INTOSAI
Working Group
on Environmental
Auditing

Coordinated International Audit on Climate Change

Key Implications for Governments and their Auditors

November 2010

INTOSAI
Working Group
on Environmental
Auditing

Coordinated International Audit on Climate Change

Key Implications for Governments and their Auditors

November 2010

The content presented in this report is based on the collective findings of individual audits conducted by national supreme audit institutions (SAIs). However, they do not necessarily represent the particular views of individuals or individual SAIs.

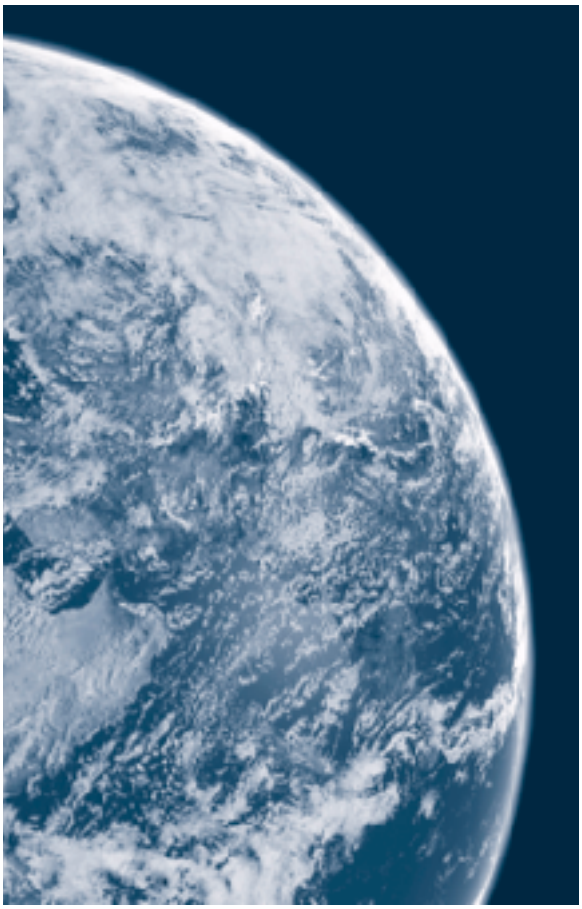
Cat. No. FA3-65/2010E-PDF
ISBN 978-1-100-17276-7

Table of Contents

Foreword

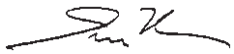
Worldwide, scientific communities consider climate change to be an important social, economic, and environmental issue that needs to be addressed through reducing greenhouse gas emissions and adapting to the resulting climatic changes, both current and potential. Countries have made important commitments in this regard, through the United Nations Framework Convention on Climate Change and its Kyoto Protocol, while negotiations on the issue continue internationally. In June 2007, 14 supreme audit institutions (SAIs) embarked on a project to cooperate in the design and undertaking of national audits of our respective governments' climate change programs and performance. The project involved a diverse group of offices—from Australia, Austria, Brazil, Canada, Estonia, Finland, Greece, Indonesia, Norway, Poland, Slovenia, South Africa, the United Kingdom, and the United States—that have varying degrees of experience in auditing governments' management of climate change. The governments of all these countries have indicated that climate change is an important issue and have made commitments to reducing greenhouse gas emissions and to addressing adaptation to climate change.

As a result of the social, economic, and environmental implications of government policies and the magnitude of public expenditures related to climate change, the actions governments take in the coming years are likely to have significant and historic implications for generations to come. As advocates of good management, effective governance, and accountability, SAIs are compelled to treat climate change policies, programs, and projects as highly material (pertinent and necessary) audit topics.



We are pleased to present the results of our audit work in this report. We hope the results of the coordinated audit will provide all SAIs—not just the 14 represented in this report—with a summary of common issues to consider as they undertake work to scrutinize their governments' achievement of climate change commitments and delivery of related policies and programs. The report highlights areas that SAIs may wish to examine to improve the implementation of their governments' climate change policies and programs. The results also provide legislatures with a means to assess the progress that governments have made and challenges they face in delivering their programs and targets.

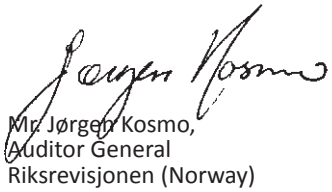
Signatures of the heads of the participating supreme audit institutions.



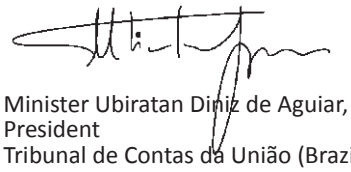
Mr. Ian McPhee,
Auditor General
Australian National Audit Office

Mr. Hadi Poernomo,
Chairman
Badan Pemeriksa Keuangan (Republic of Indonesia)

Dr. Josef Moser,
President
Rechnungshof (Austria)



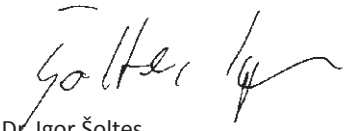
Mr. Jørgen Kosmo,
Auditor General
Riksrevisjonen (Norway)



Minister Ubiratan Diniz de Aguiar,
President
Tribunal de Contas da União (Brazil)

Mr. Jacek Jezierski,
President
Najwyższa Izba Kontroli (Poland)

Ms. Sheila Fraser,
Auditor General
Office of the Auditor General of Canada

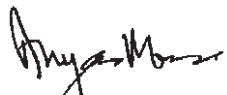


Dr. Igor Šoltes,
President
Računsko sodišče (Slovenia)

Mr. Mihkel Oviir,
Auditor General
Riigikontroll (Estonia)

Mr. Terence Nombembe,
Auditor General
Auditor General of South Africa

Dr. Tuomas Pöysti,
Auditor General
Valtiontalouden tarkastusvirasto (Finland)



Mr. Amyas Morse,
Comptroller and Auditor General
National Audit Office (United Kingdom)

Mr. Efstathios Rontogiannis,
Senior Vice-President
Ελεγκτικό Συνέδριο (Greece)

Mr. Gene L. Dodaro,
Acting Comptroller General
Government Accountability Office
(United States of America)

Acknowledgments

It is sometimes said that the journey of a thousand miles begins with a single step. I can vividly recall the enthusiasm that marked the beginning of this cooperative project in June 2007 at the 11th Meeting of the INTOSAI Working Group on Environmental Auditing. And I am thankful for the passion and dedication of so many individuals who have sustained our efforts together over these past three years.

While this summary report is the culmination of our work together, it is not the only measure of our success. Together, we have encouraged and supported national audits of climate change programs, shared our best practices and ideas on how to audit such programs, and have identified lessons learned to strengthen cooperative undertakings in the future.

This project would have not been possible without the leadership and commitment of the heads of the participating supreme audit institutions named in this report. I am especially grateful to Rick Smith for his wisdom early in the project and to Ms. Sheila Fraser, Auditor General of Canada, for her unwavering support throughout its course.

This report is the product of the efforts and contributions of all of the participants identified in Appendix 3. Particular thanks are due to the Office of the Auditor General of Canada's Sylvie Marchand and especially George Stuetz for their authoring, and to Jocelyn Lefèvre, Laurel Hyatt, Marc Lalande, and Rose Hum for their work in editing and designing the report.

It has been a challenging and rewarding journey together. I would like to acknowledge and thank in particular Airi Andresson, Steve Elstein, Jill Goldsmith, Mike Hix, Heinrich Lang, Kristin Rypdal, Edward Simanjuntak, Juliana Soares, and Wynand Wentzel for their ongoing support, wise counsel, and valued friendship along the way.

John Reed
Project Leader
Office of the Auditor General of Canada

November 2010

Executive Summary

Scientific research suggests that climate change has the potential to affect ecosystems, water resources, food production, human health, infrastructure, and energy systems, among other things. Scientific evidence from around the world suggests that climate change has already affected natural and human environments. Countries around the world have identified climate change as a pressing worldwide issue by adopting the United Nations Framework Convention on Climate Change and its Kyoto Protocol. They are collectively and individually taking actions to limit greenhouse gas emissions and adapt to the current and potential impacts of climate change. Substantial sums of money have been spent to date and will be spent in future to address this issue.

Supreme audit institutions (SAIs) play a major role in auditing government accounts and operations. They have different mandates but share a common responsibility to provide legislatures and their citizens with the information they need to hold governments accountable for prudent financial management, and to varying degrees for compliance with domestic laws and international agreements, policy implementation, and program performance. The work of SAIs is independent, non-political, and fact-based, with the aim of promoting effective management and good governance within government.

A unique cooperative effort to audit climate change programs

Fourteen supreme audit institutions from six continents have for the first time worked cooperatively to design and undertake performance audits of their national governments' implementation of commitments

and programs related to the mitigation of and adaptation to climate change. They include SAIs from both developing and developed countries.

To support the national audits, the participating SAIs developed a framework audit approach, including potential audit objectives and criteria, and questions that could guide any audit work undertaken. Each SAI designed, carried out, and domestically reported national audits to respond to their country's climate change priorities and in accordance with their internal practices and standards. This approach has been highly successful in achieving the objective of encouraging and supporting effective national audits of climate change programs.

