

# Climate for the money?

Audits within the climate area  
2009–2013

RIR 2013:19



SWEDISH NATIONAL  
AUDIT OFFICE

The Swedish National Audit Office is one of the bodies charged with exercising the powers of scrutiny vested in the Swedish Parliament. Our task is to audit state administration so as to contribute to an efficient economic use of resources, and to an effective administration.

The Swedish National Audit Office conducts both financial and performance audits. Since 1 January 2011 performance audits, such as this report, are reported directly to parliament.

THE SWEDISH NATIONAL AUDIT OFFICE

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TO THE RIKSDAG

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*We hereby deliver, in accordance with Section 9 of the Act on Audit of State Activities etc. (2002:1022) the following performance audit report:*

## Climate for the money? Audits within the climate area 2009–2013

The Swedish National Audit Office has examined whether central government uses its policy instruments so that emissions of greenhouse gases decrease in accordance with climate objectives and at reasonable cost. The audit findings are presented in this performance audit report.

Representatives of the Ministry of the Environment, the Ministry of Finance, the Ministry of Enterprise, Energy and Communications, the National Institute of Economic Research, the Swedish Environmental Protection Agency, the Swedish Energy Agency, Statistics Sweden and the Swedish Transport Administration have been given the opportunity to check the accuracy of factual content and otherwise submit comments on the draft of the final report.

The report contains conclusions and recommendations addressed to the Government.

Apart from the printed version of the performance audit report this decision consists of nine annexes.\*

Auditor General *Claes Norgren* had the right of decision in this matter. Audit director *Madeleine Nyman* was rapporteur. Audit director *Fredrik Engström* and programme director *Lena Björck* assisted in the final processing.

Claes Norgren

Madeleine Nyman

*For information:*

The Government, the Ministry of the Environment, the Ministry of Finance, the Ministry of Enterprise, Energy and Communications, the National Institute of Economic Research, the Swedish Environmental Protection Agency, the Swedish Energy Agency, Statistics Sweden and the Swedish Transport Administration.

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\* The annexes are: 1. Starting points for management and monitoring, 2. The EU Emissions Trading System, 3. Climate and energy objectives in the EU and Sweden, 4. Greenhouse gas emissions, 5. Ministries responsible, 6. Policy instruments audited and their effects, 7. Climate reports, 8. Prices of emission allowances, 9. Management and monitoring of climate policy in the United Kingdom.



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The approved performance audit report includes nine annexes that are not included in the printed version. These annexes can be downloaded from the Swedish National Audit Office website, [www.riksrevisionen.se](http://www.riksrevisionen.se). The annexes can also be ordered from the audit file (reference number 31-2011-1078), by contacting the Swedish National Audit Office's registrar.

### Electronic annexes

- Annex 1 Starting points for management and monitoring
  - Annex 2 The EU Emissions Trading System
  - Annex 3 Climate and energy objectives in the EU and Sweden
  - Annex 4 Greenhouse gas emissions
  - Annex 5 Ministries responsible
  - Annex 6 Policy instruments audited and their effects
  - Annex 7 Climate reports
  - Annex 8 Prices of emission allowances
  - Annex 9 Management and monitoring of climate policy in the United Kingdom
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## Summary

This final report in the Swedish National Audit Office's audit strategy *Sustainable development – climate* is based on and supplements the eleven performance audit reports published as part of the strategy between 2009 and 2013. The audits have found material deficiencies in central government use of policy instruments and in reporting of climate and energy policy. The Government and agencies have improved and plan to improve reporting and implementation of some measures in the area. The Swedish National Audit Office finds, however, that further work is necessary to achieve effective measures and coherent, transparent monitoring and reporting of approximate costs, effects and side-effects.

The overall conclusion from the Swedish National Audit Office's audits is that there is a risk that central government is not using its policy instruments to reduce emissions in accordance with the objectives at a reasonable cost. The costs of reducing emissions vary substantially between different measures, indicating that total emission reductions by 2020 could be achieved at a lower cost by using another combination of policy instruments. Direction towards reduced emissions is weak in parts of the business sector. It is motivated for reasons of competition, but there is no overarching and coherent reference material, for example to assess the risk of carbon leakage for the business sector in Sweden. The objectives are not clearly formulated, which creates considerable uncertainty. Coordination between various agencies is deficient, for example concerning the time horizon on which to base analyses of different measures. There is also a lack of coordination between measures at national level and at EU level.

### Audit background

*Motive:* In the past 100 years the average global temperature has risen. The Riksdag (Swedish Parliament) describes the climate changes as one of the biggest challenges of our time and the Government states that it is the environmental issue with highest priority. According to the Government, Sweden's coherent climate and energy policy entails drastic emission reductions. Sweden's national environmental objective, *Limited Climate Impact*, is based on the UN two-degree limit. The objective engages many members of the public but is very difficult to achieve. Achievement of the objective depends on measures in other countries and there is a risk that the cost of various policy instruments will be high.

*Aim:* The purpose is to examine whether the Government's management provides the framework for effective climate measures, whether the costs of various policy instruments are reasonable in relation to the climate objectives and whether reporting is transparent.

*What our audit covered:* The audits were focused on central government measures that have major economic significance and are material for achieving the emission reductions required to achieve the climate objectives. The overall question was:

*Does central government use its policy instruments so that emissions of greenhouse gases decrease in accordance with the objectives and at reasonable cost?*

## Audit findings

The Government stresses that Sweden is to show leadership; in what we do at home, in the work of the EU and internationally. The EU is the platform for a Swedish climate policy that is internationally coordinated. Emissions of greenhouse gases in Sweden constitute just over 0.1 per cent of global emissions, which in 2010 were almost 50 billion tonnes. The issue of climate change and emission quantities is global and so it is of no significance where emissions or emission reductions take place. Management is made more difficult because in the short term there is seldom any direct gain for individual countries from reducing emissions.

Sweden is a small trade-dependent economy with industrial production and transport as important driving forces for economic development. This implies an inbuilt conflict of objectives in relation to the emissions that must decrease if climate objectives are to be achieved. In Sweden, however, growth measured as GDP has increased at the same time as total carbon dioxide emissions have decreased. This means that there has been a decoupling of emissions from economic growth. The costs in Sweden for the most important measures to achieve zero emissions by 2050 are estimated by the Swedish Environmental Protection Agency to be between 0.2 and 0.5 per cent of GDP in 2050. Other actors estimate that the costs are higher.

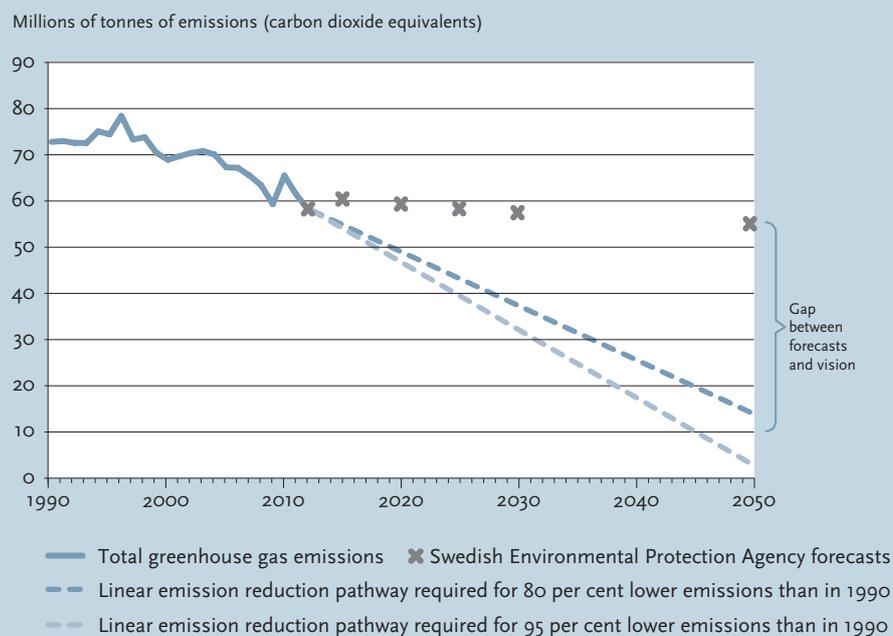
The audit resulted in the following findings and conclusions:

### *Large gap between theory and practice*

According to current estimates, the milestone target for 2020 for the environmental quality objective *Limited Climate Impact* can be achieved if sufficiently many emission credits are delivered and Sweden's emission trend is as forecast. But the Government's vision of almost zero emissions by 2050 in Sweden is far from the Swedish Environmental Protection Agency's reference scenario of trends. There is poor agreement between the environmental quality objective *Limited Climate Impact*, the social adjustment that would be needed to achieve it and the Government's

management and reporting to the Riksdag. The large gap between the need for emission reductions after 2020 and predicted emissions trends implies a great risk that the vision cannot be achieved. There is considerable uncertainty about whether it is possible in practice to achieve emission reductions and adjustment costs are at risk of being high, in terms of central government finances as well as for enterprises and the general public. The mix of policy instruments that may be most cost effective from an economic perspective is not always politically possible to implement, since there are other factors to take into consideration. The broad mix of different policy instruments in the coherent climate and energy policy affects many actors and has several purposes, implying a great need for coordination, analysis and reporting in order to achieve effective and transparent steering towards reduced emissions.

### Emissions of greenhouse gases in Sweden 1990–2012, forecasts for 2015, 2020, 2025, 2030, 2050 and emission reduction pathways to 2050 at different emission levels



Source: Swedish National Audit Office processing of data from the Swedish Environmental Protection Agency.

### Lack of important frameworks for steering

*Unclear climate and energy objectives.* Framing the climate and energy objectives and weighing up various purposes and social objectives are parts of a complex political process. But the objectives are not clearly formulated, which gives a poorer framework for coordination and clear priorities between different social objectives. For example in the conflict of objectives regarding some infrastructure investments and how the

transport sector is to contribute to climate objectives, the effect has been that neither the ministries concerned nor agencies have been given frameworks for effective steering. The specific objectives of several policy instruments are also unclear. Often a policy instrument is to contribute to several widely varying social objectives without clear priorities. Many central government measures have been introduced whose main purposes are entirely or partly directed at something other than climate. Examples of these are: promoting competition, contributing to research, development and spreading of new technology, promoting green employment or promoting sustainable development in other countries. Consequently, it is important to evaluate measures in relation to such purposes as well.

*Lack of clear priorities.* The Government emphasises that climate and energy policy is coherent, but ministries and agencies have no coherent picture of how objectives, development towards the objectives or central concepts should be interpreted and defined. Nor has the Government required coherent supporting material about approximate costs, effects and side-effects, which would be necessary to coordinate and set priorities between climate and other social objectives.

*Deficient coordination, both short and long term.* The cost effectiveness of a measure depends on the objective or objectives to be achieved and in what timeframe. The Riksdag has requested a long-term pathway for emission reduction. The Committee on Environment and Agriculture has also stressed that climate measures should be cost-effective in the long-term. But the Government's decisions on various policy instruments are often short-term, rarely longer than to 2020, and do not tie in with a long-term emission reduction pathway. The lack of long-term perspective also creates uncertainty about the degree to which agencies should give priority to climate objectives in their work. It also means that companies and the public are unsure about what decisions it is rational for them to make.

*Lack of coordination with the EU Emissions Trading System.* The Swedish National Audit Office's audit shows that the Government needs a coherent strategy for how Sweden is to use its national discretion.

When evaluating the impact of national measures in relation to the EU Emissions Trading System it is important to decide if the measures can be expected to lead to lower emissions at EU level. For example, the Government could have allowed the emission allowances in Sweden's reserve for new installations (new entrants reserve) in the 2008–2012 trading period to be frozen, so that they cannot be used. But instead the emission allowances in the reserve were sold. Such measures in Sweden and other member states together contribute to increasing the supply of emission allowances, which contributes to lower prices and thus a decreased steering effect in the trading system.

Policy instruments mainly directed at the companies participating in the EU Emissions Trading System need to be analysed collectively. This applies for example to the Swedish voluntary programme for improving energy efficiency (PFE) and the electricity certificate system. Such national policy instruments in Sweden and other countries together reduce the need for emission allowances, which contributes to a lower price. When the price of emission allowances is low and measures outside the trading sector are more expensive, there is a risk that emissions will not be reduced where measures are cheapest. The low price of emission allowances has a dampening effect on companies' willingness to invest in emission reducing technology. Central government investments, for example in climate-related research and development, are thus at risk of having less effect, since it is not certain whether it will be profitable to invest in commercialisation of new discoveries.

*Unclear division of responsibility.* The policy instruments are spread among many actors, but the Government has not allocated responsibility for coherent and balanced analysis and reporting of approximate costs, effects and side-effects.

However in November 2013 the Government set up an inquiry to review the division of responsibility between and the structure for different agencies in the environmental field. However, among those not included are the National Institute of Economic Research, the Swedish Energy Agency and Statistics Sweden, which according to the Swedish NAO would be needed in order to achieve balanced reporting.

### *Reporting is not coordinated and has major deficiencies*

The Government has not as yet carried out any aggregate monitoring and reporting of approximate costs, effects and side-effects. Consequently there is a lack of important decision-making data, which could help to reduce uncertainty in decision-making. The work of specifying and building up necessary statistical material and relevant tools of analysis needs to be started in good time before the in-depth reporting for the 2015 progress review. The Swedish National Audit Office finds that the existing analysis and reporting of individual and collective measures lacks important components, gives different parallel replies to the same question and some parts do not give an entirely fair presentation.

*Coordination problems in reporting as well.* Since there are no clear priorities for how policy is to be balanced and implemented, frameworks for coordinated and balanced reporting are also missing. The lack of coherent reporting in itself also makes considerations and implementation more difficult. Different agencies have different tasks. The consequence is that there are knowledge gaps and different parallel answers to the same question, depending on perspective. It is difficult for the Riksdag and the public to weigh up and set priorities on the basis of information that is partially contradictory.

The ministries and agencies that monitor and report lack consensus concerning starting points and approaches for reporting and analyses. The information may be correct but to date has reflected different views, not weighed together.

In October 2013, however, the Government instructed the Swedish Environmental Protection Agency and the Swedish Energy Agency to prepare a basis for following up developments towards Sweden's climate and energy objectives for 2020. The assignment is to be undertaken in consultation with the National Institute of Economic Research. In the event of the agencies having different views this is to be reported.

*No basis for assessing carbon leakage.* The risk of carbon leakage is put forward as a reason for deciding on exemption from mandatory climate policy instruments. The risk of carbon leakage refers to production being located in countries without or with lower expenditure for emissions. But neither the Government nor agencies have made an overall analysis and report of how much different industries need to pay for emissions and if the enterprises that benefit are really those that are at risk of carbon leakage. Some analyses exist, but reporting is inadequate.

#### *The effects of climate measures vary*

Swedish National Audit Office audits show that the costs per tonne of reduced emissions up to now have varied considerably between different policy instruments. According to economic theory the differences mean that measures in aggregate are not cost-effective. This raises the question of whether the costs of climate measures are reasonable, insofar as they lead to good economy in the use of public resources. The assessment of what may be reasonable costs is rendered more difficult by policy instruments often being employed to achieve several other objectives simultaneously and by the intended time perspective. Different policy instruments also interact, positively or negatively. This underlines the importance of a relevant mix of policy instruments, both in the short and long term.

#### *The polluter pays principle is not followed to the full*

Material redistributions, reductions and exemptions from various taxes and other climate and energy policy instruments taken together mean that policy signals for reducing emissions are weak in large parts of the business sector. This is not fully consistent with the polluter pays principle (PPP), which may be reasonable if there is a risk of carbon leakage. However, there is insufficient reference data for assessing whether and to what extent there is a risk of carbon leakage in different trade and industry sectors and sub-sectors in Sweden.

If the costs, mainly in the form of reduced revenues are compared with the effect in the form of reduced emissions by 2020, the Swedish National Audit Office assesses that the costs for the aggregate emission reductions are high.

## Recommendations to the Government

To create better conditions for reducing emissions in accordance with the objectives laid down by the Riksdag and at a reasonable cost, the Government should:

- Coordinate climate objectives with other overall social objectives, such as transport policy objectives, by setting clear, long-term priorities, clarifying what is to be achieved and what it costs. This will give the Riksdag better decision-making data and agencies, enterprises and the public will have long-term rules of play to enable them to make rational decisions.
- Establish an approximate pathway for how emissions are to be reduced in the long-term, even after 2020. Such an emissions reduction pathway is also needed as a basis on which to assess the mix of policy instruments that could be cost-effective in the short and long term, for the purpose of better economy in the use of central government and public resources.

The Riksdag, the Government, enterprises and the public need to have overall and balanced bases for decisions on investments and different climate measures. To achieve this, the gap between various agencies' starting points and analyses needs to contract. Consequently, the Swedish National Audit Office recommends that the Government:

- Allocates a clear responsibility and mandate as well as steering resources to achieve coordinated and balanced reporting and analysis.

The responsibility should include developing and collecting reports on approximate costs, effects and side-effects of the most important climate measures and for other measures with a major impact on emissions of greenhouse gases. This should also include analysing and reporting Sweden's national discretion in relation to the EU emissions trading system. When evaluating the impact of measures it is important to determine if they can be expected to lead to lower emissions in Sweden and at EU level. Moreover, the risk of carbon leakage should be analysed and reported. Coordinated reference material allows overall priorities, so that the clarity, transparency and effectiveness of central government measures can increase further.



# 1 Background and focus

## 1.1 Background

In the past 100 years the average global temperature has risen by 0.7–0.8°C. Burning fossil fuels releases greenhouse gases that contribute to global warming. Emissions in Sweden constitute just over 0.1 per cent of global emissions, which in 2010 were almost 50 billion tonnes.<sup>1</sup> The issue of climate change and emission quantities is global and so the location of the emissions or emission reductions is of no significance for the total amount of emissions. The Riksdag (Swedish Parliament) describes the climate changes as one of the biggest challenges of our time and the Government states that it is the environmental issue with highest priority.<sup>2</sup> According to the Government, Sweden’s coherent climate and energy policy entails drastic emission reductions.<sup>3</sup>

The Government stresses that Sweden is to show leadership, in what we do at home, in the work of the EU and internationally. The EU is the platform for a Swedish climate policy that is internationally coordinated.<sup>4</sup> Sweden is represented in the international climate negotiations through the EU.

The costs in Sweden for the most important measures to achieve zero emissions by 2050 are estimated by the Swedish Environmental Protection Agency to be between 0.2 and 0.5 per cent of GDP in 2050.<sup>5</sup> The equivalent cost in Denmark and the United Kingdom is estimated to be 0.5–2 per cent of GDP in 2050.<sup>6</sup> According to the OECD the cost increases by about 50 per cent if measures are postponed until after 2020.<sup>7</sup> The alternative of not

<sup>1</sup> Swedish Environmental Protection Agency (2012), report 6525, Appendix 3 p. 11.

<sup>2</sup> Govt. Bill 2008/09:162 p. 17, Committee report 2008/09:MJU28 p. 21, 76, 192 and 236, Riksdag Comm. 2008/09:300.

<sup>3</sup> Govt. Bill 2011/12:1 volume 1 p. 72.

<sup>4</sup> Govt. Bill 2008/09:162 p. 17.

<sup>5</sup> Swedish Environmental Protection Agency (2012), report 6537 p. 57. The estimates are not based on any specific Swedish research study, but are a simple summation of the total costs for the most important measures.

<sup>6</sup> Calculations have been made in the United Kingdom and Denmark. Swedish Environmental Protection Agency (2012), report 6525, appendix 11 p. 25 f.

<sup>7</sup> OECD (2012), *Environmental Outlook to 2050, the consequences of inaction, highlights*, p. 73.

taking any further measures at global level has been estimated in the Stern Review to generate costs of between 5 and 20 per cent of GDP.<sup>8</sup> The Climate and Vulnerability Inquiry has estimated costs and benefits in Sweden as a consequence of climate changes up to 2100. According to the Inquiry the costs are approximately the same as the benefits.<sup>9</sup>

A fundamental problem that makes it more difficult to move towards reduced global emissions is that in the short term there is seldom any direct gain from reducing emissions for individual countries, companies or private individuals. The economic incentives for reducing emissions vary considerably between different polluters in Sweden.

Sweden is a small trade-dependent economy with industrial production and transport as important driving forces for economic development. This implies an inbuilt conflict of objectives in relation to the emissions that must decrease if climate objectives are to be achieved. The Swedish Environmental Protection Agency estimates that the most difficult challenges are precisely the transition to a society that is more transport-restrictive and reducing emissions from processes in basic industries. A challenge for management is that emissions of greenhouse gases come from many sectors of society and responsibility for moving towards reduced emissions is shared by several agencies, ministries and Riksdag committees.

## 1.2 Purpose and audit issue

The Swedish National Audit Office audit strategy Sustainable development – climate has been directed at central government measures that are of major economic importance and are material in achieving the emissions reductions required to achieve Sweden’s national environmental quality objective *Limited Climate Impact*. The objective engages many members of the public but is very difficult to achieve. Achievement of the objective depends on measures in other countries and there is a risk that costs of various policy instruments will be high. The purpose is to examine whether the Government’s management provides the framework for effective climate measures, whether the costs of various policy instruments are reasonable in relation to the climate objectives and whether reporting is transparent.

