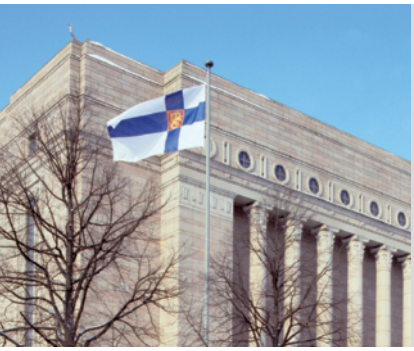


Emissions trading

- flexible mechanisms under the Kyoto Protocol

International publications of the National Audit Office of Finland 200/2009

Translation of Performance Audit Report 200/2009
Published in Finnish 18 December 2009

Emissions trading

– flexible mechanisms under the Kyoto Protocol

ISSN 1797-0598 (Bound)
ISSN 1797-0601 (PDF)
ISBN 978-952-499-127-8 (Bound)
ISBN 978-952-499-128-5 (PDF)

Edita Prima Ltd
Helsinki 2010

National Audit Office of Finland

This is an English translation of the National Audit Office's performance audit report on Emissions trading - flexible mechanisms under the Kyoto Protocol (200/2009). The report was written by Petri Soppi. It has been used in the Global Audit on Climate Change, which is being conducted under the International Organization of Supreme Audit Institutions' (INTOSAI) Working Group on Environmental Auditing (WGEA).

Helsinki, November 2009

Assistant Auditor General Vesa Jatkola

Key words:
flexible mechanisms, Kyoto Protocol, emissions trading

FACT SHEET

Publisher and date	National Audit Office of Finland, December 2009
Authors	Senior Auditor Petri Soppi
Title of Publication	Emissions trading - flexible mechanisms under the Kyoto Protocol
Parts of publication/ other versions released	The publication is available on the Internet at the website www.vtv.fi/index.phtml?menu_id=1&lang=3
Keywords	flexible mechanisms, Kyoto Protocol, emissions trading
Publication series and number	International Publications of the National Audit Office of Finland, Translation of Performance Audit Report 200/2009 published in Finnish on 18 December 2009

Identifications	ISSN	ISBN	
	1798-2219	978-952-499-	Price
	No. of pages 68	Languages English	-

Distribution	National Audit Office of Finland e-mail:tilaukset@vtv.fi
Printing place and year	Edita Prima Plc, Helsinki 2009

Contents

Abstract **9**

1 Introduction **11**

2 Audit framework **13**

2.1 Description of the audit topic 13
2.1.1 The Kyoto commitment 13
2.1.2 Finland's greenhouse gas emissions 15
2.1.3 The flexible mechanisms 17
2.1.4 Emissions reduction policies in the emissions trading and non-emissions trading sectors 19
2.1.5 Channels for procuring emission units and the administration of procurement 24

2.2 Audit boundaries, audit questions and criteria 26

2.3 Data and methods used in the audit 27

3 Audit findings **29**

3.1 The functioning of the purchasing of emission units 29
3.1.1 Effects of changes in the operating environment 29
3.1.2 The Carbon Procurement Programme's objective and planning 32
3.1.3 Support services' objectives and planning during the programme period 37
3.1.4 The organization of the purchasing of emission units 41
3.1.5 The planning and use of personnel resources 43
3.1.6 The planning of risk management 44
3.1.7 The functioning of financing practices 47
3.1.8 The use of expert information, the monitoring of the operating environment, the monitoring of activities and the transparency of activities 48

3.2 The effectiveness of the purchasing of emission units 50
3.2.1 The achievement of procurement and price objectives 50
3.2.2 The cost-effectiveness of the purchasing of emission units 57
3.2.3 The effectiveness of support services 59
3.2.4 The effectiveness of risk management 60

4 The National Audit Office's conclusions and recommendations **62**

Sources 65

Emissions trading - flexible mechanisms under the Kyoto Protocol

The entry into force of the Kyoto Protocol created an international regime aimed at mitigating the effects of climate change. In the same connection targets for reducing greenhouse gas emissions were also set for the EU member states. Between 2008 and 2012 the member states are meant to reduce their emissions to 8% below the 1990 level (in Finland's case the 1990 level). The EU's joint emissions reduction target is divided into the Community's emissions trading sector and the non-emissions trading sector, in which reducing emissions is up to the member states. In Finland the Government is responsible for seeing that the interim national target in the burden sharing agreement is achieved. In practice this means that Finland's greenhouse gas emissions in the non-emissions trading sector should not exceed the allocated amount.

From the viewpoint of direct effects on public finances, the Kyoto mechanisms are one of the most significant steering instruments in achieving the national emission reduction target. The idea of the flexible mechanisms in the rules for implementing the Kyoto Protocol is to allow the reduction in emission to take place outside Finland, where it might be cheaper than a corresponding reduction on the domestic market. The reduction in greenhouse gas emissions can thus be implemented where it is most cost-effective.

This audit concerning the use of the flexible mechanisms under the Kyoto Protocol evaluated the functioning and effectiveness of Finland's mechanism purchases. In evaluating functioning, attention was focused on the planning and organization of activities, the use of personnel resources, financing practices and the monitoring of activities. In evaluating effectiveness, attention was focused on the purchase of emission units and their cost.

The audit found that purchasing activities have been satisfactory but could be improved. The audit noted some problems in the organization of purchasing activities. These included the poor matching of personnel resources to work requirements, the complicated decision-making process in Finland's bilateral purchases and overlap between the ministries responsible for purchasing activities. Shortcomings were also observed in the monitoring of purchasing. This is actively monitored, but different indicators describing activities could be more informative. The analysis and de-

scription of planning, risk management and performance could be improved. Findings regarding performance also indicate that mechanism purchases are cost-effective compared with domestic measures to reduce emissions, and that in terms of administrative costs, investments in funds that produce emission units have been cheaper than bilateral purchases of emission units.

The National Audit Office considers that the Ministry of Employment and the Economy, which is responsible for preparing legislation regarding the Kyoto mechanisms, should carry out more detailed calculations particularly concerning funds' expected yield and costs and document these in connection with the monitoring of activities. In calculating the costs of bilateral purchases, one should also take into account all the costs that have a substantial effect on activities, including the costs of support services. Indicators describing performance should be developed accordingly.

The National Audit Office also considers that the Ministry of Employment and the Economy, in chairing the steering group for the Kyoto mechanisms, should strive to improve the planning of risk management in the steering group.

1 Introduction

The average global temperature has changed fairly rapidly in recent decades. There is evidence that increasing greenhouse gas emissions[1] have contributed to climate change[2]. The need to mitigate the detrimental effects of climate change has received great attention in international cooperation.

In 1992 the United Nations adopted a climate convention[3]. The intention was to steer the signatory nations to implement national programmes to mitigate climate change. The objective was to stabilize greenhouse gas emissions at a level that would prevent adverse effects on the viability of the planet. Supreme decision-making power concerning the convention was given to a Conference of the Parties (COP), which meets annually. The members of the Conference of the Parties are heads of state and ministers responsible for climate matters. The climate convention did not require the parties to take practical measures, but the Conference of the Parties that met in Kyoto in 1997 decided to adopt emissions targets for the signatory nations' greenhouse gas emissions in 2008-2012 by signing an international agreement known as the Kyoto Protocol[4].

Finland signed the Kyoto Protocol along with the other members of the European Union (EU). Efforts to reduce greenhouse gas emissions will have significant impacts on the member states' economies and business structure. Internal emissions trading steers a significant part of greenhouse gas emissions in the EU. Sources of emissions that are outside the emissions trading sector have been left up to the member states. The flexible mechanisms under the Kyoto Protocol are essential to meet the Kyoto targets and are a financially significant instrument in achieving national emission reduction targets. Finland's budget has included about 100 million euros in appropriations for this purpose in 2005-2009.

Energy and climate policy is an audit theme under the National Audit Office's strategic theme area "Managing environmental risks and environmental change from an economic perspective"[5]. This audit report is

---

[1] *Greenhouse gases are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), HFCs, PFCs and sulphur hexafluoride (SF6).*
[2] *IPCC (2007).*
[3] *United Nations Framework Convention on Climate Change (UNFCCC).*
[4] *The Conference of Parties is also the supreme body for the Kyoto Protocol.*
[5] *National Audit Office (2007).*

closely connected to the topics under this audit theme. The objective of the audit was to determine how successful Finland's purchasing arrangements and activities related to the Kyoto mechanisms have been.

2 Audit framework

2.1 Description of the audit topic

2.1.1 The Kyoto commitment

The Kyoto Protocol entered into force in 2005. The Protocol sets ceilings on greenhouse gas emissions, or emissions targets, for certain developed countries and groups of countries. The protocol also includes operational guidelines and institutions and provides for flexible mechanisms that are intended to allow the effective targeting of emission reduction activities. The Protocol has been signed by all the parties except the United States and four developing or emerging countries[6].

The Kyoto Protocol assigns quotas for the signatory nations' greenhouse gas emissions and sets a cap on emissions according to the overall emissions target. The signatory nations receive quotas in the form of assigned amount units (AAUs) or allowances to emit gases that are covered by the Kyoto Protocol. Emissions are expressed in metric tonne of carbon dioxide equivalent greenhouse gases. After the end of the Kyoto period, the parties must have units equal to their emissions allowances. In practice this means that nations have three ways to influence the achievement of the emissions target in the Protocol: 1) reduce emissions through national measures, 2) strengthen carbon sinks or 3) purchase credits to make up for excess emissions or in other words take advantage of the flexible mechanisms under the Kyoto Protocol (Figure 1).

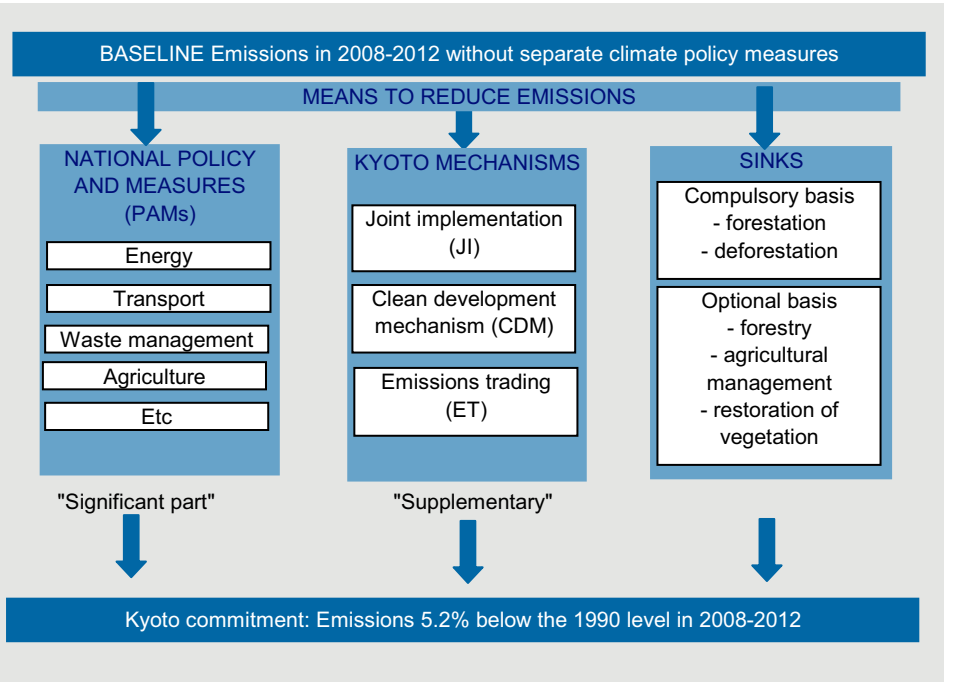
National commitments are mentioned in an annex to the protocol, which is why one sees the annex number in connection with different countries and emissions targets. According to the protocol, Annex B countries[7] are committed to placing a cap on greenhouse gas emissions in 2008-2012, defined as a percentage change compared with the baseline year (Table 1)[8]. The baseline year for emissions targets under the Kyoto Protocol is generally 1990. Countries that are not included in Annex B are not bound by emissions targets.

---

[6] *UNFCCC (2008).*

[7] *Annex B countries are mainly developed countries and emerging economies that are committed to emission reductions.*

[8] *Berghäll et al. (2003).*



Source: Berghäll et al. (2003).

FIGURE 1. Emission reduction policies in general.

TABLE 1. Kyoto commitments by country

B Annex countries	Target for limiting or reducing emissions in 2008-2012 (1990 baseline)
EU-15, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
United States (has not ratified the protocol)	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0%
Norway	+1%
Australia	+8%
Iceland	+10%
B Annex countries on average	**-5.2%**

Source: Berghäll et al. (2003).

The EU member states (EU-15) signed the protocol as a group[9] and their average greenhouse gas emissions target is 8% below the 1990 level in 2008-2012. The member states thus received AAUs equal to 8% less than the amount of emissions in the baseline year. The member states divided emission allowances with emphasis on different countries' economic possibilities to reduce emissions. This is referred to as the European Union's internal burden sharing.

The EU steers the member states' emission reduction policies to meet the joint target with the help of the European Climate Change Programme (ECCP)[10]. The most important single policy measure to curb emissions is the EU's Emission Trading Scheme, which covers about half of the member states' emissions. In addition the EU influences the member states' greenhouse gas emissions using instruments that focus on renewable energy and other things.

Finland received AAUs equal to the amount of greenhouse gas emissions in 1990. Its emissions allowance in 2008-2012 is 71.0 megatonnes (Mt)[11] of greenhouse gases per year[12]. It was given an emissions allowance of 355.0 Mt for the entire commitment period.

