pulp. It is not yet clear how the emission rights are to be allocated. Auctioning is one possibility, while another is for enterprises to be entitled to, say, 90 per cent of their emissions in 1990. An intermediate solution is also possible, with, say, a steelworks being entitled to the emissions averaged by a modern plant. If it exceeds that performance it can sell rights, and if it falls short of the target it can purchase rights or close down.

Sweden has hitherto advocated auctioning.

EU trading is expected to proceed between 2005 and 2007.

The European Climate Change Programme, ECCP

Under the European Climate Change Programme, the European Commission has worked out a number of possible ways of reducing emissions. They have shown that there are technically feasible and cost-effective methods for reducing emissions by 700 million tonnes carbon dioxide equivalents, twice as much as the Kyoto Protocol demands. The cost is estimated at less than 20 Euros per tonne.

Six areas have been designated to begin with:

- Use of non-fossil sources of energy supply including support for CHP.
- Improved energy efficiency in industry, households and the service sector including energy specifications for buildings and rule on energy-efficient public procurement.
- Reduction of nitrous oxide emissions from the nylon industry.
- Various measures for reducing methane emissions.
- Greater energy efficiency in the transport system.

The Commission is working to frame and concretise additional measures to supplement initiatives within the Member States.

The Sixth Environment Action Programme and the EU Sustainability Strategy

The Sixth Environment Action Programme, which attaches great importance to the climate issue, affirms that the EU shall work for ratification and entry into force of Kyoto in 2002, that emissions shall be reduced by 8 per cent in the period ending 2012, and that the EU shall work for substantial emission reductions internationally after 2012. The programme also proposes reduction of support for fossil fuels, both within the EU (through Structural Funds etc.) and within the Member States.

For further details, see <http://europa.eu.int/comm/environment/new-prg/index.htm>.

The Sixth Environment Action Programme was endorsed by the heads of Governments in the sustainability strategy resolved on in Gothenburg (Göteborg) in June.

Integrated environmental considerations

Environmental policy cannot only be conducted at the Ministry of the Environment, at meetings of environment ministers and within the European Commission's Environment Directorate-General. Environmental policy is also conducted in other Government depart-

ments, committees and directorates.

In 1998 Sweden took the initiative in a process of integrating environmental considerations with other fields of EU policy. The councils of transport and energy ministers, for example, have on various occasions called upon the Commission to develop several new actions. In the energy sector, this means, for example:

- Pilot projects for international trading in green certificates (a certain proportion of renewable energy).
- Review of Member States' energy subsidies.
- Measures to increase the use of renewable energy, especially biomass.

In the transport sector, priority has been given to developing a strategy for new techniques and renewable fuels.

Many decisions which, as yet, are less concrete may subsequently yield more tangible results.

The Commission's Green Paper on security of energy supply

In a Green Paper – a kind of normative debate contribution – the Energy and Transport Directorate-General of the European Commission has proposed a long-term strategy for preventing a growth of dependence on imported oil and gas. Among other things, this means continued use of coal and nuclear power, but also greater use of renewable energy and efficiency improvements.

The Council of Ministers (Energy) is expected to take a decision in December 2001.

5 Objectives of Swedish climate policy

The Government's proposals : Swedish emissions of greenhouse gases, expressed as an average for the period 2008-2012, shall be at least 4 per cent lower than emissions in 1990. Emissions should be counted as carbon dioxide equivalents and shall comprise the 6 greenhouse gases as defined in the Kyoto Protocol and by the IPCC. This objective takes as its starting point Sweden's emission forecast in the third national report to the UN Framework Convention on Climate Change.

Swedish climate policy activities and the national objective shall be followed up continuously. If the emissions trend proves less favourable than is now predicted, or if the measures taken do not produce the effect anticipated, the Government may propose further measures and/or if necessary propose a review of the objective. Account shall then be had of the consequences for Swedish industry and its competitive strength. Checkpoints will be established at 2004 and 2008.

The national objective of reducing greenhouse gas emissions by at least 4 per cent shall be achieved without compensation for uptake in carbon sinks or with Flexible Mechanisms. At the 2004 checkpoint, the Government intends to consider an objective which includes the Flexible Mechanisms.

The Environmental quality objective of Reduced Climate Impact means that the atmospheric concentrations, expressed as carbon dioxide equivalents, of the 6 greenhouse gases defined in the Kyoto Protocol and by the IPCC shall together be stabilised at a level lower than 550 ppm. Sweden shall work internationally to concentrate global efforts on this target. By 2050, Sweden's total emissions should be less than 4.5 tonnes per capita annually, expressed as carbon dioxide equivalents, diminishing further thereafter. Achievement of this target will depend to a decisive extent on international co-operation and initiatives in all countries.

The Government regards a tightening up of climate policy here and now as an urgent necessity. It is very important to minimise the risk of becoming tied to untenable structures which are binding in the long term. A long-term policy ensures that adaptation can take place with no loss of stability in social development, so that allowance can be made for the capital which is tied up in the present-day infrastructure. Clear, stable targets of sustainable development are therefore essential. This can give rise to a new wave of technical innovations and investments, generating growth and employment.

Through the proposed reduction target, the Government wishes to emphasise that climate issues, both now and in the future, will be a central concern in the pursuit of sustainable development. The Government foresees that the proposed intermediate objective will be

followed by further emissions reduction targets after 2012, so that the environmental quality objective can be achieved, and so that new international requirements can be met. Investments in fossil-free, energy-efficient technology and in new techniques and new methods leading to reduced emissions of other greenhouse gases, may therefore be presumed socio-economically profitable in the long term.

By further intensifying the national target, compared with the commitments agreed on in the EU's preliminary internal allocation of burden for the period between 2008 and 2012, which implies a 4 per cent increase on the 1990 level, the Government wishes to underscore the importance of attempting an early response to the challenge posed by the menace of climate change. Sweden shall endeavour to achieve this, both nationally and

in partnership with other countries.

Article 3.13 of the Kyoto Protocol entitles Parties to save the difference between an assigned amount for the commitment period and an emission quantity falling short of it for subsequent commitment periods. Sweden shall assert this right, which is a fundamental precondition of the national climate objective proposed by the Government. When, therefore, the EU defines the allocation of burden, Sweden shall reject any demands for principles of solidarity whereby Member States – which at the end of the commitment period have space remaining within their commitment – are to share their “surplus” with Member States which have failed to meet their commitments.

Monitoring of the intermediate objective

The intermediate objective shall be continuously monitored. If the emissions trend proves less favourable than is now foreseen or the measures taken do not yield the anticipated effect, the Government may propose additional measures and/or if necessary review the objective. At the checkpoints a review shall also be made of the consequences for other social objectives such as employment, Swedish industry and its competitive strength and energy supply. In particular, the consequences for Sweden’s base industries shall be kept under observation. In addition, comparisons shall be made with other countries regarding development and measures taken. The Government proposes that checkpoints for evaluation of the climate objective established for 2004 and 2008.

Flexible Mechanisms

Under the Kyoto Protocol, the Flexible Mechanisms shall be supplementary to national measures. In the Bonn settlement, this is taken to mean that a significant proportion of the efforts needed to achieve the emissions commitment under the Kyoto Protocol shall consist of national policy measures.

The Government attaches great importance to all developed countries taking action within their own borders, both to hasten a necessary

adjustment to sustainable development and to show that the developed countries are taking the lead in the fight against climate change. This is also a precondition for the long-term acceptance by the developing countries of quantitative commitments during coming commitment periods under the UN Framework Convention on Climate Change.

The use of Flexible Mechanisms can contribute towards a further reduction of emissions in Sweden. It is important here that the investments Sweden makes in other countries should have the intended effect and that Sweden should be amply prepared to take part in a trading system.