<sup>8</sup> Swedish Environmental Protection Agency (2007), report 5711 p. 19. There are various research studies that consider the Stern Review cost estimates to be too high; for example Nordhaus, W. (2007) *A Review of the “Stern Review on the Economics of Climate Change”*.

<sup>9</sup> Swedish Government Official Reports SOU 2007:60, section 4.8.3.

This final report is based on and supplements the eleven audit reports published within the audit strategy Sustainable development – climate between 2009 and 2013.

The audits are based on one overall, common question:

*Does central government use its policy instruments so that emissions of greenhouse gases decrease in accordance with the objectives and at reasonable cost?*

### 1.3 Basic premises

This section describes the climate objectives of the UN, the EU and Sweden. Besides the climate policy objectives, integrated climate and energy policy includes various energy targets that are described in more detail in appendix 3. In addition there is a number of objectives in other expenditure areas that affect the potential for achieving climate and energy policy objectives, such as transport policy objectives. The section also describes premises in the form of relevant statements by the Riksdag and what the Swedish National Audit Office assesses to be reasonable requirements of management and coordination to achieve effective climate policy.

About 60 per cent of Swedish emissions<sup>10</sup> are from the non-trading sector, which is regulated by the Swedish milestone target and by the EU Effort Sharing Decision. The remaining emissions are regulated by the EU Emissions Trading System. The basis of the regulation of the trading system is determined through joint EU decisions. On some matters Sweden must abide by the EU provisions on the trading system, but there is national discretion on other matters. This is described in more detail in section 5.3.

#### 1.3.1 Objectives and fundamental principles of climate policy

Climate policy proceeds from several objectives and principles that are to guide implementation. The parties to the UN Framework Convention on Climate Change have agreed that the average global temperature must not be allowed to rise more than 2 degrees above pre-industrial levels.<sup>11</sup> As far as the EU is concerned, the European Parliament and Council have stated that by 2050 global greenhouse emissions should have been reduced by at least 50 per cent

<sup>10</sup> The total Swedish emissions do not include emissions and uptake of greenhouse gases from forest and land use.

<sup>11</sup> Sweden adopted the UN Framework Convention on Climate Change in 1993, see Swedish Treaty Series SÖ 1993:13. The recognition of the two-degree target took place at the United Nations, Conference of the Parties Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 Addendum Part Two: Action taken by the Conference of the Parties at its sixteenth session, 15 March 2011, FCCC/CP/2010/7/Add.1.

compared with 1990 levels, which entails emissions reductions of 80–95 per cent for the industrialised countries.<sup>12</sup> The position refers to aggregate emissions from both the trading and non-trading sectors.<sup>13</sup>

The EU climate objectives for 2020 imply that emissions are to decrease by 20 per cent compared with the 1990 level.<sup>14</sup> Emission reductions will be distributed between the trading and non-trading sectors on the basis of the 2005 emission level. At EU level the trading sector is to reduce emissions by 21 per cent by 2020 compared with 2005. The non-trading sector is to reduce emissions by 10 per cent compared with 2005.<sup>15</sup>

The premise for Sweden's climate policy is the environmental quality objective *Limited Climate Impact*, which is also based on the UN two-degree limit. The objective has an interim target and a milestone target. The interim target applied to the period 2008–2012 and stated that Swedish emissions of greenhouse gases during the period should be at least 4 per cent lower on average than emissions in 1990. This applied to aggregate emissions from both the trading and non-trading sectors. The milestone target for 2020 applies to the non-trading sector and means that emissions are to be 40 per cent lower than in 1990. A third of the emissions reductions are to be achieved with the help of climate measures abroad.

In 2009 the Government presented the vision that “By 2050, Sweden will have a sustainable and resource-efficient energy supply and no net emissions of greenhouse gases in the atmosphere”.<sup>16</sup> The vision applies to Sweden as a whole and makes no distinction between the trading and non-trading sectors.

### Cost effectiveness

The EU emissions trading system aims to reduce emissions of greenhouse gases in a cost-effective way,<sup>17</sup> which is an important principle of Swedish climate policy as well. In addition the Budget Act stipulates that a high degree of effectiveness should be sought in central government activities. By this

<sup>12</sup> Brussels, European Council 29/30 October 2009 Presidency Conclusions, 1 December 2009, 15265/1/09, REV 1, II 7.

<sup>13</sup> Email from officials at DG Climate Action 10 June 2013.

<sup>14</sup> Govt. Bill 2008/09:162 p. 33, Committee report 2008/09:28, Parliamentary communication 2008/09:300. The objective is based on the emission level in 2005.

<sup>15</sup> According to the EU Effort Sharing Decision Sweden is to reduce emissions by 17 per cent by 2020 compared with the 2005 level. See Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, EUT L 140/136, 5.6.2009.

<sup>16</sup> Govt. Bill 2008/09:162 p. 12, see also Govt. Bill. 2010/11:100 p. 58.

<sup>17</sup> Art. 1. Directive 2003/87/EC of the European Parliament and the Council.

is meant that central government activities are to be conducted so that the objectives set by the Riksdag are achieved to the greatest extent possible given the resources available.<sup>18</sup>

### The polluter pays principle

The principle that the polluter should pay for its pollution/emissions (Polluter Pays Principle) is fundamental to environmental and climate policy. EU environmental policy builds on this principle, among others. The principle is established in international environmental conventions and in the Swedish Environmental Code (1998:88).<sup>19</sup> In addition it constitutes one of the Riksdag's key points for tax policy.<sup>20</sup> The Government has also stressed that the principle is a correct premise for environmental and climate policy.<sup>21</sup>

#### 1.3.2 *Statements by the Riksdag – effectiveness and transparency on the basis of a long-term emission pathway*

The Riksdag has requested better follow-up and reporting on the climate from the Government. The Riksdag's statements refer to the need for cost-efficiency, effectiveness, transparency and a long-term emission reduction pathway:

- It is important that the Government regularly monitors and evaluates the measures taken in the climate area as well as submitting a report and analysis of results achieved annually to the Riksdag. Performance reporting should be more clearly focused on results and effects of the measures taken.<sup>22</sup>
- The main part of central government measures in the climate area are taken within the framework of other expenditure areas.<sup>23</sup> It is necessary to have both an overall report of the most important central government measures for the respective areas and a report of the results

<sup>18</sup> Central Government Budget Act (1996:1059), Govt. Bill. 1995/96:220, section 5.1. The UN Climate Convention also has as a guiding principle that climate measures must be cost effective. See United Nations Framework Convention on Climate Change (UNFCCC), Art. 3.3.

<sup>19</sup> See J Ebbeson, Miljörätt, 2nd edition, p. 36. There is, however, no definition of the polluter pays principle and opinions differ on how far-going the principle is. One example is whether the principle applies to costs corresponding to the theoretically optimum pollution level in economic terms.

<sup>20</sup> Govt. Bill 2007/08:100 section 5.3, Committee Report 2007/08:FiU20, Communication from the Riksdag 2007/08:259–260. See also 2011/12:SkU1y p. 12.

<sup>21</sup> Govt. Communication 2011/12:150 p. 6 and 2012/13:105 p. 6.

<sup>22</sup> Committee Report 2008/09:MJU1, Parliamentary communication 2008/09:103. In Committee Report 2012/13:MJU1 p 9, Riksdag Comm.2012/13:120 the Committee and the Riksdag return to the fact that it is of great importance for the Committee to receive regular information to be able to follow ongoing developments on a continuous basis regarding climate affecting emissions.

<sup>23</sup> The Committee report refers to expenditure area 20 General environmental protection and nature conservation.

of the measures. It may be appropriate to report results in a separate Government Communication at regular intervals.<sup>24</sup>

- It would be an advantage if the Government's account also included the trend that can be observed up to 2050 – that is if the emissions are expected to decrease to the desired extent.<sup>25</sup>

The Committee on Environment and Agriculture has also called attention to the need to select the most cost-effective combination of measures to achieve the desired objective in the long term. The Committee also stressed that the synergy potential between climate policy and energy policy measures should be made use of.<sup>26</sup>

### 1.3.3 *Premises for management and monitoring climate policy*

Climate policy is complex, extending over a long period and affecting several sectors and many different actors. This makes special demands on management and coordination.<sup>27</sup> The Swedish National Audit Office assumes a number of fundamental conditions to ensure that management contributes to achieving the climate objectives at a reasonable cost. The basic conditions were drawn up in collaboration with Olof Petersson, former professor of political science at the University of Uppsala.<sup>28</sup>

To allow agencies, companies and consumers a reasonable planning framework the Riksdag and Government must clarify how emissions of greenhouse gases are to decrease over time. Long-term rules of play and coordinated reporting are required to enable actors concerned to make rational decisions, for example on investment and other measures with a long time horizon.<sup>29</sup>

The objectives for the climate area as a whole and for individual measures need to be well-formulated, measurable and monitorable for management to be meaningful and to allow achievement of objectives to be set in relation to costs. It is also important to be able to follow up climate initiatives against long-term objectives. To enable achievement of different objectives at low cost

<sup>24</sup> Committee Report 2009/10:MJU1, Parliamentary communication 2009/10:129.

<sup>25</sup> Committee Report 2010/11:MJU1, Parliamentary communication 2010/11:119.

<sup>26</sup> Committee Report 2011/12:MJU1, Parliamentary communication 2011/12:99.

<sup>27</sup> Sweden applies results-based management, a management model that means that the Government controls the agencies by means of objectives and performance reporting requirements. The agencies report to the Government, which in turn supplies the Riksdag with the reference material it requires to monitor implementation of political decisions.

<sup>28</sup> A more detailed description can be found in a statement from Olof Petersson in annex 1.

<sup>29</sup> See Svenska Dagbladet, 6 September 2012. See also Hagainitativet (2013) *Consultation response to the Swedish Environmental Protection Agency's reference material for Roadmap 2050*, Confederation of Swedish Enterprise (2012) *Ökad energieffektivitet i näringslivet – ett idédokument*, p. 14, Motormagasinet 12 March 2013.

and without undesirable side effects a coordinated assessment is needed.<sup>30</sup> This makes major demands of the Government Offices' ability to handle conflicting objectives, assign priorities and coordinate measures and various knowledge bases. The steering effect will be jeopardised unless the Government specifies an order of priority for the climate objectives in relation to other objectives and public interests.

Knowledge and dissemination of knowledge are essential preconditions for political control in general and democratic accountability in particular. An efficient accountability process assumes that it is possible to follow the measures implemented, their results and who is responsible.<sup>31</sup> Reporting of measures that have a material impact on conditions for achieving climate objectives should therefore be coordinated and transparent. Costs, effects and side-effects should be reported for each separate measure and from an overall perspective.<sup>32</sup> In that way the Riksdag and other actors concerned can obtain a current picture of whether the policies pursued are successful or not.

## 1.4 Method and implementation

This final audit in the Swedish National Audit Office audit strategy *Sustainable development – climate* is based on and supplements the eleven audits<sup>33</sup> that have been published within the strategy between 2009 and 2013. The measures audited were selected on the basis of such factors as economic importance and effect on emissions. In the various audits both qualitative and quantitative methods have been used.<sup>34</sup>

This report summarises material findings from the earlier reports, supplemented by some follow-up of changes made after the audits in question. Updates of data on emissions, emission allowances and costs have been obtained from Statistics Sweden, the Swedish Environmental Protection Agency and the Swedish Energy Agency. The Swedish National Audit Office has also made its own calculations and compilations on the basis of data from

<sup>30</sup> The Committee on Environment and Agriculture has also requested this, see Committee Report 2011/12:MJU1, Parliamentary communication 2011/12:99.

<sup>31</sup> Ahlbäck Öberg, Shirin, 2010 p. 171–172.

<sup>32</sup> Committee Report 2009/10:MJU1, Parliamentary communication 2009/10:129.

<sup>33</sup> The following audits were included in the audit strategy Sustainable development – climate: Swedish National Audit Office RiR 2009:6, RiR 2009:21, RiR 2011:8, RiR 2011:10, RiR 2011:29, RiR 2012:1, RiR 2012:2, RiR 2012:7, RiR 2012:27, RiR 2013:8, RiR 2013:9.

<sup>34</sup> For more detailed information on the methods of the various audits, see the respective performance audit report.

these agencies and other sources.<sup>35</sup> The Swedish National Audit Office has also processed new data from the Swedish Environmental Protection Agency concerning preliminary allocation of emission allowances for the trading period 2013–2020 in the EU Emissions Trading System. In Chapter 2 the Swedish National Audit Office presents partly new material from the Swedish Environmental Protection Agency and Statistics Sweden to describe different perspectives of Swedish emissions.

New empirical data has been collected, mainly concerning the Government's management and reporting to the Riksdag. The new empirical material also refers to experiences from the United Kingdom's climate work, in light of the separate legislation the UK has introduced on climate change. Collection of empirical evidence has been by means of examining policy and follow-up documentation from the Government<sup>36</sup> and agencies as well as supplementary interviews with officers at the Government Offices, agencies, European Commission and ministries in the United Kingdom. Some interviews were also conducted with representatives of companies and think-tanks to obtain more in-depth insight into the area.

Professor Runar Brännlund of the Umeå School of Business and Economics at Umeå University contributed to the audit as quality assurer from an economic perspective. Olof Petersson, former professor of political science at the University of Uppsala contributed to the audit as quality assurer of the parts referring to management.

The audit was conducted by a project group consisting of Madeleine Nyman, Fredrik Engström and head of audit strategy, Lena Björck. Petter Dahlin and Emelie Juter also participated in parts of the audit.

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<sup>35</sup> The Swedish National Audit Office's own calculations were made in most of the previous performance audit reports. In the reports in question, the calculations are described in more detail.

<sup>36</sup> The Swedish National Audit Office has audited the Government's reporting in the Budget Bills for 2008–2013, expenditure areas 20–24. The Government's accounts of its handling of Riksdag Communications to the Government from 2007 to 2012 were also examined. As regards overall climate reporting, the Swedish National Audit Office analysed a number of essential reports from the 2004 progress review onwards (see also Table 6.1, section 6.2.2).

#### 1.4.1 *Agencies and ministries responsible*

Climate and energy issues concern several different ministries and several responsible agencies. The ministries and agencies affected by the audit are above all<sup>37</sup>:

- The Ministry of Finance, Statistics Sweden and the National Institute of Economic Research
- The Ministry of the Environment and the Swedish Environmental Protection Agency
- The Ministry of Enterprise, Energy and Communications, the Swedish Energy Agency and the Swedish Transport Administration.

#### 1.4.2 *Delimitations*

All audits in the area of sustainable development – climate refer to central government measures to reduce emissions. The audits do not, however, concern measures to adapt society to new climate conditions, such as flood measures.

The focus of this concluding audit is whether the Government's management enables effective climate measures, whether the cost for different measures is reasonable and whether reporting is transparent.

Existing measures in Sweden of significance to the Government's climate and energy policy that have not been explicitly dealt with are for example the Swedish Environmental Code. See table below.

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<sup>37</sup> Agencies and ministries responsible that were included in previous audits are presented in the respective performance audit report.

**Table 1.1** Measures of climate and energy policy\*

Multi-sectoral	Energy supply	Industry	Traffic	Housing	Agriculture	Waste
<b>Emission allowance trading</b>	<b>Emission allowance trading</b>	<b>Emission allowance trading</b>	CO <sub>2</sub> emission requirements for new cars	<b>Energy declaration</b>	Rural Development Programme	Prohibition against landfill disposal
<b>Energy and carbon dioxide taxes</b>	<b>Energy and carbon dioxide taxes</b>	<b>Energy and carbon dioxide taxes</b>	<b>Energy and carbon dioxide taxes</b>	<b>Energy and carbon dioxide taxes</b>	<b>Energy and carbon dioxide taxes</b>	Capture of landfill (methane) gas
Swedish Environmental Code	<b>Electricity certificate system</b>	Regulation of some fluorinated greenhouse gases	<b>Tax exemption for bio-fuels/quota obligation</b>	Ecodesign Directive and energy labelling	Advisory services	Recycling
The Planning and Building Act	Special measures for wind power and solar electricity	<b>Programme for energy efficiency in energy-intensive industries (PFE)</b>	<b>CO<sub>2</sub> differentiated motor vehicle tax</b>	Building rules		Producer responsibility
<b>Research and development</b>		Incentives for green cars	Energy advice		Municipal waste plan	Kommunal avfallsplan
			Green car definition	Procurement of technology		Waste incineration
			Taxation of company car benefit			
			<b>Infrastructure planning</b>			

\* Measures audited by the Swedish National Audit Office are in bold type.

Source: Government Offices and Swedish Environmental Protection Agency: Report for Sweden on assessment of projected progress, March 2013, p. 7. The measure of extra investment support for biogas pumps has ended.

According to the Government the EU is the platform for Swedish international climate policy, and Sweden is represented through the EU in the international climate negotiations.<sup>38</sup> In this final report the Swedish National Audit Office has not audited the negotiation work.

<sup>38</sup> Government website, 28 October 2013.

## 1.5 Central terms and concepts

### *EU ETS*

The EU Emissions Trading System, a policy instrument to reduce emissions of carbon dioxide and other greenhouse gases from installations in the EU.

### *The Trading Sector*

Installations included in the EU Emissions Trading System. For example power plants, combustion plants, oil refineries, iron and steel works and factories that manufacture cement, glass, ceramics, pulp, paper, cardboard.

### *The Non-Trading Sector*

The operations that are not included in the trading sector, such as housing, transport, service and agriculture.

### *National emission allowances (Assigned Amount Units)*

These emission allowances were allocated to each participating state with commitments under the Kyoto Protocol.

### *Emission credits*

These are generated from emission reduction projects in other countries. One emission credit corresponds to one tonne carbon dioxide in one year. Another expression used is emission reduction unit.

### *Greenhouse gases*

The expression is used as a collective term for the greenhouse gases carbon dioxide, methane, nitrous oxide (laughing gas), sulphur hexafluoride, fluorocarbons and hydrofluorocarbons.



## 2 Perspective on Sweden's emissions of greenhouse gases

The new report from the UN Intergovernmental Panel on Climate Change shows a continued increase in global warming.<sup>39</sup> Besides the UN reporting there are alternative ways of calculating emissions. The Swedish National Audit Office would like to use this chapter to illustrate the importance of different analyses as a basis for steering effectively towards reduced emissions.

### 2.1 Emission trends globally and in Sweden

In this section the Swedish National Audit Office first describes emission trends in Sweden mainly in relation to trends in the EU. Then an account is given of the impact of emissions from international aviation and shipping. The Swedish National Audit Office also describes the decoupling of emission trends from economic growth, as well as the factors that affect emissions.

#### **Global emissions of greenhouse gases have increased drastically**

Global emissions have increased very drastically as a consequence of strong economic and population growth since the mid-1900s. See Annex 4. The increase in emissions has been particularly high from fossil-dependent electricity and heat generation in emerging economies, not least China, in the past two decades. These emissions have doubled since 1990, while emissions from industrial countries remain at about the same level.<sup>40</sup>

#### **Trends in Sweden and the EU**

Swedish emissions grew considerably in the 1900s as combustion of fossil fuels increased in pace with a growing population, increased output, increased trade and increased transport. In connection with the oil crisis of the 1970s an energy policy was initiated to make Sweden less oil-dependent by means of increased use of biofuels and expansion of nuclear power. Thus emissions of

<sup>39</sup> Intergovernmental Panel on Climate Change (IPCC) WGI AR5, *Climate Change 2013: The Physical Science Basis*.

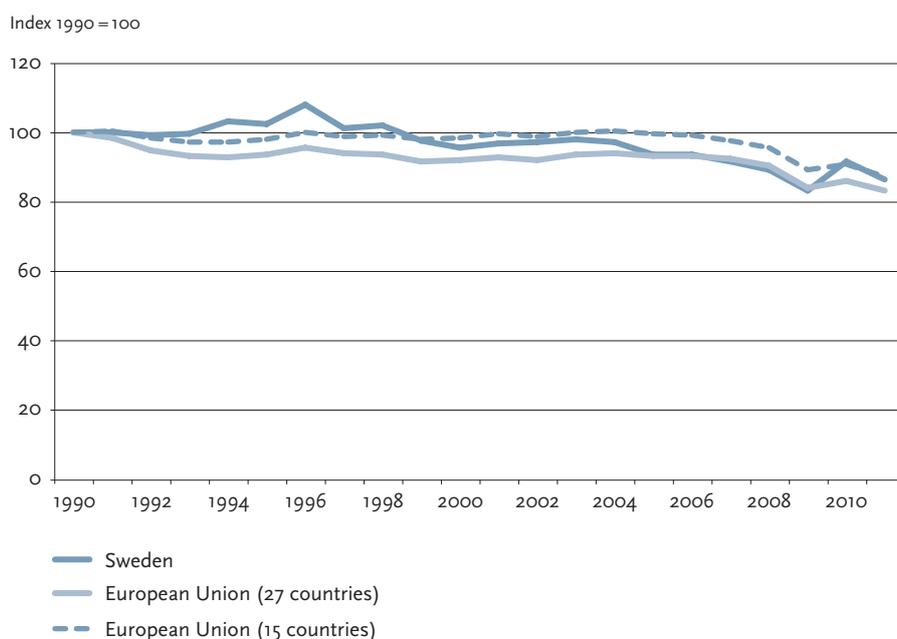
<sup>40</sup> Swedish Environmental Protection Agency 2013, report 6557 p. 26.

carbon dioxide were cut by half up to 1990, even before Sweden had an explicit climate policy.<sup>41</sup>

In 1998 the Riksdag decided on the first objective for limiting emissions of greenhouse gases. The foundation of Swedish climate policy was carbon dioxide tax, but there were also targeted measures, such as investment support and support to research and development.<sup>42</sup> Between 1990 and 2012 emissions of greenhouse gases decreased by a further 20 per cent.<sup>43</sup>

The emission trend in Sweden has by and large followed the EU-27 trend. See Figure 2.1. Compared with other EU countries Sweden’s domestic emissions per capita are among the lowest.