These audits have covered a variety of topics, including compliance with international commitments related to emission reduction targets, the assessment of risks and vulnerabilities to support adaptation efforts, the coordination and management arrangements across government agencies, the availability of reliable information to support decision making, and the performance of the policy instruments used. The audits have identified the strengths and weaknesses of their respective governments' climate change efforts and have led to some governments making improvements and indicating that noted deficiencies would be addressed. Participating SAIs believe the audits have helped legislators and the public hold governments accountable for the effective and efficient management of public funds spent on mitigation and adaptation.

Highlights of the national audits' findings

Dealing with climate change presents a formidable challenge for countries around the world. Climate change cuts across many economic sectors and levels of society and demands cooperative and coordinated action by governments at all levels, as well as coordination with international institutions, scientific bodies, private industry, non-governmental organizations, communities, and individuals. The audits found a wide variety of efforts underway to address climate change in the countries examined. Common findings resulting from these individual national audits are set out below.

Emission reduction targets, objectives, or commitments are generally in place in countries addressed by this report but are not always supported by comprehensive and specific national, regional, or sectoral strategies and plans. Targets, objectives, or actions are not always specified at regional or sectoral levels, which makes it difficult to drive action and to monitor progress. In addition, many audits concluded that the targets in the sector plans and associated goals, where they exist, do not always add up to the national target, objective, or commitment to act. Some audits found that strategies and plans are relatively short term and therefore do not form the basis for achieving sustained success over the long term.

Conflicts between programs in other areas and climate change targets, objectives, or actions have impeded effectiveness. Some audits found government programs that conflicted with climate change targets, objectives, or actions. For example, land-use policies that permit urban sprawl can work against efforts to improve energy efficiency; similarly, agriculture policies can undermine efforts to reduce the loss of forests.

Work to assess risks from climate change and planning for adaptation is at an early stage despite long-standing international commitments to plan for adaptation. Robust and comprehensive evidence-based assessments of climate impact risks and vulnerabilities are essential, yet the audits found that many governments have not fully completed the risk management process and started to plan for adaptation to climate change. SAIs consider that if a full risk assessment has not been completed but certain vulnerabilities are already known, governments can respond. In addition, governments should consider potential climate change impacts when formulating public policies to reduce the need for more costly steps in the future.

Emissions trading and the Clean Development Mechanism, which are important policy tools under the Kyoto Protocol, have not yet driven significant emissions reduction. Many audits have concluded that there are difficulties in designing and implementing emissions trading. The most important difficulty seems to be to limit the number of allowances in the system to deliver a market price high enough to trigger investment that leads to major reductions in

emissions. Audits also found that the implementation of the Clean Development Mechanism in some developing countries has been slow and is not yet driving the transfer of technology and funds.

Weak management structures impair coordination and alignment among levels of government. The audits identified some lack of coordination within national governments or ineffective management and governance structures. In most countries, an overall lead agency has been established to manage the government's climate change approach, but in some cases, clear and distinct roles and responsibilities of the numerous national government agencies involved in mitigation and adaptation efforts have not been defined. Mitigation and adaptation require actions at all levels of government and coordination between them. Adaptation in particular requires coordination across different levels of government since many effects of climate change are found at local levels.

High-quality information on climate change efforts is important but often lacking. The audits found that a lack of reliable and comprehensive data on numerous aspects of climate change hindered the ability of governments to make informed decisions and monitor actions or progress toward targets or longer-term objectives. For example, adaptation requires good information on risk and vulnerability. Several audits identified challenges with the adequacy of information and data to measure the progress of mitigation programs and substantial information gaps that hinder the ability of nations to pursue or enhance their adaptive efforts.

Evaluation of key policy choices and instruments was not always in place. The audits identified a variety of policy tools in use to mitigate climate change. These include economic instruments (such as emissions trading, subsidies, investments, and taxes), legislative instruments (such as acts and regulations), and voluntary agreements. Although governments strive to choose policy tools based on principles of cost effectiveness, policy effectiveness, and efficiency, audits found that such policy choices are rarely based on adequate data and economic modelling, and their potential or actual effects are often unknown. The United Nations Framework Convention on Climate Change has a requirement that countries evaluate the impact of their climate change policies and measures.

INTRODUCTION

Climate change: What governments do, matters

Climate change has the potential to affect such things as ecosystems, water resources, food production, human health, infrastructure, and energy systems in all countries. The Intergovernmental Panel on Climate Change (IPCC)—an international scientific body under the United Nations that reviews and assesses the most recent scientific, technical, and socio-economic information on climate change—has concluded that "warming of the climate system is unequivocal" (*Climate Change 2007: Synthesis Report*). National governments have accepted and supported the findings from this scientific body.

The IPCC reports that there have been observed increases in the global average air and ocean temperatures and sea level, along with widespread melting of snow and ice. The IPCC considers that it is "very likely" that the increase in average temperatures in the past 50 years is due to the observed increase in human-induced greenhouse gas (GHG) concentrations. The IPCC also reports that human-induced global GHG emissions have increased by 70 percent between 1970 and 2004 and the temperature is projected to increase further over the next decades. The IPCC has concluded that under current policies, GHG emissions "will continue to grow over the next few decades." There is now evidence from all continents and most oceans that regional climate changes have already affected many natural and human environments.

Climate change is also forecast to have major economic impacts on the global economy and individual national economies. According to the IPCC, climate change will have varying economic impacts by region, which are "very likely" to result in net annual costs that will rise alongside

global temperatures. Based on the continuing increase of greenhouse gases in the atmosphere, "the net damage costs of climate change are projected to be significant and to increase over time," the IPCC reports (*Climate Change 2007: Synthesis Report*). For countries with a high sensitivity (meaning that a small change in climate can have a large impact) and/or low capacity to adapt to climate change, the "net costs will be significantly larger than the global average." Other studies, like the *Stern Review on the Economics of Climate Change* prepared for the British government, conclude that the costs of addressing climate change will be lower than the actual costs that climate change will impose upon societies, if it is not addressed.

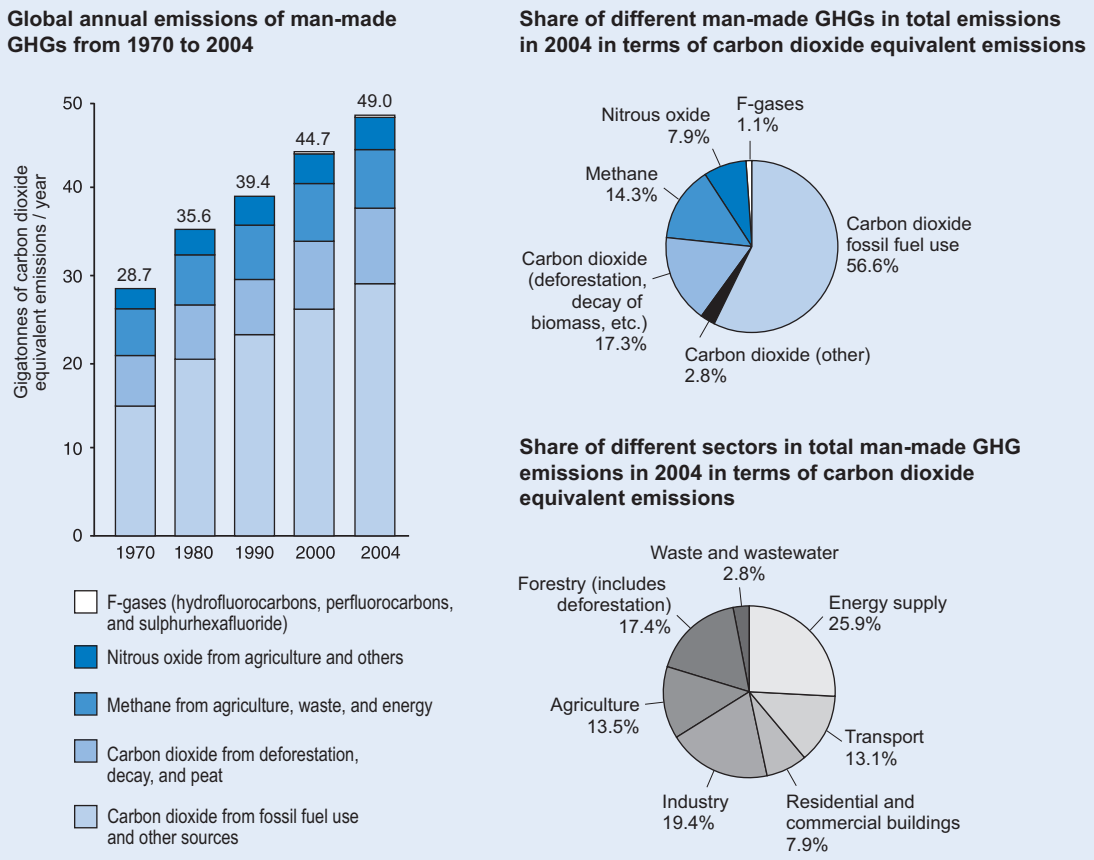
Major greenhouse gas emissions that contribute to climate change include carbon dioxide, methane, nitrous oxide, and synthetic gases such as hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride (Exhibit 1). Carbon dioxide resulting from the combustion of fossil fuels is the largest source of greenhouse gas emissions. Livestock, rice cultivation, waste, as well as energy production and use contribute to

methane emissions; agricultural and industrial processes generate nitrous oxides; and deforestation results in the release of carbon dioxide when forests burn or are cleared.

