RAČUNSKO SODIŠČE
REPUBLIKE SLOVENIJE

Summary of the Audit Report of the Court of Audit of the Republic of Slovenia on Implementing Measures to Achieve Set Objectives for Air and Ozone Layer Protection and Tackling Climate Change

Coordinated Audit of Air and Ozone Layer Protection and Implementation of Related International Agreements

Contents

1 The subject and objectives of the audit

The Court of Audit of the Republic of Slovenia (hereinafter, the Court of Audit) performed an audit of achievement of objectives set to protect the air and the ozone layer and to tackle climate changes, determined by international agreements, the European Union directives and national policies. We determined whether the auditees successfully achieved the objectives set and whether they efficiently implemented the measures, which were planned so that the set objectives would have been achieved. We verified if comprehensive policies were created and adopted in Slovenia, on the basis of which it will be possible to successfully achieve the objectives set. We also assessed, whether based on the projections of the emissions flows it will be possible to achieve the objectives set, to what extent the planned measures were implemented, and what are their effects.

The audit was performed at the auditees responsible for the achievement of set objectives and implementation of individual measures to protect the ambient air, the ozone layer and to mitigate climate change:

- Ministry of the Environment and Spatial Planning,
- Ministry of Agriculture, Forestry and Food,
- Ministry of Transport,
- Ministry of the Economy, and
- the Environmental Fund of the Republic of Slovenia (hereinafter, the Environmental Fund).

We audited performance of the auditees in the years 2005 and 2006 and took into consideration also all actions in 2007 and in the beginning of 2008, which affected the achievement of set objectives.

2 The objectives set to protect ambient air and ozone layer and to mitigate climate change

Slovenia is the signatory of all important international agreements for air and ozone layer protection and tackling climate change, which set the objectives to reduce emissions of various harmful substances that the states signatories have to achieve in the agreed time period, as well as other obligatory actions of the signatories. Slovenia has to also observe the provisions of the European Union directives, which also bind the Member States to achieve the set objectives for air and ozone layer protection and mitigating climate change.

3 Achievement of objectives and implementation of measures to protect ambient air

The quality of ambient air is especially affected by the emissions of sulphur dioxide, nitrous oxide, volatile organic compounds, ammonia, carbon monoxide, particulate matter, and also heavy metals, lead, cadmium mercury and persistent organic pollutants. It is important that the countries ensure that the emissions do not exceed allowed yearly and daily limit and alert threshold values.

3.1 Comprehensiveness and completeness of the ambient air protection policy

In 2004 the Government of the Republic of Slovenia adopted an action plan, which determined measures to reduce total annual emission quantities of sulphur dioxides, nitrous oxides, volatile organic compounds and ammonia. It also adopted an action plan to reduce total annual emissions of sulphur dioxide, carbon monoxide and particulate matter (PM 10[1]) from large combustion plants. With regard to the determined actual state of emissions and unreal emission projections from 2004, revisions of both action plans were adopted in 2006.

A continuous exceeding of allowed daily limits and alert threshold values of particulate matter (PM 10) was determined on all densely populated areas in Slovenia in 2005 and 2006. The concentrations that exceed the allowed emission values were mostly affected by congested traffic in city centres. The measures to reduce excessive exceeding of allowed concentrations were not determined and adopted.

We assessed that the adopted policy to protect the ambient air quality was not comprehensive and complete. Only the measures to achieve yearly allowed emission quantities were determined and adopted, but not the measures to achieve daily and alarm threshold emission values of all important pollutants.

The Ministry of the Environment and Spatial Planning did not perform appropriate monitoring of adopted action plans for ambient air quality. In 2006 it prepared a revision of both adopted plans due to the changes of conditions, on the basis of which future emission projections were forecasted. However it did not assess and evaluate the effects, which were the result of performance of individual planned measures. It also didn't report to the public on the results of implementation of ambient air quality protection measures.

3.2 Assessment of achieving set objectives and efficiency of implementing measures

Based on the emission decreasing trend of sulphur dioxide, ammonia and volatile organic compounds emissions, we determined that the target emissions in 2010 shall not be exceeded. The emission trends of heavy metals and persistent organic pollutants show that the emissions of these substances are decreasing and that Slovenia does not exceed the reference values from the year 1990.

In the action plan it was forecasted that in 2010 Slovenia will not meet the emission ceiling for nitrous oxides. It was anticipated that the extent of measures implemented could not ensure reduction of emissions under the set ceiling. During the audit the Ministry of the Environment and Spatial Planning started to apply more contemporary and precise methodology to asses nitrous oxide emissions produced by the traffic (COPERT III methodology). According to the calculations of emissions evaluated under this methodology, the set objective of 45 thousand tons of nitrous oxide emissions in 2010 could be achieved. The Gothenburg Protocol and the Directive on National Emission Ceilings for Certain Atmospheric Pollutants, which specify the target value of nitrous oxide emissions, do not explicitly specify that the methodologies, which were used to determine the actual and the target emissions, have to be the same.