The mechanisms supplement policy measures in the individual country and contribute towards the achievement of cost-efficiency. In addition, they open up possibilities of involving the private sector in climate policy work, and they are also an important means of disseminating climate-friendly technology and know-how (for Joint Implementation and Clean Development). Cost-efficiency is a prerequisite of subsequent, more far-reaching commitments. On 5th June 2001 the Government appointed a parliamentary delegation to investigate, prepare and draft a proposal for a Swedish system for implementing the mechanisms.

Sinks

There is an important qualitative difference between reducing the concentration of greenhouse gases by reducing emissions at source and reducing them by uptake in carbon sinks. Uptake in carbon sinks implies carbon storage of limited duration. Sooner or later the carbon stored is released in the form of carbon dioxide, e.g. as a consequence of tree-felling, insect attacks, diseases or forest fires. Activities aimed at increasing uptake of greenhouse gases in carbon sinks, therefore, are important primarily as a means of gaining time in the bid to reduce atmospheric concentrations of greenhouse gases. On previous occasions the Riksdag has indicated that sinks are to be regarded as supplementary to the main strategy of reducing

carbon dioxide emissions.

The IPCC has noted that uptake of carbon dioxide in carbon sinks cannot be increased to the extent which would be necessary in order to permanently halt the accumulation of greenhouse gases in the atmosphere due to the combustion of fossil fuels. Emissions of greenhouse gases will therefore have to be reduced.

The Government attaches importance to the existence of motive forces for increasing carbon dioxide in carbon sinks, so as to reduce Sweden's impact on climate as effectively as possible. The Government therefore intends losing no time in investigating the feasibility of promoting carbon sinks, and at the same time of illuminating any conflicts of goals with nature and heritage conservation interests, the development of biofuels and the raw material base of forest industry.

For the first commitment period Sweden can be credited with 2.13 million tonnes expressed as carbon dioxide equivalents. This is a possible supplement to the target for Swedish emissions and is not included in the domestic target itself.

Long-term climate quality objective

The Government shares the Climate Committee's view that Sweden will be better equipped for coping with substantial emission reductions in future by already now formulating targets for what needs to be achieved over the

next 50 years. With the proposed objective the Government wishes to emphasise that a process of adjustment must begin and that it is essential to aim for justice between both countries and generations. As a matter of fairness, it is important to aim at bringing down emissions per capita to a common level in a global perspective.

Where Sweden is concerned, this means, on the basis of the available forecasts of population growth in Sweden and in the world as a whole, the IPCC's calculations and efforts to achieve global convergence of emission levels, that Swedish GHG emissions must by 2050 be reduced to not more than 4.5 tonnes per capita, expressed as carbon dioxide equivalents, with further reductions thereafter. Current Swedish emissions of the 6 greenhouse gases correspond to about 7.9 tonnes per capita, expressed as carbon dioxide equivalents. This proposal, then, implies almost a halving of the total quantity of emissions. For many other developed countries, a reduction to 4.5 tonnes per capita annually represents a far heavier reduction of emissions. Sweden should vigorously pursue the question of emissions, expressed as carbon dioxide equivalents per capita, converging globally, with the long-term target corresponding to Sweden's. Achievement of this target will hinge on international co-operation and on policy measures in all countries.

6 Sweden's strategy for reducing emissions of greenhouse gases

Where traffic is concerned, the Government has found that the intermediate objectives of transport policy for a good environment should continue to apply. Those objectives also include one for carbon dioxide, namely stabilisation by 2010 at the 1990 level.

Economic instruments for reducing dependence on oil were already introduced via Sweden in the 1970s. Environmental taxes also began to be used as an instrument in the 1980s. The carbon dioxide tax introduced in 1991 was a climate policy instrument. Other forms of energy taxation also have an effect on carbon dioxide emissions. The choice of fuels for industry, heating plants and dwellings is of course decided by the total price, i.e. the actual fuel price plus energy tax plus carbon dioxide tax plus sulphur tax etc. Trading in emission rights can become an additional economic instrument. International activity plays an important part in Swedish climate policy. Work has already begun for the purpose of achieving a global agreement for the commitment period following 2012.

Emission trends

The forecasts compiled by the Climate Committee showed emission rising to just under 75 million tonnes, expressed as carbon dioxide equivalents, by 2010 (the Swedish National Energy Administration) and just under 82 million tonnes (the National Institute of Economic Research). The forecast which has since been prepared for the third national report by several

authorities to the UN Framework Convention on Climate Change puts emissions at 71 million tonnes in 2010.

The difference is due to differences of method and in the assumptions made. The latest forecast, for example, expresses the belief:

- that fluorinated gases will not increase so very much,
- that the introduction of "green certificates" will augment the use of biofuels,
- that hydropower will yield more electrical power, due to a change in correction for normal years,
- that the fuel efficiency of cars will increase, as a result of the voluntary agreement between the EU and motor manufacturers (see below).

The latest forecast still does not include the reductions occurring in Sweden as a result of local investment programmes and the climate investment programme proposed in this Bill, which partly supersedes local investment programmes. (See page 19). The effects of continuing tax changes are also excluded.

Climate policy decisions

Sweden is a pioneer in the field of climate policy. A climate strategy was already formulated in the energy and climate policy resolutions of 1991. Also in that year, Sweden introduced the world's first really effective carbon dioxide tax. The 1993 Riksdag resolution has already been mentioned several times. In 1993, carbon dioxide tax reductions were introduced for industry and the num-

Table 6.1. Emissions of various greenhouse gases expressed as carbon dioxide equivalents. Millions of tonnes.

Gas emitted	Emissions in 1990	Emissions in 1999	Forecast for 2010 (the national report)	The National Energy Administration's Forecast for 2010 (Climate Committee)	The National Institute of Economic Research Forecast for 2010 (Climate Committee)
Carbon dioxide	55.9	56.3	57.7	58.5	65.5
Methane	6.8	6.2	4.7	4.6	4.6
Nitrous oxide	7.1	7.1	7.4	8.8	8.8
Fluorinated gases (HFC, FC and SF ₆)	0.5	0.8	1.1	2.7	2.7
Grand total	70.4	70.4	70.9	74.6	81.6

ber of exceptions was reduced, at the same time as the general tax on carbon dioxide was increased.

Since then the carbon dioxide tax has again been amended on several occasions, and that has generally meant substantial increases.

The energy policy programme

The aim of Swedish energy policy is to secure, in both the long and short term, supplies of electricity and other energy on competitive terms in relation to other countries. Energy policy shall create the preconditions of efficient energy use and cost-effective Swedish energy supply with a low negative impact on health, the environment and climate, as well as facilitating adjustment to an ecologically sustainable society.

In 1997 the Riksdag adopted an energy policy programme for sustainable energy supply which among things involves the closure of the Barsebäck nuclear power station. The purpose of the adjustment programme is to develop an ecologically and economically sustainable energy system in Sweden. The main focus of this programme is on a vigorous long-term commitment to research, development and demonstration of new energy techniques. As part of the programme, for example, energy research has received additional funding and been given a partly new focus, emphasising international cooperation, above all with the countries of the Baltic Sea region. These measures extend over a 7-year period, up to and including 2004. The programme also includes international climate initiatives in the Baltic and Eastern Europe prompted by considerations of energy policy. In addition, the programme contains measures designed over a 5-year period - up to and including 2002 - to reduce electricity use, encourage the supply of energy renewables and to promote more efficient energy use.

The Government plans to introduce a new Energy Policy Bill in 2002.

Transport Policy decisions

The Government Bill Transport Policy for sustainable development (1997/98:56) formed the

basis of a Riksdag resolution in June 1998.

Transport policy has many different objectives, one of them being a good environment. This includes the intermediate objective of stabilising carbon dioxide emissions from transport at the 1990 level by 2010.

The EU environment ministers have set the target of carbon dioxide emissions from new cars not exceeding 120 g carbon dioxide per km in 2005, or 2010 at the latest. Accordingly, the European motor industry (ACEA) has voluntarily undertaken to reduce emissions to 140 g/km by 2008. Similar pledges have been made by the Japanese and Korean motor industries.