Efforts to address climate change typically fall into two categories: mitigation and adaptation. Mitigation generally involves efforts to decrease greenhouse gas emissions or enhance carbon **sinks**[1] through technology, substitution, efficiency gains, or other activities such as planting forests to absorb carbon dioxide from the atmosphere.

Adaptation involves efforts to reduce the vulnerability and increase the resilience of natural and human systems to the effects of climate change. Both mitigation and adaptation are critical to efforts to address climate change because the concentration of greenhouse gases in the atmosphere continues to rise and many of the gases stay in the atmosphere for decades or longer. Thus, an effective climate change strategy involves efforts to decrease emissions while also adapting to the reality of a changing climate.

Exhibit 1 Global man-made greenhouse gas emissions 1970–2004



Source: *Climate Change 2007: Synthesis Report*. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Figure 2.1. IPCC, Geneva, Switzerland.

1. See the Glossary for definitions of the bolded terms in this report.

The United Nations Framework Convention on Climate Change (UNFCCC) is the main global agreement on climate change. The UNFCCC rests on a set of operational principles, which include those of "equity" in allocating responsibilities and "common but differentiated responsibilities and respective capabilities" (from the UNFCCC's Article 3 on principles and Article 4 on commitments). That is, countries should respond according to their relative capacity, with developed or industrialized countries taking the lead in reducing human-induced emissions. The **Kyoto Protocol** under the UNFCCC was adopted in 1997, and took effect in 2005. The protocol commits **Annex I parties—**developed countries and countries in economic transition (countries of the former Soviet Union and Eastern Europe)—who ratified it to reduce or limit their greenhouse gas emissions on an aggregate average of 5 percent below 1990 levels in the period 2008–2012. The protocol provides some additional flexibility to countries with economies in transition to select the base year from which their emission reductions are set. The protocol enables Annex I parties to use flexible mechanisms based on market principles, which include the following:

- Emissions trading—enables Annex I parties with emissions that are lower than their Kyoto commitment to sell their excess Kyoto Protocol units to other Annex I parties that need additional Kyoto units to cover their actual emissions.
- The Clean Development Mechanism (CDM)—enables Annex I countries with Kyoto commitments to purchase Kyoto units by funding projects that reduce emissions in developing countries that have agreed to the protocol (**non-Annex I parties**). Developed countries can use CDM in addition to reducing their domestic emissions through domestic actions.
- Joint Implementation—enables Annex I countries to purchase Kyoto units through cooperative implementation of and investment in emission reduction projects in other Annex I countries, notably economies in transition.

According to the protocol, both the CDM and joint implementation flexible mechanisms operate as supplementary options and do not remove the obligation of Annex I countries to comply with their Kyoto target primarily through domestic efforts.

Negotiations have been ongoing under the UNFCCC to reach a global agreement on future climate commitments. The parties to the convention met in Copenhagen in December 2009, where a non-binding political agreement (Copenhagen Accord) was reached among many of the countries. To date, more than 135 countries have agreed to the accord while other countries have rejected it. The Copenhagen Accord includes an objective to limit global warming to below two degrees Celsius, emphasizes that deep cuts in emissions are required to reach this target, and highlights the need for an agreement to cooperate on ensuring that global emissions peak as soon as possible. Ongoing work is being undertaken with regards to monitoring, reporting, and verification of reductions achieved through various types of projects to be undertaken in the future. The Copenhagen Accord notes that developed countries shall provide adequate, predictable, and sustainable financial resources, technology, and knowledge to support mitigation and adaptation action in developing countries. According to the accord, it is a goal that developed countries will have jointly mobilized US$100 billion annually by 2020 to address the needs of developing countries.

Role of supreme audit institutions

Supreme audit institutions (SAIs) play a major role in auditing government accounts and operations. SAIs go by different names—sometimes National Audit Office, Court of Audit, Audit Board, and Office of the Auditor General—and have different mandates but similar responsibilities to provide legislatures and society with the information they need to hold governments accountable. SAIs audit governments' financial management, compliance with domestic laws and international agreements, policy implementation, and performance. SAIs are independent, non-political, and fact-based in their work.

The International Organization for Supreme Audit Institutions (INTOSAI, www.intosai.org) is the professional organization of SAIs in countries that belong to the United Nations or its specialized agencies. INTOSAI provides a forum in which government auditors from around the world can discuss issues of mutual concern and keep abreast of the latest developments in auditing and other applicable professional standards and best practices. INTOSAI has several thematic working groups, including the Working Group on Environmental Auditing (WGEA, www.environmental-auditing.org).

In June 2007, the WGEA embarked on this coordinated audit because of the economic, social, and environmental significance of governments' work to address climate change challenges. The project involved 14 supreme audit institutions—from developed countries, countries with economies in transition, and developing countries—and included Australia, Austria, Brazil, Canada, Estonia, Finland, Greece, Indonesia, Norway, Poland, Slovenia, South Africa, the United Kingdom, and the United States. Exhibit 2 shows total changes in greenhouse gas emissions from the nations involved in the coordinated audit, during the years indicated. With the exception of four countries, greenhouse gas emissions have increased from their base years (the year from which emission reductions are calculated).

For this project, the SAIs cooperated in the design and undertaking of national audits of their respective governments' climate change programs and performance. Each supreme audit institution has undertaken one or more audits (in some cases, studies and reviews) in the fields of greenhouse gas emissions mitigation and/or climate change adaptation to determine whether their governments are doing what they said they would do. During this period, 10 SAIs of the European Organisation of Supreme Audit Institutions (EUROSAI), a regional working group of INTOSAI, also undertook joint audit work focused on climate change. The findings of the 33 national audits and the EUROSAI audit work are included in Appendix A and Appendix B, respectively.

Purpose of this report

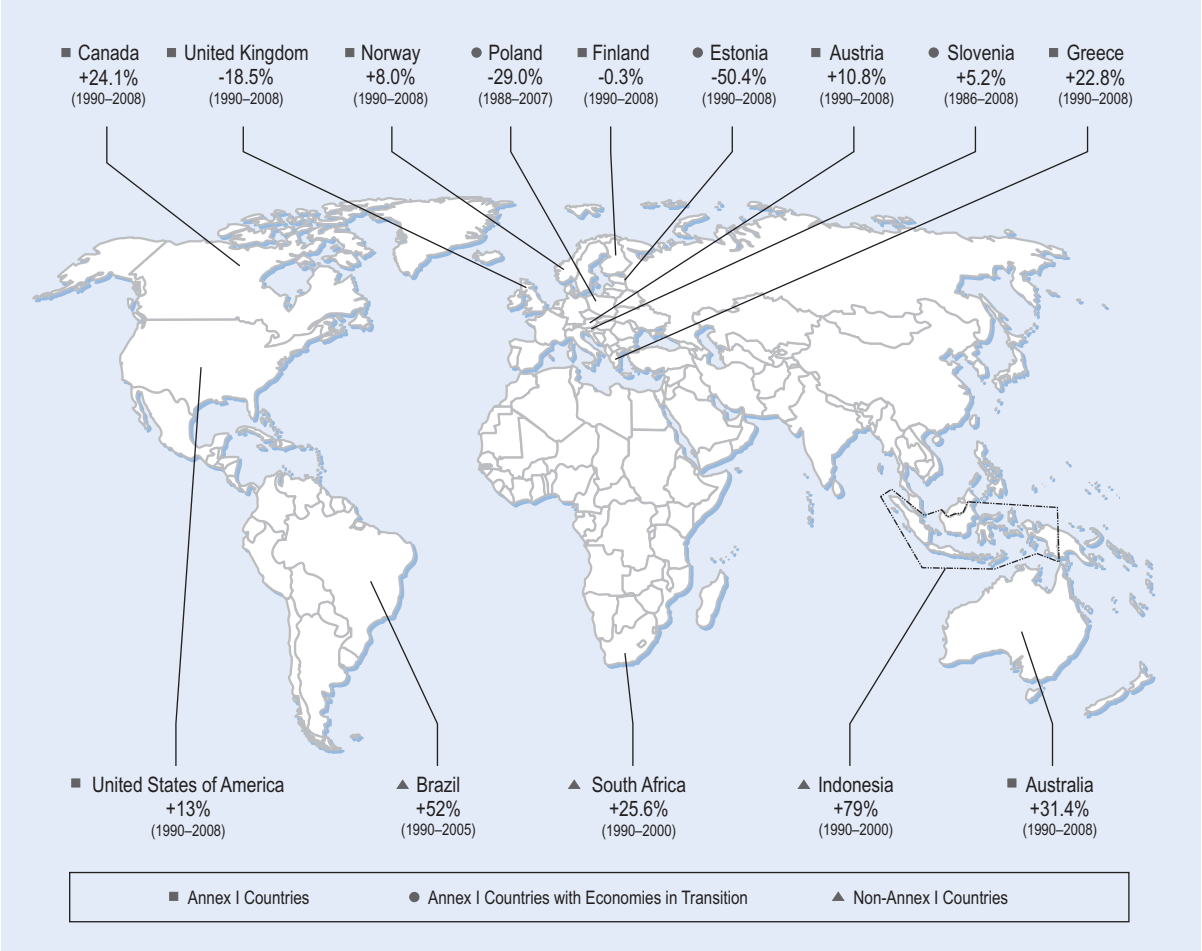
This report draws on the findings of the 33 audits of national implementation of climate change programs. It summarizes the key findings from this work and aims to

- report on whether governments are (or are not) doing what they said they would do;
- encourage governments to take, improve, and/or strengthen proper and effective actions;
- assist legislatures in holding governments to account;
- inspire other SAIs to undertake audits of climate change and coordinated audits and to help them by raising awareness of appropriate audit techniques; and

- raise awareness of the important role that supreme audit institutions play in bringing accountability to governments that are implementing policies and actions related to greenhouse gas mitigation and climate change adaptation.