**Figure 2.1** Greenhouse gas emissions in Sweden compared with EU-27 and EU-15



Source: Eurostat.

<sup>41</sup> Swedish Environmental Protection Agency 2012, report 6525, Appendix 6, p. 24.

<sup>42</sup> The carbon dioxide tax is not uniform and in some sectors there is still no pricing of carbon dioxide emissions. See for example RiR 2012:1 page 111.

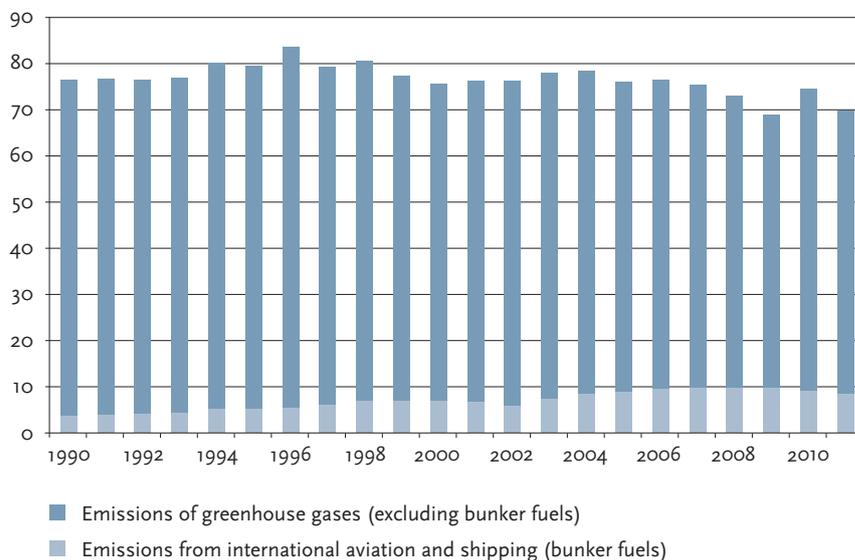
<sup>43</sup> Preliminary data from the Swedish Environmental Protection Agency website, 30 May 2013.

### Emissions from international transport are increasing but not included in reporting for climate objective

Emissions from international air and sea transport are steadily increasing, but are not included in reporting for Sweden’s climate objective since these emissions are not included in Sweden’s commitment under the Kyoto Protocol. Emissions in Sweden are higher than reporting shows, if emissions from these “bunker fuels” are included.<sup>44</sup> Emissions from bunker fuels have increased since the 1990s, in contrast to what reporting under the climate objective shows. See Figure 2.2.

**Figure 2.2** Swedish emissions of greenhouse gases with and without emissions from international aviation and shipping

Millions of tonnes of emissions (carbon dioxide equivalents)



Source: The Swedish National Audit Office’s processing of data from Statistics Sweden, *Environmental Accounts and National Accounts*.

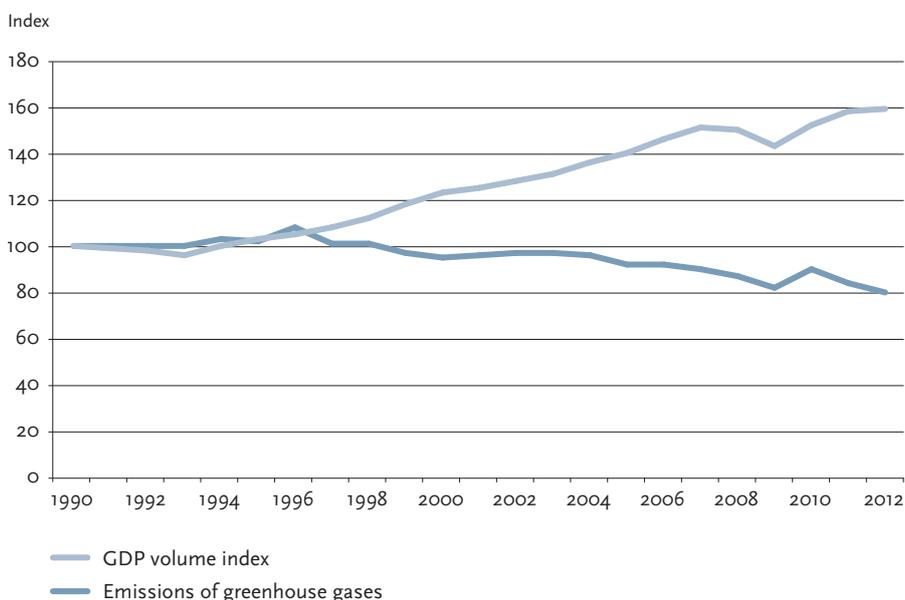
### Decoupling of economic growth from emissions

In Sweden growth measured as GDP has increased at the same time as total carbon dioxide emissions have decreased. This method of calculation shows that there has been a decoupling of emissions from economic growth. The reasons include decreased dependence on fossil fuels and an increased share

<sup>44</sup> Bunker fuels refers to fuel for ships and aircraft, regardless of nationality, that buy their fuel in Sweden but have their first destination outside Sweden. Nor do total Swedish emissions include emissions and uptake of greenhouse gases from forest and land use. Uptake from forests and land is, however, included in reports to the UN. Uptake from forests and land in 2011 was about 35 million tonnes. See Swedish Environmental Protection Agency, *National Inventory Report Sweden 2013*, p. 16.

of renewable energy as well as improved energy efficiency in the energy and housing sectors. See Figure 2.3.

**Figure 2.3** GDP development and greenhouse gas emissions in Sweden, index 1990=100



Source: Statistics Sweden, *Environmental Accounts and National Accounts*.

### Decoupling only partly explained by policy instruments

Decoupling of economic growth from emission trends can only partly be explained by central government efforts. It is above all other factors that have contributed. Economic growth and population growth contribute to increased emissions, while structural transformation in the business sector and an energy mix with a lower percentage of fossil fuels reduce emissions. Structural transformation can also lead to emissions moving to other countries.

Figure 2.4 below shows how various factors contribute to changes in emissions of greenhouse gases between years.<sup>45</sup> The second lowest part of the bars indicates that in a recession, such as during the financial crisis in 2009, when the iron and steel industry used less energy in production and less marginal electricity<sup>46</sup> (fossil fuels in electricity generation) emissions are reduced. The second lowest part of the bars also includes energy efficiency, which also

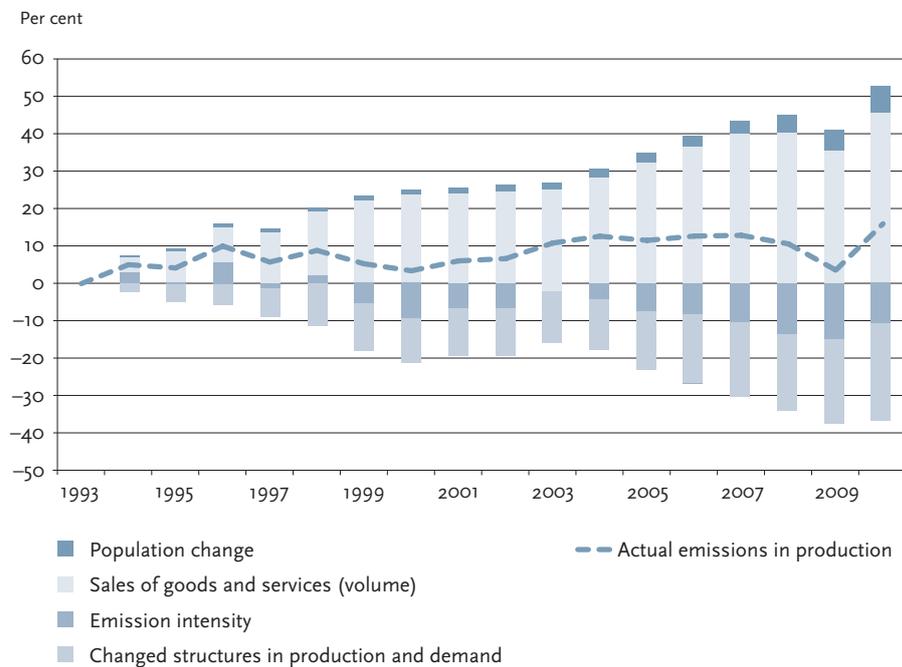
<sup>45</sup> For description of methods see European Commission (2003) *Decomposition analysis of carbon dioxide-emission changes in Germany – Conceptual framework and empirical results*.

<sup>46</sup> Marginal electricity is often from fossil fuels. Marginal electricity is the electricity generation that is added when electricity consumption increases or when electricity generation is discontinued. The term is also used for the opposite: that marginal electricity is the electricity generation that disappears when electricity generation is reduced or for additional electricity generation. See Elforsk (2006) report 06:52, *Marginal och miljövärdering av el*, p. 6.

contributes to reducing the need for energy from fossil fuels. The lowest part of the bars shows that the ongoing structural transformation from goods production to more service production contributes to reduced emissions.

When there is growth in the economy the need for energy increases, leading to increased emissions due to increased sales of goods and services (the second highest part of the bars). Emissions also increase in cold winters, such as in 1996. At that time the availability of hydropower and nuclear power was also low, which increased the use of marginal electricity.

**Figure 2.4** Factors affecting Swedish emissions.\* Percentage change compared with 1993



\* The figure shows emissions from production for Swedish consumption. Direct emissions from Swedish consumption, such as oil heating and driving vehicles are not included. Changed structures include the distribution between goods and services and trading in production. The intensity of emissions includes for example a reduced percentage of fossil fuels.

Source: Statistics Sweden, Environmental Accounts and National Accounts.

## 2.2 Swedish consumption has led to increased emissions abroad via increased imports

In this section the Swedish NAO provides further examples of necessary supplementary analysis and reporting in addition to the usual reporting.

The official<sup>47</sup> Swedish emission statistics report emissions in Sweden, which is standard even in international emission reporting and nothing that the Swedish NAO is criticising. But to achieve effective management the reference data and analysis must be supplemented, for example with emissions caused by Swedish consumption internationally. Swedish production and consumption are dependent on products manufactured in other countries that are not as directed towards reduced emissions as Sweden, as illustrated below. The Swedish climate objectives are aimed ultimately at the two-degree target, i.e. decreased global emissions. Information about emissions caused by Swedish consumption in other countries contributes to increased knowledge about what would be needed to reduce global emissions. Also imported goods cause considerable emissions in countries where they are produced.

Emissions from goods produced in Sweden, that is also emissions from exported goods, are included in reporting of Swedish emissions. On the other hand, emissions from goods produced in other countries but consumed in Sweden are not included.<sup>48</sup> In the figure below emissions in Sweden for exported goods and services have been removed and emissions in other countries from goods and services imported for Swedish use have been added. Emissions from Swedes' consumption increase when imports are included and have been estimated to be about 100 million tonnes per year.<sup>49</sup>

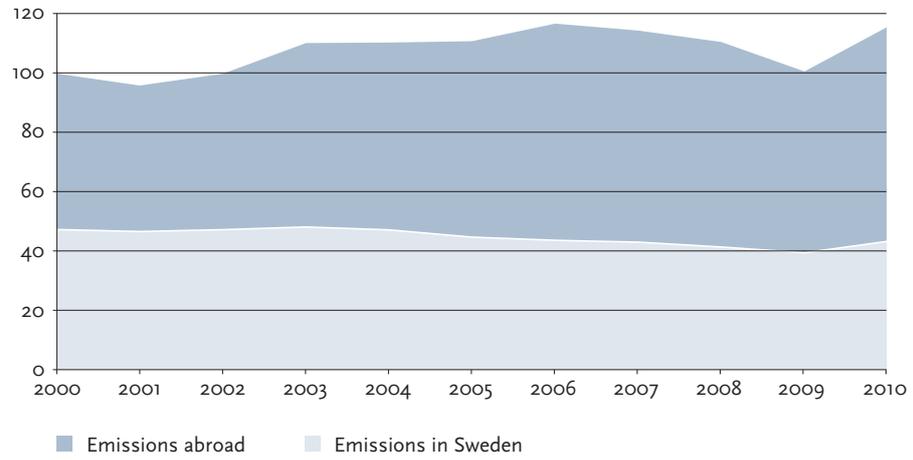
<sup>47</sup> This refers to the official emissions statistics used by the Swedish Environmental Protection Agency (UNFCCC/IPCC).

<sup>48</sup> Swedish Environmental Protection Agency (2012), report 6500 p. 10. Reporting of emissions under the UN Climate Convention is based on measurements of emissions at source.

<sup>49</sup> Emissions measured as carbon dioxide equivalents. Swedish Environmental Protection Agency 2012, report 6483 p. 8. Emissions from Swedish consumption of production in Sweden including fuels from international aviation and shipping (bunker fuels) were about 43 million tonnes in 2010. Calculations from Environmental Accounts at Statistics Sweden, including bunker fuels, cover the period up to and including 2010. According to Swedish emissions statistics published by the Swedish Environmental Protection Agency emissions were 65 million tonnes in 2010 (excluding bunker fuels and emissions from international aviation and shipping). According to preliminary calculations for 2012 by the Swedish Environmental Protection Agency these emissions decrease to 58 million tonnes in 2012. In several countries emissions from own production are approximately the same size as emissions from consumption. TCO (Confederation of Professional Employees) 2013, TCO granskar no 8 p. 5.

**Figure 2.5.** Emissions in Sweden and other countries caused by production of goods and services consumed in Sweden

Millions of tonnes of emissions (carbon dioxide equivalents)



Source: Swedish Environmental Protection Agency.



## 3 Climate objectives

Sweden's coherent climate and energy policy, like that of the EU, aims at ecological sustainability, competitiveness and security of supply. Framing objectives and weighing up various purposes and social objectives are parts of a complex political process. Formulating clear objectives to reduce emissions of greenhouse gases is complicated in that so many sectors and actors are affected and for example the pace of development of low-carbon technology is uncertain. To achieve effective management, however, objectives and concepts must be clearly defined.<sup>50</sup> It is also important that the objectives are concrete, operationalized and monitorable.<sup>51</sup> The Swedish National Audit Office's audits have shown that the climate objectives also need to be coordinated with other social objectives.<sup>52</sup> Otherwise the objectives can conflict with or increase the cost of central government measures.

### 3.1 Objectives in the Climate and Energy Bills

The present climate and energy policy objectives were adopted in combination by the Riksdag in 2009. The Swedish National Audit Office has audited central government measures of significance to climate policy in 11 reports, noting that several objectives and starting points are unclear. In several cases the Government has made proposals or decisions without defining central objectives and starting points. The audits have also shown that lack of clarity has contributed to weak governance and a lack of transparency.<sup>53</sup> However, the Government has subsequently taken a number of measures to clarify some definitions and objectives.

<sup>50</sup> The Riksdag has stressed that the environmental quality objectives have different purposes, one of which is to be a starting point for results-based management of central government activities. Consequently the Riksdag considers it essential that the objectives are clear. See Committee Report 2011/12:MJU1 p. 15, Riksdag Comm. 2011/12:99.

<sup>51</sup> European Commission (2011), *A Roadmap for moving to a competitive low carbon economy in 2050*, p. 4.

<sup>52</sup> Swedish National Audit Office RiR 2009:21, 2011:10, 2011:29, 2012:1, 2012:2, 2012:7 and 2013:8.

<sup>53</sup> See for example Swedish National Audit Office RiR 2009:6, 2009:21, 2011:8, 2011:29, 2012:1, 2012:2, 2012:7 and 2013:8.

### 3.1.1 *Unclear how climate and energy objectives for 2020 are to be interpreted and measured*

The EU's overall climate objective of a 20 per cent reduction in emissions by 2020, together with the objectives for energy efficiency and renewable energy, governs the Union's coherent climate and energy policy. The cornerstones are ecological sustainability, competitiveness and security of supply. These also apply to Sweden's climate and energy policy. There is a large number of objectives in climate and energy policy, but neither the EU nor the Government has clarified the priorities that are to apply between the various objectives. Several of the objectives are also unclear. Apart from lack of clarity in how the milestone target is to be interpreted, the Swedish National Audit Office has noted some lack of clarity in the energy efficiency objective for 2020.<sup>54</sup>

#### **Interpretation and measurement of milestone target achievement is unclear**

Swedish emission reductions in the non-trading sector are regulated both by the levels in the EU decision on linear emission reductions for the non-trading sector<sup>55</sup>, and by the Swedish milestone target. However, the Government has not entirely clarified how the milestone target for 2020 is to be interpreted and measured, which makes comparisons and coordination with EU objectives difficult. One problem is that the Swedish milestone target uses 1990 as the base year. Since there are no reliable data on emissions for various installations' emissions for the milestone target's base year 1990, a recalculation is made based on inadequate data. The corresponding problem does not exist at EU level, since the EU's distribution of emissions between the trading and non-trading sectors is measured using 2005 as base year.<sup>56</sup>

Another problem is that the Government has not specified if the target is to be interpreted as a drop by 2020 or if there is to be a linear decrease in emissions up to 2020, which is of great significance for how much emissions must decrease to achieve the target.<sup>57</sup> However, three years after the target was adopted, the Government clarified that Sweden will need about 40 million

<sup>54</sup> Swedish National Audit Office RiR 2013:8 p. 90.

<sup>55</sup> The EU decision on linear emission reductions applies to the period 2013 to 2020. The implication is that every member state is to limit its emissions for each separate year from 2013 to 2020 by not exceeding a level defined by a linear trajectory. As far as Sweden is concerned emissions reductions in the non-trading sector are to be 17 per cent by 2020 compared with 2005. See Decision No 406/2009/EC of the European Parliament and of the Council.

<sup>56</sup> Swedish National Audit Office RiR 2013:8, file annex 48.

<sup>57</sup> Swedish National Audit Office RiR 2012:1 p. 28 and RiR 2011:8.

emission credits in the period until 2020 in order to achieve the third of the target that must be reached with climate measures abroad.<sup>58</sup>

Measurement of the achievement of the target is also made more difficult because the extent of the trading sector and the non-trading sector is continually being changed. New installations are added and others are removed from the trading system. In the period 2013–2020 the trading system will in addition be extended to cover more industry sectors and greenhouse gases, leading to a decrease in the extent of the non-trading sector. However, the Government has not specified how the emissions are to be calculated when industry sectors and associated emissions are moved to or from the trading system. Unlike Sweden the EU manages this problem.<sup>59</sup>

The formulation of the Swedish milestone target thus makes comparisons with EU decisions more difficult for Swedish emissions from the non-trading sector. The Government has not reported what emission reductions are required to achieve the different objectives.<sup>60</sup> Nor has the Government coordinated the objectives with the EU objectives, despite advocating international objectives and policy instruments. The Swedish National Audit Office describes this in more detail in annex 3.

### 3.1.2 *Unclear how emissions in the transport sector are to be reduced*

Fossil fuels account for more than 90 per cent of the transport sector's energy consumption.<sup>61</sup> However, the Government has not specified in what way the transport sector is to contribute to the climate objectives.<sup>62</sup> In connection with the 2009 Climate Bill the Government reported the priority "By 2030, Sweden should have a vehicle stock that is independent of fossil fuels".<sup>63</sup> What this

<sup>58</sup> Govt. Bill 2012/13:1, expenditure area 20 p. 58. The Government also considers that the objective for international efforts towards the milestone target may need to be adjusted, for example in connection with the 2015 progress review.

<sup>59</sup> Swedish National Audit Office RiR 2013:8, file annex 48 and European Commission, DG Environment, *Relationship between ETS cap and binding national targets in Effort Sharing Decision*, presentation to the Climate Change Committee 19 January 2010. The EU objectives for emission reductions in the non-trading sector are regularly adjusted on the basis of changes in the number of emission allowances in the EU Emissions Trading System that result from installations or gases being moved into or out of the trading system. However, in Govt. Bill. 2012/13:1 UO 20, p. 57, the Government has stated that it is concerned that the transfer of activities that has taken place in connection with the development of the EU trading system should not water down the ambition of the milestone target.

<sup>60</sup> In autumn 2013, however, the Government instructed the Swedish Environmental Protection Agency and the Swedish Energy Agency to prepare a basis for monitoring developments towards Sweden's climate and energy objectives for 2020. See Ministry of the Environment press release of 13 October 2013.

<sup>61</sup> Email from the Swedish Transport Administration of 27 September 2013. Emissions from domestic transport in 2011 accounted for a third of Swedish emissions.

<sup>62</sup> In Govt. Bill 2008/09:162 the Government did not propose any specific sectoral objectives.