2.1.2 Finland's greenhouse gas emissions

Greenhouse gas emissions have risen in Finland since 1990, the baseline year in the Kyoto Protocol. Figures 2 and 3 show the development of Finland's total emissions and various sectors' shares of this total from 1990 to 2006.

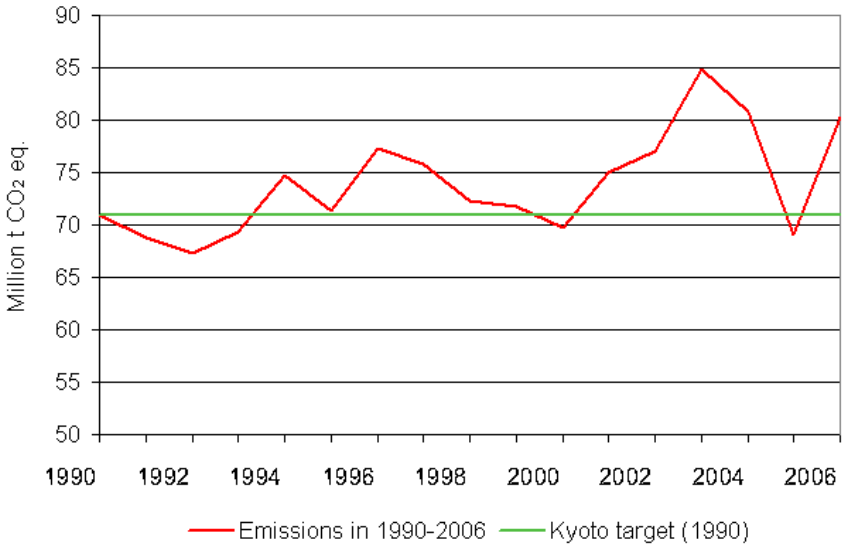
---

[9] *The EU15 took advantage of the possibility in Article 4 of the Kyoto Protocol to implement the emission target as a group of countries.*

[10] *Website http://ec.europa.eu/environment/climat/eccp.htm.*

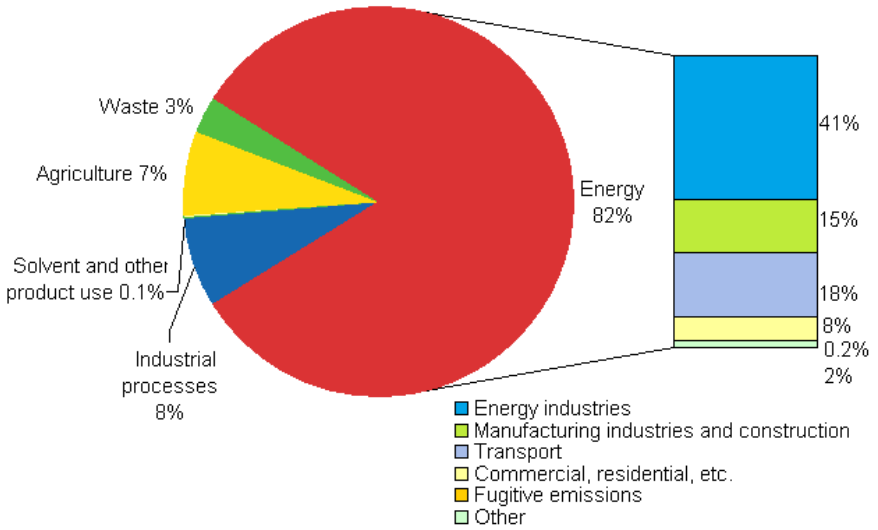
[11] *In this connection a megatonne means 1 Mt of carbon dioxide equivalent with the impacts of different greenhouse gases being weighted so that they can be reported in the same units as carbon dioxide. In practice all the emission units in the Kyoto Protocol have been specified in tonnes of carbon dioxide equivalent.*

[12] *This is the average annual amount of emissions and emissions in each year can vary.*



Source: Statistics Finland (2008).

FIGURE 2. Total greenhouse gas emissions 1990-2006 in relation to the Kyoto target (1990 level)



Source: Statistics Finland (2008).

FIGURE 3. Finland's greenhouse gas emissions by sector in 2006.

In 2006 Finland's greenhouse gas emissions were about 10 Mt higher than in the Kyoto baseline year. Energy consumption is by far the largest source of greenhouse gas emissions. It causes about 80% of Finland's

greenhouse gas emissions. This can be attributed to the high energy intensity of Finnish industry, long-distance transport infrastructure and northern weather conditions. Emissions in the energy sector include energy production, heavy industry and transport, among other things. On the basis of emissions data, policy measures in the energy sector have a significant role in ensuring compliance with the requirements in the Kyoto Protocol.

2.1.3 The flexible mechanisms

Mechanism were included in the Kyoto Protocol to allow more flexibility in reducing emissions. From an economic perspective the purpose of these mechanisms is to increase the cost-effectiveness of measures. The mechanisms steer activities to wherever emissions can be reduced with the optimal marginal costs[13]. In addition to cost-effectiveness, another objective of the Kyoto mechanisms is to promote sustainable development.

The flexible mechanisms fall into two categories: international emission trading and project-based mechanisms. International emission trading refers to a market-based arrangement in which a cap has been set on Annex B countries' total emissions. Total emissions have been divided into units equivalent to one tonne of carbon dioxide, and producing and releasing such a unit requires permission in the form of an emissions allowance. The market-based trading of emissions allowances is known as emissions trading. After emissions allowances were divided among the signatory nations, giving each of the parties permission for an agreed level of emissions, the parties could implement the cost-effective reduction of emissions using the flexible mechanisms and policy measures.

In addition to international emissions trading, nations can adapt to emission reductions with the help of project-based mechanisms, either joint implementation (JI) or the clean development mechanism (CDM). Project-based mechanisms give Annex B countries and operators that must reduce emissions under the Kyoto Protocol a possibility to invest in another Annex B country (JI) or some other country (CDM) provided the project-based mechanism that the investment concerns produces certified emission reductions (CERs) in a CDM project or emission reduction units (ERUs) in a JI project in the host country. The idea is to carry out the reduction in greenhouse gas emissions elsewhere and use emission units to offset domestic emissions. The project-based mechanisms allows flexibil-

[13] *See for example Hanley et al. (1997).*

ity in complying with the emissions cap in emissions trading under the Kyoto Protocol[14]. Projects lead to a reduction in greenhouse gas emissions compared with the emissions baseline, for example by building a facility to recover emissions at a landfill. The reduction in emissions that is accomplished by a mechanism project is recorded as an emission unit in the emissions trading register. There is no ceiling on the number of emission units that can be obtained through project-based mechanisms, so the developed countries can shift a large portion of their emission reduction efforts to developing countries with lower costs. At the same time the developing countries benefit from projects through the transfer of technology and the general increase in economic activity, among other things.

Emission units can also be obtained by increasing carbon sinks. An emission reduction of one tonne of carbon dioxide equivalent greenhouse gases counts as one removal unit (RMU).

The Kyoto Protocol contains four Kyoto emission units: AAU, CER, ERU and RMU. All of these are tradable units that give the holder the right to emit one tonne of carbon dioxide equivalent greenhouse gases. The value of these units varies, however, since there are certain differences in how they can be used: the possibility to bank CERs, ERUs and RMUs in the emission unit register after the commitment period is limited. A party to the Kyoto Protocol can bank 2.5% of CERs and ERUs out of its assigned amount to the post-Kyoto period[15]. RMUs produced during the commitment period are only valid during the commitment period[16].

Project-based mechanisms' climate policy objectives are ensured by extensive regulation and monitoring. Mechanism practices are regulated in the Kyoto Protocol by the principles of supplementarity and additionality[17]. According to the principle of supplementarity, the use of project-based mechanisms should be supplemental to national emission reduction policies. Additionality means that a project must produce a real reduction in emissions than would not occur if the project were not carried out. According to the principle of additionality, the sale of emission units resulting from emission reduction measures makes them economically feasible.

---

[14] Flexibility is achieved when a project-based mechanism is implemented in a country not included in Annex B (CDM project).

[15] In Finland's case the amount that can be banked is 8.89 Mt. The post-Kyoto period refers to international activities after 2012. These are still uncertain since an international climate convention for the post-Kyoto period has not yet been concluded.

[16] Article 3.13 of the Kyoto Protocol. (United Nations 1998).

[17] Articles 6 and 17 of the Kyoto Protocol. (United Nations 1998).

The process from the start of a project to the registering of a tradable emission unit is multi-stage and the verification of emission reductions is strictly regulated. For example, the first stage in the CDM project cycle is the drafting of a project document according to approved methods. The project is then evaluated and registered. Once the project is under way, emission reductions are monitored, verified and certified. Finally certified emission reductions are converted into Kyoto emission units. The validation of a project and the verification and certification of emission reductions must be carried out by independent bodies approved for this purpose. The CDM Executive Board is responsible for approving methods, registering projects and granting and issuing emission units. The JI project cycle is similar to the CDM project cycle except for a few details. The project process is closely monitored in order to ensure that a reduction unit has been produced according to the conditions in the protocol.

2.1.4 Emissions reduction policies in the emissions trading and non-emissions trading sectors

The European Union's most important means to achieve the commitment in the Kyoto Protocol is the European Union Greenhouse Gas Emission Trading Scheme (EU ETS). The idea is to create a market-based mechanism to reduce greenhouse gas emissions in sectors where greenhouse gases and particularly carbon dioxide are a significant factor. During the Kyoto period only carbon dioxide falls within the sphere of emissions trading. The EU ETS Directive (2003/87/EC) specifies the activities that come within the scope of emissions trading. The Directive was implemented in Finland by the Emissions Trading Act (683/2004, amended by 108/2007 and 1468/2007).

Emissions trading within the EU began in 2005 and during the period 2005-2007 the intention was to prepare emissions trading registers in the member states and to familiarize operators with emission allowance trading. At the beginning of 2008 the Kyoto commitment period entered into force, and the allocation of EU ETS allowances under the Emissions Trading Act to operators participating in emissions trading divided operators into the emissions trading sector and the non-emissions trading sector[18].

[18] *The division is referred to as the national allocation plan (NAP). Commission decision (2007).*

The emissions trading sector includes energy, the steel industry, the building products industry and the paper and forest industries[19]. About 160 enterprises and about 570 individual installations come within the scope of the Emissions Trading Act in Finland. Finland initially allocated 37.6 million emission units per year to the emissions trading sector. This is about 53% of Finland total AAUs (71.0 million). The number of units in Finland's emissions trading sector is about 2.1% of total emission allowances in the EU ETS[20].

Finland's carbon dioxide emissions in the emissions trading sector totalled about 44.6 Mt in 2006. Figure 4 shows carbon dioxide emissions broken down into emissions from industry, condensing power and district heating.

Comparing emissions in the emissions trading sector to allowances (37.6 million) shows that enterprises must purchase additional emission units or reduce their emissions. The emissions trading sector can adapt to the emission reduction target independently, and the state does not need to interfere in activities except for arranging the infrastructure necessary for emissions trading. Any indirect impact on public finances results from change in enterprises' profitability and the effects of change on the business structure as the costs of reducing emissions rise.

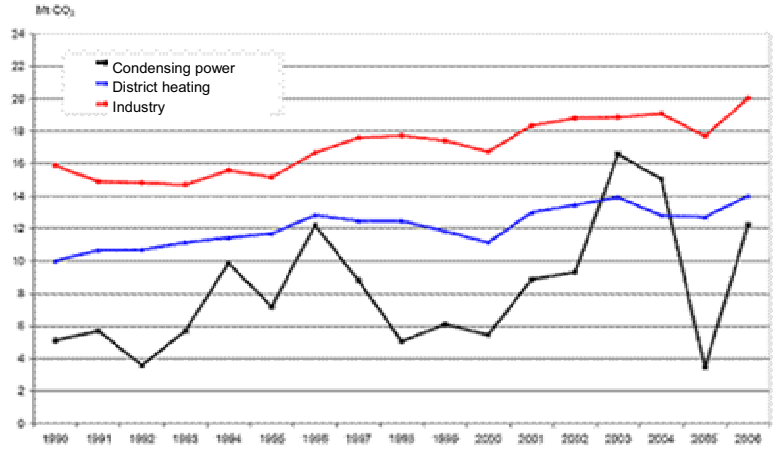
Enterprises in the emissions trading sector can also use project-based mechanisms to purchase emission units. The EU provided guidelines concerning the use of mechanisms in what is known as the Linking Directive (2004/101/EC). This directive limits the use of project-based mechanisms with regard to host country and amount, however. For instance, projects cannot be conducted in an operator's own country. The Kyoto Protocol does not forbid this, and an actor outside the EU ETS can in fact purchase emission units for the needs of the non-emissions trading sector in this way. The EU has also placed a ceiling on the amount of emission units that can be purchased using project-based mechanisms. Finland's emissions trading sector can use a total of 3.76 million emission units from project-based mechanisms[21]. Operators can have more emission units from project-based mechanisms than this, but any units exceeding the limit for each operator will not be counted.

---

[19] *Section 31 a of the Emissions Trading Act (108/2007), which breaks down industrial installations into subcategories, describes the emissions trading sector in more detail.*

[20] *European Union (2008).*

[21] *This refers to the absolute maximum.*



Source: Government decision (2008).

FIGURE 4. Finland's carbon dioxide emissions in the emissions trading sector broken down into emissions from industry, condensing power and district heating.

Initially 37.6 million emission units were allocated to the emissions trading sector, which means that 33.4 million units were left to the non-emissions trading sector per year. The non-emissions trading sector produces about 47% of Finland's total greenhouse gas emissions. Table 2 shows the breakdown of greenhouse gas emissions in the non-emissions trading sector. Emissions are slightly higher than allowances.

TABLE 2. Greenhouse gas emissions in the non-emissions trading sector.