Additional details on the methodology employed in this project are in the Project Methodology section at the end of this report.

Exhibit 2 Change in greenhouse gas emissions for coordinated audit partners*



* The information in this exhibit is derived from GHG emission inventories submitted by Annex I countries of the UNFCCC Secretariat in accordance with their obligations under the United Nations Framework Convention on Climate Change. The GHG emission inventory numbers used exclude those related to land use, land-use change, and forestry (LULUCF).

For Non-Annex I countries, the information is derived from the following sources:

- Brazil—Official preliminary information from Brazil's Second National Communication to the UNFCCC Secretariat, to be released in 2011, and provided by the Ministry of Science and Technology
- Indonesia—Indonesia's First National Communication to the UNFCCC Secretariat, and will be revised in 2011 through Indonesia's Second National Communication
- South Africa—South African Gazette No. 32490 of 12 August 2009, "Draft National Greenhouse Gas Inventory for the Republic of South Africa"

The information for each country has been provided by the respective supreme audit institutions. In addition, it should be noted that country emissions vary from year to year and are influenced by external factors beyond the control of a country; for example, a colder winter than normal requires more heating, which will result in higher greenhouse gas emissions.

Summarized Findings and Case Studies from the National Audits

Summarized findings from the national audits are presented within the two major focus areas of the work conducted: greenhouse gas mitigation and climate change adaptation. What the audits sought to determine are shown in italics at the start of each subtopic. Case studies from selected national audits serve as examples to illustrate the findings.

Mitigation of greenhouse gas emissions

Mitigation generally involves efforts to decrease emissions through technology, substitution (such as using cleaner technologies, alternative energy sources, and different raw materials), improving efficiency, structural changes in society, behavioural changes, reducing deforestation, and other efforts such as enhancing emissions sinks by, for example, the reestablishment of forests. It requires efforts to identify key sources of emissions along with policies, actions, and programs that in the short term and long term will reduce greenhouse gas emissions. The audits examined countries'

- mitigation objectives, targets, strategies, plans, and actions to reduce greenhouse gas emissions;
- monitoring activities through the use of emissions inventories;
- development and evaluation of policy choices and policy instruments;
- individual policy tools;
- work within specific sectors; and
- coordination and management.

Mitigation targets

Clear numerical or other measurable targets are necessary for a government to manage its mitigation strategies or plans. Targets that can be used as audit criteria are also a basis for accountability and reporting. In order to achieve the targets a country has committed to, targets should be specific, measurable, attainable, relevant, and time-bound. A clear measurable target that can be reviewed will facilitate the monitoring and management of progress toward achieving that goal, highlight conflicts with other goals, and improve government's ability to change course and minimize risk. The audits sought to determine whether targets were present and if they included the key elements necessary to support management objectives.

All partners in the global coordinated audit on climate change are parties to the UNFCCC, which provides general commitments on mitigation measures. A majority of the countries have also

quantified legally binding targets under the Kyoto Protocol, with the exception of the developing countries and the United States. The countries without a legally binding numerical target have established other targets or specific programs and activities that may contribute to reduced greenhouse gas emissions. Furthermore, some Annex I parties have established targets that are either stricter than their Kyoto Protocol target or reflect target commitments beyond the 2008 to 2012 period set under the protocol.

The audits found that for a majority of countries, the targets set are missing key elements. For example, some audits report that targets are not specific at the regional or industrial sectoral level. Also, some audits conclude that targets are not measurable. Consequently, it is a challenge to monitor progress against these targets.

Strategies and plans

The development of strategies and/or plans that describe the implementation of policy instruments to mitigate emissions in all sectors assist authorities in moving toward targets. Furthermore, government follow-up of strategies or plans is necessary to provide information about whether plans and/or strategies will be successfully completed. A long-term perspective is necessary for achieving climate goals. The audits sought to determine whether appropriate and sufficient strategies and/or plans were in place to meet greenhouse gas mitigation targets.

The audits found that most Annex I countries have strategies or plans in place at the national, regional, and/or sectoral levels that purport to meet their Kyoto commitments. Only one Annex I country that ratified the protocol does not have a plan in place to meet its Kyoto target. As some SAIs report, even if there is a plan, there are not always effective implementation mechanisms to ensure target achievement. Two SAIs, despite their governments having plans in place, have concluded that their countries' Kyoto target will not be met.

For most countries, national mitigation strategies or plans include the most important sources of greenhouse gas emissions. Many audits concluded that the plans are not integrated between sectors in the sense that the sector plan targets do not add up to the national target and/or that plans in one sector are not consistent with others. Some audits also conclude that certain sectoral policy plans and/or targets may result in increased greenhouse gas emissions. For example, audits have concluded that policies on transport, energy production, and land-use management (see Case Study 1 from Finland) can be in conflict with attempts to reduce greenhouse gas emissions. Similarly, agriculture policies can undermine efforts to reduce emissions from deforestation.

Although many countries support the strategic target to limit global warming by two degrees Celsius, and some have even set specific emission reduction targets for 2020 and beyond, some audits have pointed out that strategies or

Case Study 1: Incoherence of policy measures increases urban sprawl in Finland

A compact community structure is widely recognized as an important issue in various strategies and targets in the Finnish land-use planning system. Despite this, urban sprawl is very common outside growing cities. A scattered settlement structure increases traffic and negative climate impacts. The audit found that the state's actions are not sufficiently coordinated and that what is needed is a horizontal strategy that gives responsibilities to all government sectors including the ministries of Finance and Agriculture. (See Finland's audit abstract "Supplying property for housing and preventing urban sprawl: The role of a state" in Appendix A of this report.)

plans and their implementation rarely have a long-term perspective. The audits also found that for some countries where the Kyoto target already is met, little additional action has been taken because the incentives to undertake further mitigation are lacking (see Case Study 2 from Estonia). There is a risk that the absence of long-term strategies and/or plans makes climate change management more difficult and prone to a lack of effectiveness in the long run.

Monitoring achievement of national targets through emissions inventories

Credible inventories of sources of greenhouse gas emissions and removals by sinks contain essential data to monitor progress toward targets. The audits sought to determine whether the emissions inventories were credible.

Regular emissions inventory reports are required from all parties to the UNFCCC. However, the level of detail and frequency differs between Annex I and non-Annex I parties. Annex I parties' inventories are checked through an annual UNFCCC expert review process. Non-Annex I parties regularly prepare emissions inventories according to their commitment under UNFCCC, but are not required to report annually and are not checked the same way.

All Annex I parties report to UNFCCC and meet their reporting obligations, although some with delay. A few SAIs report that they have identified problems with inventories that are overlooked in the UNFCCC review process. This illustrates the importance of independent audits of the inventories.

Some audits identified emissions inventory problems in the **land use, land-use change, and forestry sector**. The findings of most countries indicated that the land-use sector faces serious challenges when it comes to monitoring emissions. However, some audits also showed that work is in progress to improve the inventories in this sector (see Case Study 3 from Estonia).

Developing and evaluating policy choices and policy instruments

Choosing and implementing appropriate policy instruments is an essential part of a plan to mitigate greenhouse gas emissions. Adequate data is important for governments in order to ensure that policy choices adhere to the key principles of effectiveness and efficiency, as well as to evaluate the impact those policy choices may have on other countries. Adequate projections of future emissions are necessary to choose and adjust appropriate policy instruments. The audits sought to determine whether the policy instruments selected by the governments are contributing to meeting the targets.