<sup>63</sup> Govt. Bill 2008/09:162 p. 58.

means and how it is to be followed up is, however, not clear. When the Swedish National Audit Office asked the ministries and agencies concerned for a clearer definition, it emerged that there was none.<sup>64</sup> The Government subsequently set up an Inquiry to define how priorities should contribute to reduced climate impact. The Inquiry will submit its report in December 2013.<sup>65</sup>

### 3.1.3 *Sweden lacks long-term clear objectives and emission reduction pathway*

The Government has not formulated clear objectives for the period after 2020, which has been pointed out as a problem in several of the Swedish NAO's audits.<sup>66</sup> Consequently, policy instruments, for example concerning biofuels, have been planned in a short-term way, without fully meeting the business sector's need for long-term rules of play for investments.<sup>67</sup>

The Government Offices has stated that the EU should decide on an ambitious binding objective for how much the Union's emissions should decrease by 2030. Otherwise the achievement of future climate objectives risks being made more expensive, for example due to non-investment in clean technology.<sup>68</sup> The Government has not proposed any such objective for Sweden.

The United Kingdom has decided on a binding target of a reduction in the country's emissions of greenhouse gases of 80 per cent by 2050 compared with the 1990 level. To ensure that emissions decrease at the rate necessary to achieve that target the British Government is to submit five-year carbon budgets to the UK Parliament. All legislative proposals that affect emissions must include a consequence analysis for emissions. See Annex 9.

#### **Unclear how Swedish emissions are to decrease after 2020**

In 2009 the Government formulated a vision that Sweden will have no net emissions of greenhouse gases in 2050. The vision may entail considerable or less extensive emission reductions in Sweden. The Government has not as yet stated how the vision is to relate to such things as carbon sinks or technology

<sup>64</sup> This is shown in RiR 2012:7. The Government had not defined the term "vehicle fleet", for example. The International Energy Agency (IEA) has recommended that the Government clarify what fossil fuel independence means and as a matter of urgency adopt an action plan on how to cost-effectively achieve the 2030 priority of making the vehicle fleet independent of fossil fuels. See IEA (2013) *Excerpt – The framework: energy policy and climate change*, p. 23.

<sup>65</sup> ToR 2012:78. See also the Government's supplementary terms of reference N (2012:05).

<sup>66</sup> Swedish National Audit Office RiR 2012:7 and RiR 2012:1.

<sup>67</sup> Swedish National Audit Office RiR 2011:10 p. 111 f. Among other things the Swedish NAO noted that the tax exemption for biofuels has not meant long-term and predictable conditions for enterprises. The Government has proposed the introduction of a quota obligation system instead of tax exemption for biofuels as of 1 May 2014. See Government Bill 2013/14:1 p. 398 f.

<sup>68</sup> See Government Offices, explanatory memorandum 2012/13:FPM110 p. 7.

for capture and storage of carbon dioxide.<sup>69</sup> Hence it is even more uncertain if long-term investments in low-carbon technology will be profitable for central government, the business sector and the public.

The EU and Sweden have adopted the UN two-degree target and support the opinion that the industrialised countries should adjust their economies to achieve emission reductions of 80–95 per cent by 2050 compared with 1990.<sup>70</sup> However, the Government has not specified in more detail how the two-degree target relates to the vision that Sweden has no net emissions.

The Riksdag considers that it would be an advantage if the Government reports a long-term emissions reduction pathway up to 2050. The Swedish National Audit Office has in several audit reports requested that the Government sets up an approximate pathway for long-term emissions reduction.<sup>71</sup> At the UN Climate Change Conference in 2010, all industrialised countries committed to producing long-term national strategies to achieve reduced greenhouse gas emissions.<sup>72</sup> Consequently the EU has decided that the Union and its member states are to draw up strategies for reducing industrialised countries' emissions collectively by 80–95 per cent by 2050.<sup>73</sup> In December 2012 the Swedish Environmental Protection Agency, on behalf of the Government, presented reference material for a roadmap 2050. The Government has not taken any position on the reference material, but has stated that in spring 2014 it intends to describe Swedish efforts to achieve the vision for 2050 in more detail.<sup>74</sup>

<sup>69</sup> Carbon sinks absorb carbon from the atmosphere and bind it. Oceans and vegetation function as the main carbon sinks. If carbon sinks are included and there is an expectation of substantial emission reductions abroad and confidence in technological developments to capture and store carbon dioxide, the vision will be easier to achieve.

<sup>70</sup> In Govt. Bill 2008/09:162 the Government states that the EU two-degree target is to govern the measures that need to be taken in Swedish climate policy. The Government assesses that the industrialised part of the world needs to reduce its emissions by 80 to 95 per cent by 2050, compared with 1990. See also Government Offices, explanatory memorandum 2012/13:FPM110 p. 5.

<sup>71</sup> Swedish National Audit Office RiR 2011:8, 2012:1, 2012:7.

<sup>72</sup> See for example Government decision (M2011/2426/KI), 21 July 2011.

<sup>73</sup> Member states must report on the progress of the work by January 2015. See Art. 4.1 b and Art. 4.2 of Regulation (EU) No 525/2013 of the European Parliament and of the Council. Several countries in the EU have completed or started work on their own roadmaps and emission objectives for 2050. The completed roadmaps have varying status but proposed targets for emissions in 2050 are relatively similar. By and large the proposed or adopted targets proceed from a reduction in global per capita emissions to 2 tonnes per capita in 2050 and that a large part of this reduction needs to be domestic. See Swedish Environmental Protection Agency 2012, report 6525.

<sup>74</sup> See Government Bill 2013/14:1 UO 20 p. 62.

### 3.2 Summary of findings

- The Government has not specified how climate and energy objectives for 2020 are to be interpreted and measured. There is no clear reference material for determining how Sweden's milestone target for 2020 relates to the EU's objectives for Swedish emission reductions in the non-trading sector. The Government has not coordinated the different objectives or reported how they differ.
- The priority of Sweden having a fossil-independent fleet of vehicles by 2030 has not been defined by either the Government or government agencies. After more than four years the Government has started investigating how the priority is to be defined and interpreted.
- The Government's long-term vision is unclearly formulated and there is no approximate pathway for emissions reduction. Policy is focused on objectives for 2020 or earlier.

## 4 Achievement of objectives, costs and side-effects

Climate measures are to help reduce emissions effectively and at reasonable cost. However, assessment of the reasonableness of costs for various climate measures is complicated, among other things because many measures are to contribute to several different objectives.

Some measures are financed via the central government budget and thus entail central government expenditure. Some examples of this are tax relief, research support and climate measures abroad. Policy instruments in climate and energy policy are also financed in other ways. The energy performance certificate policy instrument means for example that building owners must prepare and pay for data concerning energy consumption of the building, which is to contribute to reduced energy consumption and by extension reduced emissions. Another example is other statutory measures that entail abatement costs. The costs are then imposed on the actors that must adapt their activities to the statutory requirements, such as the EU's requirement that the automotive industry manufactures cars with lower emissions. Moreover, there are measures that generate income for the government, such as carbon tax.

It is important to consistently follow up how various policy instruments affect each other, the approximate costs and side-effects that arise and who has to pay. This information constitutes an important basis for decision-making, not only for the Government and the Riksdag, but also for agencies, companies and the public.

In the sections below the Swedish National Audit Office describes initially the achievement of objectives until 2020 and the prerequisites for achieving the vision by 2050. Thereafter the most important climate measures in the Government's climate and energy policy are dealt with, as well as the effects and costs of the climate measures audited by the Swedish National Audit Office. The chapter concludes by describing the side-effects of various climate measures.

## 4.1 Achievement of objectives

Achievement of climate objectives is affected by political decisions and other external events. If reduced emissions are mainly due to a weak economy and a low level of demand for fossil-intensive production, there is a risk that emissions will increase once the economy picks up again.

### 4.1.1 *It seems the milestone target for 2020 will be reached*

In 2011 emissions in Sweden were more than 61 million tonnes.<sup>75</sup> Of these, emissions of about 39 million tonnes were outside the trading sector and about 23 million tonnes from the trading sector.<sup>76</sup>

In total, emissions decreased by about 9 million tonnes between 2005 and 2012.<sup>77</sup> If emissions follow the Swedish Environmental Protection Agency's forecasts, it now looks as though the 2020 milestone target will be achieved using the policy instruments approved.<sup>78</sup> However, this assumes for example that sufficient emission credits are delivered by 2020. The Swedish milestone target for 2020 is formulated so that a third is to be achieved by means of emission reductions in other countries.

Figure 4.1 below shows the forecasts for achievement of the milestone target by 2020. The level for the milestone target includes delivered emission credits equivalent to 6.6 million tonnes (a third of the milestone target) for 2020.

<sup>75</sup> The preliminary figure for Swedish emissions of greenhouse gases amounted to about 58 million tonnes of carbon dioxide equivalents in 2012; see the Swedish Environmental Protection Agency's website, 30 May 2013. The preliminary statistics are not broken down by trading and non-trading sectors. Emissions statistics are reported exclusive of emissions from land use, land use change and forestry (LULUCF) and foreign transportation, see the Swedish Environmental Protection Agency, *National Inventory Report 2013, Sweden*, p. 15. *Carbon dioxide equivalents* is a common measurement for greenhouse gas (CO<sub>2</sub>e) emissions and specifies the amount of a greenhouse gas expressed as the amount of carbon dioxide that gives the same climate impact; the impact of 1 kilo of methane for example, is equivalent to the climate impact of 21 kilos of carbon dioxide, see the Swedish Environmental Protection Agency's website, 26 June 2013.

<sup>76</sup> The trading sector covers among other things installations in industry and energy production. As of 2012 aviation is included. As of 2013 further sectors and substances are included in the trading sector, corresponding to about 2.4 million tonnes (including aviation) carbon dioxide equivalents in 2011, see email from the Swedish Environmental Protection Agency, 28 May 2013. Activities such as transportation and housing are not included in the trading system. For more information about the EU Emissions Trading System, see Annex 2.

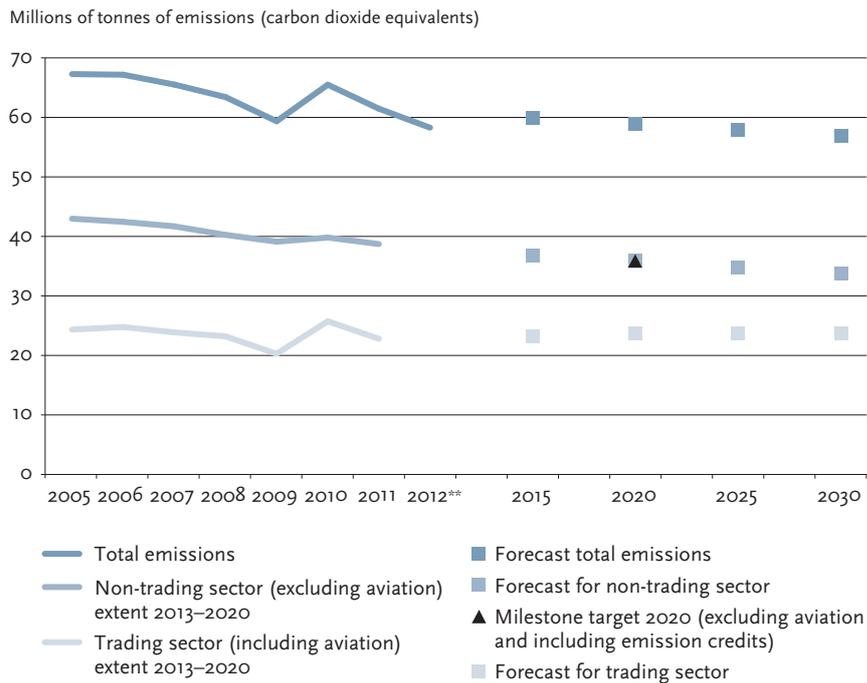
<sup>77</sup> Swedish Environmental Protection Agency preliminary data for 2012. Since the 1990 data is not reliably broken down into trading and non-trading sectors the years 2005–2012 are compared here.

<sup>78</sup> The non-trading sector has changed since the milestone target was determined. There can still be changes, which means that it is not possible to exactly state the emission reductions that are required for achievement of the milestone target.

Emissions in Sweden may not then exceed SEK 36 million tonnes<sup>79</sup> (▲) in the non-trading sector if the target is to be met. The forecast for emissions in Sweden for the non-trading sector is about 35 million tonnes<sup>80</sup> (■), which means that the milestone target will be achieved if the forecast is met.

Emissions in the trading sector are expected to rise somewhat compared with 2011.

**Figure 4.1** Emissions of greenhouse gases in Sweden 2005–2012, forecasts 2015, 2020, 2025, 2030 and milestone target for 2020\*



\* The distribution between the trading and non-trading sector is based on the installations included in the trading sector in 2013.

\*\* The Swedish Environmental Protection Agency’s preliminary data for 2012 are not broken down by trading and non-trading sectors.

Source: Swedish National Audit Office processing of data from the Swedish Environmental Protection Agency.

<sup>79</sup> The milestone target for 2020 is 29.5 million tonnes for the non-trading sector defined in accordance with installations included in 2013. A third of the milestone target is to be achieved using emission credits from other countries, corresponding to about 6.6 million emission credits. The milestone target including 6.6 million emission credits is about 36 million tonnes (36.1=29.5+6.6).

<sup>80</sup> Email from the Swedish Environmental Protection Agency, 28 May 2013.

### Delivery of emission credits determines whether the target will be met

The forecast that the milestone target till 2020 seems to be possible to achieve assumes that a sufficient number of emission credits are contracted and delivered, and that emissions in the non-trading sector decrease. The number of emission credits delivered has been low but has increased in recent years.<sup>81</sup> However, of the 40 million emission credits which the Government says are needed to achieve the milestone target, about 85 per cent have as yet not been delivered. The Swedish Energy Agency assesses that Sweden will be able to obtain about 28–31 million credits using the funds currently approved.<sup>82</sup> This means that the Riksdag will need to decide on funds to buy a further approximately 6–9 million to achieve the 40 million emission credits the Government estimates will be needed. See Table 4.1. The achievement of objectives may be lower if expected deliveries are not made.

**Table 4.1.** Emission credits delivered and expected deliveries of emission credits in relation to the 2020 milestone target, in millions

Funds/ projects	Credits delivered up to 30 Sep- tember 2013	Forecast expected contract- ed deliv- eries	Total contracted (delivered credits & expected deliveries)	Forecast emission credits for funds approved through appropri- ation direc- tions 2013*	Total including forecasts (funds appro- priation direc- tions 2013)	Mile- stone target 2020	Re- main- ing to achieve the objec- tive
Multi- lateral funds	3.3	6.9	10.2				
Separate projects	2.6	9.2	11.8				
<b>Total</b>	<b>5.9</b>	<b>16.1</b>	<b>22.0</b>	<b>6–9</b>	<b>28–31</b>	<b>40</b>	<b>9–12</b>

\* Apart from these funds the Government has allocated further funds in the Budget Bill for 2014 in the form of an extended authorisation framework for 2015–2022. The Swedish Energy Agency estimates that a further 2.5–4 million emission credits can be contracted as a result of this.

Source: Swedish Energy Agency.

<sup>81</sup> The fact that deliveries take time is partly because the control process carried out by UN independent reviewers takes time. See Swedish National Audit Office RiR 2012:27 p. 50.

<sup>82</sup> Email from the Swedish Energy Agency, 7 October 2013.

In November 2013 the market price of emission credits was about EUR 0.4 (about SEK 3) per tonne.<sup>83</sup> The low price of emission credits means great uncertainty about how the market as a whole will develop.<sup>84</sup> There is uncertainty as to whether the Swedish Energy Agency will obtain sufficiently many emission credits in time to achieve the milestone target. One solution could be to buy emission credits on the second-hand market. The Government has decided, however, to steer purchases towards some categories and countries to also achieve several other purposes, requirements and focuses with the purchases.<sup>85</sup> On the second-hand market the buyer cannot always select emission credits from a particular project category, which means that it would then be uncertain if the Government's other purposes could be fulfilled.<sup>86</sup>

#### 4.1.2 *Large gap between vision and forecast until 2050*

Regardless of how the Swedish emission reductions vision is interpreted, it will be difficult to achieve with the policy instruments approved so far. According to the forecasts, emissions of greenhouse gases will decrease considerably more slowly than would be required to achieve emission levels corresponding to 80 to 95 per cent of emissions in 1990, see Figure 4.2. Important conditions for achievement of the vision are innovations and technology leaps that reduce the need for fossil fuels. According to the Swedish Transport Administration various actors have stressed that changes in behaviour are also needed, above all to reduce energy consumption.<sup>87</sup>

<sup>83</sup> The price of CER DEC2013, already issued and delivered emission credits from CDM projects (Clean Development Mechanism) which are used in the EU Emissions Trading System. Thomson Reuters Point Carbon's website, 21 November 2013.

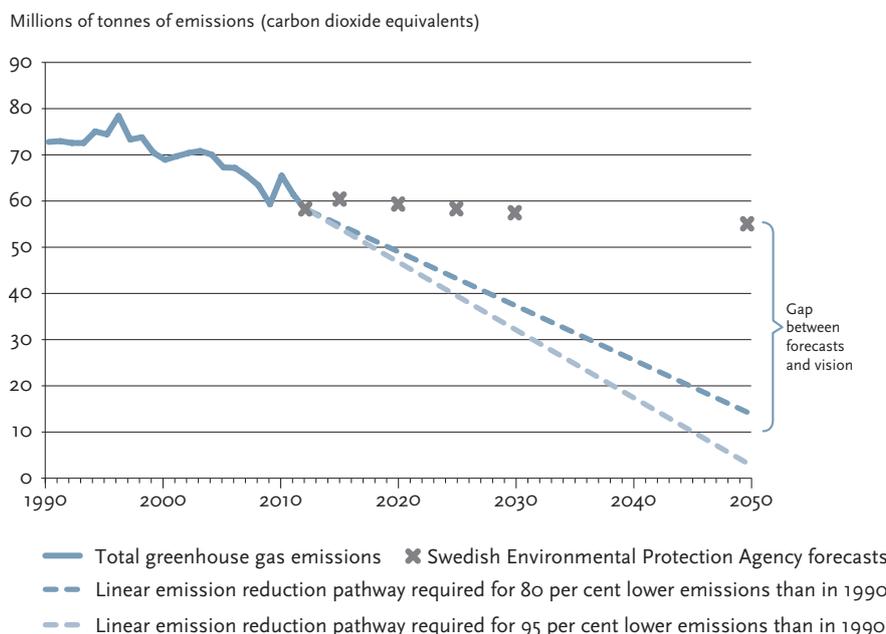
<sup>84</sup> Comment by the representative from the Swedish Energy Agency at the seminar on emissions trading, Bird & Bird and IVL Swedish Environmental Research Institute, 12 June 2013.

<sup>85</sup> Swedish National Audit Office RiR 2011:8 p. 24 f.

<sup>86</sup> Ibid. p. 57.

<sup>87</sup> Email from the Swedish Transport Administration of 27 September 2013.

**Figure 4.2** Emissions of greenhouse gases in Sweden 1990–2012, forecasts for 2015, 2020, 2025, 2030, 2050 and emission reduction pathways to 2050 at different emission levels\*



\* Preliminary data for 2012. The forecasts up to and including 2030 build on reports by the Swedish Environmental Protection Agency to the UN. The forecast for 2050 builds on the Swedish Environmental Protection Agency's reference scenario in accordance with the agency's supporting material for the roadmap 2050, which is based on the long-term scenario to 2030 reported by Sweden to the EU in March 2011.

Source: Swedish National Audit Office processing of data from the Swedish Environmental Protection Agency.

## 4.2 Effects and costs of different policy instruments

The assessment of whether Sweden's national interim target for 2012 has been achieved depends on how the Government will deal with Sweden's surplus of national emission allowances. If the surplus is sold to another country, which is then allowed to increase its emissions, then global emissions will not be reduced any further.<sup>88</sup> In that case the Swedish efforts that contributed to the surplus will only have meant a redistribution of emissions between different countries and the target cannot be said to have been achieved. If instead the surplus is saved the target will be achieved in the short term. But if it is then

<sup>88</sup> In practice there is no market for national emission allowances. A number of potential purchaser countries have taken political positions in connection with the Doha Meeting that they will not buy national emission allowances from the Kyoto Protocol. In addition, legislation concerning the EU climate and energy package does not allow surpluses of national emission allowances from the 2008–2012 Kyoto period to be used for meeting targets for the period 2013–2020 in the EU Emissions Trading System. Swedish National Audit Office RiR 2013:8 p. 66 f. However, it is still possible to save emission allowances.

used or sold, the effect will be that global emissions will not be reduced.<sup>89</sup> If the surplus is annulled, Swedish efforts will contribute to reduced emissions globally as well. The Government has not yet decided how to deal with the surplus.<sup>90</sup>

After 2012 Sweden's emissions in the trading sector are governed by the EU Emissions Trading System cap.<sup>91</sup> The market price of emissions (short, medium and long term) is assumed to arise through shortage of emission allowances in combination with flexibility to trade in them. Total emissions in the trading system are to decrease in pace with the linear fall in the emission cap of 1.74 per cent per year in the period 2013–2020 and thereafter unless otherwise decided.<sup>92</sup>

Sweden's commitment to emission reductions in the non-trading sector is steered both by the levels in the EU Effort Sharing Decision on linear emission reductions for the non-trading sector, and by the Swedish milestone target.<sup>93</sup>

Costs<sup>94</sup> for different policy instruments may consist of purchase of emission credits, appropriations to research and development, or higher expenditure on infrastructure, for example. Policy instruments can also entail reduced tax revenue, for example exemption from energy tax on electricity as part of the Swedish voluntary programme for improving energy efficiency.