Local investment programmes

The local investment programmes have been allocated SEK 7.2 bn between 1998 and 2003, focusing both on sustainable adjustment and on employment, and concentrating to a great extent on the reduction of greenhouse gas emissions. The investments for which support has been awarded hitherto will, according to the applications, lead to the replacement of fossil fuels and electricity by renewable energy corresponding to 2.6 TWh per annum and to energy efficiency improvements equalling 2.2 TWh per annum. These measures are expected to reduce carbon dioxide emissions by 1.7 million tonnes per annum. The figures are uncertain pending final reporting on the programmes, but a recent evaluation of a number of communities where programmes began in 1998 show their targets to have been reached and exceeded. Some emission reductions occur abroad and cannot be credited to Sweden.

The policy measures are expected to achieve full effect by 2008.

Environmentally Oriented Product Policy

The purpose of a product policy is to achieve, in the long term, products which are highly efficient in terms of material and energy and whose negative impact on the environment and human health at the time of manufacture and use is minimised throughout their life cycle.

The Government has presented a strategy, An Environmentally Oriented Product Policy, indi-

cating how this work should be conducted in Sweden, within the EU and internationally.

This policy work addresses subjects such as labelling, standardisation and development of markets for “green” consumption. This may be elusive during an introductory phase, but it can assume great importance in the longer term.

Settlement

Efficient energy use in settlement is one of the most important means of achieving urgent environmental and climatic objectives. Settlement – housing, non-housing premises, services etc. – accounts for roughly 40 per cent of Sweden’s total energy use and has considerable environmental impact. Vigorous measures are therefore needed. First of all, the use of fossil fuels has to be reduced by improving energy efficiency and augmenting the use of renewable energy sources. The strategic role is further underlined by the positive environmental impact of measures to reduce energy consumption, in the form of reduced resource inputs and reduced emissions of greenhouse gases.

Many of yesterday’s solutions and products were designed to minimise labour input and purchasing cost, e.g. for lighting, ventilation, heating, air conditioning, windows and other parts of a building’s climate shell, even at the price of additional inputs of materials or energy. With new techniques and combinations of technical solutions, which already exist or are being developed, great improvements and cost-savings can be achieved simultaneously.

The Environmental Advisory Council’s Dialogue Project

The Council, acting on behalf of the Government, has conducted a discussion with the enterprise sector in two fields:

- *Building/Dwelling* (property managers, developers, contractors, materials manufacturers, architects and consultants, banks, insurance companies and telecom companies). In the energy sector, the group’s target is for space and water heating, not later than 2025, to employ only limited amounts of fossil fuels and for more than half the energy requirement

to be derived from renewable sources by 2015, with use of outsourced energy declining by 30 per cent between the base year 2000 and 2025.

- The dialogue group *Future Trade in Convenience Goods* (retail trade, hauliers, the food industry and the IT sector) has focused on the logistics and e-commerce, as well as the content of the product and its manufacture. The target for 2025 is a halving of transport operations (transport of convenience goods by the food industry and retail trade, as well as shopping journeys by households) and much larger proportion of renewable energy in the foodstuff chain.

The dialogue as a working procedure also occurs in product policy. The interest shown by business enterprise has been predominantly positive.

Refuse policy decision

Methane emissions from landfill sites account for 3 per cent of Sweden’s greenhouse gas emissions. Landfill sites also create other environmental problems.

Methane emissions can be reduced either by collecting the methane, which is done in some places, or by burning the refuse instead, which is also common. Some substances which are now sent to landfill sites can be upgraded to full-quality biofuels.

The quantity of refuse can also be reduced through a growth of recycling or reuse and by improving the quality of refuse for combustion by using better systems for the collection of environmentally hazardous waste.

Combustion of carefully pre-separated refuse can also replace fossil fuels.

All these things are in progress. The Environmental Quality Objectives Bill proposes two intermediate objectives for landfill sites:

- The amount of material dumped (mining waste excluded) shall be reduced by 50 per cent by 2005 compared with the 1994 level.
- All landfill sites shall, by 2008 at the latest, have achieved a uniform standard and meet exacting environmental requirements in accor-

dance with Directives adopted by the EU on landfill disposal of refuse.

Tax as an instrument for reducing carbon dioxide emissions

Energy taxation has been used as a policy instrument ever since the oil crisis of the 1970s. Energy tax was reduced by half in 1991, simultaneously with the introduction of a carbon dioxide tax.

This tax coincided with a comprehensive tax reform which had the effect of reducing taxation of incomes and capital. Since then, value added tax has been levied on all use of energy, except for aircraft fuel and bunkering oil. This can be seen as an early instance of green tax change.

In the 2001 Budget Bill, a strategy was presented for successively increasing the environmental relation of the taxation system through green tax change, which means raising environmental and energy-related taxes to offset a reduction of taxes on labour.

Carbon dioxide tax was raised in 2001 from SEK 0.37 to 0.53 per kg carbon dioxide. Part of the increased carbon dioxide tax was offset by a lower energy tax to increase physical steering in favour of reduced carbon dioxide emissions. Electricity tax was raised by SEK 0.018.

Taxes on labour were reduced by raising the basic deduction for wage-earners and pensioners by about SEK 1,100 and lowering the corresponding charges payable for self-employed persons by about 0.1 per centage points.

Work at local level

Not all climate policy is a matter of national government or international activity. At local government (municipal) level, together with the Swedish Society for the Conservation of Nature, a network has been formed of “challenger municipalities” – Lund, Växjö, Sjöfalle, Uppsala and Övertorneå – which have defined more far-reaching carbon dioxide targets of their own. In addition to these challenger municipalities, climate targets have been adopted by about 80 other communities. Sixty or more municipalities have jointly described how they could achieve something like a 20 per cent reduction of carbon diox-

ide emissions from municipal facilities by 2008.

Voluntary activities

Individual persons and small groups can also help to reduce emissions of greenhouse gases. Eighty-eight schools in Europe are mounting a “wager” campaign to reduce carbon dioxide emissions by 8 per cent in 8 months.

Sweden has several activities gathered under the klimat.nu project, which is being operated by the Swedish Society for the Conservation of Nature, all adult education associations, the United Nations Association of Sweden and the Church of Sweden. This activity takes the form of popular education and is being conducted through the medium of study circles, homepages, media initiatives etc.

The Government has contributed funding for the project.

Many other activities are being operated quite independently of the Government but are also contributing towards the attainability and intensification of climate objectives.

International Initiatives

As regards assistance to developing countries, “The Overriding Aim of Sweden’s Development co-operation is to Raise the Standard of Living of Poor Nations”.

One of the five intermediate objectives is “far-sighted management of natural resources and concern for the environment”.

Four intermediate objectives have been defined for assistance to Eastern Europe, one of them being to “support an environmentally sustainable development”.

Both objectives accommodate many projects serving to reduce climate impact.

Capacity development (build-up of administrative capacity) and research are an important part of Sida’s climate-related initiatives. (Sida = the Swedish International Development Co-operation Agency).

Between 1998 and 2002 Sweden contributed about MSEK 448 to the Global Environment Fund (GEF) under the UN Framework Convention on Climate Change. Forty per cent of

this founding is being applied to climate-related initiatives. The Government attaches importance to the continuation of GEF's activities.

Experiment with Joint Implementation

Since 1993, Sweden has implemented, commenced or planned more than 70 projects for energy efficiency improvement and conversion of oil-fired boilers for biofuels etc., mostly in the Baltic countries.

The project, which is a pilot project for the joint implementation of measures to reduce greenhouse gases, is being undertaken with a view to further developing the flexible mechanisms of the Kyoto Protocol.