The audits found that a variety of policy instruments are being used to mitigate climate change. Economic instruments are important in all countries and include emissions trading, subsidies, investments, and taxes. Legislative tools (acts and regulations) and voluntary agreements are also frequently used. The wide array of policy

Case Study 2: Estonia's Kyoto target was already met when the target was set

In some countries, such as Estonia, greenhouse gas (GHG) emissions were already below the Kyoto target when the target was set. For example, at the time of signing the Kyoto Protocol in 1998, Estonia's GHG emissions had dropped approximately 50 percent compared with the base-year level (1990). This was mainly caused by the collapse of big industries producing for the Soviet market. Nevertheless, Estonia's national GHG reduction plan sets the target at 8 percent below 1990 levels and describes no further mitigation targets. The audit found that this has been one of the reasons for low prioritization of greenhouse gas mitigation. (See Estonia's audit abstract "The state's efforts to reduce greenhouse gas emissions" in Appendix A of this report.)

instruments can be necessary to reach targets but can be a challenge when it comes to evaluating their individual effects. This underlines the importance of good reporting systems and performance indicators to measure the actual results. It also implies a particular challenge for policy makers with respect to coordination.

Most countries' governments state that their choices of policy instruments are based on the key principles of cost effectiveness, efficiency, and effectiveness. However, governments are not assessing performance of key individual instruments in all cases or the assessments are incomplete. The audits found that where assessments were made, policy choices and targets are rarely based on adequate data. Several audits have concluded that there is a lack of information about the degree of cost effectiveness of different instruments and their potential or actual effects are often unknown (see Canada's Case Study 4 on the tax credit for transit use and Slovenia's Case Study 5 on indicators). Furthermore, costs of measures are frequently reported to be unknown or uncertain. As a consequence, it is difficult to evaluate the performance of policy instruments, both prior to and after implementation. In some cases, examples of appropriate monitoring were found (see Brazil's Case Study 6 on monitoring of vegetal cover loss).

Projections of greenhouse gas emissions are based on a number of assumptions about economic development, technology changes, and effects of policy tools, and require inputs of modelling work. Some audits have identified problems with greenhouse gas emissions projections, such as with respect to their input data, realistic assumptions, and level of detail. The consequence can be that policy tools that have been chosen do not lead to expected

Case Study 3: Deficiencies in Estonia's national greenhouse gas inventory were overlooked but efforts for improvement are underway

The audit carried out by the supreme audit institution of Estonia discovered several deficiencies in the national greenhouse gas (GHG) inventory in addition to those noted by the United Nations Framework Convention on Climate Change experts who conduct an annual review of all Annex I parties' emissions inventories.

To find out the potential problems related to the quality of the Estonian GHG inventory, the Ministry of the Environment initiated a twinning project between Estonia and Finland. The inventory experts from Statistics Finland together with the Estonian inventory compilers reviewed the Estonian inventory report and common reporting format tables and made recommendations for improvement. The project focused on the following sectors: energy; industrial processes; agriculture; land use, land-use change, and forestry; and waste. The audit found that the Ministry of the Environment has made a good effort, which hopefully will ensure the quality control of these systems in the future. (See Estonia's audit abstract "The state's efforts to reduce greenhouse gas emissions" in Appendix A of this report.)

Case Study 4: Canada's Public Transit Tax Credit is expected to have negligible environmental impact

In its 2006 Budget, the federal government of Canada announced the Public Transit Tax Credit for individuals who take public transit. The measure was intended to ease traffic congestion in urban areas, to improve the environment through the use of public transit, and to reduce personal income taxes. Estimates indicated that the Public Transit Tax Credit would lead to negligible reductions in Canada's greenhouse gas emissions, despite the CAN$635 million reported in the 2007 Budget as the three-year cost of the Tax Credit as of that date. With regard to other air emissions, no analyses were provided to support the assertion that the Tax Credit would result in measurable impacts. (See Canada's audit abstract "Managing air emissions" in Appendix A of this report.)

reductions in greenhouse gas emissions or are not cost effective, or that unrealistic targets are set.

Using policy instruments to achieve targets

The use of policy tools such as economic instruments, depending on their design, can be considered a cost-effective way to meet climate targets. Both emissions trading and taxes are policy instruments that put a price on greenhouse gas emissions and are potentially cost effective. For an emissions tax to be effective, governments should have a clear understanding of how a policy tool of this kind will lead to a change of behaviour, and therefore which combination of tools to use. Putting a price on the production of greenhouse gases is important to trigger investments into cleaner technologies and is in accordance with the "polluter pays principle"—the idea that the entity that creates emissions should pay for their cleanup or mitigation. The audits sought to determine whether economic instruments are being managed effectively.

All of the European countries included in this report are taking part in the **European Union Emissions Trading Scheme** (EU ETS), the largest GHG emissions trading system now in operation, and in these countries the audits show a high reliance on EU ETS as a policy tool to mitigate greenhouse gas emissions.

Many audits have concluded that the current market **emissions allowance** price is not high enough to trigger major reductions in emissions or in investments in cleaner technologies. The allocation principles of the EU ETS are essential for determining efficiency and cost effectiveness. The audits found that countries in the past have allocated allowances to company facilities based on past emissions in combination with projections of future emissions. Several audits pointed out that the result was too many allowances in the system. As a result, the allowances were without economic value, which meant there were few economic incentives to cut emissions. In addition, the economic downturn and uncertainties with

Case Study 5: Government did not monitor and evaluate the effectiveness and efficiency of each policy instrument in Slovenia

A national audit established that in the 2005–2008 period, the Slovenian government did not monitor and evaluate the effectiveness and efficiency of each policy instrument of the Slovenian climate change policy. It was not possible to determine the relative contribution of each policy instrument to the overall climate change policy. The national audit office recommended that the Ministry of Environment and Spatial Planning introduce a solid performance indicator system to be able to constantly monitor the performance of each policy instrument. In the preparation of its plan for 2009–2012, the ministry evaluated the contribution of each policy instrument that was part of its 2006 climate change policy and designed a performance indicator system to constantly monitor performance of each instrument. (See Slovenia's audit abstract "Achievement of objectives set to protect air and ozone layer and to tackle climate change" in Appendix A of this report.)

Case Study 6: Brazil's monitoring and results management are a good practice

The monitoring programs in Brazil follow up in detail the loss of vegetal cover of the Amazon region and inform actions to prevent and fight against deforestation and fires. These monitoring programs contribute to a reduction of greenhouse gas emissions. In addition, the monitoring confirms if those governmental actions brought the expected results and effectively contributed to reducing the deforestation in the region. The audit found that this was a case of good management. (See Brazil's audit abstract "Public policies regarding the mitigation of greenhouse gas emissions in the Legal Amazon forest region" in Appendix A of this report.)

respect to a global climate agreement have contributed to a lower price. Some audits have concluded that the market's current low carbon price and uncertainty concerning the future carbon price will affect the level of investments in today's carbon reduction technologies and the degree to which these systems are able to deliver emission reductions (see the United Kingdom's Case Study 7 on the EU ETS).

In audits looking at taxes and charges, some emitters were given exceptions or lower rates. This generally has resulted in a low degree of effectiveness when it comes to emissions reductions in a situation where the tax level is too low. Audits have also concluded that taxes have had a large impact on reducing growth in GHG emissions (see Norway's Case Study 8 on carbon tax).

The credibility of the EU ETS depends on high-quality emissions data and reliable projections for each facility. Consequently, there is a need for verification of historical data and/or projections as well as the actual emissions in the trading period (see Case Study 9 from Austria and Case Study 10 from Poland regarding verification issues). All countries with an EU ETS report that emissions from companies are reported and verified. In many countries, independent accredited assessors validate the emissions. With a single exception, none of the audits has identified major implementation problems with the EU ETS emissions verification. Problems

Case Study 7: UK review of the European Union Emissions Trading Scheme found deficiencies

The United Kingdom review found that the European Union cap for emissions of greenhouse gases under Phase II of the EU Emissions Trading Scheme (ETS) would not require an absolute reduction in emissions across the EU if participating industries used all the Kyoto Protocol's project credits for emissions reductions in developing countries. The review found that the ETS had achieved a functioning carbon market and UK companies reported that it had some impact on company behaviour. But the global recession would reduce the impact of the scheme. The decision to permit allowances and project credits to be carried forward to the ETS's third phase may help prevent another collapse in the allowances market but it would reduce the scheme's impact in Phase III. (See the United Kingdom's abstract "European Union Emissions Trading Scheme" in Appendix A of this report.)

Case Study 8: Carbon tax on Norwegian petroleum activities has reduced the growth in emissions

Energy generation causes about 90 percent of the emissions from Norway's petroleum sector. A carbon dioxide tax on petroleum activities offshore was introduced in Norway in 1991. The audit found that this tax level translates into a cost per tonne of carbon dioxide emitted that is higher than in other sectors. In addition, emissions from this sector have been lower than they would have been without the tax. Operators report that measures to improve energy efficiency have been motivated by taxation. The audit found that this effect has decreased in recent years because available reduction measures are no longer considered cost effective by the companies. (See Norway's audit abstract "The Office of the Auditor General's investigation into goal achievement in climate policy" in Appendix A of this report.)

Case Study 9: Audited emissions reports improved quality of Austrian data

As part of the emissions trading system, plant operators in Austria had to submit carbon dioxide emissions reports to a database at the Ministry of Agriculture, Forestry, Environment and Water Management. Every emission report had to be checked by an independent certified auditor prior to submission. The audit found that this improved the quality of the submitted data significantly. (See Austria's audit abstract "Emission trading system" in Appendix A of this report.)

identified included the lack of on-site checks and verifiers trusting data submitted by companies.