Central government climate efforts consist not only of costs, but also generate central government revenue. For example, the State receives about SEK 70 billion in energy and carbon taxes per year.

Annex 6 contains a summary of the policy instruments audited by the Swedish National Audit Office, the effects in the form of reduced emissions they have had, and central government expenditure and revenues.

<sup>89</sup> Swedish National Audit Office RiR 2009:21 p. 40.

<sup>90</sup> In a response to interpellation 2012/13:197 Minister for the Environment Lena Ek stated, however, that the Government's intention is to deal with the surplus of national emission allowances in a way that does not entail any net increase in emissions in other countries. See Parliamentary Record 2012/13:57.

<sup>91</sup> See Annex 2.

<sup>92</sup> The linear reduction refers to the emission allowances that are auctioned out and the freely allocated emission allowances that refer to cogeneration installations' heat generation, see email from the Swedish Environmental Protection Agency, 31 May 2013.

<sup>93</sup> A surplus may possibly arise if Sweden exceeds the Swedish milestone target. The Government has not taken a position on what Sweden should do with any such surplus. See Swedish National Audit Office RiR 2013:8 p. 66.

<sup>94</sup> The Swedish National Audit Office has audited both fiscal costs and polluters' costs.

#### 4.2.1 *The cost of reducing emissions varies*

Costs per tonne of reduced emissions for different policy instruments calculated by the Swedish National Audit Office<sup>95</sup> are widely distributed. For example, emission allowances in the EU Emissions Trading System cost about SEK 40 per tonne<sup>96</sup> and climate measures in other countries cost about SEK 85 per tonne.<sup>97</sup> At the same time carbon tax is SEK 1,050 per tonne on a general level. Tax exemption for biofuels<sup>98</sup> entailed reduced tax revenue for central government of SEK 3,000 per tonne. Audit of the policy instrument of environmental requirements in public procurement shows that in some cases it may be a saving to buy green cars compared with conventional cars.<sup>99</sup>

It is difficult to assess whether the costs of various climate measures are reasonable, among other things because many measures are also to contribute to several other objectives. A simplified way of comparing the cost of different climate measures in Sweden is to start with carbon tax, which makes up part of the petrol price, among other things. In 2009–2011 the general level of carbon tax was SEK 1,050 per tonne.<sup>100</sup> A comparison can also be made with the price of emission allowances, which is currently about SEK 40 per tonne.

The effects of a policy instrument may be that emissions decrease over a longer period. For example, subsidised installation of geothermal heating can mean reduced emissions for many years ahead. The cost per tonne of reduced emissions in this case will be lower the longer the installation remains. It continues to reduce emissions every year throughout its useful life. The costs of the measures that lead to long-term reductions in Sweden, for example, can thus be lower than a calculation of a short-term measure shows. The cost of purchasing an emission credit always corresponds to an emission reduction of one tonne in one year.<sup>101</sup>

<sup>95</sup> The Swedish National Audit Office has not estimated any welfare losses or abatement costs.

<sup>96</sup> In November 2013 the price of emission allowances in the EU Emissions Trading System (EUA) was EUR 4.49 per tonne, according to the Thomson Reuters Point Carbon website, 21 November 2013. See also historical emission prices in Annex 8.

<sup>97</sup> It is difficult to calculate how much emissions decrease as a result of some policy instruments, for instance climate related research and development and the Swedish voluntary programme for improving energy efficiency. According to the Swedish Energy Agency's latest annual report on the Swedish CDM and JI programme, climate measures in other countries are estimated to be about SEK 75 per tonne.

<sup>98</sup> The Government has proposed the introduction of a quota obligation system instead of tax exemption for biofuels as of 1 May 2014. See Government Bill 2013/14:1 p. 398 f.

<sup>99</sup> Swedish National Audit Office RiR 2011:29 p. 12. This is based on estimates of life cycle costs for different categories of official cars in connection with public procurement in central, regional and local government.

<sup>100</sup> The general level of carbon tax was SEK 1,080 per tonne in 2012 and 2013, see Calculating conventions 2012 and 2013 p. 167.

<sup>101</sup> Sweden can only count this reduction in one specific year, even if the reductions in the host country continue for a longer period.

In order to be able to assess whether the costs are reasonable, an overall assessment of the cost and impact of various policy instruments must also be carried out. This type of analysis can be difficult and subject to a high level of uncertainty. But an overall assessment, for example of the costs of different policy instruments, is nevertheless necessary to achieve good economy in the use of central government funds. In Chapter 6 the Swedish National Audit Office explains that the Government's and agencies' analyses and reports do not give a coherent picture of emissions reductions in relation to costs. It entails a risk that the aggregate costs will be higher than necessary.

### 4.3 Side effects

There may be different reasons for polluters paying different amounts for their emissions. One example is carbon tax, which has different levels and exemptions, based on its resource directing nature and consideration for the competitiveness of the business sector. A side-effect of central government climate measures is, however, that there are considerable differences between what different polluters must pay for their emissions, both between households and the business sector, between different types of household, between the trading and non-trading sector and between different industries.

Another side-effect is that policy instruments can affect other national and EU policy instruments positively or negatively. For example, measures targeting installations in the EU Emissions Trading System to achieve energy efficiency objectives and renewable energy objectives in the short term have contributed to reducing the price of emission allowances within the trading system. The incentive for companies to invest in clean technology that the EU Emissions Trading System is to offer is diminished due to this.

#### 4.3.1 *Differences in what different polluters pay for emissions*

The business sector and households need to pay different prices for emissions, since climate-related taxes are different for different polluters. Of total carbon dioxide emissions, the business sector accounted for about 81 per cent. Households<sup>102</sup> accounted for about 19 per cent, but paid almost half of the climate-related taxes.<sup>103</sup>

<sup>102</sup> Included here are households' direct emissions, above all private motoring and oil heating. Households' indirect emissions from production of goods and services via consumption are not included. Statistics Sweden, Environmental Accounts, emissions from 2010 including households' non-profit organisations and public consumption.

<sup>103</sup> See Swedish National Audit Office RiR 2012:1 p. 30. Data on emissions is from Statistics Sweden, Environmental Accounts.

The EU Emissions Trading System is another policy instrument that entails differences between enterprises inside and outside the trading sector and between different trade and industry sectors. In previous audits the Swedish National Audit Office has noted that enterprises in the trading sector have had lower costs, in some cases no costs at all, for their emissions, compared with enterprises outside the trading sector.<sup>104</sup> One of the reasons for this is that enterprises have received free emission rights<sup>105</sup> in combination with allocation having been considerably greater than enterprises have needed. The Swedish National Audit Office has shown that the aggregate surplus allocated to 2011 was worth about SEK 1.8 billion.<sup>106</sup> The Government has previously stressed that allocation of free emission allowances means a redistribution.<sup>107</sup> Major differences in what different polluters pay in practice in relation to their emissions is not fully consistent with the polluter pays principle (PPP). According to the Government there may be reason to deviate from the principle if there is a risk of carbon leakage; in other words production being located in countries without or with lower expenditure for emissions. However, the Swedish National Audit Office has noted that the Government has not analysed how much different trade and industry sectors have paid for emissions.<sup>108</sup>

Ahead of the third trading period (2013–2020) new allocation principles apply for the EU Emissions Trading System, see annex 2. For 2013 it entails even greater differences between what enterprises in different trade and industry sectors must pay in practice for emissions, which is described in the following section.

<sup>104</sup> Swedish National Audit Office RiR 2012:1 and RiR 2013:8.

<sup>105</sup> Auctioning is considered by the National Institute of Economic Research and the OECD, for example, to be a better method of allocation than free allocation. According to the OECD arbitrary unexpected redistribution is avoided if emission allowances are auctioned out. The Government considers that auctioning contributes to fulfilling the polluter pays principle. See Swedish National Audit Office RiR 2012:1 p. 38.

<sup>106</sup> Swedish National Audit Office RiR 2012:1 p. 11.

<sup>107</sup> See Government Bill 2005/06:184 p. 97. The intention of the statement was that existing biofuel fired installations for district heating output should not be allocated free emission allowances. According to the Government such installations had no need to report emission allowances since biofuel based heat generation does not give rise to emissions. According to the Government, allocation of emission allowances to such generation would only act as wealth transfer without having any environmental steering effect.

<sup>108</sup> Swedish National Audit Office RiR 2012:1 p. 9. In the communication in response to the audit the Government stated that it would continue coordination of economic policy instruments in the climate and energy area and that in the short term it would particularly assess the effectiveness of the policy instruments as well as whether they needed to be supplemented. The Government also stated that development work is in progress at the Government Offices, aimed at better monitoring the distribution effects of energy and carbon taxation. Govt. Communication 2011/12:150 p. 8.

### **Substantial increase in free emission allowances in 2013 for many Swedish installations**

In the first and second trading periods many Swedish enterprises received far more free emission allowances than they needed. In all the surplus corresponded to 22.7 million tonnes of carbon dioxide emissions for the periods. The preliminary surplus for 2013, which is the first year of the third trading period, corresponds to emissions of about 10 million tonnes, equivalent to about half of the total emissions from Swedish installations. For 2015 and 2020 as well, the allocation of free emission allowances is expected to be higher than the forecast emissions.<sup>109</sup> See Figure 4.3. For the EU Emissions Trading System as a whole the allocation will decrease. According to the European Commission the rapid accumulation of surplus will cease as of 2014. However, the total surplus for the EU, which at the start of the third trading period was expected to be between 1.5 and 2 billion emission allowances, is not expected to decrease to any considerable degree in the third trading period.<sup>110</sup> According to the European Commission, the reasons for the substantial surplus increase in early 2013 include great use of emission credits from climate efforts in other countries, sales of emission allowances from the previous trading period and from the new entrants' reserve and early auction of emission allowances in the third trading period.<sup>111</sup>

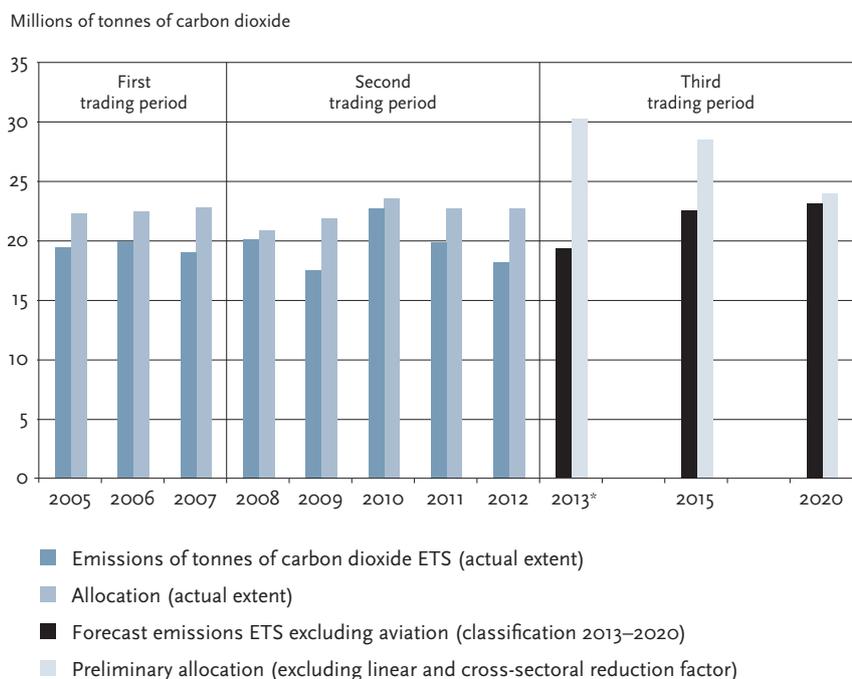
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<sup>109</sup> The forecast and allocation refer to Swedish industrial sectors and energy companies covered by the EU Emissions Trading System. Aviation is not included in these calculations.

<sup>110</sup> European Commission, COM(2012) 652 final, p. 4. According to the Commission, the structural surplus in the EU will continue to be about 2 billion emission allowances during the greater part of the third trading period.

<sup>111</sup> European Commission website, 9 October 2013.

**Figure 4.3** Allocated and proposed allocation of emission allowances and emissions for Swedish industrial sectors and energy companies in the EU Emissions Trading System 2005–2020



\* 2013 emissions are calculated as 2012 emissions for installations in ETS in accordance with 2013–2020 breakdown, plus preliminary allocation for new installations approved by the European Commission.

Source: Swedish National Audit Office processing of data from the Swedish Environmental Protection Agency.

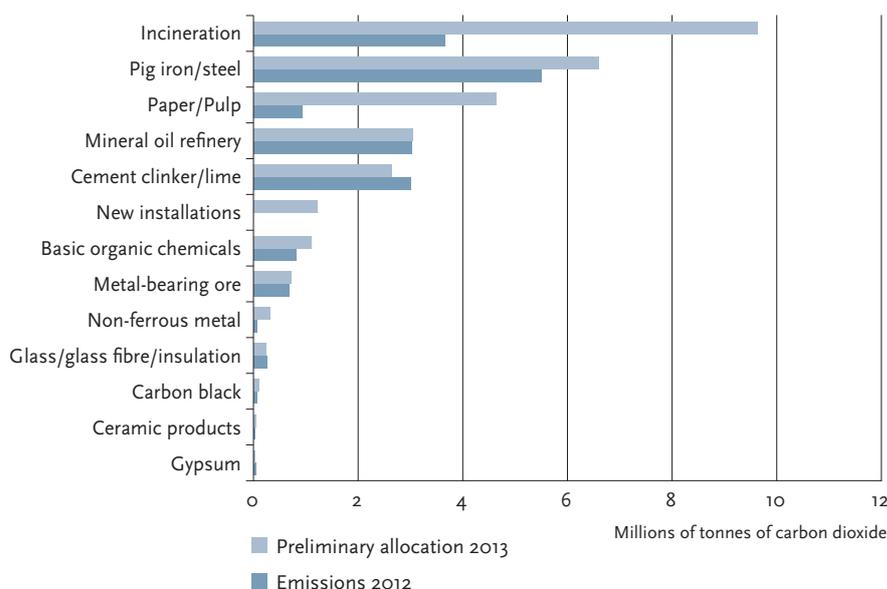
The new allocation principles in the third trading period favour enterprises with relatively low emissions per unit of output. Swedish enterprises are therefore compensated in the third trading period with considerably more free emission allowances than they need.

If the costs of investing in low-carbon technology are lower than the price of emission allowances, according to economic theory firms will make such investments since this is more profitable. The firms can thereafter sell their emission allowances to firms in need of emission allowances. If the price of emission allowances is lower than investing in low-carbon technology these investments will decrease or not be made.

The enterprises in Sweden that will provisionally have most free emission allowances compared with emissions in 2012 are in the incineration and paper/pulp industry sectors. The preliminary surplus for enterprises in the incineration industry sector corresponds to emissions of almost 6 million tonnes. However, it is not all enterprises that are favoured in this way. For

example, enterprises in the cement clinker/lime industry sector will receive somewhat fewer free emission allowances compared with emissions in 2012. See Figure 4.4.

**Figure 4.4** Preliminary allocation in 2013 per industry sector compared with emissions in 2012



Source: Swedish National Audit Office processing of data from the Swedish Environmental Protection Agency.

### Pulp and paper industry – an example calculation

In the audit *Energy efficiency in industry – effects of central government action* the Swedish National Audit Office presented an example calculation of how pulp and paper industry enterprises together benefit economically from various policy instruments and exemptions.

In 2010 enterprises in the pulp and paper industry were exempted from energy tax on electricity through participation in the Swedish voluntary programme for improving energy efficiency (PFE), received electricity certificates for their back pressure electricity generation, were exempted from quota obligation for electricity certificates and received a surplus of emission allowances. However, the pulp and paper industry had to pay a higher electricity price. In that way the value added of these policy instruments and exemptions for the pulp and paper industry was just under SEK one billion in 2010.<sup>112</sup> Due to increased allocation of free emission allowances to the Swedish pulp and paper industry,

<sup>112</sup> Swedish National Audit Office RiR 2013:8 p. 80 f. SEK 1 billion corresponds to about three per cent of the industry's value added, which according to the national accounts at Statistics Sweden, was about SEK 33 billion in 2010.

the surplus will probably be greater in the future, at least at the beginning of the 2013–2020 trading period.

#### 4.3.2 *National policy instruments contribute to reduced prices for emission allowances*

Total emissions in the trading system are not affected by extra national policy instruments for energy efficiency or an increased share of renewable energy production directed at enterprises in the trading system.<sup>113</sup> This is because emissions in the trading system are regulated by an emissions cap. On the other hand various national policy instruments directed at installations in the trading system can affect the price of emission allowances by reducing the demand for emission allowances in the system. When individual member states take measures to increase energy efficiency and reduce fossil-fuel dependence emissions decrease and thus also demand for emission allowances. With the same quantity of emission allowances in the system the price then falls as demand decreases. In that way the price signal is weakened further when one or more member states take national measures to stimulate climate and energy investments.

National policy instruments directed at installations in the trading system can, however, reduce the cost in the trading system for achieving the emissions objective. This can possibly also provide scope for emission reductions in the longer term, since lower prices for emission allowances could make it politically possible to reduce the emissions cap after 2020 if the trading system still remains.<sup>114</sup> At the beginning of the 2000s the European Commission estimated that the price of emission allowances would be about EUR 33 per tonne, equivalent to about SEK 250 per tonne.<sup>115</sup> In practice up to now the price has usually been considerably lower and the Government and others have stated that it is necessary to strengthen credibility in the trading system and its price signals.<sup>116</sup>

Some EU member states have introduced or are considering introducing national policy instruments targeting industry sectors in the trading system to counteract the weak price signal in the trading system. One example is the United Kingdom that has introduced a floor price for carbon dioxide from fossil fuels in electricity generation installations. The reason is that the price of emission allowances in the trading system is not sufficient to bring about

<sup>113</sup> Swedish National Audit Office RiR 2013:8 p. 65 f.

<sup>114</sup> Ibid. p. 68.

<sup>115</sup> European Commission, COM(2000) 87 final, p. 28. See also Swedish National Audit Office RiR 2012:27 p. 23.

<sup>116</sup> Govt. Communication 2012/13:105 p. 6.

necessary investments for adapting the energy system to more renewable electricity and nuclear power.<sup>117</sup>

According to the Swedish Government the efficiency and price in the trading system is weakened by unilateral national taxes and other policy instruments directed at enterprises included in the trading system. In that case installations in less ambitious member states are favoured without reducing total emissions. In addition the Government believes that the competitiveness of Swedish enterprises could be affected.<sup>118</sup>

Through the tax restructuring decided by the Riksdag for the period 2010–2015 carbon tax is changed, which the Swedish NAO has noted leads to increased cost-effectiveness in relation to the climate objective. One of the changes is that carbon tax has in principle been abolished for installations in the EU Emissions Trading System.<sup>119</sup>

### **The low price can reduce profitability of investments that reduce emissions**

The purpose of the EU Emissions Trading System is that the price of emission allowances is determined by the market. Regardless of price, a predetermined emissions cap applies. If demand for emission allowances is small it will be less profitable to invest in technology to reduce emissions.

However, the probability of major technological leaps that are necessary to reduce emissions sufficiently by 2050 decreases when willingness to invest in this technology decreases. According to the European Commission the current low price of emissions increases the risk of being locked into carbon-intensive structures.<sup>120</sup> Investments in low-carbon technology become more risky, since profitability is reduced when the price falls. Low investment propensity may also mean that central government investment in such things as climate related research and development will be less effective, since the incentive to make use of research results through commercialisation is diminished.

<sup>117</sup> See Annex 9.

<sup>118</sup> Govt. Communication 2011/12:150 p. 6 and Govt. Communication 2012/13:105 p. 7 and email from the Ministry of the Environment, 26 June 2013.

<sup>119</sup> Swedish National Audit Office 2012:1, p. 12.

<sup>120</sup> European Commission's Green Paper 2013 p. 4.

#### 4.4 Summary of findings

- It seems the Swedish milestone target for 2020 will be achieved, on condition that sufficiently many emission credits are delivered and that emissions follow the Swedish Environmental Protection Agency's forecast. There is uncertainty as to whether the State will receive sufficiently many emission credits in time to achieve the milestone target. One solution could be to buy emission credits on the second hand market. However, on the second hand market the buyer cannot always choose emission credits from a particular project category, which entails uncertainty as to whether other purposes of the purchases can be achieved.
- According to the Swedish Environmental Protection Agency's reference scenario the 2050 vision can probably not be achieved with current policy instruments and technology development. Emissions need to decrease substantially after 2020. One condition for achievement of the vision is innovations and technology leaps that reduce the need for fossil fuels.
- There are great differences in costs between various climate measures. According to economic theory, this indicates that central government aggregate costs for climate measures could be lower. The assessment is made more difficult, however, because policy instruments are often intended to contribute to fulfilling several other objectives at the same time.
- There is no coherent picture of emission reductions in relation to costs, which entails a risk of aggregate costs being higher than necessary.
- The preliminary allocation of free emission allowances is increasing considerably, both in Sweden totally and for some Swedish installations, in the beginning of the third trading period. In practice this will mean increased differences in costs and revenues between different industries. Parts of the business sector will receive and will continue to receive large revenues without needing to take any measures to reduce emissions.
- The low price of emission allowances in the EU Emissions Trading System has also contributed to poor incentives for enterprises in the trading sector to invest in new, cleaner technology. The steering effect of measures directed at such investment thereby decreases. The effects of some central government measures, such as support to climate related research and development, thus risk being reduced.