The World Bank Prototype Carbon Fund

Together with other countries, as well as business enterprises, Sweden is taking part in the World Bank's Prototype Carbon Fund, which is a kind of test bench for the Flexible Mechanisms of the Kyoto Protocol, serving to provide practical experience of projects for reducing greenhouse gas emissions which can be carried out and credited to the investor country. This work is an important contribution to the negotiations on rules for the mechanisms.

Baltic co-operation

The Nordic Council of Ministers has proposed that an experimental area for Flexibility Mechanisms begin operating in the Baltic Sea region in 2003. This is to be undertaken within BASREC, Baltic Sea Region Energy Co-operation.

The climate issue and export credits

Sweden is to be a prime mover within the EU and the OECD as regards taking account of the climatic effects of exports receiving Governmental export credits or guarantees.

In the review of the Swedish Export Credits Guarantee Board's Environmental Policy, special attention will be paid to the climate issue. The Swedish Export Credits Guarantee Board should also investigate the possibility of facilitating exports which make use of the Flexible Mechanisms

Preparatory measures for achieving the intermediate objective

The Government's assessment: Sweden should pursue an active, cost-effective climate policy aimed at reducing emissions of greenhouse gases both nationally and internationally. This climate work should be integrated with society's activities, and each and every one should assume his or her share of responsibility. This applies both to national and local authorities and to business enterprises, NGOs and individual persons. Broad participation by all agents will augment the possibilities of limiting effects on climate. Legislation and economic instruments can be supplemented by various agreements and by the dialogue between the state and business enterprise. Various forms of climate work, such as use of environmental management systems, environmental declarations, environmental labelling, development of environmental technology, environmentally appropriate procurement and a dialogue between different agents, should be developed and deepened. This can be accomplished partly within the framework of an environmentally oriented product policy, which also has an important role to play in climate policy work. The climate work conducted by NGOs should also be observed and supported by national authorities. The effects of these measures should be continuously monitored, so that an assessment can be made of the need for further initiatives. Checkpoints are being introduced for 2004 and 2008.

General direction of climate policy

The climate issue affects the entire globe, regardless of each country's individual contribution to emissions, and it therefore has to be resolved in an international context. At the same time, each country must assume its share of responsibility for minimising the risks of climate change. This calls both for a development of sectorial responsibility, i.e. the allocation of responsibility where it is easier for measures to be taken, and for their impact to be assessed and their progress monitored. Generally effective instruments and working procedures must also be developed.

The climate issue also includes questions of fairness both towards poorer countries and groups of the population and towards future generations. Efforts to achieve a fairer distribution between the nations of the world of the greenhouse gas emissions which the climate sys-

tem can cope with are therefore an important part of Swedish climate policy. The climate issue must be handled conjointly with a number of other development objectives which can and should be mutually supportive.

The long-term character of the climate question calls for a policy which is cost-effective in the long term and, accordingly, factors in the costs and the human suffering which future environmental disasters caused by a changed climatic system will presumably entail.

The Government's assessment : In the Budget Bill for 2001 a strategy was presented for successively increasing the environment relation of the taxation system by means of a green tax change. Basically this strategy means heavier taxation of the energy and environmental sector offsetting a reduction of taxes on labour. The tax change strategy is expected to involve a total of SEK 30 bn over a 10-year period. Continued tax change, according to the strategy, should be based on the environmental quality objectives defined by the Riksdag. Readjustment of the energy system, with a limitation of carbon dioxide emissions, is a central task in this connection. By contributing towards more efficient energy use, a tax change can also facilitate the phase-out of nuclear power. In the Budget Bill for 2002 it is proposed that a second step be taken in the tax change process. When this step has been accomplished, environment and energy taxes will have been raised by SEK 5.6 bn within the framework of the tax change strategy, at the same time as the tax on income will have been reduced by the corresponding amount. In addition, a revenue-neutral shift in the levying of taxation from energy tax to carbon dioxide tax will have been effected, imparting additional weight to the carbon dioxide tax. Other important elements of continuing work with the tax change strategy are the review now in progress of industrial exemptions from energy and carbon dioxide tax and the review, also in progress, of the combined effects of all traffic-related taxes, the aim being to steer developments in favour of safer, more environment-friendly road traffic.

Tax as a policy instrument

With effect from the New Year 2001, the Government has raised carbon dioxide tax as part of the green tax change, and has also raised it by effecting a redistribution between carbon dioxide tax and energy tax. Certain further increases are included in the Budget Bill for 2002.

The green tax change is to continue, and the reform of the energy tax system is a central component of it. That reform shall:

- contribute towards more efficient energy use,
- facilitate national production of electrical power,
- favour the use of biofuels,
- simplify the energy taxation system and place it on firm foundations,
- reduce the environmental impact of industry (in other fields as well as that of greenhouse gases).

At the same time, the competitive strength of industry is to be safeguarded and distributive and regional aspects taken into account.

Properly implemented, a green tax change can contribute towards full employment. It is a central component of efforts to make Sweden a model of ecologically sustainable development.

Review of rules on the reduction of energy tax for certain sectors

A parliamentary committee is to review the various reductions of energy and carbon dioxide taxes.

The general point of departure shall be that energy shall as far as possible be equally taxed and that the exceptions shall not be greater than is justified by considerations of competitiveness, by global environmental considerations and by what is required in order for the system to be manageable. The Committee shall report on its work not later than 31st December 2002.

Closer environmental relation of road traffic taxation

A Commission is to consider the reintroduction of mileage tax and a differentiation of vehicle tax according to carbon dioxide emissions etc.

This enquiry is to be completed by April 2003. The Government attaches importance to the encouragement of alternative fuels by means of tax reduction, both for private projects and on a more general basis.

Tax on refuse

Legislation came into force at the New Year 2000 imposing a tax on refuse, aimed partly at reducing the amount of refuse dumped at landfill sites and, accordingly, the quantity of methane emitted from these sources. The Budget Bill for 2002 provides for this tax, at present SEK 250 per tonne, to be raised to SEK 288.

A Commission to evaluate whether the tax operates as intended in relation to various objectives is to report to the Government on 1st February 2002.

State grants for climate-related measures in local climate investment programmes

The Government's assessment : New support for local climate investment programmes is to be introduced with effect from 2002, as proposed in the Budget Bill for that year. Municipalities will be able to apply for support for action programmes reducing emissions of greenhouse gases in Sweden. These programmes are to be drawn up in partnership with business enterprise, NGOs and other agents in the municipalities. In certain cases measures contributing towards the fulfilment of other environmental objectives and rated especially important in a local or regional perspective will qualify for inclusion in the programmes, which are also to include measures of popular education and information. Under certain conditions grants should also be available for measures not included in a concerted programme. The cost-effectiveness of programmes will be an important basis of assessment. More exact evaluation criteria are to be devised for the assessment of actions and programmes.

In its Budget Bill for 2002, the Government proposes that the grant amount to MSEK 900, spread out over 3 years.

Local climate programmes will replace the local investment programmes which have hitherto existed. Development according to local conditions is an important adjunct to the national policy instruments. State support for local climate investment programmes should have long-term results beyond the projects themselves, in the form of interest, organisation and co-operation. Experience can be gained of new techniques.

Since 1998 the local investment programmes have comprised a broad spectrum of measures, and a large proportion of them have a bearing on the climate problem. About 45 per cent of the grants awarded have been for investments in energy conversion and energy efficiency. Calculations indicate that they will contribute substantially towards reducing Sweden's emissions of greenhouse gases.

The importance of the climate question justifies the expenditure of a large part of the remaining allocation on measures which reduce greenhouse gas emissions. In its Budget Bill, the Government has therefore proposed that, respectively, MSEK 200 and 300 of the funding allocation be transferred in 2002 and 2003 to local climate investment programmes. The Riksdag has voted MSEK 400 for climate investment programmes in 2002.