The Clean Development Mechanism of the Kyoto Protocol

The purpose of the Clean Development Mechanism (CDM) of the Kyoto Protocol is to assist parties not included in Annex I to achieve sustainable development, and to assist Annex I parties to achieve compliance with their quantified emissions limitations. The Kyoto Protocol states that the use of the flexible mechanisms should be supplemental to domestic action. The Kyoto Protocol rules state that a CDM project must be additional. That is to say, a project must reduce emissions by sources or enhance removals by sinks in quantities that are additional to any that would have otherwise occurred without the CDM. The audits sought to determine whether CDM is being implemented as required.

The coordinated audit found that many countries will not meet their Kyoto targets unless they buy emission credits through a process such as CDM. The audit has examined plans to use the CDM. CDM programs are in place in developed countries that need to purchase credits in the market to meet their commitment, but several countries without a short-term need have also established CDM programs. The parties to the protocol have not determined a ceiling for use of the flexible mechanisms in order to fulfill individual national commitments. Therefore auditors could not determine whether domestic action is sufficient.

Few SAIs have reviewed the results of CDM, and those that have examined the issue have found that not all CDM projects are **additional**, in spite of improvements in the UN approval system to ensure that projects are additional (see Case Study 11 from the United States on the CDM). Also, emission

Case Study 10: Emissions in Poland were verified by authorized auditors

In Poland, reports were verified by authorized auditors or inspectors for environmental protection. The Polish Centre of Accreditation accredited the verifiers, and the Polish National Administrator of Emission Trading managed the auditors' register. The audit found that the verification system was in accordance with EU requirements for emission verification. (See Poland's audit abstract "Implementation of selected tasks under the provisions of the United Nations Framework Convention on Climate Change" in Appendix A of this report.)

Case Study 11: The United States identified lessons learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism

As part of efforts to learn from the international experience with emissions trading and the Clean Development Mechanism, the US Government Accountability Office (GAO) identified important program design and implementation issues that are relevant to climate change policy proposals under consideration in the United States. With respect to emissions trading, GAO found that (1) accurate emissions data are essential to setting an effective emissions cap; (2) a trading program should provide enough certainty to influence technology investment; and (3) the method for allocating allowances may have important economic effects, namely, free allocation may distribute wealth to covered entities, whereas auctioning could generate revenue for governments. Regarding the Clean Development Mechanism (CDM), GAO found that the CDM provided a way for industrialized countries to meet their emission reduction targets at less cost than reducing emissions at home but that some offset credits were awarded for projects that would have occurred in the absence of the CDM, despite a rigorous screening process. Such projects do not represent net emission reductions and can compromise the integrity of programs that allow the use of CDM credits for compliance. (See the United States of America's audit abstract "Lessons learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism" in Appendix A of this report.)

leakages—an increase in emissions outside the boundary of the project that were caused by the project—was identified as a problem.

In the developing countries covered by this report, two out of three SAIs have concluded that implementation of CDM programs has not yet been sufficient to drive technology transfer and funds. Consequently, the CDM's full potential has not been realized (see Indonesia's Case Study 12 regarding assessment of the CDM).

The role of sectors in mitigation

Greenhouse gas emissions from specific sectors such as energy and transport, which are a key source of national greenhouse gas emissions, are a key focus of any country that wishes to reduce its domestic emissions. The audits sought to determine the effectiveness of policy tools that are intended to reduce emissions in specific sectors.

Several audits addressed topics related to specific emission sectors such as energy, industry, land use, land-use change, forestry, and transport; and some of these audits assessed the effectiveness of policy tools in these areas. Policy instruments to promote energy savings and renewable energy production and consumption were recognized by many countries as a key element in meeting their greenhouse gas emission targets.

SAIs that audited the effectiveness of policy instruments to promote energy saving and renewable energy production and consumption found that these instruments can be effective but that careful consideration should be given to program implementation and design (see Case Study 13 from Poland and Case Study 14 from Australia on renewable energy programs).

Case Study 12: Clean Development Mechanism authority in Indonesia did not optimally perform

The audit found that Indonesia's National Committee for Clean Development Mechanism (CDM Committee) did not perform optimally. From 2005 to 2009, the CDM Committee approved 90 CDM project proposals and monitored and evaluated only 6 of these projects during their operation. Key causes were limited human resources, no evaluation system for the performance of the CDM Committee, and a lack of coordination and cooperation between the CDM Committee and local governments. The audit concluded that the Government of Indonesia should optimize the process of approval and monitoring of CDM projects, develop the CDM Committee performance evaluation system, review its work mechanism, and improve the cooperation with local government in monitoring the approved CDM projects. (See Indonesia's audit abstract "Waste management in five municipalities in Indonesia" in Appendix A of this report.)

Case Study 13: Polish scheme to promote renewable energy was effective

In 2005, the Green Certificates Scheme was established to support the use of renewable energy sources in Poland. The system imposed on entrepreneurs selling electricity the obligation to deliver a set amount of energy from renewable energy sources to final users and to purchase all electricity generated from renewable sources in their areas of operations. If entrepreneurs failed to meet those obligations, they were to pay fees and/or penalties. The audit found that this was an effective policy tool for promoting renewable energy, as the amount of energy generated from renewable energy sources in Poland grew from 4,222 gigawatt hours to 6,200 gigawatt hours between 2006 and 2008. The Polish Group for Energy, Electric Power Plants Complex of Lower Oder moved toward improving energy generation efficiency and reducing carbon dioxide emissions by modernizing power units and building installations for co-combusting biomass with coal. The audit found that between 2006 and 2008, carbon dioxide emissions were reduced by 125,693 metric tonnes through the modernization program and by 603,774 metric tonnes through the use of biomass. (See Poland's audit abstract "Implementation of selected tasks under the provisions of the United Nations Framework Convention on Climate Change" in Appendix A of this report.)

SAIs also audited voluntary agreements with industry (see Norway's Case Study 15). Agreements between actors in certain emissions sectors and government to deliver agreed reductions within a time frame can lead to measures such as investments in clean technology that will reduce greenhouse gas emissions.

Land use and land-use change activities such as deforestation may also cause an increase in greenhouse gas emissions. Unsustainable exploitation of forest such as illegal logging is an important driver of deforestation. Also, the use of forest area for rural and urban settlements, agriculture and livestock, and mining are other examples of activities that can cause deforestation.

The audits found that in some developing countries there is a need for stronger law enforcement to reduce illegal logging. Land use policy needs to be improved to promote conservation, environmental measures, and sustainable productive activities. Public policies for settlements, agriculture and livestock, and mining and ponds may conflict with the objectives of public policies on forest preservation, and coordination of these actions pose a challenge to government. Some audits show that forest supervision and monitoring need to be improved. In addition, strong law enforcement is needed to reduce illegal land use (see Indonesia's Case Study 16).

Case Study 14: Some Australian renewable energy programs were less effective than others

Australia examined sectoral greenhouse gas reduction programs and renewable energy programs (such as those focusing on residential and rural solar rebates) originally valued at AUS$1.7 billion. Each program had different administrative issues and challenges and the effectiveness of some of these programs was constrained by weaknesses in the program implementation and design. The audit recommended that greater consideration needs to be given to setting clear and measurable objectives, assessing and implementing appropriate risk mitigation strategies, applying a rigorous merit-based assessment of applications for competitive grants, and implementing effective measuring and reporting on the performance. (See Australia's audit abstract "The administration of climate change programs" in Appendix A of this report.)

Case Study 15: Most voluntary agreements with the manufacturing sector in Norway are successful

Emissions from the manufacturing sector in Norway have been reduced by 26 percent from 1990–2007. The reduction is mainly due to the closing down of some high-emitting plants, modernization, and process changes. Voluntary agreements to reduce emissions have been a central regulatory tool to achieve these reductions as four agreements between the government and the industry have been signed. Yet in the fourth agreement, signed in September 2009, the level of ambition is quite low, and the audit concludes that it is not likely to contribute to significant reduction of greenhouse gases from the industry. (See Norway's audit abstract "The Office of the Auditor General's investigation into goal achievement in climate policy" in Appendix A of this report.)

Case Study 16: Land-use change policy has caused deforestation in Indonesia

The audit found that some companies and/or the local community had made illegal use of forested areas for the development of plantation estates, mining, and ponds. The consequence of these activities has been the loss of forested areas, which has resulted in damage to the function of the conservation area and loss of hydrological function of the forests, which may lead to future flooding and drought. The audit recommended that the central government work with the local governments to terminate the licences given to the agricultural, pond, and mining companies and other parties that were proven to be illegally occupying or converting the forested areas. (See Indonesia's audit abstract "Indonesian forest management in the Department of Forestry Jakarta, Bogor, Riau, and West Kalimantan" in Appendix A of this report.)