## 5 Climate policy management

Many decisions that are important for achieving climate objectives at a reasonable cost are prepared by ministries and agencies that have the main responsibility for other social objectives. This means it is particularly important that the Government's management is clear; otherwise there is a risk that core activities are regularly given higher priority. The ability of the Government Offices to deal with conflicting objectives, assign priorities and coordinate measures within and between different policy areas is also important to achieve the desired achievement of objectives at reasonable cost.<sup>121</sup> The Ministry of the Environment is responsible for implementation and reporting of Swedish climate policy, as well as for some central policy instruments such as the EU Emissions Trading System. At the same time the Ministry of Finance is responsible for fiscal policy that includes the important policy instruments of energy and carbon tax. The Ministry of Enterprise, Energy and Communications is responsible for sectors where emissions most need to be reduced, for example transport and industry. The divided responsibility means that coordination between those responsible needs to be effective. Annex 5 includes a table showing which ministries are responsible for the various policy instruments.

### 5.1 Coordination processes in the Government Offices

National and international climate policy is the responsibility of the Ministry of the Environment, but to achieve reduced emissions in accordance with the objectives a large number of ministries must be involved. The formal consultation processes<sup>122</sup> constitute part of coordination within the Government Offices, but much takes place informally. Questions are broken down into smaller parts that are negotiated between ministries and divisions at official level. In practice many detailed priorities are agreed between officials at different ministries,<sup>123</sup> which may involve a risk that long-term priorities

<sup>121</sup> This is shown by the Swedish National Audit Office audits in the climate field, covering a number of ministries: The Ministry of the Environment, the Ministry of Enterprise, Energy and Communications, the Ministry of Finance, the Ministry for Rural Affairs, the Ministry of Health and Social Affairs, the Ministry of Education and Research and the Ministry for Foreign Affairs.

<sup>122</sup> The formal consultation processes consist of joint preparation, preparatory meeting, working lunch and circulation for comment. These are described in more detail in annex 5.

<sup>123</sup> Premfors, Rune, Sundström, Göran, *Government Offices*, 2007, p. 132 and 151.

between different social objectives are not always taken into account clearly and transparently. However, according to the Ministry of the Environment and the Ministry of Finance, the Government Offices' joint preparation procedures and coordination function well on cross-sectoral issues, such as climate.<sup>124</sup>

## 5.2 Management of agencies in climate efforts

When designing climate measures other social objectives also need to be taken into account, since various policy instruments affect each other. Among others, the Committee on the Constitution stresses that the Government's management of agencies needs to be clear and far-sighted. This is to ensure good quality in both the Government's information provision and the Government's reporting to the Riksdag.<sup>125</sup> There are several examples in the Swedish National Audit Office's climate audits that the Government's management of agencies has been unclear, which has had a negative impact on the implementation of climate measures.<sup>126</sup> The Agency for Public Management points out that the Government's management geared to the business of each agency entails reinforced compartmentalisation. The meeting structure between ministries and agencies is rarely used to deal with cross-sectoral issues.<sup>127</sup>

### 5.2.1 Unclear divisions of responsibility in climate policy

Several of the Swedish National Audit Office's audits show that divisions of responsibility between different agencies and ministries are not sufficiently clear. In some cases there is also a lack of assigned responsibility for the whole, which emerged for example in the audit of environmental requirements in public procurement. No ministry or agency had explicit responsibility for coordination or overall responsibility for the policy instrument. In the 2014 Budget Bill the Government stated that it intends to concentrate current support for guidance and information about public procurement, including innovation procurement, to the Swedish Competition Authority.<sup>128</sup> In the audit of climate-related taxes, the Swedish National Audit Office recommended that the Government should indicate clear responsibility for coordination

<sup>124</sup> Interview with the Ministry of the Environment and the Ministry of Finance, 18 December 2012.

<sup>125</sup> The Committee on the Constitution reviewed the Government's management of infrastructure planning on the basis of the deficiencies the Swedish National Audit Office referred to in its performance audit report RiR 2012:7. See Committee Report 2012/13:KU 20 p. 29.

<sup>126</sup> Such examples are described in the following sections.

<sup>127</sup> The Agency for Public Management (2013), *Flexibilitetens fördelar och faror – perspektiv på regeringens myndighetsstyrning*, p. 9 and 13 f.

<sup>128</sup> See Government Bill 2013/14:1 UO 2 p. 12.

of continual data collection, analyses and coherent reporting. This referred to costs and effects of the climate-related taxes, the EU Emissions Trading System and the interaction between these policy instruments in relation to emissions.<sup>129</sup> The Government stated in its communication on the audit that a clear responsibility for coordinating analyses, coherent reporting and interaction between policy instruments in relation to emissions is important.<sup>130</sup>

When several agencies and ministries are responsible for different parts of an area, the risk is great that no-one is able to take effective responsibility for cross-system problems or to coherently analyse and report costs and effects of measures taken. The consequences of this are that for several different policy instruments there is no coherent picture of costs, effects and side-effects. Nor is there any coherent picture of effects, costs and side-effects of the aggregate climate measures, which means that the prospects of accountability are small.

However in November 2013 the Government set up an inquiry to review the division of responsibility between and the structure for different agencies in the environmental field.<sup>131</sup>

### 5.2.2 *Agencies interpret the objectives in different ways*

Effective management assumes continual monitoring of policy instruments and measures. To enable this, the main purpose of the policy instrument should be known.<sup>132</sup> Policy instruments in the climate field have many different purposes and audits by the Swedish National Audit Office show that the Government has seldom expressed what the main purpose is, or how agencies and others concerned should prioritise between different purposes.<sup>133</sup> One example was the tax exemption for biofuels. It influenced several objectives in different policy areas. The Government had not, however, defined any main purpose for the policy instrument or set priorities between the different

<sup>129</sup> See Swedish National Audit Office RiR 2011:29 and 2012:1. See also for example Swedish National Audit Office RiR 2009:6 and 2012:2.

<sup>130</sup> Govt. Communication 2011/12:150 p. 9.

<sup>131</sup> Ministry of the Environment, press release *New Government Inquiry on review of agencies in the environment field*, 18 November 2013.

<sup>132</sup> See for example National Institute of Economic Research, *Miljö ekonomi och Politik* 2012, p. 11.

<sup>133</sup> See for example Swedish National Audit Office RiR 2011:8, 2011:10, 2011:29, 2012:2 and 2012:7.

objectives.<sup>134</sup> Nor has the Government prioritised between different objectives and purposes for Sweden's purchases of emission credits in other countries.<sup>135</sup>

Decisions that materially affect the prospects of achieving the climate objectives need to be analysed and coordinated by the Government. In several of the Swedish National Audit Office's audits in the climate field it has emerged that the Government has not set priorities between different social objectives.<sup>136</sup> When the Government's priorities are not clear the conditions for achieving effective measures are weakened, since the costs would then need to be divided between several purposes. When the cost of achieving a purpose is not clear, transparency is also reduced along with the possibility of accountability.

### 5.2.3 *Agencies interpret the objectives in different ways*

The Government's unclear priorities and management have led, for example, to several agencies making their own assumptions about emission objectives and emission reductions to fulfil their mandates. In the area of transport it was not clear to agencies how they should prioritise between different conflicting objectives. The agencies then based their analyses on premises that later proved to be incompatible with government policy.<sup>137</sup>

There are also examples of expert agencies having difficulties in agreeing on common premises. The National Institute of Economic Research is to make an annual assessment of the short and long-term effects of the environmental objectives.<sup>138</sup> However, the Government has not specified the premises for climate policy in the assignment that is to be carried out in consultation with the Swedish Environmental Protection Agency. The lack of climate objectives after 2020 means that in its reporting the National Institute of Economic Research has made its own assumptions about an emission reduction pathway to 2030 and 2050.<sup>139</sup> However, the Swedish Environmental Protection Agency entered a reservation against some of the conclusions, since the agency

<sup>134</sup> When the share of renewable energy increases it contributes both to the renewable energy objective and the security of supply objective. The tax exemption for biofuels also affects the conditions for achieving agricultural, industrial and environmental policy objectives. See Swedish National Audit Office RiR 2011:10. The Government has proposed the introduction of a quota obligation system instead of tax exemption for biofuels as of 1 May 2014. See Government Bill 2013/14:1 p. 398 f.

<sup>135</sup> Swedish National Audit Office RiR 2011:8 p. 34. However, the Government has clarified how many emission credits are necessary to meet the milestone target for 2020. Govt. Bill 2012/13:1, expenditure area 20 p. 58.

<sup>136</sup> See Swedish National Audit Office RiR 2009:21 and 2012:7.

<sup>137</sup> See Swedish National Audit Office RiR 2012:7.

<sup>138</sup> Ministry of Finance, *Appropriation directions for budget year 2012 regarding the National Institute of Economic Research*, 22 December 2011, p. 4.

<sup>139</sup> The National Institute of Economic Research 2012, *Miljö, ekonomi och politik*, p. 113. The choice of assumptions is of great significance for the analysis results.

considered that the analyses had not taken account of the long-term nature of climate changes.<sup>140</sup>

The Swedish Environmental Protection Agency also entered a reservation against the conclusions of the National Institute of Economic Research in a government-commissioned report in which the agencies were to identify and analyse the consequences of interaction between different objectives in climate and energy policy.<sup>141</sup> The Swedish Environmental Protection Agency was of the opinion that the National Institute of Economic Research's application of the climate objectives, combined with simplification of the purposes of the energy objectives, mean that the analysis is "misleading" and "unfounded".<sup>142</sup>

In a similar way the National Institute of Economic Research entered a reservation against the Swedish Environmental Protection Agency's analyses in the reference material for Roadmap 2050. The reason given by the National Institute of Economic Research was that cost effectiveness analyses had been given so little space.<sup>143</sup>

Neither the EU nor the Government has clarified the priorities that apply between the various climate and energy policy objectives.<sup>144</sup> These priorities have significance for the costs of fulfilling objectives, since different policy instruments affect each other. The fact that the Government's premises for climate policy are unclear affects the formulation of various decision-making data.

#### 5.2.4 *Unclear governance reduces firms' willingness to invest*

Agencies, firms and consumers need reasonable planning conditions to enable them to make well-founded decisions, for example concerning investments and other measures with a long time horizon.<sup>145</sup> Consequently clear premises and objectives are needed for climate policy. In the Swedish National Audit Office climate audits several examples of a lack of long-term perspective have been

<sup>140</sup> The National Institute of Economic Research 2012, *Miljö, ekonomi och politik*, p. 211.

<sup>141</sup> National Institute of Economic Research (2013) special study 33.

<sup>142</sup> Representatives of the Ministry of the Environment state in an interview that it is good that not everything has been coordinated and that the agencies' different perspectives must be shown. Interview with the Ministry of the Environment, 18 December 2012.

<sup>143</sup> Swedish Environmental Protection Agency report 6525, Appendix 12, p. 443.

<sup>144</sup> In 2013 the European Commission proposed a framework for EU climate and energy policy until 2030. See European Commission, *Green Paper – A 2030 framework for climate and energy policies*, COM (2013) 169 final.

<sup>145</sup> See for example European Commission, COM (2013) 169 final, p. 2. See also Swedish Environmental Protection Agency 2012, report 6537 p. 32.

noted. It is not clear to agencies responsible what is to be achieved.<sup>146</sup> When agencies and firms are uncertain of the Government's objectives and priorities, analyses of costs and effects will be incomplete. This increases the risk of decisions that make climate policy more expensive in the longer term. Firms' incentives to invest in the long term, for example in low-carbon technology, are at risk of decreasing. The business sector has sought long-term rules of play to enable firms to make rational decisions, for example on investment and other measures with a long time horizon.<sup>147</sup>

### Several firms would like to see a long-term perspective

The Government notes that the economies of the western world need fundamental readjustment to achieve the emission reductions that the two-degree limit entails.<sup>148</sup> According to the European Commission this development assumes that both the state and the business sector invest in long-term measures, even if they are expensive in the short term; such as research and efficiency improvement.<sup>149</sup>

The Swedish National Audit Office audit of tax exemption for biofuels showed that the absence of long-term and predictable decisions limits firms' planning ability.<sup>150</sup>

Several enterprises have jointly stated that climate and energy policy needs to be more long-term. The Government needs, for instance, to clarify the target levels for renewable energy, the transition of the transport system and which types of energy are desirable in Sweden in the future.<sup>151</sup> Different enterprises also describe the need for interim targets in the short term.<sup>152</sup> According to the Confederation of Swedish Enterprise the Government's agreement on nuclear power does not give the long-term perspective necessary for the

<sup>146</sup> See Swedish National Audit Office RiR 2012:1 p. 91 f., RiR 2012:2 p. 87 and RiR 2012:7 p. 114 f. By clarity is meant for example that the agency's remit is specified in that assignments, rules and, where relevant, objectives and priorities are stated. Govt. Bill 2009/10:175, p. 98.

<sup>147</sup> Hagainiatiivet, *Consultation response to the Swedish Environmental Protection Agency's reference data for roadmap 2050*, 1 February 2013. See also Svenska Dagbladet website, 6 September 2012, and Confederation of Swedish Enterprise, *Ökad energieffektivitet i näringslivet – ett idédokument*, March 2012 p. 14. See also Motormagasinet's website, 12 March 2013.

<sup>148</sup> Govt. Bill 2008/09:162 p. 18.

<sup>149</sup> See for example European Commission, 8 March 2011, *Roadmap for moving to a competitive low carbon economy in 2050*, p. 6 and 10. See also IEA, *Energy Policies of IEA Countries Sweden 2013 Review, Excerpt – The framework: energy policy and climate change*, p. 26. See Swedish National Audit Office RiR 2011:10.

<sup>150</sup> See Swedish National Audit Office RiR 2011:10.

<sup>151</sup> See Svenska Dagbladet, 6 September 2012.

<sup>152</sup> Hagainiatiivet, *Consultation response to the Swedish Environmental Protection Agency's reference data for roadmap 2050*, 1 February 2013. See also Svenska Dagbladet website, 6 September 2012, and Confederation of Swedish Enterprise, *Ökad energieffektivitet i näringslivet – ett idédokument*, March 2012 p. 14. See also Motormagasinet's website, 12 March 2013.

future electricity supply.<sup>153</sup> The Confederation of Swedish Enterprise has also described the importance of long-term premises and common rules of play for enterprises and the business sector.<sup>154</sup>

The International Energy Agency (IEA) recommended in its latest assessment of Swedish energy policy that clarity is needed on how the future electricity mix is to be in Sweden and how nuclear power is to be replaced.<sup>155</sup>

### 5.3 Sweden's national discretion in relation to the EU Emissions Trading System

The Government has used Sweden's national discretion in relation to the EU Emissions Trading System in different ways. According to the Government the Directive that regulates the EU Emissions Trading System provides very little margin for alternative solutions.<sup>156</sup> However, the Swedish National Audit Office notes that member states have national discretion to introduce national rules or measures on matters not governed by EU legal instruments, or that the EU has explicitly left to members states to decide. The national measures can be broken down into the following groups:

- *Measures that affect the number of emission allowances (the cap) in the trading system:* Could for example refer to member states allowing emission allowances at their disposal to be frozen. Sweden has this possibility as regards remaining emission allowances in the new entrants' reserve during the second trading period (2008–2012). In 2013 the Government tasked the Swedish Energy Agency with selling the remaining emission allowances in the reserve.<sup>157</sup> The number of remaining emission allowances was about 1.3 million (equivalent to emissions of 1.3 million tonnes).<sup>158</sup> According to EU legislation, installations in the trading system have the right to convert remaining emission allowances from the second trading period to emission allowances in the third trading period. Member states do not have that possibility.<sup>159</sup> There is no compulsory EU legislation stipulating that member states must sell remaining emission

<sup>153</sup> Seminar, IEA Review of Swedish energy policy, 5 February 2013, presentations by representatives of the Confederation of Swedish Enterprise and Fortum.

<sup>154</sup> Confederation of Swedish Enterprise, *Ökad energieffektivitet i näringslivet – ett idédokument*, March 2012 p. 14.

<sup>155</sup> See IEA website, 12 March 2013.

<sup>156</sup> Govt. Bill 2009/10:28, p. 39.

<sup>157</sup> Government's decision of 21 February 2013, M2013/651/K1.

<sup>158</sup> Email from the Swedish Energy Agency, 8 October 2013.

<sup>159</sup> Email from the Ministry of the Environment, 3 October 2013.

allowances from their reserves for the second trading period. The Government could have frozen emission allowances in Sweden's reserve, to prevent their use in the trading system.<sup>160</sup> That measure would have contributed to an equivalent reduction in emissions at EU level. Instead the emission allowances in the reserve were sold to enterprises that can save them for the coming period.

- *Measures targeting enterprises in the trading system but that do not affect the total number of emission allowances in the trading system, since total emissions in the trading system are determined through a common cap:* Emissions at EU level are not affected by such measures. But various national policy instruments targeting enterprises in the trading system may reduce demand for emission allowances and consequently reduce price signals in the trading system.
- *The use of the member states' own revenue from auctioning emission allowances:* The EU recommends that at least 50 per cent of member states' own revenue or a monetary value equivalent to this income from auctioning emission allowances is to be used for climate measures, which Sweden has not done.<sup>161</sup> The revenues accruing to Sweden are not earmarked; instead they go directly to the central government budget.<sup>162</sup> In addition the Swedish treasury receives larger revenues, since Sweden has negotiated an increase in the Swedish allocation of auctioned emission allowances of a further 10 per cent.<sup>163</sup>

In annex 2 the Swedish National Audit Office gives a more detailed description of national discretion in the EU Emissions Trading System and Sweden's handling of it.

## 5.4 Summary of findings

- The Swedish National Audit Office audits show that divisions of responsibility in climate policy are not sufficiently clear. For several different policy instruments there is no coherent picture of approximate costs, effects and side-effects. This also applies to aggregate climate measures.
- The Government has not set priorities between different social objectives or between different purposes of climate measures. It is then unclear to

<sup>160</sup> Email from the Ministry of the Environment, 8 October 2013.

<sup>161</sup> Article 10.3, Directive 2003/87/EC of the European Parliament and the Council.

<sup>162</sup> The Central Government Budget Act (1996:1059) is based, among other things, on non-earmarking of revenues.

<sup>163</sup> Directive 2003/87/EC of the European Parliament and the Council, Article 10.2.b) compared with annex 2a.

agencies which objectives and premises their analyses should be based on. The possibilities of making decisions on cost-effective measures with different time horizons are reduced. Transparency and accountability also decrease, since there is no coherent picture of approximate costs, effects and side-effects.

- Unclear long-term governance means small incentive to firms to invest in low-carbon technology, since they are uncertain as to the profitability of these investments.
- The Government has used Sweden's national discretion in relation to the EU Emissions Trading System to a varying degree. When evaluating the importance of measures it is important to determine if they can be expected to lead to lower emissions, not only in Sweden, but also at EU level. The Government has decided to sell the surplus in Sweden's reserve (equivalent to 1.3 million tonnes) instead of allowing these emission allowances to freeze.



## 6 Monitoring and reporting climate policy

A prerequisite for emission reductions at a reasonable cost is that costs, effects and side-effects are monitored, analysed and reported, both for individual measures and collectively. Monitoring should include data on the extent to which political objectives are achieved.<sup>164</sup>

In this chapter the Swedish National Audit Office reports findings on the Government's and agencies' monitoring, analysis and reporting of climate policy.<sup>165</sup> Section 6.1 deals with monitoring and reporting of individual measures, while section 6.2 deals with analyses and reporting collectively. A comparison is also made of how British climate policy is monitored.

### 6.1 Monitoring and reporting of various climate measures

Several agencies deliver different material on individual climate measures to the Government and to each other. A long chain of reference material needs to be compiled and analysed to be able to report to the Government and then on to the Riksdag. Sweden also reports to the EU and UN.

#### 6.1.1 *Deficiencies in monitoring and analysis of various measures*

The Swedish National Audit Office has pointed out deficiencies in monitoring in 10 audits of policy instruments in climate and energy policy.<sup>166</sup> There are no aggregated data for climate related research and development concerning the cost and contribution of the research.<sup>167</sup> There is also no monitoring of whether research has led to commercialisation or whether it has been otherwise

<sup>164</sup> See for example Committee Report 1999/2000:FiU13, Parliamentary communication 1999/2000:16.

<sup>165</sup> As part of the work on this final report the Swedish National Audit Office has examined the Government's reporting to the Riksdag in Budget Bills for 2008–2013, expenditure areas 20–24 and Climate and Energy Bills in 2009. The audit focused on how Swedish emissions of greenhouse gases and central government climate measures have been reported.

<sup>166</sup> Swedish National Audit Office RiR 2009:6, 2009:21, 2011:8, 2011:10, 2011:29, 2012:1, 2012:2, 2012:7, 2013:8 and 2013:9.