Like the local investment programmes, the climate investment programmes are primarily intended for concerted programmes and should be part-financed by the applicants. This way the money will yield a bigger return, and the environment commitment of the municipalities will be strengthened, partly because these matters will be elevated to municipal executive board level as opposed, for example, to being dealt with by a municipal committee. Individual projects will qualify for grants in certain cases.

One important lesson learned from the local investment programmes is the great advantage of linking up an investment programme with measures of information and popular education.

The Government will subsequently be defining criteria and conditions for the distribution of grants for projects and programmes of different kinds.

Follow-up and evaluation is a strategic issue,

one of the purposes of the scheme being to disseminate experience of various methods and solutions, e.g. to other municipalities. A special council, headquartered at the Swedish Environmental Protection Agency, will be made responsible both for local investment programmes and for climate investment programmes. This council will consist of representatives of, primarily, the Swedish Environmental Protection Agency, the Swedish National Energy Administration, the National Road Administration and other important agents in the climate sector.

Information drive

The Government's assessment : An information drive is to be conducted on a broad basis together with national authorities, municipalities, schools/educational institutions, business enterprise and NGOs. The Government has earmarked MSEK 30 for 2002, and similar amounts are anticipated for 2003 and 2004.

Energy policy

The Government's assessment : Energy policy, taking the 1997 energy policy resolution as its starting point, should contribute towards the achievement of the intermediate objective for the period 2008-2012 and to the laying of good foundations for achieving the long-term climate objective by 2050, as well as making it possible for this to be achieved parallel to the ongoing readjustment of the energy system.

The 1997 energy policy resolution provided for the phase-out of Barsebäck 1, and the closure of Barsebäck 2 when the loss of electricity output can be offset by the supply of new electrical power or reduced electricity use. In this connection a programme was launched for researching, developing and demonstrating techniques. The results of the energy policy programme shall be evaluated and, together with experience from the closure of the Barsebäck plant, will form the basis of future decisions on how the readjustment is to continue.

The conditions applying to the programme have been changed by the ongoing deregulation of the power market in the Nordic countries.

The Government is to appoint an expert committee to analyse developments in the Nordic power market, e.g. as regards security of supply and relation to the power supply systems of neighbouring regions. The investigator shall also analyse the effects of deregulation on emissions of greenhouse gases and shall assess the impact of the regulation on the feasibility of renewable energy sources.

Within the energy policy programme, several processes are underway which have implications for climate policy:

- The report Trade in Power Certificates – A New Way of Promoting Electrical Energy from Renewable Sources was presented in 31st October 2001. It proposes quotas for renewable electricity.
- In May 2001 the Swedish National Energy Administration submitted proposed planning targets for wind power.
- A working group on the promotion of more rational energy use presented its report on 31st October 2001.
- A report on long-term agreements between the State and Industry on energy efficiency measures was also presented to the Government on 31st October 2001.

Increased electricity production from renewable energy sources

The 1997 energy policy programme defined a number of production targets for increasing the supply of renewable energy with investment support. The targets set for biofuelled CHP and wind power will be achieved, unlike that for small-scale hydropower. More funding will be allotted for investment in wind power up to and including 2002.

The Government finds that a transition to a more commercially adapted system of support will bring greater cost-effectiveness, promote technical development and create opportunities for international harmonisation. The allocation of tasks will then be for the State to define targets

for the development of renewable energy sources (a mandatory part which has to be accomplished), while leaving the procedure for doing so for the market to decide. The mandatory component of renewable electrical energy will be successively increased.

The Government intends introducing a Bill at the beginning of 2002, with a view to the new system of support taking effect at the New Year 2003.

Special remarks on wind power

The Swedish National Energy Administration has proposed a planning target of 10 TWh wind power per annum within 10 or 15 years.

Siting conditions are to be investigated by the National Board of Housing, Building and Planning and a report submitted by 1st March 2002.

Bioenergy

Bioenergy use in Sweden is very high, approximately 94 TWh/year in 1999, and has been growing by several TWh annually for many years now. The cost of both biofuel and combustion plants has declined steeply.

In the short term, use of biofuels is expected to continue at roughly the same pace as in the 1990s.

Biofuels are mostly used in the district heating sector, where they have replaced fossil fuels, both directly in the boilers of heating plants and indirectly, as a result of district heating expanding to replace individual oil-fired boilers.

Through the future system of green certificates, it is believed that more biofuel will come to be used for electricity production in forest industry.

Areas requiring additional research and development comprise techniques a small-scale combustion from other environmental viewpoints, and production of ethanol from raw timber.

Standardisation is needed, to facilitate the growing trade in biofuels. The European Commission is working on this.

Energy efficiency improvements

Effective resource utilisation, energy use included, is a precondition of sustainable development. The

Government intends returning to the question of energy efficiency in its Energy Bill during the spring of 2002.

Limited use of fossil fuels

The Government is to appoint a special Commission to analyse fossil fuel replacement in various chronological perspectives. The Commission shall analyse areas in which different types of fossil fuel use could be made more efficient or where fossil fuels could be replaced by other fuels.

Transport policy

The Government's assessment : The transport system needs to be developed parallel to society, so as to respond to changing needs and demands. This means transport policy being framed in such a way as to contribute towards achievement of the national climate objective for the period 2008-2012 and of the environmental quality objective *Reduced Climate Impact*. The present intermediate transport policy aims for a good environment should remain in force. When the Riksdag has taken decisions on the Environmental Objectives Bill, the Infrastructure Bill and the present Bill on Sweden's climate strategy, the intermediate objectives of transport policy for a good environment should be reviewed and updated and a concerted implementation strategy defined for the transport sector.

Transport accounts for roughly 40 per cent of Sweden's emissions of carbon dioxide. Two-thirds of those emissions derive from passenger transport. Emissions have increased over the past 25 years, both per capita and in relation to emissions from all developed countries.

One positive development, though, is the development of co-ordinated freight chains using sea, road and rail transport on an integrated basis, creating for business enterprise the possibilities of both more efficient and more sustainable transport operations.

The present environmental policy objective, stabilisation of transport emission by 2010 at the 1990 level, remains valid for the time being. It is to be updated subsequently.

Possible ways of inflecting the rising emissions trend include:

- encouragement of rail transport. The

Government believes that the heavy rail investments provided for in its Infrastructure Bill will make it possible for some road and air traffic to be transferred to the railways.

- fuel efficiency improvements to cars (a voluntary agreement with the European motor industry, see page 19).
- promotion of ethanol.

Fuel quality

More efficient engines require fuels of greater purity. Within the EU, the Government intend pressing the issue of future standard fuels within the Community having a composition which favours fuel-efficient techniques.

Mileage tax etc.

Three Member States of the EU – Germany, Austria and the Netherlands – have declared their intention of introducing mileage tax on HGVs. The purpose of the tax is to limit such traffic. The Road Traffic Taxation Commission is to investigate whether this is also appropriate in Sweden, though Community legislation may cause problems here. These may possibly be resolved by a new road charges Directive which is being drafted by the Commission.

Environmental road charges in urban communities

One way of dealing with both pollution and congestion problems is by conditioning demand. This can be done, for example, through some form of congestion charge. Charges of this kind have been tested in several countries.

Since, in the eyes of the law, these charges are a form of taxation, they have to be decided on by the Riksdag. One precondition for introducing them, however, is that the municipalities or regions in question actually want them. If, after a considerable majority has voted in favour of so doing, municipalities or regions request to be allowed to introduce congestion charges as part of a wider strategy for dealing with the congestion and environmental problems entailed by traffic, the Government will draft legislation on the subject.

Eco-driving and speed monitoring

The Government regards instruction in eco-driving (which reduces fuel consumption) as an important part of drivers' training. Increased monitoring of compliance with speed regulations is another way of reducing emissions. In the Budget Bill for 2002 it is proposed that the police be allocated MSEK 50 for speed surveillance cameras.