Transport is another major source of greenhouse gas emissions. The Intergovernmental Panel on Climate Change projects these emissions to increase further, but despite this, few climate audits have included the transport sector. Of these, one audit has concluded that a carbon graded tax on new passenger vehicles has resulted in improved energy efficiency (see Case Study 17 from Norway).

Few audits have addressed the results of action in developing and implementing new technology in the public and private sectors. The audits that addressed the area found that development and deployment of new technology is essential for governments to reach climate targets in these sectors. However, the findings suggest that technology development is a high-risk area because it requires large investments and is subject to tight time frames for development, implementation, and deployment in order to reach mitigation targets.

Managing progress

In order to mitigate greenhouse gas emissions, cooperation is needed among different national governmental bodies, as well as with state and local authorities. It is also important that clear roles and responsibilities are defined. The audits sought to determine whether management arrangements were in place across the relevant agencies and other players to implement effective mitigation strategies.

Most countries in the coordinated audit have identified one lead ministry, often the Ministry of Environment, as having the coordinator role of the climate policy, while some countries have established a dedicated body for this task.

Some SAIs report that roles and responsibilities are clear and documented. However, other SAIs have identified coordination problems between industrial sectors and different levels of government. Explanations for a lack of coordination include roles are not clear, emphasis has been on cross-sectoral economic instruments rather than sectoral planning, and/or that climate change is a low priority compared with other sector goals. A key element for the success of climate policies is effective coordination among key stakeholders; however, in many countries, coordination is poor and is in the early stages. New organizations to aid in coordination were formed as a consequence of audit work performed (see Case Study 18 from Greece and Case Study 19 from Slovenia).

Adaptation to climate change

Impacts from climate change are occurring, and adaptation involves efforts to manage these impacts on natural and human systems. It requires efforts to identify risks and vulnerabilities, prioritize actions to be taken, build capacity to address adaptation, and work to address specific vulnerabilities. The audits examined countries' commitments, strategies, and plans to address adaptation; their risk and vulnerability assessments; their management and monitoring of progress; and their assistance for developing countries' adaptation.

Case Study 17: Tax on new passenger vehicles in Norway has improved energy efficiency

Norway's Parliament agreed that in 2012 the average emissions from new personal vehicles shall not exceed 120 grams of carbon dioxide per kilometre. The main tool to accomplish this goal is through positive and negative tax incentives. The tax on new cars was changed to make it more expensive to buy high-emitting vehicles and less expensive to buy low-emitting vehicles. The audit concludes the result has been a decrease in average emissions from new personal vehicles. (See Norway's audit abstract "The Office of the Auditor General's investigation into goal achievement in climate policy" in Appendix A of this report.)

Commitments, strategies, and plans

Signatories to the United Nations Framework Convention on Climate Change (UNFCCC) (Article 4) and the Kyoto Protocol (articles 10, 12) have made commitments to developing plans and programs for adaptation. With this in mind, the audits sought to determine how these international commitments translated into national ones, and which commitments, strategies, and plans had been developed.

Two SAIs' audits that dealt with adaptation strategies reported that their governments have made clear commitments related to adaptation as part of their national agenda and have developed their respective national strategies for comprehensive and consistent actions. In one case, this was built on assessed risks and vulnerabilities. In the other, it involved a commitment to a thorough national risk assessment and cost benefit review and set out work to develop capacity and to start addressing adaptation issues.

For other countries, there are no explicit commitments to adaptation, despite requirements dating back over a decade. Some governments, however, have started to develop their adaptation strategies. There are examples of countries starting to plan adaptation measures, taking individual action at a local or sectoral level, or developing risk assessment work without the country having yet developed an overall strategy (see Case Study 20 from the United States and Case Study 21 from Brazil). SAIs consider that if certain key vulnerabilities are already known, governments can start to respond even before a full risk assessment is completed. In addition, governments should consider potential climate change impacts when formulating public policies. For example, the identification of the potential for higher incidences

Case Study 18: Greece established the new Ministry for the Environment, Energy and Climate Change as a result of audit

Up to October 2009, the Greek Ministry for the Environment, Physical Planning and Public Works was the governmental body assigned with the responsibilities of building construction and protecting the environment, along with other responsibilities such as the overall administrative management of physical and urban planning. The audit found that the attribution and performance of duties regarding conflicting sectors within the ministry was the main reason that work on greenhouse gas (GHG) mitigation was given a low priority. The government responded by founding a new Ministry for the Environment, Energy and Climate Change in October 2009. Key responsibilities now include: the preservation and improvement of environmental quality, renewable national resources, biodiversity, water resources, sound management of non-renewable energy resources, promotion of renewable energy resources, GHG mitigation, climate change adaptation, and coordination of the government's environmental policies. (See Greece's audit abstract "Climate change—Emissions trading system" in Appendix A of this report.)

Case Study 19: Slovenia established the new Climate Protection Office as a result of audit

A national audit in Slovenia concluded that there was no governmental body responsible for monitoring and evaluating the effectiveness and efficiency of measures carried out by different ministries, agencies, or other bodies from different sectors. The supreme audit institution recommended establishing a government Climate Protection Office and clearly defining its roles and responsibilities. In June 2009, the governmental Office for Climate Change was established. Its main tasks are to coordinate the implementation of different sectors' climate change policies, design climate change mitigation and adaptation policies, monitor the implementation of mitigation and adaptation policies, and evaluate the effectiveness and efficiency of climate change policy instruments. (See Slovenia's audit abstract "Achievement of objectives set to protect air and ozone layer and to tackle climate change" in Appendix A of this report.)

of flooding may require infrastructure to be built to manage floodwaters and to lessen their economic impact. Preparing for these impacts now may reduce the need for more costly steps in the future.

Assessing risks and vulnerabilities

Climate change will have diverse impacts throughout the world, with regional and local variations. An effective approach to adaptation requires an assessment of the national and local risks and vulnerabilities so that priorities can be determined. The audits sought to determine whether the governments had assessed their respective country's key vulnerabilities based on identified risks.

Many of the participating SAIs reported that their respective governments planned to undertake an overall country assessment of the risks and vulnerabilities. So far, one country has completed its assessment. SAIs reported that in advance of a comprehensive assessment, risk assessments had been completed for various areas or topics, such as for water resources, agriculture, infrastructure, health, land-use change, forestry, and fisheries (see Case Study 22 from South Africa).

Case Study 20: The United States could benefit from a national adaptation plan

In the United States, some federal, state, and local authorities have started to identify information needs in relation to climate change impacts and to take action to protect habitats and infrastructure from sea-level rises. However, federal and state officials faced many challenges in addressing adaptation issues from the lack of a national plan and a lack of clarity regarding the roles and responsibilities of different levels of government. The audit recommended the development of a national adaptation plan that sets roles and priorities for federal, state, and local authorities; identifies measures to help authorities address adaptation in government decision making; and explains how resources will be made available to implement the plan. (See the United States of America's audit abstract "Climate change adaptation: Strategic federal planning could help government officials make more informed decisions" in Appendix A of this report.)

Case Study 21: Incorporating climate change in a Brazilian public entity's plans was a good practice

The Brazilian Agricultural Research Corporation, subordinate to the Ministry of Agriculture and Livestock, undertook studies on how the agricultural and livestock sector could adapt under various climate change scenarios. It identified the country's vulnerabilities to plagues and diseases and the impacts on agriculture production. It also provided preliminary answers to questions of vulnerability, mitigation, and options of new production systems. The corporation's initiative was considered "good practice" by the supreme audit institution because it is a pioneering initiative in the adaptation area and the corporation was one of the first public entities in Brazil to incorporate climate change in its strategic planning, despite the lack of guidelines from the federal government. (See Brazil's audit abstract "Adaptation measures for climate change scenarios in the agriculture and livestock sector" in Appendix A of this report.)

Case Study 22: South Africa has undertaken a national assessment of risks and vulnerabilities

South Africa undertook an initial study of climate change in the late 1990s that formed the basis of the National Climate Change Response Strategy. The study addressed the national vulnerability to climate change impacts, covering climate scenarios, water resources, agriculture, human health, commercial forestry, rangelands, and biodiversity. Research has been ongoing and the Department of Science and Technology is compiling a risk and vulnerability atlas that will be used as a planning tool for adaptation interventions at regional, national, provincial, and municipal levels. (See South Africa's audit abstract "Status of climate change initiatives in South Africa" in Appendix A of this report.)

Such assessments are complex, requiring detailed historical data and capacity to undertake complex modelling work (see Case Study 23 from Brazil).

Overall, governments have not fully completed the risk management process, and planning is at an early stage. The existing approaches are for the most part not comprehensive or coordinated.

Managing and monitoring progress of adaptation strategies or plans

Effective management is essential to rationalize the allocation and use of resources at all levels and to ensure that implementation plans and roles and responsibilities are clear. Monitoring is essential to assessing progress. The audits sought to determine whether management and monitoring arrangements were in place across the relevant agencies and other players to implement effective adaptation strategies.

The audits found that adaptation work involves many players across national government, local government, public agencies, and the private sector and is therefore challenging to manage and coordinate. Some SAIs reported that roles and responsibilities were not always clear or documented at the national government level; however, good practices were identified within individual organizations and in some local governments.