	Million tonnes	Per cent
CO2 emissions	24.2	66
Transport	14.0	38
Heating	4.9	13
Industry, agriculture, construction	4.9	13
Other gases	12.5	34
Total	36.4	100

Source: Government decision (2008).

Finland is adapting to the need to reduce emissions in the non-emissions trading sector with measures outlined in the Government's Energy and Climate Policy Strategy for the Near Future[22]. According to the strategy, the emission balance will be influenced using the Kyoto mechanisms and different clean policy solutions, which concern all the greenhouse gases mentioned in the Kyoto Protocol (Figure 5). The Ministerial Working Group on Climate and Energy Policy is responsible for implementing the strategy and also coordinates the use of project-based mechanisms.

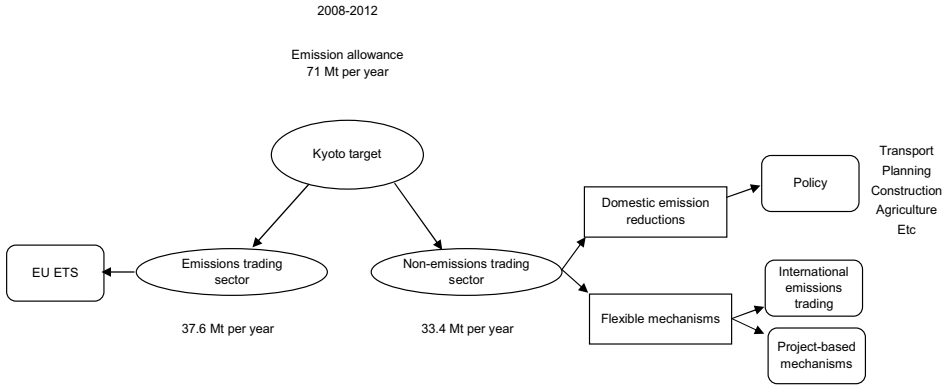


FIGURE 5. Finland's climate policy and the non-emissions trading sector.

Reducing greenhouse gas emissions through policy measures is challenging, since the need to coordinate different taxes, infrastructure investment objectives and future emissions, the difficulty of reducing fugitive emissions and the slow impact of policies complicate the evaluation of the effectiveness of solutions. It has been estimated that only 1 Mt of greenhouse gas emissions can be reduced through with policy measures at a price of 10 euros per tonne (€/t), so the use of the flexible mechanisms make sense in terms of costs and requirements. Rules for using the flexible mechanisms are set out in the Act on the Use of the Kyoto Mechanisms (109/2007).

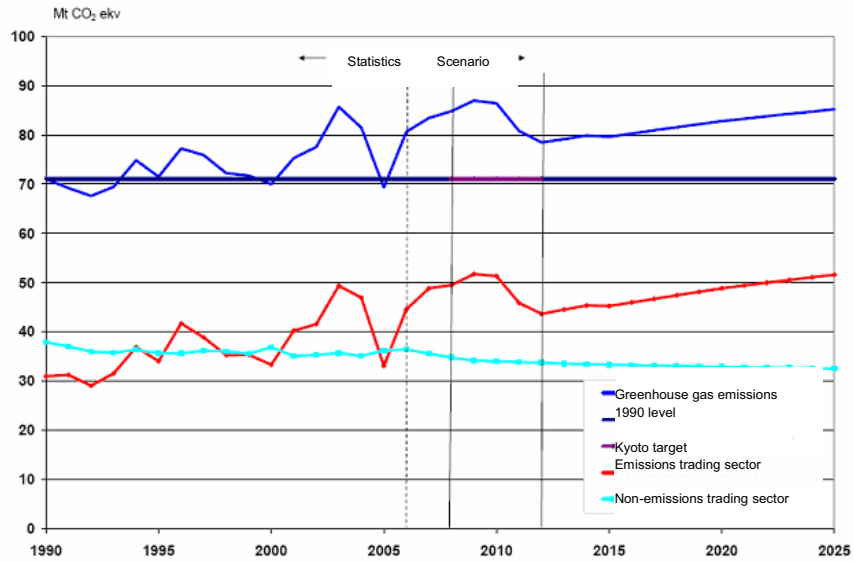
The direct significance of the non-emissions trading sector on public finances is greater than in the emissions trading sector. Since the emissions trading sector was divided from the non-emissions trading sector in the initial allocation, responsibility for the emissions target in the non-

[22] *Government report to Parliament (2005).*

emissions trading sector must be taken into consideration in the Government's climate policy choices. Achieving the emissions target in the non-emissions trading sector means carefully predicting emissions, implementing emission reduction policies and using the Kyoto mechanisms in a planned manner.

Predicting emissions reliably is important, since measures to reduce greenhouse gas emissions must be planned on the basis of anticipated emissions. On the other hand, as Figure 6 shows, predicting emissions in the non-emissions trading sector is not subject to a great deal of uncertainty because of their steady baseline.

Finland has prepared for the Kyoto mechanisms with the help of two programmes. The CDM/JI Pilot Programme started in 2000 and concluded at the end of 2005. Its purpose was mainly to gain experience to support purchasing later on. The actual programme for purchasing emission units for the Kyoto period is referred to as the Carbon Procurement Programme.



Source: Government decision (2008).

FIGURE 6. Finland's greenhouse gas emissions in the non-emissions trading sector.

Purchasing emission units through the flexible mechanisms is the most significant area of policy when it comes to achieving Finland's Kyoto target. Finland's objective was to purchase about 10 million emission units at the start of the commitment period (i.e. in the Carbon Procurement Pro-

gramme). This was lowered to 5 million at the beginning of 2008. The state budget has included appropriations for mechanisms as follows[23]:

- €30 million transferable appropriation in the third supplementary budget for 2005 (GP 206/2005 vp; 32.60.42)
- €10 million in authorizations in the supplementary budget for 2006 (GP 55/2006 vp; 32.60.43)
- €30 million in authorizations in the budget proposal for 2007 (GP 122/2006 vp; 32.60.43)
- €15 million in authorizations in the budget proposal for 2008 (GP 62/2007 vp; 32.60.43)
- €15 million in authorizations in the budget proposal for 2009 (GP 116/2008 vp; 32.60.43).

The application of funds has not been according to plan (Table 3).

TABLE 3. Application of funds appropriated for flexible mechanisms.

Year	Trans. appropriation 32.60.42; € million	Authorization 32.60.43; € million	Estimated appropriation 32.60.43; € million	Final accounts 32.40.42; € million	Final accounts 32.40.43; € million
2005	30			30	
2006		10	2		0.006
2007		30	5		1.029
2008		15	10		1.430
2009		15	10		

The Kyoto mechanisms will also play a significant role after the commitment period.

2.1.5 Channels for procuring emission units and the administration of procurement

The emission units under the Kyoto Protocol (CER, ERU, AAU, RMU) can be procured in quite different ways[24]. One way is to purchase units directly on the regulated emission unit market. For example, several deriva-

[23] *About 30 million euros is intended for use in the post-Kyoto period.*

[24] *CERs are the most common and ways of procuring the other units are more limited.*

tives exchanges offer CER futures[25]. Most trading in Kyoto emission units is conducted with non-standardized contracts, however. These can be over-the-counter (OTC)[26] contracts, in which a transaction concerns an emission unit that has already been registered or an eventual emission unit that is still in a project-based mechanism's production process. Contracts regarding CERs and ERUs that are produced in project-based mechanisms are generally concluded with the implementer of the project (bilateral project) or indirectly through a carbon fund. Carbon funds conclude bilateral agreements with project providers and sell emission units to organizations according to their own rules.

Changes in the market prices of different emission units are strongly correlated with each other. There are some differences between emission units with regard to usability, but otherwise they are interchangeable. The market for emission units under the EU Emission Trading Scheme, with its large volume, strongly affects price fluctuations for emission units under the Kyoto Protocol[27].

Procurement channel options create the biggest difference in the price of emission units. Procurement channels differ from each other in terms of risk and therefore price. Purchasing units through a derivatives exchange involves the least delivery risk. Contracts concluded through intermediaries are subject to counterparty risk. The direct purchasing of emission units through the flexible mechanisms differs considerably from the procurement of marketable emission units, since a project will produce emission reduction units in the form of the emissions it reduces during a certain period. If a project is only at the beginning of its project cycle, the last emission unit deliveries may not take place until years later.

A carbon fund assembles a portfolio of projects and then delivers emission units according to investors' wishes. A carbon fund adds one more intermediary compared with direct purchasing and often means a lengthening of the delivery period, if the fund's portfolio is not full at the sign-up time. Funds' detailed operating rules may differ considerably.

The administration of the flexible mechanisms and responsibility for their implementation have been divided among several ministries. The Ministry of Employment and the Economy plays a key role, since its task is to coordinate administration and chair the Steering Group for the Kyoto Mechanisms. The Ministry of the Environment is responsible for joint implementation (JI) and international emissions trading, while the Ministry

---

[25] *For example the European Climate Exchange.*

[26] *Over the counter means an unstandardized transaction outside an exchange.*

[27] *European Climate Exchange (2009).*

for Foreign Affairs is responsible for clean development mechanism (CDM) projects and the Finnish Environment Institute (SYKE) for support services related to the purchasing of emission units up to the end of 2009.

2.2 Audit boundaries, audit questions and criteria

The audit focused on the Carbon Procurement Programme. It touches on the CDM/JI Pilot Programme only as far as it has relevance for the Carbon Procurement Programme. The audit covers the period from the beginning of 2006 to the beginning of 2009.

The emissions target in the non-emissions trading sector can be influenced through numerous steering instruments. Owing to the Kyoto timeframe, the most significant factor in adapting to the emissions target is the flexible mechanisms under the Kyoto Protocol. The main question in the audit was:

Has Finland been successful in purchasing emission units through the flexible mechanisms under the Kyoto Protocol?

The main question can be divided into two subquestions:
1. How well has the purchasing of emission units functioned?
2. How effective has the purchasing of emission units been?

In evaluating the functioning of purchasing, attention was focused on the planning of activities and support services, the organization of administration, the planning and use of personnel resources, the planning of risk management, the monitoring of the operating environment, the use of expert information, the functioning of financing practices and the monitoring of activities. The transparency of activities was also examined.

The criteria used in evaluating purchasing were based on good governance and the report of the Mechanism Administration Working Group[28]:

- Systematic planning
- Organization: problem-free operating relations; speed and straightforwardness, overlapping activities

[28] *Report of the Mechanism Administration Working Group (2005).*

- Efficient use of personnel resources
- Efficient utilization of the operating environment and expert information
- Quality and utilization of monitoring information
- Functioning of financing practices: usability and speed.

In evaluating the effectiveness of purchasing, attention was focused on the achievement of procurement and price objectives and the cost-effectiveness of procurements. The effectiveness of support services and the functioning of risk management were also examined.

The criteria used in examining the effectiveness of purchasing were based on guidelines prepared for the implementation of Finland's climate objectives:

- Procurement objective for emission unit purchasing
- Cost objective for emission unit purchasing
- Cost-effectiveness: procurements' cost-effectiveness relations
- Production objectives for support services and their achievement
- Achievement of risk management objectives.

2.3 Data and methods used in the audit

The audit was based on an analysis of written data, interviews, statistical data and calculations performed in the audit. Written data mainly consisted of mechanism administration's reports, documents and expert statements. Data were used particularly to audit the effectiveness of purchasing. The calculations that were made in connection with the audit were based on numerical data received from administration.

Interviews were conducted with representatives of the Ministry of the Environment, the Ministry of Employment and the Economy, the Ministry for Foreign Affairs and the Finnish Environment Institute to determine views regarding organizational structures, their functioning and other matters related to the functioning of administration. Interviews were conducted in the form of semi-structured theme interviews. Interviews allowed a comparative evaluation between different units and produced perspectives on possible problems.

The audit was conducted by Senior Auditor Petri Soppi and was supervised by Director Arto Seppovaara. Feedback on the draft audit report was requested from the Ministry of the Environment, the Ministry for Foreign Affairs, the Ministry of Employment and the Economy and the Finnish

Environment Institute, all of which provided feedback. This feedback was taken into consideration in the final audit report.

3 Audit findings

3.1 The functioning of the purchasing of emission units

3.1.1 Effects of changes in the operating environment

Several changes have taken place in the operating environment that have made it more difficult to use mechanisms. The most significant of these are described briefly below.

The Kyoto Protocol entered into force in 2005, and decisions that were made before that concerning the flexible mechanisms were more or less subject to uncertainty. A certain number of signatories had to ratify the Kyoto Protocol before it could enter into force. When Russia signed and ratified it at the end of 2004, the entry into force was sealed[29]. Uncertainty concerning the entry into force of the Kyoto Protocol led to caution in the use of the flexible mechanisms.

Finland made preparations for the use of the flexible mechanisms with the CDM/JI Pilot Programme (1999-2005), which created operational preconditions for procurement. Guidelines for Finland's use of the mechanisms were provided in the report Energy and Climate Policy for the Near Future - National Strategy to Implement the Kyoto Protocol[30], which appeared in late 2005. This report contained decisions regarding the use of mechanisms during the Kyoto period. Before the national energy and climate strategy, it was not clear to what extent the flexible mechanisms would be used to meet Finland's Kyoto target.

The experience gained in the pilot programme was refined with the help of studies and evaluations[31] into an information base on which the organization for the Carbon Procurement Programme was created[32]. The administrative framework used in the pilot programme was expanded. Administrative responsibilities were written into the Act on the Use of the Kyoto Mechanisms (109/2007). Before the act entered into force, there was some

---

[29] *UNFCCC (2009).*

[30] *Government report to Parliament (2005).*

[31] *For example Ahonen (2005), Report of the Mechanism Administration Working Group (2005), Biota BD Oy (2006) and Finnish Environment Institute (2006a).*

[32] *Report of the Mechanism Administration Working Group (2005).*

uncertainty about who was responsible for what in mechanism administration[33]. Amendments to the Act on Public Contracts (348/2007) that were made in June 2007 also changed procurement procedures, since stages in which tendering was required placed an extra burden on administration. Legislation regulating administrative relations and procurement has thus taken shape quite recently.