Aviation

Air traffic in Sweden during 1999 emitted 2.5 million tonnes of carbon dioxide. Aviation is the form of traffic whose emissions are growing fastest.

International solutions are needed for international aviation. The ICAO (International Civil Aviation Organisation) recommends that continuing work be made to focus among other things on levies for engine emissions and emissions trading. Sweden has since 1998 had a system of take off and landing charges based on emissions of hydrocarbons and nitrogen oxides. This does not include carbon dioxide. In view of developments within the EU, a system should be prepared which includes a carbon dioxide parameter in the take off and landing charges.

Within Eurocontrol, the European Organisation of the Safety of Air Navigation, Sweden is pressing for an environmental differentiation of en-route charges according to carbon dioxide emissions.

Promotion of alternative fuels

The Government's assessment One important measure to limit the climate impact of the traffic sector is a policy promoting the introduction and greater use of alternative fuels. To this end, the Government has already proposed a taxation strategy for alternative fuels and perquisite taxation reliefs for environmentally adapted cars.

In view of decisions impending within the EU, the Government intends returning with targets for the further introduction of alternative fuels.

In order to achieve a distinct increase in the proportion of vehicles using alternative fuels, the

costs involved must be reduced in relation to those of petrol and diesel oil. The Government has proposed tax reliefs for fuel and a relief concerning the perquisite taxation of environmentally adapted cars.

Taxation strategy for alternative fuels

This involves certain legal problems, partly in relation to the EU, but the Government is confident of a solution being found.

Tax reduction is possible for pilot projects, which are exempted from both energy tax and carbon dioxide tax, and through a general carbon dioxide tax exemption under an article in the Mineral Oils Directive.

MSEK 150 per annum is earmarked for pilot projects. The cost of abolishing carbon dioxide tax on carbon dioxide-neutral fuels is estimated at MSEK 750 per annum. This applies both to the admixture of ethanol, for example, and the use of "pure" alternative fuels. The intention is for this to come into force in 2003, following approval by the Council and the Commission.

Perquisite taxation of environmentally adapted cars

The market for company cars is strategic, because they represent a large proportion of new car sales.

The Government has proposed reducing the perquisite taxation value of electric and hybrid cars to 60 per cent of the perquisite value for the nearest comparable car, though by not more than SEK 16,000. For cars powered by alcohol or gases other than lpg (biogas, natural gas, hydrogen gas), the proposal is 80 per cent and up to SEK 8000.

It is proposed that these rules enter into force on 1st January 2002. In the case of cars already running on ethanol and gas (not lpg), the rules are to apply to tax assessments between 2003 and 2006.

Work within the EU

The European Union wishes to promote such alternative propellants as natural gas, biofuels and hydrogen gas, with a view to reducing

dependence on imports and reducing emissions.

The Commission has proposed that the tax on biofuels be reducible to 50 per cent of the corresponding tax on petrol and diesel fuel, with a further reduction for local traffic (taxi traffic included) and vehicles used for public activity.

Environmental classification of petrol and diesel fuel

The Government is to review the environmental classification of vehicle fuels and in doing so will see to it that alternative or more environment-friendly fuels are not unfavourably treated. If Community legislation creates problems, the Riksdag has assumed that the Government will endeavour to bring about a change. This task shall be entrusted to the National Environmental Protection Agency.

Green certificates for alternative fuels

The green certificates, with mandatory quotas of renewable electricity in power production, can perhaps also be used to promote the introduction of alternative transport fuels. After a decision has been taken on green certificates for electrical energy, the Government shall investigate the feasibility of this and, assuming feasibility, how such a system can be constructed.

Environmental agreements

Voluntary agreements between the State on the one hand and businesses or branches of economic activity on the other with a view to achieving environmental objectives are an alternative to legislation and control by taxation. This method has been used in other countries but only to a very limited extent in Sweden.

Work is now in progress in several quarters, on somewhat varying lines:

- Mention has already been made of the Environmental Advisory Council's Dialogue Project.
- The National Environmental Protection Agency has compiled an inventory of values where agreements would be an effective method.
- The Ministry of Industry, Employment and

Communications is studying the feasibility of long-term agreements to achieve energy efficiency improvements in energy-intensive industry.

The Government will be returning to this subject in its Energy Policy Bill in the spring of 2002.

Reduction of carbon dioxide emissions through environmentally driven business development

The Government's assessment :International demand for climate-efficient technology and climate-efficient services can be expected to grow rapidly when countries have to fulfil their commitments by reducing emissions of greenhouse gases and in connection with the use of the various mechanisms of the Kyoto Protocol. The Government will therefore be reviewing possible needs for action and, if necessary, the measures which could be taken to enable Swedish businesses and products to occupy the leading edge once demand for climate-efficient technology and climate-efficient services comes into being.

Swedish industry has many products which are efficient in terms of energy, environmental performance and climate impact, and has in this way acquired competitive advantages which will grow as a result of the Kyoto agreement and EU enlargement.

In the report *Sustainable Sweden – a success story*, it is estimated that the world market for environmental technology (known as end-of-pipe technology) will reach SEK 6000 bn by 2010.

In a report entitled (in Swedish) *Swedish Products reducing Carbon Dioxide Emissions – an overview*, the Swedish Delegation for Sustainable Technology has highlighted examples from the energy, transport, construction and industrial sectors. Its work should be carried on. The Government will consider possible needs for measures to ensure that Swedish industry remains on the leading edge of this development.

Swedish implementation of the Flexible Mechanisms of the Kyoto Protocol

The Government's assessment :The Government intends making the necessary preparations for Swedish implementation of the Flexibility Mechanisms of the Kyoto Protocol. These preparations will concern both a national and an international system of emissions trading and the product-based mechanisms, bearing in mind developments within the EU and especially in the Baltic Sea region. The Government has adopted terms of reference for a parliamentary delegation to further investigate, draft and document proposals concerning a Swedish system for implementation of the mechanisms. The Government intends to have a national system in place not later than 2005.

The Government also intends reviewing the forms of Sweden's international climate initiatives in the energy sector relating to project-based mechanism when rules and guidelines for these have been defined by the Parties to the UN Framework Convention on Climate Change.

Cost-effectiveness is an important criterion, both nationally and internationally. By promoting certain measures abroad, one can achieve a heavier reduction of emissions for a given amount of money than by taking those measures exclusively within the home country.

On 5th July 2001 the Government appointed a parliamentary delegation to propose a system and rules for the Flexibility Mechanisms. The delegation is to report during 2002. It is then to frame criteria for mechanism projects and comment on project proposals from the Swedish National Energy Administration. It is to investigate the connection between the mechanisms and other policy instruments, such as carbon dioxide tax. This work will continue until the end of 2004.

The Government is to appoint a negotiator to prepare agreements on procedure for crediting emission reductions in connection with joint implementation. The participation of private enterprise under voluntary agreements shall be taken into account.

Advanced construction

The Government's assessment The climate impact of settlement should be successively reduced. More efficient use of energy above the resources and efficiently operating homes, non-housing premises and services are important prerequisites of sustainable development. Planning, building and property management should contribute towards achievement of the climate objectives and other environmental objectives. The use of fossil energy shall be continuously reduced.

The construction sector accounts for roughly 40 per cent of carbon dioxide emissions. These fell by 20 per cent between 1990 and 1997 and are expected by the Climate Committee to fall by 30 per cent between 1990 and 2010, mainly as a result of increased connection to district heating and the installation of heat pumps.

Newly built houses are normally more energy-efficient. New buildings today can be made very energy-efficient, simultaneously with the achievement of good functions in other respects. Sweden's real estate comprises almost 700 million square metres of heated space. More than 10,000 processing plants supply these properties with water, sewerage, energy, refuse disposal etc. About 40 per cent of all commercial energy and 50 per cent of all electricity is used in this sector. Every year about 1,000 million tonnes of water and 8,000 million tonnes of air circulate through the properties.