[1] Particulate matter 10.

Nevertheless, we believe that the reduction of emissions only due to the application of a different methodology does not present an actual reduction of emissions as the result of successful implementation of measures.

In accordance with the Gothenburg Protocol, the contracting parties have to continuously collect data on harmful effects of photo-oxidants (sulphur and nitrous compounds, ozone and heavy metals). We determined that the Ministry of the Environment and Spatial Planning did not ensure an appropriate institutional organization in order to carry out monitoring of the effects of polluted air on natural vegetation and agricultural plants as well as monitoring of critical values for individual pollutants regarding their effects. This information is not collected systematically in Slovenia.

The measures to improve the ambient air quality to reduce the frequency of exceeding of allowed daily and alarm threshold values of particulate matter emissions were not performed. Therefore, the exceeding of allowed daily concentrations of particulate matter (PM 10) continuously occurred in the most densely populated areas with regular traffic congestion in 2007 as well.

In 2005 and 2006 no funds from the state budget were intended to finance the measures to improve the ambient air quality.

4 Achievement of objectives and implementation of measures to protect the ozone layer

4.1 Comprehensiveness and completeness of the ozone layer protection policy

In 2003, the Ministry of the Environment and Spatial Planning prepared and the Government of the Republic of Slovenia adopted two plans on handling of substances that deplete the ozone layer, namely the Action plan on handling of halons and the Action plan on handling of hydrochlorofluorocarbons. The action planes specify the measures to abandon the use and to handle these substances, especially the mandatory measures for controlled capture of halons and hydrochlorofluorocarbons from the devices, which still contain these substances. An appropriate legislation was also adopted, which determined mandatory handling of substances that deplete the ozone layer, in accordance with the Montreal Protocol and the Regulation of European Union on Substances that Deplete the Ozone Layer.

We determined that the Ministry of the Environment and Spatial Planning did not regularly collect and monitor the data on controlled capture of hydrochlorofluorocarbons and report to the public of implementing the adopted measures.

4.2 Assessment of achieving set objectives and efficiency of implementing measures

Production, marketing and use of the substances that deplete the ozone layer (hydrochlorofluorocarbons, other fully halogenated hydrochlorofluorocarbons, halons, carbon tetrachloride, 1,1,1-trichloroethane and partially halogenated hydrobromofluorocarbons) are prohibited in Slovenia. The measures for mandatory handling, capturing, recycling, removal and destruction of halons and hydrochlorofluorocarbons were determined and adopted. They have to be performed

by the owners of devices that contain these substances and by authorised services of the equipment, which contains the substances that deplete the ozone layer.

There was no production, import, marketing and use of substances that deplete the ozone layer in Slovenia in 2005 and 2006, except the controlled allowed import of hydrochlorofluorocarbons for analytical, research and medical purposes, exclusively from the states signatories to the Montreal Protocol.

On the basis of the reports to the European Commission on the capture of substances from the waste devices that deplete the ozone layer, we determined that, according to the specified mandatory handling, in average only 31 percent of the hydrochlorofluorocarbon quantity from waste devices that contained these substances was appropriately captured. Almost 70 percent of the hydrochlorofluorocarbon quantity from the devices, which discontinued to be used in 2005 and 2006, were uncontrollably released into the atmosphere. The Ministry of the Environment and Spatial Planning does not have adequate data on the capture of hydrochlorofluorocarbons and did not perform suitable control of the capture of these substances.

Based on the inspections performed by the Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning, it was determined that the holders of devices, which contain substances that deplete the ozone layer, do not perform regular leakage inspection of these devices, which is why their malfunctions may occur more often and as a consequence even uncontrolled release of the substances that deplete ozone layer. The Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning proposed that the Ministry of the Environment and Spatial Planning amend the legislation on handling of substances that deplete the ozone layer, so that the device operators would be obligated to report all uncontrolled releases to the Ministry of the Environment and Spatial Planning. The Ministry of the Environment and Spatial Planning has not carried out yet the proposed harmonisation of legislation.

In 2005 and 2006, the measures to abandon the use of substances that deplete the ozone layer were not financed from the state budget.