<sup>167</sup> The Government intends to present a coordinated account of the scope and results of climate research when it reports on other climate work in future Budget Bills, apart from the reporting on environmental and energy policy. The Swedish Energy Agency and Formas (Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning) have been instructed to report how the results of the research they have financed have contributed to achieving the climate objectives. Govt. Communication 2011/12:161 p. 8.

utilised.<sup>168</sup> Another example is that the major differences in how much different polluters in practice pay for emissions, that is, the distribution effects, have not been monitored or reported by the Government. Firms in the trading sector have in practice paid very little, in some cases nothing, for emissions. At the same time other taxpayers have had to pay considerably more in relation to their emissions.<sup>169</sup>

The deficiencies in monitoring in many cases are a consequence of unclear objectives. The area of transport is an example. Agencies concerned in the area believe that the objectives in some cases are so unclear that they cannot be used as a basis for management and monitoring.<sup>170</sup> Another reason is that the Government does not always indicate which agency is to be responsible for monitoring. This applied for example to the energy performance certificate system, which the Government later clarified.<sup>171</sup>

In 2013 the Committee on the Constitution reviewed the Government's handling and reporting of infrastructure planning in relation to climate objectives on the basis of the Swedish National Audit Office findings.<sup>172</sup> According to the Committee the audit presents the challenges the Government encounters in its various constitutional roles in relation to the Riksdag and agencies when central government measures are taken that are governed by monitorable objectives and that are characterised by conflicting objectives. According to the Committee the challenges are particularly conspicuous when these objectives are of equal merit. In its role in relation to the Riksdag the Government faces justified demands that it report complex correlations in terms of how well different policy instruments affect achievement of objectives.<sup>173</sup>

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<sup>168</sup> The Government plans to evaluate the results of the initiatives in strategic research areas in 2015. See Swedish National Audit Office RiR 2012:2 p. 31. The Swedish Energy Agency has made an annual follow-up of the number of research students who have been awarded doctorates with the support of the Agency, which according to the Agency is a benefit that the research has brought. See email from the Swedish Energy Agency, 30 September 2013.

<sup>169</sup> Swedish National Audit Office RiR 2012:1 p. 87 f. This applies for example to the effects of aggregate tax exemptions, exemption from quota obligation for electricity certificates and surplus of freely allocated emission allowances that have benefitted parts of industry. See also Swedish National Audit Office RiR 2013:8 p. 91.

<sup>170</sup> Swedish National Audit Office RiR 2012:7 p. 48 f.

<sup>171</sup> Swedish National Audit Office 2009:6. Due to new EU requirements in the reworked Energy Performance of Buildings Directive the Government proposed in Govt. Bill 2011/12:120 among other things rules on independent control systems for energy performance certificates.

<sup>172</sup> Swedish National Audit Office 2012:7.

<sup>173</sup> Committee Report 2012/13:KU20 p. 29.

### 6.1.2 *Deficient and fragmentary reporting to the Riksdag*

Deficient monitoring affects the framework for giving the Riksdag clear information on costs and effects of different measures and aggregated for all important climate measures. The Swedish National Audit Office's audits in the area of climate show major deficiencies in the Government's reporting to the Riksdag. For example, reporting is fragmented and difficult to assess. In many cases the effects of the measures on emissions of greenhouse gases are not reported.

#### **Reporting is not transparent**

In several reports the Swedish National Audit Office has drawn attention to lack of transparency in the Government's reporting to the Riksdag. This applies for example to reporting of Sweden's national emission rights and the financial value of the emission rights surplus. In 2009 the value of the surplus was estimated to be between SEK 7 and 8 billion.<sup>174</sup> The Riksdag has not as yet had the opportunity to take a position on any proposal from the Government on the treatment of the surplus. After the reports, however, the Government has included the holding and surplus of national emission rights in the Central Government Annual Report.<sup>175</sup>

Another example is central government infrastructure planning. The Swedish National Audit Office noted that in its reporting to the Riksdag the Government has not shown that the profitability of certain projects is based on increases in traffic that are probably difficult to reconcile with climate objectives. Without this disclosure the reporting to the Riksdag is not transparent, consistent or fair in terms of climate objectives.<sup>176</sup> No improvement has yet been made in this reporting.

#### **No summary of the most important climate measures and their cost**

On the basis of the Government's reporting in the Budget Bills it is difficult to gain a picture of what the most important climate measures are, what they cost and how they are to contribute to the climate objectives. There is no summary of the most important measures, despite the Riksdag having requested this.<sup>177</sup> However, the Government improved reporting somewhat in 2013. In the 2013 Budget Bill, in connection with performance reporting for the environmental

<sup>174</sup> Swedish National Audit Office RiR 2009:21 p. 11.

<sup>175</sup> See for example Govt. Communication 2012/13:101 p. 161 f.

<sup>176</sup> Swedish National Audit Office 2012:7.

<sup>177</sup> Committee Report 2010/11:MJU1, Parliamentary communication 2010/11:119, Report 2009/10:MJU1, Parliamentary communication 2009/10:129, Report 2008/09:MJU1, Parliamentary communication 2008/09:103.

quality objective Limited Climate Impact, the Government mentions some measures being taken in other expenditure areas than general environmental protection and nature conservation.<sup>178</sup> The costs of some of the climate measures reported through appropriations can be found in various expenditure areas.<sup>179</sup> However, the Government has not given any coherent picture of the costs.

In the Climate Bill of 2009 the Government gives an account of various climate measures. For the non-trading sector as a whole the Government reports schematically implemented and estimated emission reductions in six different areas.<sup>180</sup> As regards costs and emission reductions of various climate measures, the Government only reports these in a few cases. The only more detailed account of costs and effects of emissions is the restructuring of climate related taxes, 2010–2015.<sup>181</sup> However, the Swedish National Audit Office has noted that the Government's reporting of the costs of the tax restructuring differs between the Climate Bill, the subsequent Budget Bill and the Bill on restructuring taxes.<sup>182</sup>

### **The effects of climate measures on emissions is seldom reported in budget bills**

In the Budget Bills the Government sometimes emphasises that certain measures are important, but not the effects they have had or are expected to have on emissions. Nor are the side-effects of the central government measures reported to the Riksdag. Only in the 2013 Budget Bill were some climate measures reported under their own headings in the Government's performance report.<sup>183</sup> The Government reports what the measure can contribute in the form of reduced emissions in only one instance.<sup>184</sup>

<sup>178</sup> Another example is that regional work that was previously reported under expenditure area 21, *Energy*, and sustainable towns was previously only affected under the environmental quality objective *A good built environment*. This despite the fact that the Government maintains that one aim of the initiative is to reduce emissions of greenhouse gases. See Government Bill 2012/13:1, UO 20 p. 18 f.

<sup>179</sup> Under expenditure area 20 only one appropriation that refers to reduced emissions of greenhouse gases is presented: International climate measures. Under other expenditure areas there are examples of appropriation items that are directly climate related. One example is expenditure area 21, *Energy*. This applies to regional and local initiatives for energy efficiency etc., and energy technology. The appropriation is used to stimulate the spread of some energy technology solutions that are assessed to have positive effects on the climate. See Government Bill 2012/13:1 expenditure area 21.

<sup>180</sup> Govt. Bill 2008/2009:162 p. 60.

<sup>181</sup> Ibid. p. 237 f.

<sup>182</sup> Swedish National Audit Office RiR 2012:1 p.76.

<sup>183</sup> This applies to the sections on international climate measures, climate research, regional climate work and sustainable towns in Govt. Bill. 2012/13:1, UO 20 p. 18 f.

<sup>184</sup> This applies to international climate measures, where the reporting has been developed since the Swedish National Audit Office report RiR 2011:8.

The Agency for Public Management considers that the Government needs to develop performance reporting to the Riksdag, to even out the gap between agencies' limited performance reports and the Riksdag's demand for reports on effects in relation to objectives.<sup>185</sup>

In the Swedish National Audit Office's review of the Budget Bills only eight central government measures were identified in which direct and quantified contributions to reduced emissions were reported by the Government.<sup>186</sup>

## 6.2 Aggregate monitoring, analysis and reporting

Climate policy is intersectoral and covers a number of different policy instruments. Consequently, aggregate monitoring, analysis and reporting are necessary as a base for coordination of decisions. A coordinated assessment assumes that there is a clear order as to what is to be analysed, why it should be analysed, how often and by whom. Clear and recurring orders are also important for achieving comparability over time.

The Swedish National Audit Office has gone through the Government's and the agencies climate reporting<sup>187</sup> to assess whether a coherent picture is given as to what the climate measures are, what they have cost and their effects and side-effects.<sup>188</sup>

### 6.2.1 *Analysis and monitoring is not based on common premises*

The Government has no strategy for analysis and monitoring of different measures or what the aggregate measures give in terms of effects, side-effects or what they cost. The Government has not stated who has responsibility for ensuring sufficient coordination of decision-making data. Basic premises about the future in the transport and energy area for example are not shared by all agencies.

Instead, the Government instructs agencies without coordinating the premises. The absence of strategy and common premises means that the agencies need to order data for specific purposes. New orders are time-consuming and expensive.

<sup>185</sup> Agency for Public Management (2013), p. 9 and 14 f.

<sup>186</sup> Four of these were reported under expenditure area 20, the others under other expenditure areas.

<sup>187</sup> Climate reporting refers to publications prepared by the Government or agencies to fulfil national and international monitoring and reporting requirements in the climate area.

<sup>188</sup> The examination is restricted to reports describing developments in the climate area generally for society as a whole that have not been reported to the Riksdag. Reports analysing climate policy in just one sector, such as agriculture, housing or transport policy, were not included in the list.

Central assumptions need to be coordinated when the analyses are to reflect the same period and the same areas. However, the various agencies that monitor and report each use different assumptions in their analyses.

The agencies' different models illustrate different approaches, which means that model-specific assumptions also need to be made. For example, energy system models are detailed as regards energy consumption and choice of technology. The links to and description of other aspects of the economy are only generally outlined. The opposite is true of economic models.<sup>189</sup>

Moreover there is no continuity in updating material data in the agencies' analysis models. Data is compiled on the basis of various aggregation levels and for different years.<sup>190</sup>

To gain a full picture, different types of analysis need to be made and weighed together. The National Institute of Economic Research's EMEC model for example would need to be supplemented with energy and transport analyses. In 2011/2012 the National Institute of Economic Research together with researchers at Chalmers University of Technology and Luleå University of Technology worked on a pilot project aimed at trying to soft-link the EMEC model with the TIMES-Sweden energy system model.<sup>191</sup>

### 6.2.2 *Reporting of costs and effects is not coherent*

The Government Offices and agencies publish a large volume of reports that describe developments in the climate area in various ways. However, there is no register of Swedish climate reporting and the publications it includes. The Swedish National Audit Office has examined a number of central reports, listed in the table below.<sup>192</sup> There are eleven reports comprising about 4,400 pages including annexes.<sup>193</sup> Some of these are reported to the UN or the EU.

<sup>189</sup> Email from the National Institute of Economic Research 22 October 2013.

<sup>190</sup> The Swedish National Audit Office has pointed out for example that Statistics Sweden's model FASIT (Swedish abbreviation of Distributional Analysis System for Income and Transfers) has been updated on an ad-hoc basis. Swedish National Audit Office RiR 2012:1 p. 74.

<sup>191</sup> Email from the National Institute of Economic Research 22 October 2013.

<sup>192</sup> See a more detailed description of the progress reviews, the in-depth evaluation, national report and the National Institute of Economic Research environmental economic report in annex 7. Besides the reports included in the table, and which the Swedish National Audit Office has gone through, other reports are also published. One example is the Swedish Energy Agency and Swedish Environmental Protection Agency annual reports to the EU on trade in emission allowances under Article 21 of Directive 2003/87/EC of the European Parliament and the Council.

<sup>193</sup> The Climate Committee reporting was not included in the examination as it was regarded as reference material for the Climate Bill.

**Table 6.1** Climate policy reporting

Publication (last published)	Frequency of reporting	Agency responsible for publication	Recipient
Follow-up of environmental quality objectives (2013)	Annual	Swedish Environmental Protection Agency	The Government
In-depth evaluation (2012)	Every fourth year	Swedish Environmental Protection Agency	The Government
Progress review for climate policy (2008)	No regular intervals	Swedish Environmental Protection Agency Swedish Energy Agency	The Government
National report to the UN (2009)	Every fourth year	Government Offices, Swedish Environmental Protection Agency	The United Nations
National Inventory Report (2013)	Annual	Swedish Environmental Protection Agency	The United Nations
Progress Report EU (2013)	Every other year	Government Offices, Swedish Environmental Protection Agency	EU
National Institute of Economic Research environmental economic follow-up (2012)	Annual	National Institute of Economic Research	The Government
Environment-related taxes, subsidies and emission allowances (2010)	No regular intervals	Statistics Sweden	The Government
Roadmap 2050 (2012)	No regular intervals	Swedish Environmental Protection Agency	The Government

Source: Swedish National Audit Office processing of data 2013.

Most reports contain emissions statistics; in some cases forecasts are presented.

Three of the reports<sup>194</sup> list all important central government climate measures. But none of the reports present aggregate costs for climate measures. Costs for some measures are presented, however. These reports also provide some information about the effects on emissions of some individual climate measures.

Reports on the actual impact of different measures on emissions are rare. The reports to the UN make some attempt at this<sup>195</sup>, but it is not complete. None of the reports give a coherent picture of the effects in relation to costs.

<sup>194</sup> Interim report 1–4 in the reference material of the Swedish Energy Agency and the Swedish Environmental Protection Agency to the 2008 progress review, Ds. 2009:63 and the *Report for Sweden on assessment of projected progress*, March 2013.

<sup>195</sup> Email from the Swedish Environmental Protection Agency, 30 September 2013.

In summary, the Swedish National Audit Office review shows that a lot of information has been compiled, but it is spread out in a number of reports. It is unclear how the reports relate to each other. Anyone wanting a coherent and updated picture needs to gather the data from a number of different sources and even then data is missing as to approximate costs, effects and side-effects. Apart from the reports studied by the Swedish National Audit Office there is sector-specific material that analyses the potential of reducing emissions in different sectors, such as housing, agriculture and transport.

### **The Swedish environmental protection agency's basis for the roadmap to 2050**

In December 2012 the Swedish Environmental Protection Agency was instructed by the Government to devise the basis for a road map for a Sweden without emissions of greenhouse gases by 2050. The remit did not include evaluating climate measures implemented. The report includes scenarios and proposals for policy instruments to reduce emissions of greenhouse gases in the long term. The Government has not as yet made a decision on the Swedish Environmental Protection Agency's proposals, but intends to take a position before the end of its mandate period in 2014.<sup>196</sup>

### **Late analysis of the interaction between climate and energy objectives**

When in 2009 the Government set up the milestone target and the energy efficiency and renewable energy objectives for 2020, the interaction between the objectives had not been analysed. In 2012 the Government instructed the National Institute of Economic Research to identify and analyse the consequences of conflicts and synergies between different objectives in climate and energy policy.

### **Poor analysis of policy instrument mix**

In several audits the Swedish National Audit Office has noted the lack of analysis of the relation between different climate policy instruments.<sup>197</sup> An important example is that the effects of climate-related taxes have not been analysed together with the effects of the EU Emissions Trading System.<sup>198</sup>

The audits of the energy performance certificate system and climate research found deficiencies in coordination between measures. The energy performance certificates had not been coordinated with other central government policy

<sup>196</sup> Govt. Bill 2012/13:1, UO 20 p. 23.

<sup>197</sup> See Swedish National Audit Office RiR 2009:6, 2012:1 and 2013:8.

<sup>198</sup> See Swedish National Audit Office RiR 2012:1.

instruments for energy efficiency.<sup>199</sup> Coordination between climate research and other policy instruments is necessary to create the conditions for utilising and commercialising research findings, thus contributing to the climate objectives in practice.<sup>200</sup> The Swedish National Audit Office noted, however, in its audit of climate-related research and development that there is no such clear coordination.<sup>201</sup> In the appropriation directions for 2013 the Government has instructed the agencies concerned to report how results of climate research financed by the agencies contributes to achieving the climate objectives and how this reporting can be done on a current basis so that the Riksdag and the Government gain a better and coherent presentation of the scope, results and effects of climate research.<sup>202</sup>

### 6.2.3 *Lack of aggregate reporting to the Riksdag*

The Riksdag has on several occasions requested better monitoring and reporting on the climate field from the Government.<sup>203</sup> The statements refer to the need for cost-effectiveness, effectiveness, a long-term emission reduction pathway and transparency.

The Government has referred to the fact that the information requested by the Riksdag exists in older Bills and documents or will be published in connection with the 2015 progress review. The Government has also stated that in future reports it will take the Riksdag's statements into consideration.<sup>204</sup> Moreover, in October 2013 the Government instructed the Swedish Environmental Protection Agency and the Swedish Energy Agency to prepare a basis for following up developments towards Sweden's climate and energy objectives for 2020. The assignment is to be undertaken in consultation with the National Institute of Economic Research. In the event of the agencies having different views this is to be reported.<sup>205</sup>

<sup>199</sup> An example of this was central government grants and tax relief that property owners can be granted if they carry out various energy efficiency measures. Another example was the municipal energy advisory service.

<sup>200</sup> See Swedish Environmental Protection Agency 2012, report 6537, "Policy instruments need to cover the entire system of innovation from research, development and demonstration to policy instruments for market introduction." p. 34.

<sup>201</sup> Swedish National Audit Office 2012:2.

<sup>202</sup> Appropriation directions for budget year 2013 for the Swedish Energy Agency and the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning.

<sup>203</sup> The Riksdag's statements were made through its approval of the statements made by the Committee on Environment and Agriculture in the report on the budget for the years in question.

<sup>204</sup> Govt. Communication 2009/10:75 p. 114 f. and Govt. Communication 2010/11:75 p. 112.

<sup>205</sup> Government Decision (M2013/2523/KI), 10 October 2013.

At EU level the Commission has analysed the cost-effectiveness of various ways of reducing emissions by 2050.<sup>206</sup>

### **Scanty reporting of emissions over time and for some sectors**

In the Budget Bills the Government presents information on the development of emissions and its reasons, but the information is not coherent. In addition important information is missing. The Government focuses mainly on the annual reporting of emissions of greenhouse gases and not on the development of emissions over time or in different sectors.<sup>207</sup> As a rule there are no forecasts of Swedish emissions in relation to the climate objectives.<sup>208</sup> Emissions of greenhouse gases from the energy sector and industry are not reported in the Budget Bills, despite the fact that those emissions constitute about a third of Swedish emissions.<sup>209</sup> On the other hand there is information about emissions in the agricultural sector and for the transport system in the Government's reporting of the expenditure areas concerned.<sup>210</sup>

### **Achievement of objectives is analysed without any link to central government measures**

The Government gives an account in the Budget Bills of the overall development of greenhouse gas emissions and makes an assessment of the possibilities of achieving the interim target for 2008–2012 and the milestone target for 2020. But the analysis does not relate achievement of objectives to climate measures or the need for new measures. Nor does the Government's reporting present the extent to which reduced emissions are a consequence of central government measures or of changes in the rest of the world.<sup>211</sup>

<sup>206</sup> European Commission (2011), *A Roadmap for moving to a competitive low carbon economy in 2050*, p. 14.

<sup>207</sup> One exception is for example that the transport sector's emissions are commented on in the 2013 Budget Bill.

<sup>208</sup> An example of an exception is that in the 2008 Budget Bill the Government reports a forecast for the 2010 emission level.

<sup>209</sup> Under expenditure areas 20 and 21 the Government reports some data concerning the development of national emissions.

<sup>210</sup> Expenditure area 22, *Transport and communications*, and expenditure area 23, *Green industries, rural areas and food*. There is no reporting for expenditure area 23 of emission development in the Budget Bills for 2008–2009. In 2012 the Government submitted a special performance communication to the Riksdag on environment, climate and energy measures in agriculture. See Govt. Communication 2011/12:124, CommitteeReport 2011/12:MJU24, Parliamentary communication 2011/12:290.

<sup>211</sup> In the 2012 Budget Bill there are examples of the Government linking world events to the emissions trend. There the Government states that the substantial decrease in 2009 can to some extent be put down to the global economic downturn.

### **The risk of carbon leakage has not been reported**

Measures that affect firms' competitiveness through increased costs for emissions are often linked to the risk of carbon leakage, that is that production is located in countries with no or lower expenditure for emissions. However, it is necessary to have material concerning how much firms pay for emissions in order to assess the risk of carbon leakage and the reasonableness of compensation claims from different groups. Otherwise the implementation of cost-effective climate policy is made more difficult, since various reductions and reliefs risk reducing cost effectiveness. When there is no reference data for assessing whether claims are well-founded, decision-makers will have difficulty in determining which policy instruments can be used without serious unwanted side-effects. It will also be difficult to assess how policy instruments should be designed to achieve the desired emission reduction. The Swedish National Audit Office's audit of climate-related taxes showed that the Government and agencies lack such reference data.<sup>212</sup>

### **Coordinated monitoring and analysis in the United Kingdom**

The United Kingdom has set up an independent committee of experts (the Committee on Climate Change) tasked among other things with monitoring regularly the implementation of UK climate policy through an annual progress report to Parliament. The British Government is obliged to give a formal response to the Committee's report. In that way Parliament receives coordinated information on a regular basis about the development of emissions in different sectors and how the Government's policy management is working. Besides the five-yearly carbon budgets that the Government submits to Parliament, the Government produces a carbon plan. The purpose is to give clear signals about the direction of Government climate policy management. The plan is based on the carbon budgets and the long-term climate objective. In the plan the Government provides forecasts of the costs of policy instruments and their effects on emissions, both for individual and aggregate policy instruments. The Government also presents underlying analyses with intervals for possible emission reductions in different sectors. The Committee on Climate Change analyses also include assessments of the cost effectiveness of different ways of reducing emissions after 2020. See Annex 9.