At the moment the market for project-based mechanisms is influenced particularly by international negotiations concerning the post-Kyoto period[34]. Many projects are just getting under way, and their emission unit yield potential may extend far into the post-Kyoto period, according to project characteristics. The situation increases uncertainty among investors as well as the organizations arranging projects. There is also uncertainty concerning the usability and value of emission units. The Copenhagen Climate Conference in December 2009 will set the stage for future international climate matters. The final content of a climate convention will affect the EU's emissions targets and will be reflected in the use of the Kyoto mechanisms[35].

The Conference of the Parties (COP/MOP) will make decisions regarding the implementation of the Kyoto Protocol. The CDM Executive Board (CDM EB), which is responsible for monitoring and developing methods in CDM projects, and the corresponding body for joint implementation, the JI Supervisory Committee (JISC), have actively sought and presented new forms for mechanism projects. The active updating of guidelines has required caution on the part of organizations purchasing emission units through the flexible mechanisms[36].

In addition to changes in rules, the international administration of the flexible mechanisms has been influenced by practical arrangements. The first designated operational entities[37] for CDM projects were not accredited until 2004[38]. Operational entities play a significant role in the project cycle of flexible mechanism projects, since they validate and verify a CDM project on the basis of rules under the Kyoto Protocol. In practice the timetable has meant that the progress of CDM projects has been de-

[33] *Minutes of the Steering Group for the Kyoto Mechanisms.*
[34] *Interviews with representatives of administration.*
[35] *Interviews with representatives of administration.*
[36] *Interviews with representatives of administration.*
[37] *A designated operational entity (DOE) verifies the reduction in emissions in a CDM project. Each DOE must be confirmed by outside evaluators before it starts operating.*
[38] *Executive Board (2004).*

layed. JI projects have faced a similar problem, since the accreditation of the first accredited independent entities (AIE) took place quite late in relation to the Kyoto timetable. This has not directly affected the conclusion of emission reductions purchase agreements by organizations responsible for purchasing, but it has hampered the management of projects and increased uncertainty about the timetable for emission unit yields. Inspection procedures for CDM projects, which account for about 90% of all project mechanisms, are backlogged[39]. This slows the creation of certified emission reductions (CERs) that can be registered.

In addition to administrative challenges regarding the flexible mechanisms, organizations' activities have been influenced by changes in emission units' supply and demand. The general volume of the flexible mechanisms has been substantially influenced by the EU Emission Trading Scheme and the possibility allowed by the Linking Directive to use mechanisms in the emissions trading sector. Annex B countries are not the only ones that are interested in procuring mechanisms.

Market forces have changed on the mechanism market. In the early 2000s project buyers could get projects to compete with one another, but when the procurement programme started the situation was no longer the same[40]. The approval of the Kyoto Protocol and the EU Emission Trading Scheme considerably strengthened demand for emission units. The supply of project-based mechanisms did not adjust accordingly. This was noted in a memorandum prepared by the Steering Group for the Kyoto Mechanisms in summer 2006: "The procurement environment for emission units is marked by high demand and many uncertainties. One can speak of a seller's market[41]."

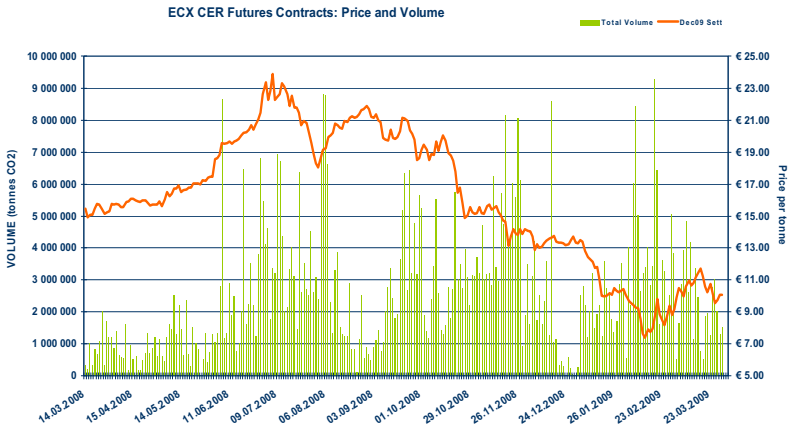
High demand for projects led to a situation in which project sellers could work out the best contract terms for themselves. This places demands on project buyers' flexibility: they face a trading situation as market price purchasers, so the most efficient purchaser in terms of costs and operating methods has a competitive edge.

The market price of emission units has fluctuated widely. A volatile price level interferes with the predictability of the costs of procurement (see

[39] *Interviews with representatives of administration; UNEP Risoe (2009).*

[40] *Interviews with representatives of administration.*

[41] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*



Source: ECX (2009).

FIGURE 7. Changes in the market price of CER futures (12/09) 03/2008-03/2009.

3.1.2 The Carbon Procurement Programme's objective and planning

Finland's procurement objective for the Kyoto period was written into the 2005 Energy and Climate Policy report. The Carbon Procurement Programme got under way at the beginning of 2006. The programme was meant to purchase emission units amounting to 10 Mt carbon dioxide equivalent by 2012. One emission unit equals one tonne of greenhouse gas emissions, so the plan was to purchase 10 million units. Specific spending limits were not given for procurements, but the point of departure in using the flexible mechanisms has been the alternative costs of other climate policy measures and an evaluation of the market price of emission units. Implicitly the price ceiling has been €10/emission unit. If a higher price than this is paid to purchase emission units, the marginal costs of domestic emission reduction policies are approached[42]. The Carbon Procurement Programme was expected to have total costs of 100 million euros.

The purchasing of emission units takes place on a market whose future is clouded by uncertainties[43]. The challenging operating environment requires planning on the part of those involved in purchasing. The following

[42] *Assuming that the marginal costs of domestic emission reduction policies remain unchanged. Those responsible for procuing flexible mechanisms also point out that the direct information base concerning the alternative costs of emission reduction measures in the non-emissions trading sector has some gaps.*

[43] *See for example the memorandum of the Steering Group for the Kyoto Mechanisms (2006), for example.*

paragraphs deal with the planning of the implementation of Finland's purchasing of emission units. The purpose is to examine how the authorities responsible for purchasing have conducted planning so as to meet objectives and particularly to determine whether planning has been systematic, how general operational lines have been chosen and how individual emission unit investments have been planned.

The general operational lines of the Carbon Procurement Programme and the use of individual procurement channels have been recorded in memorandums that have been prepared by the Steering Group for the Kyoto Mechanisms[44]. The first memorandum, written in 2006, outlines a plan for the use of different procurement channels (see Table 4). An annex sets out operational lines for the ministries responsible for purchasing (Ministry of the Environment, Ministry for Foreign Affairs), focusing on plans based on the division according to type of project (JI/CDM).

[44] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006) and memorandum of the Steering Group for the Kyoto Mechanisms (2008a). Concerning policies for the post-Kyoto period: memorandum of the Steering Group for the Kyoto Mechanisms (2008b).*

TABLE 4. Objective-oriented plan for using mechanisms.

Category	Investment (€ million)	Units, million (assumption)	Responsible authority
Own projects	33.3	3.7	ForMin, MinEnv
- of which CDM	(24.3)	(2.7)	SYKE, ForMin
- of which JI	(9)	(1)	SYKE, MinEnv
GIS (international emissions trading)[45]	30	3.0	MinEnv
TGF/NEFCO (fund)[46]	2.5 (paid)	0.3	MinEnv
MCCF/EBRD (fund)[47]	10 (+optio)	1.0	MinEnv, ForMin
- of which JI and CDM	(5)	(0.5)	MinEnv, ForMin
- of which GIS	(5)	(0.5)	MinEnv
Other funds or direct purchases	18	2.0	ForMin
Total	93.8	10.0	
Support service consultant 2006–2013	4.0		(SYKE 2006-2007)
International mechanism administration charges and support for purchasing (incl. GIS)	2.2		MinEnv
Total	100		
CDM/JI Pilot Programme		2.0	ForMin (MinEnv)

Source: Memorandum of the Steering Group for the Kyoto Mechanisms (2006).

Procurement channels have been limited to bilateral projects, carbon funds and international emissions trading (Table 4). The target was to purchase 10 million emission units in the Carbon Procurement Programme. The objective-oriented plan for using mechanisms is based on an assumption of an emission unit price of 10 euros (100 million euros for 10 million

[45] *GIS: Green Investment Scheme. An arrangement in which AAUs are purchased on the condition that the proceeds are invested in emission reduction activities (trading "hot air").*

[46] *Nordic Environment Finance Corporation's (NEFCO) TGF carbon fund, which mainly finances JI projects in eastern Europe..*

[47] *The European Bank for Reconstruction and Development's (EBRD) Multilateral Carbon Credit Fund, which mainly finances JI projects in the emerging economies.*

units)[48]. Purchasing was split into different channels, with the assumption that unit costs would be equal. Purchasing was also split roughly equally between the responsible authorities (Ministry of the Environment, Ministry for Foreign Affairs). The planning process and the logic behind weightings were not explained in any detail.

The audit indicated that, general fluctuations in the price of emission units were not taken into consideration in planning purchasing. On the basis of the description of the operating environment, it is clear that the budget for the Carbon Procurement Programme is affected particularly by general fluctuations in the price of emission units. Since it is impossible to plan the application of funds in the programme precisely owing to price changes, considering and documenting different price scenarios would improve the planning of the application of funds and make it more comprehensive.

The implementation plans of the ministries responsible for purchasing (Ministry of the Environment, Ministry for Foreign Affairs)[49] are largely based on the lines presented in the memorandum of the Steering Group for the Kyoto Mechanisms. They go over matters influencing different types of project somewhat more deeply, but with regard to implementation they conform with the memorandum of the Steering Group for the Kyoto Mechanisms.

The Carbon Procurement Programme's procurement objective was updated at the beginning of 2008. The emission balance in the non-emissions trading sector was considered to have shrunk because of changes in the grounds for calculating carbon sinks. Furthermore the decision reached by the European Commission in June 2007 concerning Finland's national division of emission units between the emissions trading sector and the non-emissions trading sector shifted pressure to the emissions trading sector. The Carbon Procurement Programme's original procurement objective was cut in half, to 5 million units. This is still the current procurement objective. The second memorandum that was prepared by the Steering Group for the Kyoto Mechanisms[50] outlined alternatives according to the

---

[48] The assumption is not meant to predict the average price of emission units but serves as a marginal price for the alternative costs of other emission reduction policies. A unit price of 10 euros, which was derived implicitly from the energy and climate policy strategy that appeared in 2005, thus serves as a cost-effectiveness criterion when emission unit purchases are compared with other emission reduction policies.

[49] Plans are in an appendix to the memorandum of the Steering Group for the Kyoto Mechanisms dated 6 June 2006.

[50] Memorandum of the Steering Group for the Kyoto Mechanisms (2008a).

new procurement objective. The decision to change the procurement objective was made by the Ministerial Working Group on Climate and Energy Policy in early 2008[51]. As a result of the lowering of the procurement objective, it was possible to shift funds originally intended for the procurement programme to the post-Kyoto commitment period. About 30 million euros was shifted to the post-Kyoto commitment period.

Finland's purchasing of emission units is also meant to produce "other benefits" besides emission units[52]. Owing mainly to matters related to the Kyoto mechanisms' project cycles and the market situation, Finland's planning in connection with other benefits has been carried out as a subcriterion limiting the procurement of emission units[53]. Finland does not participate in international projects or carbon funds that invest in palm oil production, projects that do not comply with the recommendations of the World Commission on Dams or F-gas projects[54][55]. The above-mentioned matters also limit the direct purchasing of emission units, mainly CERs, since about half of current CER units have been produced by F-gas projects[56].

During the audit it came to light that the Carbon Procurement Programme's plan assumed that support services would provide services from 2006 to the end of the Kyoto period or 2012 (see Table 4). This is not consistent with the service production agreement that was signed with support services. The term of the service production agreement was two years, with the option of a two-year extension.

The plan for the Carbon Procurement Programme assumes that the producer of support services (service provider) will spend about 4 million euros on activities (administrative costs) in 2006-2012. In the working programme for support services, in which the purchasing of emission units has been planned according to the term of the service agreement, the cost structure is about 2 million euros smaller than was presented in the tentative plan. This discrepancy is significant in planning the cost-effective targeting of emission units, since different fixed costs make up a considerable portion of procurement costs. If costs had been specified according to

---

[51] *Ministerial Working Group on Climate and Energy Policy (2008).*

[52] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*

[53] *Interviews with representatives of administration.*

[54] *An exception is the World Bank's Prototype Carbon Fund (PCF), which Finland jointed during the CDM/JI Pilot Programme before subcriteria had been defined.*

[55] *F-gases are HFCs, PFCs and sulphur hexafluoride.*

[56] *The World Bank (2007).*

the service provider's agreement period, this would have made bilateral purchases the most cost-effective option according to a study conducted by an outside consultant.[57]

3.1.3 Support services' objectives and planning during the programme period

The Finnish Environment Institute (SYKE) provides support services for the purchasing of emission units. The service provider is an externalized negotiating partner. In March 2006 the Finnish Environment Institute was selected after a tendering process to provide support services for the purchasing of emission units during the Kyoto period from the beginning of 2006 to the end of 2007. The Finnder (Finnish Drive for Emission Reductions) team was established to take charge of providing support services. At the end of the programme's first period, the service agreement was extended up to the end of 2009.