This, needless to say, has great environmental consequences.

One important component of climate work is to engage in a dialogue with players in the construction sector (see page 20) in order to identify opportunities and obstacles where sustainable development is concerned. The energy efficiency target must not come in to conflict with other objectives for the indoor environment. The Government is preparing an Indoor Environment Bill, to be introduced in the spring of 2002.

Planning for sustainable urban development

The main responsibility for physical planning rests with the municipalities. Planning in municipalities and regions must be improved and co-ordinated in order for sustainable development to be achieved. This is also a matter of the charges applied to municipal activity, municipal supervision, environmental planning, energy planning and advisory activities. The Government will be investigating the feasibility of developing a new model of co-ordinated planning for a sustainable society.

One of the objectives of urban planning is to reduce the need for daily transport by siting shops and work places nearer people's homes.

Analyses have shown out-of-town shopping centres to mean longer transport distances and fewer small shops. Before new establishments are decided on, therefore, it is important that the planning data should clearly indicate anticipated effects on traffic input, air pollution, acoustic disturbance and interference with the natural and man-made landscapes.

In its coming review of the Planning And Building Act, the Government intends to address the question of out-of-town shopping centres.

Best techniques and research

Demand for goods and services must be moved in an environment-friendly direction, with states and major purchasers setting an example. Higher demands will lead to a successive improvement of competence and of environmental management.

There is a great need for additional competence, research and development. This applies above all to systematically appropriate solutions, with many intrinsically good components working together in one building.

A national research strategy should be framed for sustainable urban development.

Life-cycle perspective

Industry, municipalities, county councils and private property companies purchase buildings and parts of buildings for very large sums of money

every year. Many equipments are relatively cheap to buy but then cost a great deal in energy. Work is in progress to develop methods for a life-cycle cost perspective but needs to be upgraded so as to give clients/developers tools for formulating concrete stipulations in connection with the procurement of a building.

The Committee for Ecologically Sustainable Procurement has obtained results which should be used.

Quality and efficiency

Fragmentation of the building process is often likened to a relay race. The entire construction and management process requires co-ordination in order to provide more of a holistic view of the building, a clearer focus on the management stage and the finished product, and systematic feedback of experience.

Clear responsibility, guarantees, continuity and competence development - especially on the ordering side - are key concepts for greater co-ordination.

The Government will be closely observing the quality work which is being developed within the Council for Quality in Building, set up at the Government's Initiative in May 2001. During an initial phase, the developers in the national Government sector will be co-operating on competence development.

National property owners setting an example

The environmental quality objective A Good Built Environment means among other things that energy use and environmental impact in both new and existing buildings shall be lower in 2010 than in 1995.

The Government is to task national property owners with describing opportunities for efficiency improvement and for the reduction of fossil fuel use.

Classification of housing and non-housing premises

Properties are complex systems, and most customers do not know what energy and environmental solutions are available. A classification system which takes account of the indoor envi-

ronment, energy and resources will provide the consumer with a readily available signal. These possibilities are being explored within the dialogue project *Building/Dwelling* (see page 18). Key ratios for energy use and environmental impact are highly important, but for the sake of comparability they need to be less ambiguously defined.

The National Board of Housing, Building and Planning was commissioned to investigate this matter and presented its final report in October.

Wood as a building material

Wood is an environment-friendly material which ought to be more extensively used for building.

Swedish industry is well to the fore. In its Regional Policy Bill (2001/02:4), the Government proposes that a programme for promoting sustainable growth in national wood manufacturing industry be operated between 2002 and 2004 so that wood manufacturing enterprises can co-operate in regional groups, among other things to encourage optimum use of timber.

Information

Society has a duty, together with the players in the construction industry, to develop effective experience feedback and access to quality-assured knowledge. It is especially important to reach local ecocycle committees and business networks.

Reduced emissions of methane and fluorinated gases

The Government's assessment : There should be further investigation of measures which can be taken to reduce emissions of greenhouse gases from agriculture.

Methane etc. from agriculture

According to the Climate Committee, agricultural emissions of methane and nitrous oxide accounted for 12 per cent of total Swedish emissions of greenhouse gases.

Nitrous oxide emissions are connected with the nitrogen in question, which is being addressed under the environmental quality objective Zero Eutrophication.

Gas-tight coverings for manure stores are one method of reducing methane escapes. The methane can then be utilised, at the same time as ammonia emissions are avoided.

The usefulness of this and the expensive implies to differently sized farms must be investigated. The National Environmental Protection Agency shall be commissioned, together with the Swedish Board of Agriculture, to review the calculation methods.

Biofuel cultivation on arable land is also of importance from a climatic viewpoint.

Agricultural land can also be a sink for carbon dioxide.

Limitation of the use of the three fluorinated gases HFC, FC and SF₆

The Government's assessment Emissions of the fluorinated gases HFC, FC and SF₆ should not increase compared with emissions for 2000, expressed as carbon dioxide equivalents. The use of fluorinated gases should be limited to areas where alternatives are lacking.

The National Environmental Protection Agency should be instructed to continue developing policy instruments for remaining areas of use, in collaboration with the industries and national authorities concerned.

Emissions of fluorinated gases have increased far less than was previously feared. To a great extent they (HFCs) are used as a substitute for ozone-degrading substances, and phase-out of the latter is virtually complete.

In addition, FCs occur as a pollutant from aluminium production and is emitted, to a lesser extent, from use in other areas/applications. Although the emissions are not very great, large quantities are accumulated in technical systems. They leak diffusely and are difficult to eliminate.

Since FCs and HFCs have extremely long dwell times (up to 50,000 years), in the atmosphere

emissions of these substances leads to an accumulation which is irreversible for a very long time. The National Environmental Protection Agency has reported on an assignment concerning prohibition of the use of these gases and investigation of alternative policy instruments. Failing new measures, the Agency believes that emissions will increase by about 30 per cent over the next 10-year period, while the quantity of these substances accumulated in various technical systems will increase even more. New techniques, however, are being rapidly developed.

The aim of preventing any further increase from 2000 can be achieved if use is limited to those areas where alternatives are lacking, at the same time as new use is prohibited and further measures are deployed for reducing emissions. A Council Directive, which Sweden is campaigning for within the ECCP (European Climate Change Programme), could be an effective countermeasure.

The Government concurs with the National Environmental Protection Agency's view that environmental levies may be a good policy instrument, together with a prohibition of certain uses.

Regarding the use of SF₆ in electrical equipment, the National Environmental Protection Agency proposes that an attempt be made to negotiate an agreement with the industry to minimise emissions from production, use and scrapping and to develop alternatives.

The Government shares the Agency's view that there is a big potential for cost-effective emission reductions in aluminium production and that examination under the Environmental Code and the IPCC Directive is the best way of regulating these emissions.

Limitation of emissions of greenhouse gases from landfill sites

The Government's assessment :Emissions of greenhouse gases from landfill sites are expected to decline considerably over the coming 20-year period, as a result of measures already taken. Methods of measurement are urgently needed for monitoring methane gas emissions from landfill sites and research needs to be focussed on this subject.

The target, set in 1993, of reducing methane gas emissions from landfill sites by 30 per cent between that year and 2000 has not been achieved. By 1999 the reductions stood at 15 per cent. As from 2000, however, a tax is being levied on refuse sent to landfill sites, landfill dumping of unseparated combustible waste will be prohibited as from 2002, and a general ban on organic waste will apply from 2005.

Partly as a result of these measures, the National Environmental Protection Agency expects methane emissions from landfill sites to be halved between 2000 and 2010 and to be reduced by 80 per cent between 2000 and 2020.

Accordingly, the Government sees no need for any further measures, but on the other hand better follow-up and measurement are called for, among other things to streamline the collection of methane where it occurs.