5 Achievement of objectives and implementation of measures to tackle climate change

By signing the Kyoto Protocol, Slovenia undertook to reduce the greenhouse gas emissions by 8 percent in the period between 2008 and 2012 with regard to the base year. The emissions of these gases may not exceed 18.96 million tons of carbon dioxide equivalent emissions per year. Because of the carbon stocks bound in forests (carbon sinks), Slovenia can compensate for additional 1.3 million tons of carbon dioxide equivalent. Thus, Slovenia's emissions in the target period amount to the total of 20.28 million tons.

5.1 Comprehensiveness and completeness of the climate change mitigation policy

To achieve the Kyoto Protocol objectives the Government of the Republic of Slovenia adopted the Framework strategy to fulfil commitments under the Kyoto Protocol in 2002 and the Action Plan to reduce greenhouse gas emissions, which was amended in 2004 and 2006. By reviewing the mentioned strategic documents, we determined that:

- the selection of the proposed measures to reduce greenhouse gas emissions does

not base on cost -benefit analysis, therefore it is not clear, whether the most cost-efficient and economically justified measures were chosen;

- action plan does not contain long-term projections of greenhouse gas emissions thus it is not possible to plan and adopt a long-term policy to mitigate and adapt to climate change;
- national policy to tackle climate change does not contain measures to adapt to the already occurred consequences of climate change;
- the national policy on climate change is not adequately harmonised with national strategic development documents, as well as with sectoral policies in transport, energy and agriculture, which are of key importance to reduce greenhouse gas emissions;
- the Ministry of the Environment and Spatial Planning did not adequately monitor implementation of action plans to reduce greenhouse gas emissions in order to comprehensively assess and evaluate the effects of implementation of individual measures so far.

5.2 Assessment of achieving set objectives and efficiency of implementing measures

The greenhouse gas emissions in the base year in Slovenia amounted to 20,314 thousand tons. After 1986 they began to decrease due to the reduced scale of production and in 1991 reached the lowest point. Afterwards they began to increase again because of the revival of economic activity and the increase of production, so that in 2005 they exceeded the base year level from 1986. A smaller reduction of emissions was recorded in 1999 and 2000, but afterwards they started to increase again. The greenhouse gas emissions in 2006 amounted to 20,585 thousand tons and were higher by 3 percent than the target value for the period between 2008 and 2012. The emissions have increased by 18.14 percent since 1992 and have been increasing by the average annual rate of 1.12 percent. The flow of greenhouse gas emissions between 1986 and 2006, the greenhouse gas emissions with already included actual sinks, and the base and target emissions in Slovenia are shown in Figure 1.

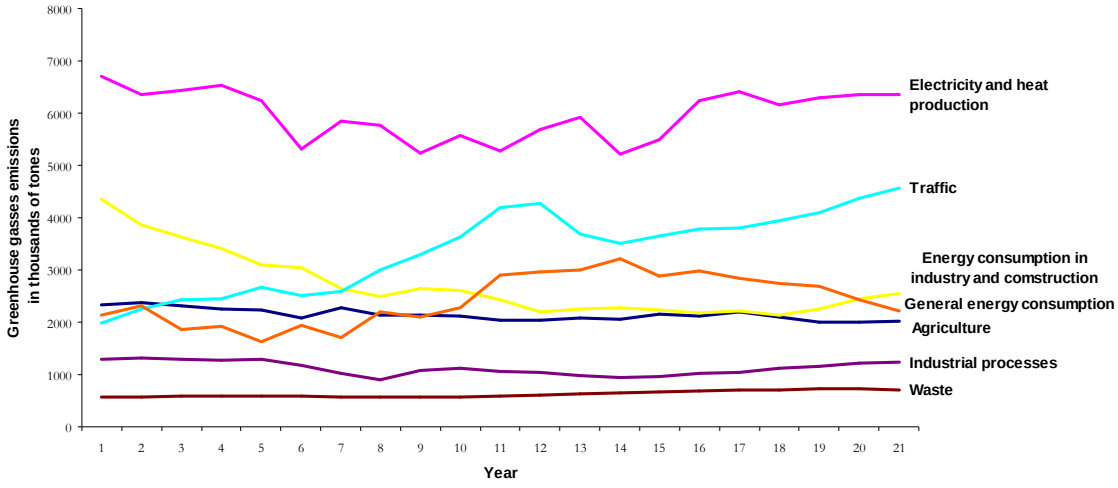
Figure 1: The flow of greenhouse gas emissions in Slovenia between 1986 and 2006

Source: GHG Inventory 2006, table 10: Emission trends, Environmental Agency of the Republic of Slovenia

After 1992 the greenhouse gas emissions have constantly increased. Their growth somewhat accelerated after the year 2000, because they have increased by the average annual rate of 1.45 percent. Projections referred to in the action plans that the emissions should begin to decrease after 2002 were not realised because of the inadequate extent of their implementation.