Support services were described in the agreement between the Ministry of Trade and Industry and the Finnish Environment Institute concerning support services for the use of the Kyoto mechanisms. The objectives of support services, as part of Finland's purchasing of emission units, are mentioned in a memorandum of the Steering Group for the Kyoto Mechanisms[58]. The Finnish Environment Institute also concluded an agreement with the Ministry of the Environment that specifies the service provider's tasks from the viewpoint of the ministry's needs. The purpose of support services is to support the ministry in achieving procurement objectives and assist in administrative tasks[59]. The service provider is expected to perform the following functions:

- proactively search for and carry out cost-effective, bilateral projects conducted with project-based mechanisms
- participate as an expert in the Steering Group for the Kyoto Mechanisms and other possible working groups
- take care of tasks related to the international monitoring of the use of mechanisms such as participating in meetings of the CDM Executive Board and the JI Supervisory Committee and reporting on them
- represent Finland in international conferences and other administrative connections as necessary
- participate in the monitoring and administration of funds as necessary

---

[57] *Pricewaterhousecoopers (2006).*
[58] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*
[59] *Ministry of Trade and Industry (2007).*

- take care of projects shifting from the CDM/JI Pilot Programme and other tasks
- provide advisory services regarding the use of mechanisms to businesses and other actors, arrange seminars, develop procedures and guidelines
- perform other assigned tasks related to mechanisms.

Activities have not changed essentially during the programme, although the focus of services has shifted as one approaches the end of the Kyoto period[60]. The change in focus is due to the fact that the need to identify projects is decreasing while administrative work on existing projects is increasing.

The Steering Group for the Kyoto Mechanisms set an objective for the service provider for the first contract period in winter 2006[61]. The main objective for the period was to prepare purchase agreements for project-based mechanisms totalling 3.7 million emission units in 2006-2007, including 2.7 million units from CDM projects and 1 million from JI projects. The minimum size for each project was set at 250,000 emission units[6263]. The subcriteria limiting procurement excluded F-gas projects, hydropower projects exceeding 20 megawatts (MW)[64] and palm oil projects from the range.

Bilateral projects were also expected to produce other benefits or services besides emission units. These included the transfer of Finnish technology, projects' positive environmental impacts (mainly JI projects) and promoting sustainable development (mainly CDM projects).

The audit found that other benefits were not defined precisely. They are described in a vague way and indicators that would allow objectives to be set were not used. If other objectives (sustainable development and environmental friendliness) are defined according to the rules for the flexible mechanisms in the Kyoto Protocol, these objectives in themselves are not supplementary since they will be met in any case if a project meets the requirements for the Kyoto mechanisms.

---

[60] *Interviews with representatives of administration.*

[61] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*

[62] *Finnish Environment Institute (2006b).*

[63] *An exception to the minimum size can be projects that are justified from the viewpoint of Finland's development or neighbouring area cooperation and will yield at least 100,000 emission units.*

[64] *Hydropower projects over 20 MW are also possible if they are in accordance with Article 11 b of Directive 2004/101/EC 11 (Finnish Environment Institute 2007b).*

The emission unit objective was changed for the second support service period (2008-2009) in connection with the updating of the programme[65]. When new mechanism policies were outlined at the beginning of 2008, support services' procurement objective was lowered to 1.7 million units. Then in September 2008 it was lowered to 1.3 million units, with more emphasis being placed on funds[66].

The planning of support services has been included in the working programmes for support services[67]. In its plan the service provider expected to produce purchase agreements in line with the main objective for the responsible ministries to approve.

The function-based plan describes the organization's functions, its purpose, criteria for operational performance, resource requirements, cost estimate, monitoring and timetable. The functions of support services are to promote projects (identification, development and purchase agreements), joint administration (developing and maintaining procedures), support services (marketing and networking), international negotiating services and managing the CDM/JI Pilot Programme.

The audit examined the progress of projects and the achievement of the objectives set for them, since the other functions in the working programme support this core function. Table 5 shows the progress plan for projects.

[65] *Memorandum of the Steering Group for the Kyoto Mechanisms (2008a).*
[66] *Interviews with representatives of administration.*
[67] *Finnish Environment Institute (2006b). Finnish Environment Institute (2008a).*

TABLE 5. Function-based plan according to project cycle stage.

	PIN[68]-documents	PDD[69]-stage C-ERPA[70]	Verified Registered Recognized ERPA	In operation up to 2012	CER/ERU
Proportion (executed)		10%	75%	75%	90%
Units	73 million	7.3 million	5.5 million	4.1 million	3.7 million
JI, number	44	5	4	3	3
CDM, number	88	9	7	6	6

Source: Finnish Environment Institute: Working programme for producing support services for the Kyoto mechanisms 10/2006.

In Table 5 the progress plan for projects is expressed in relation to different stages in the project cycle. According to the plan only a small portion of project-based mechanism plans will make it through different project cycles and yield emission units. The plan was prepared using very conservative estimates of the number of projects that will yield emission units compared to the number of projects in the early stages.

When the Carbon Procurement Programme's procurement objectives were updated in 2008, the service provider's procurement plan was also revised. A new progress plan for projects corresponding to the need for purchasing was set in the updated working programme[71]. The updated progress plan is less detailed and the objective is expressed simply in emission units, which total 1.3 million.

The audit found that the service provider had a plan based on purchase agreements' project cycles up to the 2008 procurement plan. The updated plan is not broken down in this way.

One reason why planning based on project cycle stages stopped could be the scope of the service provider's potential portfolio[72], taking into ac-

[68] *PIN (Project Idea Note): Preliminary description of a project*

[69] *PDD (Project Design Document): Detailed description of the implementation of a project.*

[70] *C-ERPA: Conditional ERPA (Emission Reduction Purchase Agreement). A purchase agreement for a mechanism-based project enters into force only after certain conditions have been met.*

[71] *Finnish Environment Institute (2008a).*

[72] *Service provider's project table.*

count the remaining length of the service agreement. In other words the number of potential projects handled in the working programme was sufficient to meet the revised procurement objective. Changing planning practices in the operational plan nevertheless weakens the clarity and transparency of planning documents.

3.1.4 The organization of the purchasing of emission units

The use of the flexible mechanisms in the Carbon Procurement Programme involves cooperation among various administrative actors. The Steering Group for the Kyoto Mechanisms decides on strategic lines and reports to the Ministerial Working Group on Climate and Energy Policy, which coordinates the implementation of climate strategy. The steering group comprises representatives of the Ministry of Employment and the Economy, the Ministry of the Environment, the Ministry of Agriculture and Forestry, the Ministry of Finance, the Energy Market Authority and the Finnish Environment Institute. The Ministry of Employment and the Economy holds the chair. The steering group coordinates the planning of procurement. It has met about once a month to update operational matters and discuss strategic lines for procurement[73].

The operational side of the flexible mechanisms has been divided according to type of project (JI/CDM). The Act on the Use of the Kyoto Mechanisms (109/2007) assigns administrative tasks regarding the flexible mechanisms to the Ministry of the Environment (JI) and the Ministry for Foreign Affairs (CDM). In addition the Ministry of the Environment is in charge of international emissions trading (AAUs). The operational use of the flexible mechanisms also includes the organization producing support services, which prepares Finland's bilateral CDM and JI procurement and produces purchase agreements for the responsible ministries to approve. The service provider on the basis of a fixed-term contract is the Finnish Environment Institute, which established the Finnder team for this purpose.

The Ministry of Employment and the Economy also participates on the operational side. Funds intended for procurement are budgeted through the ministry. It chairs the Steering Group for the Kyoto Mechanisms and has budget responsibility for the operational side of the use of mechanisms.

[73] *Minutes of the Steering Group for the Kyoto Mechanisms.*

Dissatisfaction concerning the organization of purchasing was expressed in interviews that were conducted with representatives of administration mainly on the operational side. The frequency of the steering group's meetings, on the other hand, has fitted well with the need to steer strategy in a changing operating environment.

Problems on the operational side have arisen because of the fragmented organization. Decision-making concerning purchasing is sometimes time-consuming and complex organizationally. On the basis of audit interviews and regular reports submitted by the service provider[74], problems arise particularly in Finland's bilateral purchases, in which the service provider handles project-level negotiations. Owing to the many stages in the project cycle, the service provider must request approval from the responsible ministry several times. When a purchase agreement reaches the approval stage, the ministry must apply for funds to the Ministry of Employment and the Economy, which has budget responsibility. If a purchase agreement costs over 5 million euros, it must go through the Cabinet Finance Committee's decision-making procedure.

The audit found that, owing to the administrative organization and operating conditions of the purchasing of emission units, the decision-making process includes overlapping functions. The administration of purchasing has been arranged according to type of project (JI/CDM), and in a situation in which the decision-making systems for the two categories do not differ significantly, the systems are congruent in terms of functions. Section 3.1.2 dealt with procurement objectives in different types of project and the planning of purchasing. No significant difference was found between different mechanisms with regard to decision-making. This is because Finland's purchasing of emission units is guided strongly by cost-effectiveness while other factors that influence decision-making serve as subcriteria and compliance with them can be easily verified. This being the case, it would be possible to make decisions in the same organization with administration's current operating conditions. This only concerns operational activities, however.

[74] *For example Finnish Environment Institute (2008b) and Finnish Environment Institute (2008c).*

3.1.5 The planning and use of personnel resources

The purchasing of emission units under the Kyoto Protocol will require about 7.5 person-years of work[75]. Personnel resources have been concentrated on the support services provided by the Finnish Environment Institute[76]. Support services will account for about 4 person-years of the total required personnel resources, the Ministry of the Environment 1-1.5, the Ministry for Foreign Affairs 1, the Ministry of Employment and the Economy 0.75-1.

Policy lines concerning the Carbon Procurement Programme have not contained details on the use of ministries' personnel resources. Each ministry was expected to manage with an input of about 1 person-year, however. The way in which the Ministry of the Environment and the Ministry for Foreign Affairs have focused personnel resources can be considered reasonable from the viewpoint of the programme's original procurement plan, since JI and CDM procurements were given more or less equal weight.

The use of personnel resources was planned precisely in the service provider's working programme. The Finnish Environment Institute had expected to get along with six employees during the support service period, including three working full time[77]. Planning took into consideration the resources required for each function.

The service provider's activities were hampered by high staff turnover, particularly in the beginning of the programme. Problems involving personnel resources are mentioned in reports to the Steering Group for the Kyoto Mechanisms[78]. The underuse of personnel resources is also visible in the application of funds during the first service period (2006-1007), which deviates significantly from the budgeted amount.

On the basis of interviews with representatives of support services, staff turnover and recruiting were affected adversely by the uncertain future of support services. There are few experts in the use of mechanisms. The possibility to hire competent personnel on fixed-term contracts[79] further restricts the potential number of experts. Uncertainty regarding the length of employment increases staff turnover.

---

[75] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006) and memorandum of the Steering Group for the Kyoto Mechanisms (2008a).*
[76] *Interviews with representatives of administration.*
[77] *Finnish Environment Institute (2006c).*
[78] *For example Finnish Environment Institute (2008b).*
[79] *The use of fixed-term contracts is due to the short agreement period.*

In contrast with the original programme's policy lines, purchasing has concentrated on CDM projects[80]. Projects thus place the biggest load on personnel at the Ministry for Foreign Affairs. In addition to studying and approving direct bilateral projects promoted by support services, the Ministry for Foreign Affairs has prepared and currently administers three carbon funds to meet the procurement objective for the Kyoto period and one fund for the post-Kyoto period. On the basis of the audit, the allocation of personnel resources is not in line with the work requirement in the system as a whole and can cause an excessive amount of work for staff at the Ministry for Foreign Affairs who are responsible for the use of mechanisms.

3.1.6 The planning of risk management

Decisions regarding the use of the Kyoto mechanisms are aimed at selecting the most economical instrument that will produce emission units, taking risk into account. Those responsible for purchasing emission units can think that the market prices everything that is essential and that emission units are purchased directly from the market. If decision-makers believe they can make procurements in line with objectives more cheaply by making their own arrangements, compared with the market price, maintaining a separate procurement system makes sense. Finland's purchasing objectives are broad and risk management allows administration to achieve the most economical ways of producing emission units in relation to objectives.

Risk management tools have been discussed in memorandums prepared by the Steering Group for the Kyoto Mechanisms[81]. Many risks are involved in procurement, and there is little research information on their overall effects[82]. Basic information regarding projects (location, type, size) is available, however.

A memorandum that was prepared by the steering group in 2006 identifies possible risk factors. These are divided into general project development risks and Kyoto risks. General project development risks are risks that are typically found in any project. These include completion risks, operational risks, technological risks, delivery risks, economic risks, ex-

[80] *See section 3.2.1.*

[81] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006), memorandum of the Steering Group for the Kyoto Mechanisms (2008a) and memorandum of the Steering Group for the Kyoto Mechanisms (2008b).*

[82] *Electrowatt-Ekono (2006).*

change rate risks, political risks and environmental risks. General project development risks are uncertainties regarding the general functioning of a project producing emission units, and they are not directly linked to the production of emission units but can still affect it. For example, a hydropower project may produce more or less energy, causing a change in the number of emission units.

Kyoto risks are uncertainties linked to the project cycle of instruments and related procedures. These include the host country's approval risks, CDM projects' validation and registration risks, volume and timing risks associated with the monitoring and verification of project mechanisms, and risks concerning noncompliance with the purchase agreement.