Climate measures for sustainable development in developing countries

According to the UN Framework Convention on Climate Change, the industrial countries are to take the lead in endeavours to prevent climate change. The participation of the developing countries, however, is of great importance in achieving the objectives set forth in the Convention. Thus, in the long term, their involvement in terms of commitments on emissions, for example, must increase, though it is only reasonable that future commitments are in proportion to the level of development in each country, and related factors.

Support from the industrialised countries for the efforts of developing countries to prevent and adapt to climate change can also help put the developing countries in a better position to take on concrete commitments in future. Accordingly, the Government considers that Sweden should continue to play an active part in international cooperation.

Technological cooperation and capacity-building measures are required in order, for example, to analyse vulnerability to climate change, to elaborate strategies for adaptation and to inte-

grate these strategies into overall plans. The Government considers that support for such action is of crucial importance. Swedish climate-linked development cooperation, both bilateral and multilateral, is expected to increase in the coming years.

The role of the sectors

The Government's assessment Through sectorial responsibility, responsibility for achieving the climate objective is distributed within all sectors of society, with public authorities, businesses and other organisations in different sectors of the community assuming responsibility for the climate issue within their various fields of activity. Sectorial responsibility thus means that climate considerations, like other environmental considerations, are factored into the sector's decision-making. Balances between the sectors have to be struck by means of inter-sectorial decisions. The introduction of environmental management within national authorities also implies an integration of climate considerations. Environmental management systems are a management tool for the environmental activities of business enterprises and other organisations, serving to structure and systematise the activity itself.

The responsibility of national authorities for climate issues should be made more clear, e.g. by defining more closely their sectorial responsibilities for the environment.

Climate research

Climate research is needed as a basis for participation in international negotiations and for impact assessments, e.g. with respect to agriculture and forestry and dam safety.

The new Swedish Research Council for Environment, Agricultural Sciences And Spatial Planning (Formas), set up in 2001, is specially responsible for climate research. Sweden has an important research group at the SMHI (Swedish Meteorological and Hydrological Institute) Rossby Centre which devotes itself to regional climate modelling (SWECLIM). This has to a great extent been funded by MISTRA (the Foundation for Strategic Environmental

Research). In the Government's view, the future of the Centre must remain assured after the funding support from MISTRA is discontinued, and it has instructed SMHI and others to submit proposal on the future organisation and funding of Swedish climate modelling.

Environmental Objectives Council

The Government's assessment For the co-ordination and streamlining of work relating to the environmental quality objectives and climate issues at national authority level, the Government intends setting up a special Environmental Quality Objectives Council, attached to the National Environmental Protection Agency. The Agency should be made the national authority responsible for the environmental quality objective Reduced Climate Impact

The Climate Committee proposed a special Climate Council affiliated to the National Environmental Protection Agency. The Government sees no cause for a special Climate Council. Climate issues should be co-ordinated with other environmental quality objects within the Environmental Quality Objectives Council proposed in the Environmental Quality Objectives Bill.

The tasks of the Environmental Quality Objectives Council will include the following:

- Co-ordinating the work of the national authorities with reference to climate issues and the environmental quality objectives.
- Taking charge of the collection, processing, compilation and quality-auditing of emission statistics.
- Taking charge of annual reporting to the Government and of the provision of input data for a more comprehensive evaluation every 4 years.
- Compiling supportive documentation for international reports.

The Environmental Quality Objectives Council should include representatives of the target and environmental authorities responsible. It should also include representatives of county administrative boards, sectorial authorities, municipalities, NGOs and a business enterprise. The Council will be appointed by the Government.

Legislative questions

Review of the Planning and Building Act

The Climate Committee regards physical planning as an important instrument of long-term climate policy. The Planning and Building Act is already a support with regard to the climate issue and for climate policy, but its outline character and the scope for interpretation which it allows the municipalities mean, according to the Committee, insufficiently strong support for long-term climate policy. The Committee therefore recommends a review of the Planning and Building Act, with a view to making it operate in an ecologically sustainable manner, with climate and energy conservation as high priority issues. (See also page 32)

In its Bill entitled Swedish Environmental Quality Objectives – intermediate objectives and remedial strategies (2000/01:130), the Government calls for a review of the Planning and Building Act to make it more effective in promoting sustainable development. This also includes climate aspects.

The Environmental Code as an instrument of climate policy work

The Environmental Code is the basic legal instrument for achieving the various environmental quality objectives. The overriding aim of the Code is to promote sustainable development whereby present and future generations will be assured of a healthy and good environment. The Code shall be applied in such a way that human health and the environment are protected from harm and inconvenience, whether due to pollution or other influences.

The rules of consideration in Chap. 2 of the Environmental Code have a bearing on work to achieve the climate objectives. It is the duty of each individual to take the protective measures needed in order to prevent, avert or counteract harm or inconvenience to human health or the environment. The very risk of such harm or inconvenience occurring is sufficient to raise the demand for protective measures. Furthermore, the possibility of re-use and recycling shall be utilised and energy shall be derived primarily from renewable sources.

The rules of the Environmental Code concerning environmental quality standards also have implications for climate policy work. Environmental quality standards are rules concerning the quality of soil, water, air or the environment generally which may be issued by the Government if necessary for the lasting protection of human health or the environment or for repairing damage or inconvenience to human health or the environment.

The wider possibilities, compared with previous legislation, of laying down conditions for the sanctioning of a polluting activity, coupled with the rules on environmental quality standards, can be expected to result in the Code being very extensively used for tackling forms of pollution relevant to the climate problem. Even though national environmental quality standards in themselves are not suitable for addressing such global problems as climate, they may become an important instrument for the achievement of national environmental quality objectives. In addition, the environmental quality standard may become relevant to climate work as an adjunct to the rules on emissions trading which can be expected to result from international work with reference to climate problems. It is impossible at present to tell exactly how these rules will be constructed.

The compatibility of the Constitution Act and the Environmental Code with commitments and the distribution of assigned quantities of emissions, based on the UN Framework

Convention on climate change and its Kyoto Protocol, will be highly important.

The Municipal Energy Planning Act

The Climate Committee calls for a review of the Municipal Energy Planning Act. The Government shares this view and intends returning in a special Bill on energy policy in the spring of 2002. The current Bill on Sweden's climate strategy and the Environmental Quality Objectives Bill constitute a point of departure for this work.

Environmental accounting and indicators

In 1998 Sweden, through an addition to the Annual Accounts Act, stipulated the inclusion of environmental impact in the statutory administration reports of limited companies. Guidelines have been worked out by the Swedish Accounting Standards Board.

Environmental performance indicators are defined, for example, within EMAS, thus augmenting the possibilities of comparing environmental information.

The Government is to carry out a follow-up and will then consider the need for amending the legislation.

Follow-up and evaluation

The reporting requirements under the UN Framework Convention on Climate Change and within the EU are destined to increase, both for Sweden's part and as an international commitment.

Remote sensing data analysis is an especially important data source.

The National Environmental Protection Agency is responsible for international reporting. The third national report was presented to the UN Framework Convention in November.

The Government wants to see co-ordinated, coherent annual accounting of the environmental objectives, climate objectives included.

7 Ratification of the Kyoto Protocol

The Government's proposal: That the Riksdag approve the Kyoto Protocol.

The Government proposes that the Riksdag approve Sweden's accession to the Kyoto Protocol when a decision has been taken within the EU on a legally binding mutual distribution of emissions within the Commission, corresponding for Sweden's part to 104 per cent of the

1990 level, and subject to ratification taking place together with and simultaneously with the EC and other Member States. This approval will also include decisions by the Conference of Parties on a system for compliance with the Kyoto Protocol.

This is a summary of the Bill, and where there are any differences between the text of the summary and that of the Bill itself, the text of the Bill is the authentic text.

The summary is available on the Ministry of the Environment website (www.miljo.regeringen.se). It can also be ordered from the Ministry of the Environment, phone 08-405 10 00.
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REGERINGSKANSLIET

Ministry of the Environment