The emissions, which are the result of the fossil fuel combustion in energy production and its consumption, contribute more than three quarters of the total amount of greenhouse gas emissions. Because of fossil fuel combustion to produce electricity and heat, 31 percent of the total amount of greenhouse gas emissions is produced, during general consumption of energy[2] 14 percent, and during energy consumption in the industry and construction 11 percent. Because of the traffic approximately 22 percent of the total amount of greenhouse gas emissions are produced, and in the agriculture 10 percent of all emissions. The emissions, which are produced due to industrial processes, contribute 6 percent to the total amount of emissions, during waste disposal 3 percent of all greenhouse gas emissions are released, and the emissions from other sources contribute 3 percent. The flow of greenhouse gas emissions according to sectors is shown in Figure 2.

Figure 2: The flow of greenhouse gas emissions according to sectors between 1986 and 2006



Source: GHG Inventory 2006, table 10: Emission trends, Environmental Agency of the Republic of Slovenia

5.2.1 Implementation of measures in the energy and industrial processes sector

In the energy and industrial processes sector, mostly the measures to trade emission allowances and the measures to encourage efficient energy consumption and increase the share of energy consumption from renewable sources were carried out.

Emission trading scheme

The European Union introduced mandatory trading in greenhouse gas emissions for its

[2] Consumption of energy in households, service sectors, agriculture and forestry.

Member States at the European Union level and established the European Union Greenhouse Gas Emission Trading Scheme. The emission allowance trading scheme in Slovenia also presents part of the overall European trading scheme. The trading rules are regulated by the Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading. The emission allowance trading is performed in two periods, namely between 2005 and 2007 and between 2008 and 2012. By comparing the plans to allocate emission allowances for both trading periods, by comparing the data on the number of allocated emission allowances[3] and actual emissions for 2005 and 2006, and based on the results of the survey, which was conducted among installation operators that participate in emission allowance trading, we determined the following:

- The planned effect of operation of the emission allowance trading is the largest measure to reduce greenhouse gas emissions in Slovenia. It contributes one quarter to the total reduction of emissions and is therefore the most important measure.
- The allocation method of emission allowances between 2005 and 2007 enabled the allocation of a larger number of allowances to devices, which were technologically behind the best available technologies, because of considering historical emissions as the basis for the emission allowance allocation and merely symbolic consideration of the best available techniques. Such allocation was reflected also in the trading results, because most of the installation operators concluded the trading in 2005 and 2006 with allowance surplus with regard to the actual (verified) greenhouse gas emissions.
- The emission trading scheme in Slovenia is small and non-homogenous. 97 device operators participated in the market in 2005 and 2006. The largest operator was allocated 53 percent of all allowances during both years, the largest 10 operators 86 percent of all allowances, and 25 percent of the smallest participants received only 1 percent of all allowances. The described structure of emission allowance market participants limited the market operation to some extent, which is also evident from the questionnaire that we sent to the installation operators. Only 30 percent of all installation operators traded in emission allowances in 2005 and 2006. 64 percent of all traders traded in Slovenia, and the others in the frame of the European scheme. 80 percent of all who were active in the market traded to cover the deficit of emission allowances, and for 20 percent of all participants the allowances represented a financial investment.
- Based on the comparison of emission allowance allocation for both trading periods, we determined that the average annual quantity of allocated emission allowances for the period between 2008 and 2012 is lower than the average annual quantity of allocated emission allowances in the period between 2005 and 2007 by 6 percent. In the period between 2008 and 2012 the use of the best available techniques shall be taken more into account, and the impact of historical emissions shall have to be smaller. We believe that under such allocation of emission allowances the efficiency of market operation shall be greater.

The measures to increase efficient energy consumption and to increase the share of energy consumption from renewable sources

Reduction of emissions because of more efficient energy consumption and the increase in renewable energy consumption may be achieved especially by paying direct initiatives for such investments. Financial stimulations to investments were paid out by the Ministry of the Environment and Spatial Planning and favourable[4] loans by the Environmental Fund of the Republic of Slovenia. During verification of granting of

[3] One emission allowance is issued for the emission of 1 ton of carbon dioxide.
[4] Favourable loans mean that the loans are treated according to a more favourable interest rate than the market interest rate.

direct initiatives we determined the following:

- The funds are awarded by two different institutions, therefore there are two parallel decision-making systems on co-financing of investments with the same purpose. An individual recipient can receive non-refundable funds and also a favourable credit for the same investment. Because demand of non-refundable funds as well as favourable credits is much higher than the offered funds and because it is still increasing, such parallel stimulation of investments does not ensure the most efficient allocation of funds and therefore co-financing of a larger number of investments.
- The effects of carried out investments are determined by the Environmental Fund and the Ministry of the Environment and Spatial Planning with regard to non-refundable funds and granted favourable credits. The institutions do not have information, whether a particular applicant was granted also by the other institution, therefore both institutions determine the effects for the entire investment. Thus, the duplication of assessment of actual effects of carried out investments occurs, because of which the overall assessment of greenhouse gas emission reduction is overestimated.
- In 2005, EUR 4,335 thousand were intended to subsidise investments into efficient energy consumption and to increase the share of renewable energy, with which the greenhouse gas emissions were reduced by 24 thousand tons, and EUR 3,995 thousand in 2006, with which the emissions were reduced by 28 thousand tons. Compared to the annual amount of planned grants, in 2005 only 7.5 percent of all planned funds were intended for these investments, and in 2006 only 7 percent. In 2007, EUR 3,800 thousand (6.6 percent of planned amount) were intended to subsidise investments into efficient energy consumption and to increase the share of renewable energy. Inadequate co-financing of measures to increase the share of renewable energy was also reflected in the primary energy balance of Slovenia, whereby the share of renewable energy consumption in 2006 amounted to 10.7 percent and was lower by 1.2 percentage point compared to the year 2000.

5.2.2 Implementation of measures in the transport sector

The main effects of greenhouse gas emission reductions in transport could be achieved by redirecting the road transport to the railways and increasing the role of public passenger transport. During the audit of implementation documents, we determined that the objectives of measures, which also have indirect effects in reductions of greenhouse gas emissions, were not specified, the time schedule of implementation of individual measures was not determined, the implementation costs of measures were not assessed, as well as the effects of implementation of individual measures to reduce greenhouse gas emissions. The funds to implement measures to reduce greenhouse gases in transport were not planned in the 2008 and 2009 state budget drafts. We also determined that the method to determine and monitor the effects of implementation of individual measures in transport is inadequately detailed in order to successfully measure the effects of their implementation in the target period.

5.2.3 Implementation of measures in the agriculture sector

We determined that in agriculture for the years 2005 and 2006 it is not possible to determine the effects of implementation of measures to reduce greenhouse gas emissions and whether the planned effects were achieved, because adequate assessment and monitoring mechanisms of these effects were not established. It is possible to determine the flow of emissions in agriculture from the records of total emissions, but since no methodology was used and individual effects were not

monitored consistently, it is not possible to precisely determine and attribute the effect to a particular measure. The method to determine and monitor the effects of implementation of individual measures in agriculture was not adequately detailed in order to successfully measure the implementation effects of these measures in the target period.

5.2.4 The assessment of implementation of measures to reduce greenhouse gas emissions in 2005 and 2006 and the assessment of possible achievement of emission target values in the period between 2008 and 2012

The reduction of greenhouse gas emissions in the key sectors of energy and transport is not being carried out in accordance with the planned implementation dynamics of measures. On the basis of the described current implementation of planned measures, we assessed that the measures in energy, industry and transport sectors were not realistically planned, and if they are carried out inconsistently, the planned reduction of emission values shall not be achieved. The implementation of most planned measures is expected in the target period therefore the effects in most cases will occur afterwards. The lack of budget funds to finance the implementation of measures to reduce greenhouse gasses points to the fact that implementation of this policy in Slovenia does not present an adequate priority despite signing the international agreement to achieve agreed reduction of emissions.

6 Required corrective measures and recommendations to the auditees

On the basis of described findings we requested that the Ministry of the Environment and Spatial Planning prepares measures to protect the ambient air quality, especially measures to reduce particulate matter emissions (PM 10), and that it prepares a strategy and a plan to implement the tasks of the Climate Protection Office. Individual planned activities of the Office, holders of activities and the time schedule of their implementation have to be clearly defined, whereby it is necessary that system solutions for the preparation of the strategy to adapt to the consequences of climate change are adopted and the climate change aspect is integrated into the key national development and sectoral policies.

We recommended to the Ministry of the Environment and Spatial Planning to begin to monitor and control capture of the substances that deplete ozone layer, to prepare a new action plan to reduce greenhouse gas emissions based on long-term emission growth projections, to consistently evaluate the effects of the current implementation of measures and in case of probable future allocation of emission allowances examine the possibility of allocation of larger quantities of allowances through an auction. We recommended to all auditees to identify all sectoral measures which may contribute to the reduction of greenhouse gas emissions, determine their possible effects as the objective and to ensure consistent monitoring of this objective.