Operational lines concerning the Carbon Procurement Programme's risk management are contained in a memorandum of the Steering Group for the Kyoto Mechanisms[83]. In risk management matters the steering group has relied on a study by an outside consultant[84], which also discusses risk management matters. Risk management is meant to be based on diversification and the deliberate setting of an overdimensioned procurement objective in order to avoid the risk of falling short. Diversification was to be carried out according to existing possibilities:

- according to type of emission unit (ERU, CER, AAU)
- according to type of project (JI, CDM)
- geographically
- organizationally (procurement channels).

A memorandum that was prepared by the steering group in early 2008 deals with the planning of risk management from the viewpoint of practical implementation[85]. It notes: "Risk management is extremely important in the programme, since the boundary conditions for many procurements involve major uncertainty factors (e.g. the price of emission units and their development, the development of emissions, uncertainty regarding carbon sinks, deliveries of emission units etc)." The memorandum also takes a position on key risk management tools: "The key tools for managing risks are regular programme updates and the revision of emission data and evaluations of the development of emissions and the prices of emission units."

The risk management measures in the Carbon Procurement Programme - regular communication and updates - have been considered adequate to

---

[83] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*
[84] *Electrowatt-Ekono (2006).*
[85] *Memorandum of the Steering Group for the Kyoto Mechanisms (2008a).*

adjust the procurement portfolio or risk weighting according to the risk profile.

A memorandum that was prepared by the steering group towards the end of 2008[86] takes a closer look at risk management practices in the programme. Risk management should be based on the following:

- the monitoring of the progress of international climate convention negotiations and EU legislation
- the selection of types of projects and host countries
- the diversification of procurement
- a conservative estimate of the number of units that will be produced
- the monitoring of the emission balance in the Kyoto period.

These measures reflect the monitoring of the operating environment, the anticipation of changes in the procurement objective and the diversification of procurements. From the viewpoint of risk management, the main principle is extensive diversification.

The policies outlined by the Steering Group for the Kyoto Mechanisms have said very little about diversification. The procurement weighting in the steering group's memorandum[87], presented in Table 4 in section 3.1.2, is not entirely fixed, as is made clear on page 17 of the memorandum, which states: "The proposed division of procurements will be evaluated at regular intervals and weightings will be changed according to the situation on the basis of the dynamically developing mechanism market and experience." The procurement plan is in fact a rough framework for the mechanism market's changing operating environment. The procurement plan also has fixed elements, which involve the division of bilateral purchases. This comes to light in Annex 1 to the steering group's memorandum[88], in which the Ministry for Foreign Affairs presents its own policy lines according to its mandate: "With regard to funds the amounts invested and emission reduction targets will be adjusted as part of the Carbon Procurement Programme and separate JI or CDM targets will not be set for emission reductions. Through bilateral CDM projects the Ministry for Foreign Affairs' objective is 2.7 million tonnes carbon dioxide equivalent during the period 2008-2012."

The fixed division in the original procurement plan for bilateral purchases restricted diversification policy. Equal unit prices in different pro-

---

[86] *Memorandum of the Steering Group for the Kyoto Mechanisms (2008b).*
[87] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*
[88] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*

ject channels[89] would be the ideal situation for procurement. From the viewpoint of risk management one could easily decide on weightings. Realistically speaking this is very unlikely, however.

The audit also found that the planning of risk management is based on diversification, but administration has not analysed weightings or justified the selected diversification plan in detail. Extensive diversification does not ensure optimal allocation unless risk weightings have been examined. Weightings are based on the steering group's subjective interpretation of the procurement situation, which is not based on systematic data collection.

3.1.7 The functioning of financing practices

The use of mechanisms is based on cooperation among three ministries and a unit operating under a government agency. Appropriations earmarked for the purchasing of emission units are directed through the Ministry of Employment and the Economy to the Ministry of the Environment and the Ministry for Foreign Affairs, which are responsible for purchasing. Interviews with representatives of mechanism administration indicated that managing payment cash flows has been difficult in some respects in the appropriation-based financing system. The application of funds involves questions regarding sequencing and the possible reassignment of funds. For example, the service provider has reported that the procedure for extracting funds causes delays in activities[90]. Mechanism administration should be prepared to receive funds, on account of the final costs of carbon fund investments, among other things, without weakening its capacity to act. Receiving funds is not possible through direct cash management means, however; they must be recycled as new appropriations.

The audit found that the transfer of funds is slow as a result of the complicated organizational structure of purchasing. Particularly from the viewpoint of negotiations concerning bilateral purchases, agreeing on financing arrangements has been time-consuming. This is mainly due to the fact that the service provider must operate as an intermediary between the responsible ministry and the counterparty to the purchase agreement.

On the basis of interviews that were conducted in the audit, the service provider's biggest problem with current financing practices has neverthe-

---

[89] *The spending estimates in Table 3 in section 3.1.2 are based on a unit price of about €10/Mt, taking all costs into account.*

[90] *Finnish Environment Institute (2008c).*

less been the difficulty of arranging deposits. Not being able to pay deposits was viewed as a factor that severely weakened the competitiveness of bilateral purchases on the mechanism market. The service provider, which arranges purchase agreements on behalf of the ministries, cannot promise deposits without full guarantees. The inflexibility of the deposit system restricts the preparation of agreements, since flexible financing arrangements are more the rule than the exception in procurements. Provisions regarding full guarantees for deposits are contained in the responsible ministries' financial rules[91]. The service provider has strived to remedy the situation in cooperation with Finnfund[92].

3.1.8 The use of expert information, the monitoring of the operating environment, the monitoring of activities and the transparency of activities

The ministries responsible for the use of mechanisms have relied on several outside studies in planning activities. To support its coordination work, the Ministry of Employment and the Economy commissioned a study[93] that analysed mechanisms' operating environment, Finland's procurement restrictions/competitiveness and risk management. It also obtained a post-Kyoto fund comparison[94]. The Ministry of the Environment commissioned an external study[95] on matters affecting its JI purchasing strategy. The Ministry for Foreign Affairs commissioned an outside evaluation[96] concerning the establishment of a Finnish carbon fund. Experience gained in the CDM/JI Pilot Programme has also been utilized in planning the Carbon Procurement Programme[97].

The audit pointed to the extensive and sound use of expert information, which has been applied to support purchasing activities. The purchasing of emission units requires information in a number of special fields (national and international legislation, financing, project cycle, project management, projects' technical properties), and the use of expert services makes it possible to supply the information the needed for decision-making faster.

---

[91] *See for example Ministry for Foreign Affairs (2006).*
[92] *Finnish Environment Institute (2008c).*
[93] *Electrowatt-Ekono (2006).*
[94] *Climate Wedge (2008).*
[95] *GreenStream Network (2006).*
[96] *Pricewaterhousecoopers (2006).*
[97] *Interviews with representatives of administration.*

The development of the operating environment for purchasing has been monitored actively at steering group meetings, in different reports and memorandums, and in outside studies[98]. The audit found, however, that the information produced in monitoring the operating environment could be utilized more effectively. For example, the Carbon Procurement Programme's first operational plan gave a fixed division for bilateral projects, although experience obtained in the CDM/JI Pilot Programme[99] had already shown that the process of promoting and gaining approval involves different uncertainties for CDM and JI projects. Owing to the Carbon Procurement Programme's application of funds, attention should also have been paid to the effect of changes in the market price of emission units on planned spending.

Monitoring and evaluating operational processes is important for learning and development in an organization. The plan was for the monitoring of purchasing to be based on annual reporting according to responsibilities as well as the active exchange of information at steering group meetings. The service provider and the ministries responsible for purchasing report to the Ministry of Employment and the Economy, which is responsible for coordinating purchasing. The monitoring of purchasing covers responsible actors' core process thoroughly: the ministries responsible for purchasing report on the progress of purchasing and related challenges, while the service provider describes the services it produces and recommends ways to improve the provision of services. Reporting obligations were included in the first memorandum of the Steering Group for the Kyoto Mechanisms[100].

The audit found that the monitoring of operational processes has been utilized with the aim of improving procurement functions. Support service reports[101] mention functions that need to be improved. They also describe development measures that have been carried out. The development of activities has remained incomplete in many respects, however. For instance, the service provider mentions problems involving financing functions in several interim reports, but problems have not been resolved.

On the basis of the audit, reporting practices have been intended to provide the transparency required by good governance. A general framework has also been created for systematic monitoring. Administration's reports are understandable and have been supplied actively. The minutes of the

---

[98] *For example Electrowatt-Ekono (2006).*
[99] *See for example Biota BD Oy (2006).*
[100] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006).*
[101] *Support services reports 1-5.*

Steering Group for the Kyoto Mechanisms describe and elucidate activities extensively. Reports have drawn attention to problems and suggestions for improvements.

The audit found that mechanism administration's monitoring has not paid attention to all the essential factors that affect the planning of activities. Changes in the market price of emission units affect carbon funds' actual costs. Potential costs have not been documented clearly according to different price scenarios.

3.2 The effectiveness of the purchasing of emission units

3.2.1 The achievement of procurement and price objectives

The original procurement objective was 12 million emission units by the end of the Kyoto period. Of this total about 2.15 million units had been agreed in purchase agreements (the expected yield was about 2.46 million units) in projects dating from the CDM/JI Pilot Programme, so this would have left about 10 million units for the Carbon Procurement Programme[102][103].Because of changes in the operating environment, the objective was lowered by 5 million units at the beginning of 2008. Consequently the current objective is about 5 million units (12 - 2.16 - 5 = about 5). The objective for the entire Kyoto period is 7 million units (12 - 5 = 7).

So far Finland has concluded purchase agreements in the Carbon Procurement Programme that are expected to yield 4.99 million emission units on the basis of original estimates. Taking into account the agreements concluded during the CDM/JI Pilot Programme, the objectives set for procurement during the Kyoto period have been achieved with regard to purchase-delivery agreements.

Expected emission unit yields vary as mechanism-based projects progress. Currently the Carbon Procurement Programme's expected total yield is about 4.22 million units, which falls short of the original objective by about 780,000 units. The shortfall for the Kyoto period is 0.32 million emission units (7 - 2.46 - 4.22 = 0.32). At the moment a CER future delivered in December 2009 would cost about 11.5 euros per unit. The addi-

[102] *Service provider's calculations.*
[103] *European Climate Exchange. 05/2009.*

tional funding that would be required at the CER market price is therefore about 3.68 million euros.

Most procurements have been investments in carbon funds, and the total number of emission units these are intended to produce (CDM/JI Pilot Programme and Carbon Procurement Programme together) is about 4.95 million. The yield objective for the funds included in the Carbon Procurement Programme is about 3.54 million units. Table 6 shows the Carbon Procurement Programme's investments in different funds together with the amount invested.

TABLE 6. Investment in funds.

Fund	Type of project	Amount invested	Emission unit objective, million
Testing Ground Facility, NEFCO (TGF)[104]	JI	2 500 000	0.30
Multilateral Carbon Credit Fund, EBRD (MCCF)	JI	10 000 000	1.00
Asia Pacific Carbon Fund, ADB (APCF)	CDM	18 000 000	1.84
Fine Carbon Fund, Greenstream Network Oy (FCF)	CDM	4 000 000	0.40
Total		**34 500 000**	**3.54**

Calculating the price of an emission unit on the basis of information in agreements and nominal costs (the information in Table 6), one obtains a figure of about €9.86/emission unit. If investments in funds are discounted at a rate of 5% up to 2009, the unit price is €10.77/emission unit[105].

The unit price of fund investments changes over time. It is difficult to evaluate actual costs before procurements have been made. Funds use invested capital for procurements in the order in which payments according to agreements are received. If, for example, an imaginary carbon fund was established in 2007 and it concludes purchase agreements in 2010, the capital received by the fund, plus interest, will only be used then. Determining the actual costs of fund investments is thus influenced by several

[104] *The table shows an additional investment in the TGF fund that was made during the Carbon Procurement Programme.*

[105] *The calculation assumes that emission units will be delivered at the same time at the end of the investment period and that funds' costs will be according to expectations.*

factors, including the scheduling of payments, differences in interest rates between the fund and the investor, the possible effects of exchange rate differences, the formation of the fund's fixed costs and fluctuations in the market price of emission units.

The audit found that funds' expected emission unit yields are difficult to estimate because most of the carbon funds in which Finland has invested are only in the project start-up stage and the actual implementation of funds is still uncertain. Estimates of carbon funds' emission unit yields also include several uncertainties that increase the mean error of yield estimates. A good example is the TGF fund, in which Finland has invested during the CDM/JI Pilot Programme and the Carbon Procurement Programme. The original yield objective for Finland's investments was about 0.55 million units in all. Currently Finland's potential yield of all the fund's projects would be about 0.45 million units[106][107]. TGF has committed slightly less than 90% of its assets to projects. If potential yields are scaled with the fund's estimated risk coefficients, invested assets and resulting emission unit yields shrink considerably. TGF's planned agreements in Russia alone lower the expected committed capital to 26% of the original figure[108]. This is because Russia's JI administration is still not functioning and Russia's JI projects cannot produce ERUs according to the rules in the Kyoto Protocol[109].

Funds' final emission unit yields and the total costs necessary to procure them vary largely according to the emission price unit. The audit did not find that the effects of different price scenarios on Finland's fund investments had been evaluated, nor had cost expectations corresponding to yield expectations been analysed.

Funds' expected yields, which have been collected directly from monitoring documents or ministries' memorandums, are presented in Table 7.

---

[106] *Ministry of the Environment (2009).*

[107] *This estimate takes into account Finland's fund investments during the CDM/JI Pilot Programme and the Carbon Procurement Programme.*

[108] *Ministry of the Environment (2009).*

[109] *Interviews with representatives of administration.*

TABLE 7. Expected yields of funds in the carbon procurement programme.