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<sup>212</sup> Swedish National Audit Office RiR 2012:1 p. 87 f.

### 6.3 Summary of findings

- In several audits the Swedish National Audit Office has noted deficient and fragmentary monitoring of individual climate measures. In several cases the monitoring deficiencies are due to the objectives themselves being unclear and that the Government's priorities between different objectives are in turn unclear.
- The Government has no strategy for analysis and monitoring of different measures or what the aggregate measures give in terms of effects, side-effects or what they cost. The Government has not stated who has responsibility for ensuring sufficient coordination of decision-making data. Consequently there is no continuity in the agencies' monitoring and updating of data and analysis models.
- There is no aggregate follow-up or analysis. For example, the Government Offices and agencies publish a large number of reports in the climate area, but none of the reports provide a coherent picture of the effects in relation to costs.
- Lack of clarity in agencies' monitoring and analysis of different climate measures in turn affects the Government's reporting to the Riksdag. The Government's reporting has no coherent picture of the most important climate measures, what they cost and their effects.

## 7 Conclusions and recommendations

The Swedish National Audit Office audits have found material deficiencies in central government use of policy instruments and reporting of climate and energy policy. The Government and agencies have improved and plan to improve reporting and implementation of some measures in the area. The Swedish National Audit Office finds, however, that further work is necessary to achieve effective measures and an integrated, transparent follow-up and reporting of approximate costs, effects and side-effects.

The overall conclusion from the Swedish National Audit Office's audits is that there is a risk that central government is not using its policy instruments to reduce emissions in accordance with the objectives at a reasonable cost. The costs of reducing emissions varies substantially between different measures, which indicates that the total emission reductions by 2020 could be achieved at a lower cost by using another combination of policy instruments. The objectives are not clearly formulated, which creates considerable uncertainty. Coordination between various agencies is deficient, for example concerning the time horizon on which to base analyses of different measures. There is also a lack of coordination between measures at national level and at EU level.

The deficiencies make assessments of the cost-effectiveness of the measures in the short and long term difficult. The lack of aggregate reporting and assessment also means that reasonable transparency requirements are set aside. In aggregate the climate and energy policy measures have led to major redistributions and favoured parts of the business sector, often without any requirement to take measures to reduce emissions. Exemptions from and reductions in energy and carbon taxes and free allocation of emission allowances are some examples. This is not fully consistent with the Riksdag's and the EU's climate policy premise: the polluter pays principle (PPP). There may be reason to deviate from the PPP if there is a risk of carbon leakage; in other words production being located in countries without or with lower expenditure for emissions. But the Government and agencies have not analysed and reported how much different trade and industry sectors need to pay for emissions and if the companies that benefit are really those that are at risk of carbon leakage. Some analyses exist, but reporting is inadequate.

## 7.1 Large gap between theory and practice

According to current estimates, the milestone target for 2020 can be achieved if sufficiently many emission credits are delivered and Sweden's emission trend is as forecast. But future emissions are expected to decrease more slowly than they did in the period from 1990 until now. The Government's vision of almost zero emissions by 2050 in Sweden is far from the Swedish Environmental Protection Agency's reference scenario of trends. With the measures decided by the Government, emissions are expected to only decrease from today's 58 million tonnes to about 55 million tonnes in 2050. There is poor agreement between the environmental quality objective *Limited Climate Impact*, the social adjustment that would be needed to achieve it and the Government's management and reporting to the Riksdag. The large gap between the need for emission reductions after 2020 and predicted emissions trends implies a great risk that the objectives cannot be achieved. A precondition for achieving substantial emission reductions is major technological advances that have not as yet been made. Adjustment costs also risk being high, both for central government finances and for enterprises and the public. The mix of policy instruments that may be most cost effective from an economic perspective is not always politically possible to implement, since there are other factors to take into consideration. The broad mix of different policy instruments in the coherent climate and energy policy affects many actors and has several purposes, implying a great need for coordination, analysis and reporting in order to achieve effective and transparent steering towards reduced emissions.

Moreover the Government has not yet decided how Sweden's surplus of national emission allowances (assigned amount units, AAUs) is to be dealt with. This means that it is still unclear whether Sweden's national interim target for 2012, now passed, has been achieved. If the surplus is sold the emissions can take place in another country, which would mean that global emissions will not decrease. If instead the surplus were to be saved the target would be achieved, unless these emission allowances are eventually either used in Sweden or sold. In that case the effect will be that global emissions will not decrease in the long term. In practice there is no market for national emission allowances for the period 2013–2020. After that the conditions for use or sale are unclear.

## 7.2 Lack of important frameworks for steering

The Swedish National Audit Office audit shows that the Government's management lacks important frameworks for using the policy instruments more effectively and at reasonable cost. Framing objectives and weighing

up various purposes and social objectives are parts of a complex political process. Framing clear objectives to reduce emissions of greenhouse gases is complicated by the fact that so many sectors and actors are affected.

### 7.2.1 *Unclear climate and energy objectives*

The Swedish National Audit Office notes that the Government has not indicated a long-term pathway for how emissions are to decrease. This implies poorer conditions for coordination and clear priorities between different social objectives. It also implies worse conditions for agencies to choose long-term effective measures. For example in the conflict of objectives regarding some infrastructure investments and how the transport sector is to contribute to the climate objectives, the effect has been that neither the ministries nor agencies concerned have been given frameworks for effective steering.

The specific objectives of several policy instruments are also unclear; often a policy instrument is to contribute to several widely varying social objectives without clear priorities. Many central government measures have been introduced whose main purpose entirely or partly targets something other than the climate, such as promoting competition, contributing to research, development and spreading of new technology, promoting green employment or promoting sustainable development in other countries. Consequently it is important to evaluate measures in relation to such purposes as well. There is a risk that costs of policy instruments, which are also aimed at achieving other objectives, will be used to argue that climate policy is expensive and inhibits Swedish companies' competitiveness.

### 7.2.2 *Lack of clear priorities*

The Government emphasises that climate and energy policy is coherent, but ministries and agencies have no coherent picture of how objectives, development towards the objectives or central concepts should be interpreted and defined. Nor has the Government required coherent supporting material about approximate costs, effects and side-effects, which would be necessary to coordinate and set priorities between climate and other social objectives. The consequence of the Government not openly setting priorities between climate and other social objectives has been that different agencies have different pictures of what is to be done, when it is to be done and what effects are expected. The practical priorities are often set in detail by officials at various ministries, often on the basis of political and economic weight.

### 7.2.3 *Deficient coordination, both short and long term*

The Committee on Environment and Agriculture has stressed that climate measures should be cost-effective in the long term. The European Commission and the UK, for example, unlike Sweden have carried out analyses to assess the cost-efficiency of various ways of reducing emissions after 2020. The Riksdag has requested a long-term pathway for emission reduction. But the Government's decisions on various policy instruments are often short-term, rarely longer than to 2020, and do not tie in with a long-term pathway. The lack of long-term perspective creates uncertainty about the degree to which agencies should give priority to climate objectives in their work. This also means that companies and the general public are uncertain about what decisions are rational, for example when a company is to invest in machinery or how a private individual is to choose housing or a car. The cost effectiveness of a measure depends on the objective or objectives to be achieved and in what timeframe.

According to the Swedish Environmental Protection Agency the greatest challenges in the long term are adjusting to a more transport-restrictive society and reducing emissions from processes in basic industry. The Swedish National Audit Office audit has shown that current development in infrastructure planning is high risk, since it builds on increases in traffic that with knowledge now available will probably be difficult to reconcile with the climate objectives. The Government has not coordinated infrastructure planning with climate objectives but is hoping that major, as yet unknown technology advances will contribute to emission reduction. Nevertheless, the Government has not clearly coordinated climate research with climate objectives, for example, to direct research towards achieving the technology advances that would be needed in the transport sector and industry.

### 7.2.4 *Lack of coordination with the EU Emissions Trading System*

The Government and Riksdag point out that climate efforts should be seen in an international perspective, since Sweden's emissions of greenhouse gases form such a small part of global emissions. But the Swedish National Audit Office's audit shows that the Government needs a coherent strategy for how Sweden is to use its national discretion. The EU Emissions Trading System covers about 40 per cent of Sweden's emissions and a third of all EU emissions. When evaluating the impact of national measures in relation to the EU Emissions Trading System it is important to decide if the measures can be expected to lead to lower emissions at EU level. Measures that reduce the cap in the trading system could be for example that member states freeze emission allowances at their disposal, so that they cannot be used. For example, the Government could have allowed the emission allowances in Sweden's reserve

for new installations (new entrants reserve) in the 2008–2012 trading period to be frozen, thus demonstrating leadership in the EU. But instead the emission allowances in the reserve were sold, so that they can be used by companies in the current trading period. Such measures in Sweden and other member states together contribute to increasing the supply of emission allowances, which contributes to lower prices and thus a decreased steering effect in the trading system.

The large surplus of emission allowances in the trading system is a weak incentive for companies to take measures that will reduce emissions in the long term.

Policy instruments mainly directed at the companies participating in the EU Emissions Trading System need to be analysed collectively. This applies for example to the Swedish voluntary programme for improving energy efficiency (PFE) and the electricity certificate system. Such policy instruments in Sweden and other countries together reduce the need for emission allowances, which contributes to a lower price. When the price of emission allowances is low and measures outside the trading sector are more expensive, there is a risk that emissions will not be reduced where measures are cheapest. The objectives are achieved as a result of recession and other policy instruments, rather than of the trading system. Investment propensity is dependent on expected future policy, among other things.

There is a risk that central government investment in climate-related research and development will be ineffective, for example. The low price of emission allowances in the EU Emissions Trading System has a dampening effect on companies' willingness to invest in emission reducing technology. Central government investments, for example in climate-related research and development, are thus at risk of having less effect, since it is not certain whether it will be profitable to invest in commercialisation of new discoveries.

### 7.2.5 *Unclear division of responsibility*

Policy instruments are spread among a number of actors. When several agencies and ministries are responsible for different parts of an area, the risk is great that no-one is able to take effective responsibility for cross-system problems or to make an aggregate analysis and report approximate costs, effects and side-effects of measures taken. But the Government has not allocated responsibility for coordinated and balanced analysis and reporting of climate policy in the Government Offices or at any agency. The absence of a coherent organisational solution may have contributed to the lack of aggregate reporting.

However in November 2013 the Government set up an inquiry to review the division of responsibility between and the structure for different agencies in the environmental field. However, among those not included are the National Institute of Economic Research, the Swedish Energy Agency and Statistics Sweden, which according to the Swedish NAO would be needed in order to achieve balanced reporting.

### 7.3 Reporting is not coordinated and has major deficiencies

A coherent picture of emission reductions in relation to costs is needed, otherwise the aggregate costs are at risk of being higher than necessary. Even if the Government and agencies have improved some parts of the reporting, there is not as yet any aggregate monitoring and reporting of approximate costs, effects and side-effects. Consequently there is a lack of various important components of decision-making data, which could help to reduce uncertainty in decision-making. The work of specifying and building up necessary statistical material and relevant tools of analysis needs to be started in good time before the in-depth reporting for the 2015 progress review. The Riksdag needs to know approximately which effects are achieved using different policy instruments and to get an overview of what they cost altogether. The Swedish National Audit Office finds that the existing analysis and reporting of individual and collective measures lacks important components, gives different parallel replies to the same question and some parts do not give an entirely fair presentation. Consequently, reporting is not in proportion to the need of decision-supporting data. The lack of transparency is also reinforced by the fact that expenditure for different policy instruments in many cases are outside the central government budget.<sup>213</sup>

Analysis and reporting of costs, effects and side-effects are spread over several agencies whose main purpose is other than the climate. Agencies have different starting points and definitions that have not been coordinated. This lack means that analysis and reporting is fragmented and has important gaps. All in all, this means that the supporting data for policy implementation is insufficient and learning and improvement are made more difficult. The most important deficiencies in reporting are that the effects, in the form of emission reductions, have not been coherently reported in relation to the costs. Nor is there any coherent reporting to the Riksdag on how different policy instruments affect each other in relation to different objectives, and whether they lead to material side-effects, or on the risk of carbon leakage.

<sup>213</sup> When the costs of climate measures are imposed directly on producers and consumers, for example legislation and regulations, the central government budget is not affected. Nevertheless the costs need to be monitored and reported transparently.

### 7.3.1 *Coordination problems in reporting as well*

Since there are no clear priorities for how policy is to be balanced and implemented, frameworks for coordinated and balanced reporting are also missing. The lack of coherent reporting in itself also makes considerations and implementation more difficult. Different agencies have different tasks. The consequence is that there are knowledge gaps and different parallel answers to the same question, depending on perspective. The different ministries and agencies that monitor and report lack consensus concerning starting points and approaches as regards reporting and analyses. The information may be correct but to date has reflected different views, not weighed together. It is difficult for the Riksdag, agencies, enterprises and the public to weigh up and set priorities on the basis of information that is partially contradictory. Consequently, assigned responsibility for coherent and balanced reporting is necessary.

The National Institute of Economic Research EMEC analysis model is an important tool for preparing some decision support data. But the model cannot alone answer the questions that need to be highlighted. The National Institute of Economic Research model does not, for example, handle how entirely new technology will replace existing technology when there are major price changes. To obtain sufficient decision support data, the work on the model would need to be supplemented regularly by energy and transport analyses and analyses of what adjustments need to be made to obtain reasonable long-term costs for the desired achievement level. To achieve supporting data for such analyses the Swedish Environmental Protection Agency, the Swedish Energy Agency, Statistics Sweden and the National Institute of Economic Research would need to collaborate more and start with the same definitions and consistent assumptions. At present analyses often follow different tracks and coordination of material is insufficient. The agencies often put forward differing views in consultation responses. In October 2013, however, the Government instructed the Swedish Environmental Protection Agency and the Swedish Energy Agency to prepare a basis for following up developments towards Sweden's climate and energy objectives for 2020. The assignment is to be undertaken in consultation with the National Institute of Economic Research. In the event of the agencies having different views this is to be reported.

### 7.3.2 *No basis for assessing carbon leakage*

In the climate change debate the risk of carbon leakage is often put forward as a reason for deciding on exemption from mandatory climate policy instruments, thus favouring parts of the business sector. The risk of carbon leakage refers to production being located in countries without or with lower expenditure for emissions. But neither the Government nor agencies have made an overall analysis and report of how much different industries need to pay for emissions

and if the companies that benefit are really those that are at risk of carbon leakage. Hence there is no clear proof of whether and in that case when carbon leakage arises in practice. Some analyses exist, but reporting is inadequate. The Government has not requested any such reporting or risk analysis. Major differences in what different polluters pay in relation to their emissions is not fully consistent with the polluter pays principle (PPP). There is no coherent review of redistributions and other side-effects, since there is no coherent reporting of how all or parts of the business sector are affected by different policy instruments.

#### **7.4 The effects of climate measures vary**

The aggregate costs of the most important policy instruments that would be needed to achieve the 2050 vision would, according to a simple estimate by the Swedish Environmental Protection Agency, be equivalent to 0.2–0.5 per cent of GDP in 2050.

Swedish National Audit Office audits show that the costs per tonne of reduced emissions up to now have varied considerably between different policy instruments. Examples of costs per tonne for reduced emissions are emission allowances in the EU Emissions Trading System, about SEK 40 per tonne and climate measures in other countries, about SEK 85 per tonne. At the same time carbon dioxide tax is SEK 1,050 per tonne on a general level. Tax exemption for biofuels entailed reduced tax revenue for central government of SEK 3,000 per tonne. Sometimes it may be a saving to steer towards reduced emissions, for example by imposing certain environmental requirements in public procurement. According to economic theory the differences indicate that costs of measures for 2020 could have been lower as a whole. This raises the question of whether the costs of measures lead to good economy in the use of public resources. The assessment of what may be reasonable costs is rendered more difficult by policy instruments often being employed to achieve several other objectives simultaneously and by the intended time perspective. Different policy instruments also interact, positively or negatively. This underlines the importance of a relevant mix of policy instruments, both in the short and long term.

## 7.5 The polluter pays principle is not followed to the full

Material redistributions of wealth, reductions and exemptions from various taxes and other climate and energy policy instruments taken together mean that policy signals for reducing emissions are weak in large parts of the business sector. This does not fully comply with the polluter pays principle (PPP), which may be reasonable if there is a risk of carbon leakage. However, there is insufficient basis for assessing whether and to what extent there is a risk of carbon leakage in different trade and industry sectors and sub-sectors in Sweden.

Swedish National Audit Office has shown in an example calculation that the pulp and paper industry in 2010 was favoured with about SEK 2.5 billion via various policy instruments and exemptions from policy instruments, which was offset by about SEK 1.5 billion through facing a somewhat higher electricity price due to the EU Emissions Trading System. Hence the value added to the industry by these policy instruments and exemptions was close to one billion kronor in that year.

A consequence of allocation in the EU Emissions Trading System has been that Swedish enterprises have received more free emission allowances than they have needed. The Swedish National Audit Office has shown that the aggregate surplus allocated up to 2011 was worth about SEK 1.8 billion (equivalent to 15 million tonnes of emissions). In all, the surplus in the first and second trading period corresponded to emissions of 22.7 million tonnes (2005–2012). The preliminary surplus of emission allowances for 2013 corresponds to emissions of 10 million tonnes. For 2015 and 2020 the preliminary allocation of free emission allowances is also higher than the forecast emissions. One reason is that the new allocation principles in the third trading period favour enterprises with relatively low emissions per unit of output. Swedish enterprises are therefore compensated in the third trading period with considerably more free emission allowances than they need. According to economic theory, the surplus of emission allowances goes to holders of capital, with no requirement for reduced emissions. At EU level the surplus corresponded to about 2 billion tonnes of emissions at the start of the trading period starting in 2013.

Comparing the costs, mainly in the form of reduced revenues, with the effect in the form of reduced emissions by 2020<sup>214</sup>, the Swedish National Audit Office finds that the costs for aggregate emission reductions are high.

<sup>214</sup> Note that emissions in the trading system are governed by the cap in the trading system.

## 7.6 Recommendations

To create better conditions for reducing emissions in accordance with the objectives laid down by the Riksdag and at a reasonable cost, the Government should:

- Coordinate climate objectives with other overall social objectives, such as transport policy objectives, by setting clear, long-term priorities, clarifying what is to be achieved and what it costs. This will give the Riksdag better decision-making data and agencies, enterprises and the public will have long-term rules of play to enable them to make rational decisions.
- Establish an approximate pathway for how emissions are to be reduced in the long-term, even after 2020. Such an emissions reduction pathway is also needed as a basis on which to assess the mix of policy instruments that could be cost-effective in the short and long term, for the purpose of better economy in the use management of central government and public resources.

The Riksdag, the Government, enterprises and the public need to have overall and balanced bases for decisions on investments and different climate measures. To achieve this, the gap between various agencies' starting points and analyses needs to contract. Consequently, the Swedish National Audit Office recommends that the Government:

- Allocates a clear responsibility and mandate as well as steering resources to achieve coordinated and balanced reporting and analysis.

The responsibility should include developing and collecting reports on approximate costs, effects and side-effects of the most important climate measures and for other measures with a major impact on emissions of greenhouse gases. This should also include analysing and reporting Sweden's national discretion in relation to the EU Emissions Trading System. When evaluating the impact of measures it is important to determine if they can be expected to lead to lower emissions in Sweden and at EU level. Moreover, the risk of carbon leakage should be analysed and reported. Coordinated reference material allows overall priorities, so that the clarity, transparency and effectiveness of central government measures can increase further.

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This final audit in the Swedish National Audit Office audit strategy *Sustainable development – climate* is based on and supplements the eleven audits that have been published within the strategy between 2009 and 2013.

The Swedish National Audit Office has examined whether central government uses its policy instruments so that emissions of greenhouse gases decrease in accordance with climate objectives and at reasonable cost. Side-effects and reporting were included in the audit.

The overall conclusion is that there is a risk that central government is not using its policy instruments to reduce emissions in accordance with the objectives at reasonable cost. The costs of reducing emissions vary substantially between different measures, which indicates that the total emission reductions by 2020 could be achieved at a lower cost by using another combination of policy instruments. The objectives are not clearly formulated, which creates considerable uncertainty. Coordination between various agencies is deficient, for example concerning the time horizon on which to base analyses of different measures. There is also a lack of coordination between measures at national level and at EU level.

The Riksdag, the Government, enterprises and the public need to have overall and balanced supporting material for decisions on investments and different climate measures. The Government and agencies have improved reporting and implementation of some measures. However, the Swedish National Audit Office finds that further work is necessary to achieve effective measures and coherent, transparent monitoring and reporting.

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