Fund	Expected emission unit yield
Testing Ground Facility, NEFCO (TGF)[110]	0.25 million
Multilateral Carbon Credit Fund, EBRD (MCCF)[111]	0.73 million
Asia Pacific Carbon Fund, ADB (APCF)[112]	1.54 million
Fine Carbon Fund, Greenstream Network Oy (FCF)[113]	0.40 million
Total	**2.92 million**

In addition to emission units, other objectives have been set for the purchasing of emission units. These include environmental friendliness, the transfer of Finnish technology and promoting sustainable development. Other benefits besides reducing greenhouse gas emissions are discussed in the following paragraphs.

On the basis of interviews that were conducted in the audit, the implementation of procurement objectives and the monitoring of purchasing have focused strongly on emission units. Other objectives and their benefits have not been studied thoroughly. Most mechanism-based projects are presently in the start-up stage, and their real impacts will not be verifiable for years.

The benefits of transfers of Finnish technology through carbon funds' mechanism-based projects were considered small in interviews. Project implementers naturally select the most cost-effective technology option to carry out a project, from their own point of view. Those responsible for Finland's procurements can at most inform Finnish enterprises about potential customers implementing mechanism-based projects, but the actual selection of technology for a particular project is independent of Finland's procurements.

The environmental benefits of projects from an economic perspective arise as a result of the sum of the positive and negative impacts of pro-

---

[110] The Carbon Procurement Programme's share of the expected yield has been estimated on the basis of the relative share of investments (CDM/JI Pilot Programme about 45%, Carbon Procurement Programme about 55%) (Ministry of the Environment 2009).

[111] Ministry of the Environment (2008).

[112] Ministry for Foreign Affairs (2008); the Asian Pacific Carbon Fund mainly finances CDM projects in Asia.

[113] Information is based on the original agreement that was signed in spring 2008; GreenStream Network Oy's Fine Carbon Fund finances JI and CDM projects mainly in Asia and eastern Europe.

jects. These impacts depend on the type of project. If an emission reduction project reduces particulate emissions as well as greenhouse gas emissions, this is a positive environmental impact. On the other hand, a large dam project can have numerous negative external impacts. For the emission units produced in projects to be counted under in the Kyoto Protocol, they must meet the standards mentioned in the protocol[114]. Each mechanism-based project goes through a multi-stage approval process, and this ensures the formal acceptability of the emission units produced by a project.

The problems involved in verifying the benefits of promoting sustainable development are similar to the problems involved in evaluating environmental benefits in general. A registered emission unit has in principle met the sustainable development criteria in the Kyoto Protocol, but a measurement of real overall impacts has not been made. The audit found that the actual benefits of promoting sustainable development in Finland's mechanism-based projects have not been measured. Therefore the achievement of sustainable development cannot be evaluated.

The achievement of other benefits through carbon funds is also quite challenging because Finland's share of investments and say in the use of funds' capital is limited. Among carbon funds producing emission units for the Kyoto period, Finland's shares in the EBRD's Multilateral Carbon Credit Fund (MCCF) and the Asia Pacific Carbon Fund (APCF) are more flexible than in other funds when it comes to decision-making. Investors in the MCCF and the APCF can select the individual project in which they wish to participate[115]. The freedom to select projects puts an investor in a better position to select projects that fit in better with the other benefits that the investor wished to achieve. The other benefits of the MCCF and APCF funds cannot be evaluated at this stage, since the funds are just concluding purchase agreements that will produce emission units for the Kyoto period.

Finland has agreed on direct bilateral purchases of emission units for the Kyoto period with five mechanism-based projects during the Carbon Procurement Programme. Table 8 shows these bilateral projects together with the number of emission units they are intended to produce according to purchase agreements and nominal costs[116]. According to this information the cost is about 9.69 euros per unit.

---

[114] *According to the protocol a project must promote sustainable development and environmental friendliness.*

[115] *Interviews with representatives of administration.*

[116] *Costs are based on the service provider's estimates of cost impacts.*

TABLE 8. Purchase agreements for bilateral projects.

Location	Type	Project form	Purchase agreement yield	Nominal project costs [117]
Rouste, Estonia	Wind power	JI	171 287 t	1 627 227€
Ruseifeh, Jordan	Dump	CDM	362 709 t	2 854 518€
Ningxia, China	Solar cooker	CDM	175 459 t	1 491 402€
Dagangou, China	Hydropower	CDM	113 175 t	1 018 575€
Hunan, China	Biogas	CDM	670 000 t	7 469 000€
Yhteensä			**1 492 630 t**	**14 460 722€**

These projects will produce emission units annually until the end of the Kyoto commitment period. Payments for emission units will be made in connection with deliveries. Finland has already concluded enough purchase agreements for bilateral projects for the Kyoto period, so their expected yields and costs can be examined more accurately than funds' yields. The Finnish Environment Institute, which produces support services, documents bilateral projects' yield and cost information. The service provider's role is visible in the way information is presented, which particularly emphasizes the service provider's information needs. The audit found that the service provider does not supply all the information that is needed for the responsible ministries' decision-making. There are gaps regarding the costs of preparing different documents for projects and the administrative costs of support services, for example. Cost information on bilateral projects is presented in table calculations for budget purposes, with nominal values, so it is difficult for the people who decide on and monitor projects to get a clear picture of differences in the evaluation of costs over time. The budget-based calculation should be supplemented to take into account different matters that influence value formation. Table 9 presents an evaluation of discounted total costs that was made in the audit. These mainly describe assessments at the time a decision was made. The figures are more usable than funds' discounted values, since bilateral projects' cost structure is considerably more fixed: uncertainly mainly involves the technical production of emission units and payments.

[117] *Costs of producing emission units according to the purchase agreement including deposits and validation and verification costs.*

TABLE 9. Bilateral purchase agreements discounted.

Location	Type	Project form	Purchase agreement yield	Discounted costs[118]
Rouste, Estonia[119]	Wind power	JI	171 287 t	1 447 217€[120]
Ruseifeh, Jordan	Dump	CDM	362 709 t	2 831 631€
Ningxia, China	Solar cooker	CDM	175 459 t	1 357 605€
Dagangou, China	Hydropower	CDM	113 175 t	1 010 077€
Hunan, China[121]	Biogas	CDM	670 000 t	6 899 221€[122]
Total			**1 492 630 t**	**13 545 751€**

The total unit price of bilateral purchase agreements according to the information in Table 9 is about €9.08/emission unit. The service provider's operating costs have not been taken into account in projects' costs, although they are an essential cost item for central government finances. The audit estimated that the discounted cost of support services is about €1.27/emission unit[123]. This brings the unit cost at the time of the agreement to about €10.35/emission unit.

Table 10 presents the costs of bilateral projects discounted at a rate of 5% and corresponding expected yields at the moment, which differ somewhat from yields according to purchase agreements[124]. Table 10 thus represents a current evaluation of the unit costs of bilateral purchases, which are about €9.44/emission unit. If the costs of support services[125] are

[118] *In addition to emission unit, validation and verification costs and deposits, this includes registration, PDD and CDM EB fees. The discount rate is 5%.*

[119] *The estimate of transaction costs is based on incomplete information owing to the recent nature of the project.*

[120] *Arvio transaktiokustannuksista perustuu vielä osittain puutteelliseen tietoon hankkeen tuoreuden takia.*

[121] *The estimate of transaction costs is based on incomplete information owing to the recent nature of the project.*

[122] *Arvio transaktiokustannuksista perustuu vielä osittain puutteelliseen tietoon hankkeen tuoreuden takia.*

[123] *In calculating costs the service provider's actual costs for 2006 and 2007 were used. Estimates for 2008 and 2009 are budget-based. Costs have been discounted.*

[124] *Expected yields are based on the service provider's estimate.*

[125] *Support services' discounted costs are now estimated at €1.46/emission unit owing to the lower yield estimate.*

included, the unit price is about €10.90/emission unit. The slightly higher unit cost is due to the rise in the share of "fixed costs"[126].

TABLE 10. Estimated yields of bilateral projects.

Location	Type	Project form	Purchase agreement yield	Discounted costs
Rouste, Estonia	Wind power	JI	171 287 t	1 447 217€
Ruseifeh, Jordan	Dump	CDM	250 936 t	2 163 430€
Ningxia, China	Solar cooker	CDM	133 219 t	1 053 348€
Dagangou, China	Hydropower	CDM	77 336 t	738 446€
Hunan, China	Biogas	CDM	670 000 t	6 899 221€
Total			**1 302 778 t**	**12 301 662€**

The audit found that bilateral projects' estimated yields and corresponding expected costs are easier to estimate than carbon funds', since the bilateral project portfolio consists of purchase agreements that have already been signed. The unit price that must be paid for them has already been agreed, and payment schedules are known.

The evaluation of the other benefits of bilateral projects is subject to the same observation as in the case of carbon funds: these benefits have not been evaluated precisely.

3.2.2 The cost-effectiveness of the purchasing of emission units

One audit question concerned the cost-effectiveness of the Carbon Procurement Programme. In order to evaluate this, the cost-effectiveness of purchasing activities as a whole must be compared with the costs of other policies aimed at reducing greenhouse gas emissions. Such a comparison will show whether procurements have produced value added or not. It is also necessary to examine the cost-effectiveness of individual procurements in order to determine whether individual investments have been cost-effective. In this way one can evaluate how successful an allocation has been.

The audit found that evaluating the unit costs of procurement channels (funds and bilateral projects) is a challenging task. Cost-effectiveness at

[126] *These include validation, verification, registration, PDD and CDM EB fees.*

the time an investment decision is made can, using certain simplified assumptions, be analysed by discounting the costs of intended procurements of emission units in purchase agreements with comparable alternative costs at the same time.

The alternative cost for the Carbon Procurement Programme as a whole has been considered the general reference price of procurement of about €10/emission unit[127]. This objective price was stated in information for 2005. If one uses 5% as the annual general rise in costs, the reference price in 2009 would be about €12/emission unit. Comparing this with the unit prices for Finland's carbon fund and bilateral purchases at the time of investments (about €10.77 and about €10.35, it appears that investments at the time of agreements were cost-effective compared with other policies aimed at reducing emissions.

Evaluating Finland's procurement allocation in individual procurement channels, it is important to remember that determining funds' unit prices is more uncertain than bilateral projects' unit prices. In order to obtain a clearer picture of differences in cost-effectiveness between Finland's procurement channels, one must examine differences between procurements' transaction costs[128]. This will show how large a share of procurement costs go to other things besides the procurement of emission units. Administrative transaction costs are generally set in service agreements, and as such they are better suited than unit costs to evaluate the cost-effectiveness of the procurement channels used by Finland. Qualitative differences in administration cannot be observed simply by looking at administrative costs, however.

The audit estimated the administrative transaction costs of Finland's bilateral purchases and carbon funds. Other transaction costs (such as validation/project design document costs) were not considered. The administrative annual cost for bilateral purchases was estimated at about 3% a year compared to capital for bilateral purchasing activities. The administrative costs of bilateral purchases were estimated from the service provider's scaled expense items discounted at a rate of 5%. Support services' operating period has been estimated according to the length of the present service agreement (2006-2009). About 1.5 percentage points of carbon funds' capital is used annually for administrative costs on average. Funds' administrative costs were estimated on the basis of the cost information

---

[127] *The alternative cost is apparent in the 2005 energy and climate strategy (Government report to Parliament 2005).*

[128] *Transaction costs in this case refer to administrative costs. They do not include Kyoto project cycle costs such as PDD and validation costs.*

and balance sheets reported by funds. From the viewpoint of administrative costs, carbon funds appear to be a more cost-effective channel than bilateral purchases.

Support services' administrative costs are budgeted as a fixed item. Carbon funds' costs are adjusted as a percentage of costs. It follows from this difference that bilateral purchases become relatively cheaper in relation to the volume of procurement.

The audit found that the administration of the Carbon Procurement Programme has not analysed the comparability of different procurement channels thoroughly. Administration has documented information mainly using the figures reported in agreements. Interviews indicated that there were differences in administrative transaction costs, but a more thorough, documented consideration of problems in determining cost-effectiveness had not been performed. The procurement portfolio consists of different procurement channels producing emission units. The failure to determine cost relations between them makes it difficult to monitor cost differences between procurement channels and therefore the effectiveness of procurement allocation.

3.2.3 The effectiveness of support services

On the basis of audit findings, the service provider has had difficulties negotiating enough purchase agreements for bilateral projects to meet the original procurement objective. During the first service agreement period (2006-2007) support services produced purchase agreements concerning three CDM projects aimed at a total of 0.65 million CERs[129][130]. The number of emission units was clearly lower than the original objective. The first memorandum of the Steering Group for the Kyoto Mechanisms[131] set an objective of about 2.7 million CERs (CDM projects) and 1 million ERUs (JI projects) or a total of 3.7 million units. The project-cycle objectives in the working programmes for support services[132] were met only partially. At the start of the project cycle possible purchase agreement candidates were identified, but a larger number of projects than expected never reached the purchase agreement stage.

---

[129] *Ruseifeh, Jordan and Dagangou and Ningxia, China. See section 3.2.1 for details.*

[130] *Finnish Environment Institute (2008b).*

[131] *Memorandum of the Steering Group for the Kyoto Mechanisms (2006*

[132] *Finnish Environment Institute (2006b).*

The service provider examined reasons for the low number of purchase agreements in its final report[133]. The main external reason was the changing operating environment and the competitive market situation. The market situation has hampered decision-making so that, in practice, potential projects that have reached an advanced stage[134] and are suitable in terms of procurement costs have been in short supply. Owing to the market situation, procurement has thus been faced with a situation where it has been necessary to buy what is available.

The Finnish Environment Institute reported gaps in administration and a shortage of personnel resources as internal problems. An interview with a representative of support services[135] shed light on gaps in administration. These included difficulties regarding financing practices (see section 3.1.7) and the organization of activities (see section 3.1.4). Problems involving personnel resources were discussed in section 3.1.5.

3.2.4 The effectiveness of risk management

The risk management of procurement is essential for procurements' cost-effectiveness and in order to avoid a shortfall. Economic risk consists above all of emission units' price risk. If existing methods of procurement do not produce the desired number of emission units, administration must correct the shortfall at the prevailing price on the emission unit market. In addition price fluctuations change expectations concerning carbon funds' yields. In mechanism management risk is also associated with failing to meet the Kyoto commitment. This risk is only theoretical, however, since emission units can be procured on the market even with a short delivery period. Risks involving economic losses in procurements are limited, since payment is made for emission units on delivery[136]. For example, risks associated with individual countries mainly involve a price risk as a result of a possible shortfall.

Finland's flexible mechanism investments have focused on project-based mechanisms or the purchasing of ERUs/CERs through JI/CDM projects. Diversification according to type of emission unit and type of project overlaps[137], since Finland is not purchasing AAUs for the Kyoto pe-

[133] *Finnish Environment Institute (2008b).*
[134] *That is, projects that will produce emission units to meet the Kyoto commitment.*
[135] *Interviews with representatives of administration.*
[136] *Interviews with representatives of administration.*
[137] *Procurement plan in Table 3 in section 3.1.2.*

riod. Finland's procurements have concentrated on CDM projects. JI projects' share of the Carbon Procurement Programme's total portfolio based on purchase agreements is about 30%.

In diversification according to type of project, the question is what weights should be given to CDM and JI projects. Comparing Finland's total portfolio to the total project-based mechanism market, one observes that Finland's procurements have clearly given more weight to JI projects. CDM/JI Pipeline[138], which reports on all project-based mechanisms that are under way, says that JI projects account for about 10% of the "market portfolio" of project-based mechanisms. The JI/CDM ratio in Finland's projects has clearly veered from the corresponding weighting in the market portfolio. The diversification of the portfolio could also be examined according to type of project and host country.

The audit found that the weightings given to different properties in the procurement portfolio and their effect on yield expectations have not been systematically documented. The effects of different risks, such as country-specific risk, on yield expectations for the Carbon Procurement Programme's portfolio as a whole have not been documented. A risk management policy based on diversification means in this case highly unspecified activity in which objectives are hard to put a finger on: the main tool of risk management, diversification, has been used but the rationality of diversification has not been studied or monitored.

[138] *UNEP Risoe (2009).*

4 The National Audit Office's conclusions and recommendations

The use of the Kyoto mechanisms is one of the most significant measures taken by the Government to achieve Finland's emission reduction target under the Kyoto Protocol. On the basis of the energy and climate policy strategy that appeared in 2005, the Government planned to spend about 100 million euros on the purchasing of emission units. The audit examined the success of the purchasing of emission units for the Kyoto period in the Carbon Procurement Programme: the functioning of procurement and the effectiveness of procurement. The audit focused on the Carbon Procurement Programme's purchasing activities. Other national or international actor relations regarding mechanism matters were not examined. The National Audit Office considers that those responsible for purchasing have succeeded satisfactorily. Purchasing activities could be improved, however.

Functioning of the purchasing of emission units

The implementation of Finland's purchasing of emission units for the Kyoto commitment period is based on cooperation among four actors: the Ministry of Employment and the Economy, the Ministry for Foreign Affairs, the Ministry of the Environment and the Finnish Environment Institute. The audit observed a number of operational problems in purchasing that reflect the organization of administration. Problems arise especially in implementing bilateral purchases: formalities in financing practices have slowed purchasing. The practice of requiring full guarantees does not suit the competitive mechanism market, in which actors competing for purchase agreements are not restricted by deposit policies.

The use of personnel resources in purchasing has not been optimal, since most of Finland's investments have concerned CDM projects, so that the Ministry for Foreign Affairs' relative administrative burden has been larger than was originally planned. Dividing operational activities between two ministries is not justified from the viewpoint of efficiency. At present the selection according to type of project is based on the same decision-making conditions. The service provider's activities have been

hampered by uncertainty regarding the term of the service agreement, which has been reflected in personnel resources.

The framework for planning Finnish procurement policy has functioned fairly well. Content production in planning has not paid adequate attention to changes in the operating environment, however. Administration has not produced clear indicators regarding procurement cost relations, not has the total project portfolio or its implementation been put in perspective against background factors in all respects.

Mechanism administration has monitored the implementation of purchasing quite comprehensively. The information produced in this way has been used to improve purchasing activities. One problem regarding the transparency of activities is the difficulty of comparing cost and yield indicators.

The National Audit Office considers that the Ministry of Employment and the Economy, which is responsible for preparing legislation regarding the Kyoto mechanisms, should investigate possibilities to arrange operational responsibility for purchasing more efficiently, for example by placing one ministry in charge.

Furthermore the National Audit Office considers that the Ministry for Foreign Affairs and the Ministry of the Environment, which are responsible for purchasing, should update the cost monitoring of activities and should also document expected yields weighted with risks in monitoring documents.

The effectiveness of the purchasing of emission units

The Carbon Procurement Programme's original procurement plan was rigid from the viewpoint of bilateral purchase agreements. The project structure on the mechanism market has required the flexible division of bilateral project-based mechanisms.

Emission unit procurement objectives have been met as far as delivery agreements are concerned. The delivery of emission units is subject to considerable uncertainty, however, and the expected total emission unit yield at the moment does not meet procurement objectives. There is still time to make up the shortfall, however, nor does this constitute a significant risk for public finances.

The main condition for the appropriateness of the purchasing of emission units is that unit costs are lower than the costs of other emission reduction policies. The delivery agreements in the procurement portfolio have been concluded at unit costs that meet this condition. The actual

costs of procurements may still change as a result of uncertainty concerning the availability of emission units.

The evaluation of the costs of purchasing emission units has not been coherent in all respects. The effects of the time value have not been taken into account in costs. A more accurate estimate of costs is available for bilateral purchase agreements than for investments in funds. Mechanism administration has not taken into account all the essential cost items in bilateral purchases, however.

The administrative costs of Finland's bilateral purchases are currently higher than the corresponding costs for funds producing emission units. Furthermore the competitive advantage of bilateral purchasing compared with other market actors is weakened by the inadequate availability of financing instruments. There is, however, less uncertainty regarding bilateral purchases' yields than funds' yields, since most of the funds in which Finland has invested are just concluding project agreements.

Risk management with regard to purchasing is based on diversification. The audit indicated that the weightings in diversification have not been analysed sufficiently in planning purchasing and that the effects of individual risks have not been reflected clearly in the procurement portfolio. At present the biggest uncertainty regards actual yields of emission units and the cost of making up any shortfall.

The National Audit Office considers that the Ministry for Foreign Affairs and the Ministry of the Environment, which are responsible for purchasing, should improve the calculation of funds' yield and cost expectations. Cost calculations in bilateral purchases should take into account all the essential costs influencing activities, such as the costs of support services. Indicators describing performance should thus be developed.

Furthermore the National Audit Office considers that the Ministry of Employment and the Economy, in chairing the Steering Group for the Kyoto Mechanisms, should strive to improve the planning of risk management in the steering group.

Sources

1. Legislation and norms

Directive 2004/101/EC of the European Parliament and of the Council.

Directive 2003/87/EC of the European Parliament and of the Council.

Commission decision (2007) concerning the national allocation plan for the allocation of greenhouse gas emission allowances notified by Finland in accordance with Directive 2003/87/EC of the European Parliament and of the Council. 4/VI/2007.

Act on Public Contracts (348/2007).

Act on the Use of the Kyoto Mechanisms (109/2007).

Act to Amend the Emissions Trading Act (108/2007).

Act to Amend the Emissions Trading Act (1468/2007).

Emissions Trading Act (683/2004.

United Nations (1998). Kyoto Protocol to the United Nations Framework Convention on Climate Change.

Government decision (2008). Government decision on the allocation of emission allowances to installations. 14 February 2008..

2. Other written sources

Ahonen, H.-M. (2005). The Finnish CDM/JI Pilot Programme - Activities, Experiences and Lessons Learned.

Berghäll, O., Ahonen, H-M., Sinivuori, K., Snäkin, J-P. (2003). Kioton pöytäkirjan toimeenpanon säännöt (The Kyoto Protocol and its operational rules). The Finnish Environment 607. Ministry of the Environment.

Biota BD Oy (2006). Suomen CDM/JI -koeohjelman arviointi (Evaluation of Finland's CDM/JI Pilot Programme.)

Climate Wedge (2008). Analysis of Post-2012 Carbon Funds for the Ministry of Employment and the Economy. Final Report.

Electrowatt-Ekono (2006). Final Report. Ministry of Trade and Industry; study of mechanism policy options.

ECCP (2008). http://ec.europa.eu/environment/climat/eccp.htm.

European Union (2008).
http://ec.europa.eu/environment/climat/emission/2nd_phase_ep.htm.

European Climate Exchange 2009. www.exc.eu.

Executive Board (2004). EB Meeting 13.

Green Stream Network (2006). Background study for Finland's JI strategy.

Government proposal to Parliament for a supplementary budget in 2006. Helsinki 2006.

Government proposal to Parliament for a third supplementary budget in 2005. Helsinki 2005.

Hanley, N. Shogren, J. & White, B. (1997). Environmental Economics in Theory and Practice. MacMillan Press. London.

Ministerial Working Group on Climate and Energy Policy (2008). Minutes 7. Updated 26 February 2008.

IPCC (2007). IPCC Fourth Assessment Report. Intergovernmental Panel on Climate Change. http://www.ipcc.ch/.

Ministry of Trade and Industry (2007). Support services for the use of the Kyoto mechanisms. Task description. Updated 20 April 2007.

Report of the Mechanism Administration Working Group (2005). Kioton mekanismien hallinnoinnin työnjako ja resurssit (Division of labour and resources in the administration of the Kyoto mechanisms). Publications of the Ministry of Trade and Industry 3/2005.

Memorandum of the Steering Group for the Kyoto Mechanisms (2008a). Use of the Kyoto mechanisms.

Memorandum of the Steering Group for the Kyoto Mechanisms (2008b). Purchases of emission units in 2013-2020.

Memorandum of the Steering Group for the Kyoto Mechanisms (2006). Use of the Kyoto mechanisms.

Minutes of the Steering Group for the Kyoto Mechanisms (2005). Meetings 1-8.

Minutes of the Steering Group for the Kyoto Mechanisms (2006). Meetings 9-20.

Minutes of the Steering Group for the Kyoto Mechanisms (2007). Meetings 21-31.

Minutes of the Steering Group for the Kyoto Mechanisms (2008). Meetings 32-42.

Pricewaterhousecoopers (2006). Study regarding the establishment of a Finnish carbon fund.

Finnish Environment Institute (2008a). Working programme for the production of support services for the use of the Kyoto mechanisms 1 January 2008 - 31 December 2009.

Finnish Environment Institute (2008b). Support services for the use of the Kyoto mechanisms. Final report 2006-2007.

Finnish Environment Institute (2008c). Support services for the use of the Kyoto mechanisms. Fifth interim report.

Finnish Environment Institute (2007a). Support services for the use of the Kyoto mechanisms. Second interim report.

Finnish Environment Institute (2007b). Support services for the use of the Kyoto mechanisms. Third interim report.

Finnish Environment Institute (2006a). Support services for Finland's CDM/JI Pilot Programme. Final report.

Finnish Environment Institute (2006b). Working programme for the production of support services for the use of the Kyoto mechanisms. 1 March 2006 - 31 December 2007.

Finnish Environment Institute (2006c). Support services for the use of the Kyoto mechanisms. First interim report.

The World Bank (2007). State and Trends of the Carbon Market 2007.

Statistics Finland (2008). www.stat.fi.

Ministry for Foreign Affairs (2008). APCF financing meeting material.

Ministry for Foreign Affairs (2006). Financial rules of the Ministry for Foreign Affairs. 1 March 2006.

UNEP Risoe (2009). CDM/JI Pipeline Analysis and Database.

UNFCCC (2008). http://unfccc.int/kyoto_protocol/items/2830.php.

UNFCCC (2009). http://unfccc.int/.

Government report to Parliament (2005). Energy and Climate Policy for the Near Future - National Strategy to Implement the Kyoto Protocol.

State budget proposal for 2007. Helsinki 2006.

State budget proposal for 2008. Helsinki 2007.

State budget proposal for 2009. Helsinki 2008.

National Audit Office (2007). The National Audit Office's strategy for 2009-2012.

Ministry of the Environment (2009). NEFCO Baltic Sea Region JI pilot fund. Draft memorandum.

Ministry of the Environment (2008). Memorandum on an EFRD report (Multilateral Carbon Credit Fund (MCCF) 2008 Review and Work Programme 2009). Updated 12 November 2008.

3. Interviews

Service provider; Finnish Environment Institute; 27 February 2009, one person.

Ministry of Employment and the Economy; 20 March 2009, one person.

Ministry of the Environment; 11 March 2009, one person.

Ministry for Foreign Affairs; 13 March 2009, one person.

International publications

140/2007The Preparation of the Natura 2000 Network

141/2007Tax Subsidies – Achievement of Accountability

Performance Audit Manual

Performance Audit Risk Analyses

National Audit Office's separate report to Parliament on the audit of the final central government accounts for 2008 and the Report on the Final Central Government Accounts

Publications in English are available on the National Audit Office's web-site (www.vtv.fi/en). The site also contains abstracts of all performance audit reports.

NATIONAL AUDIT OFFICE OF FINLAND
Antinkatu 1, P.O. Box 1119, FI-00101 HELSINKI
Telephone +358 9 4321, fax +358 9432 5820, www.vtv.fi

ISBN 978-952-499-127-8 (Bound)