SAIs reported that monitoring progress in adaptation is particularly challenging as by definition the outcomes are long term, constantly evolving, and dependent on a number of uncertainties. Strategies and progress monitoring may initially focus on whether risk assessments have been completed or whether good governance arrangements and coordination are in place. One SAI reported that comprehensive reporting requirements had been introduced in part to meet statutory obligations (see United Kingdom Case Study 24).

Case Study 23: Challenges for Brazil in assessing risks and vulnerabilities in some sectors

In examining adaptation measures for climate change scenarios in the agriculture and livestock sector and the coastal zones, key problems were identified in Brazil, with data needed for assessing adaptation risks and vulnerabilities. Problems included the lack of access to meteorological data, existing data not being available in easily accessible digital form, and the lack of a centralized system to coordinate and store monitoring data on oceanic variables. These issues make it difficult to construct scenarios for assessing risks related to adaptation when key historical data is absent or not easily accessible. (See Brazil's audit abstract "Adaptation measures for climate change scenarios in the Brazilian coastal zones" in Appendix A of this report.)

Case Study 24: Monitoring progress with the UK adaptation program is at an early stage

Under the *Climate Change Act 2008*, the UK government is required to prepare a National Adaptation Plan. An external organization, the Climate Change Committee, has been established to scrutinize the government's progress against the plan. The National Audit Office review confirmed that the UK Adapting to Climate Change Programme team was working to develop indicators to measure success, but work was at an early stage. Key elements include

- requiring local governments to report their assessment of their progress in identifying climate change risks and addressing priorities for action;
- establishing arrangements for mandatory reporting by public authorities and utility companies on their adaptation risk assessments and actions; and
- requiring government departments to prepare adaptation plans.

(See the United Kingdom's abstract "Adapting to climate change" in Appendix A of this report.)

Assisting developing countries

The UNFCCC and Kyoto Protocol commit developed countries to assist developing countries in adapting to climate change and require that funding for this be in addition to official development assistance. In December 2009, this issue was reiterated in the Copenhagen Accord, which set a goal of developed countries contributing US$100 billion a year to developing countries by 2020. The audits sought to determine whether recipient countries had a management framework in place to effectively access and manage funds made available by donor countries.

One developing country SAI reported there were frameworks in place to manage funds received, but that it had been a challenge to access funding from donor countries provided through bilateral and multilateral donor agencies. Case Study 25 from South Africa identified the problems with getting an overall picture of donor funding received for climate change due to a lack of centralized information on donor funding.

Case Study 25: There is a lack of centralized information on donor funding for climate change in South Africa

South Africa's Department of Environmental Affairs is the focal point for the Global Environment Facility, the international organization that serves as the financial mechanism for the United Nations Framework Convention on Climate Change. Individual departments and government entities identify climate change initiatives and seek donor funding for those projects, and account for the monies received and spent, in accordance with the government accounting and audit framework. The Department does not control or manage donor funds received, so it is not possible to get an overall picture of donor funding received for climate change. (See South Africa's audit abstract "Status of climate change initiatives in South Africa" in Appendix A of this report.)

Lessons Learned for Supreme Audit Institutions

This coordinated project has demonstrated the breadth of the understanding and value that auditors can bring from audits of climate change mitigation and adaptation in their country. Supreme audit institutions (SAIs) can audit and report to their legislatures on the substantial flows of resources involved in addressing climate change commitments, the efficiency and effectiveness of government policies and programs, and the scope for their improvement. The experiences gained by the supreme audit institutions participating in this coordinated project indicate that this has been a valuable experience for INTOSAI when it comes to exchanging knowledge and audit experience on environmental auditing, as well as inspiring other climate change audits. This project has also identified a series of lessons that could assist SAIs in future climate change audits.

Identify and audit the governance of government actions on climate change. Climate change initiatives can involve a wide range of government entities from national to local levels. There are also a wide range of policy measures and programs that governments can use to directly reduce greenhouse gas emissions or indirectly provide incentives to others to do so, and to promote adaptation action. Auditors can establish whether the plans are coherent and comprehensive, addressing all key sectors, and whether they have the potential to meet national commitments. Auditors can also establish whether delivery responsibilities are clear and whether delivery agents are held to account for their implementation.

Use audit findings and experience to recommend appropriate interim milestones and measures to track progress. The success of climate change mitigation policies and, in particular, adaptation measures may be difficult to measure and may only be tracked over the long term. Auditors should use the performance

indicators that have been used for performance measurement by the government and, where there are gaps in existing data or performance metrics are not available, look for suitable indirect or proxy measures of performance.

Establish their countries' reliance on emissions reductions in other countries and, if they are significant, validate the assurance for the reductions achieved. The flexible mechanisms under the Kyoto Protocol for joint implementation and clean development are important policy instruments to achieve reductions and can involve substantial flows of funds, which auditors should cover in the audit of government accounts. Auditors can also address the government's arrangements for obtaining assurance on reductions achieved in other countries, and may seek additional assurance through coordinated audits with other SAIs or international organizations.

Examine financial management controls. Climate change mitigation and adaptation both involve significant economic and social costs and benefits, and there are risks associated with not taking action. Actions to address climate change can also be costly. Some costs, revenues, liabilities, and assets will be encompassed within the public accounts. Therefore it is important to consider that climate change issues can also be audited through financial audits. Transparent processes for allocating and tracking funds are needed to ensure that resources are directed toward a government's declared strategic priorities and administered effectively. Furthermore, government investments in climate change programs are likely to substantially increase over time—such as through international assistance to vulnerable developing countries. Such efforts will require accounting systems and program evaluation functions to ensure accountability and maximize the return on investments in international assistance.

Determine whether donor funding from other countries supports mitigation or adaptation, and if material, audit their government's assurance on the proper receipt and use of the funding. Climate change-related funding for developing countries may come through the flexible mechanisms, development aid programs, multilateral or regional finance mechanisms, institutions, or through specific adaptation funding. Auditors should audit the receipt of funds in government accounts and also address the effectiveness of controls to ensure their proper use.

Build capacity in one's SAI to undertake environmental audits and on issues such as climate change. The specialist knowledge required for auditing policies and programs to tackle climate change will differ between countries, and may be developed and maintained in the relevant sectoral audit teams or in a central audit team. Training and advice may be sought and provided by independent experts. During the course of work, the project benefited from expert input. As well, for some of the individual audits, some of the SAIs relied on outside advice. The SAI should review the skills of its auditors and the need for further knowledge sharing and training. This project has also shown that experience sharing between auditors could help less experienced auditors improve their skills, as well as direct them toward useful methodology or information sources.

Share knowledge with peers and undertake cooperative work where this will add value. Climate change requirements are shared across national boundaries; some policies and programs may be determined at the global or regional level and, individually, national governments may follow similar approaches. SAIs can strengthen their audits through information exchange, and the INTOSAI WGEA is a good source of information and contacts to support this exchange and facilitate coordinated audits. Other sources could include audits undertaken by other oversight agencies at the state or provincial level within individual countries or audit work undertaken within international organizations such as the World Bank. During this coordinated audit, certain topics were not covered extensively by many SAIs, even though they were considered important from a climate change perspective. These areas include adaptation; technology development and transfer; and the sectors of transport, housing, and agriculture. These could be areas to consider in future audits by other SAIs.

GLOSSARY

additional—Additionality is the required condition that projects conducted under the Clean Development Mechanism (CDM) of the Kyoto Protocol must reasonably demonstrate that the emission reductions from the project are additional to what would have happened in the absence of the project. Without the CDM, the project would not have been implemented due to economic, technological, or other reasons.

Annex I parties—Under the United Nations Framework Convention on Climate Change, those industrialized countries that were members of the Organisation for Economic Co-operation and Development in 1992, plus countries with economies in transition, including the Russian Federation, the Baltic states, and several Central and Eastern European states.

emissions allowance—"An allowance to emit 1 tonne of carbon dioxide equivalent during a specified period," as defined by the European Union regulations on emissions allowance trading. Also known as an allowance credit, emission offset, emission-reduction credit, or carbon credit.

European Union Emissions Trading Scheme—A policy instrument developed and implemented by the European Union (EU) to "promote reductions in greenhouse gases in a cost-effective and economically efficient manner." The scheme would help the European Union and member countries in meeting their Kyoto Protocol emission reduction targets. Under the scheme, companies in the EU can meet their individual emission targets by trading in emissions within the European Union and funding Clean Development Mechanism projects under the Kyoto Protocol from developing countries.

Kyoto Protocol—An international and legally binding agreement linked to the United Nations Framework Convention on Climate Change. Its major feature is that it sets binding targets for 37 industrialized countries and the European Union for reducing greenhouse gas emissions. These reductions amount to an average of five percent against 1990 levels over the period 2008 to 2012. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005.

land-use, land-use change, and forestry sector—A sector of the greenhouse gas inventory that includes emissions and removals of greenhouse gases resulting from direct human-induced land use, land-use change, and forestry activities.

non-Annex I parties—Mostly developing countries as designated by the United Nations Framework Convention on Climate Change (UNFCCC). Some of these are recognized by the UNFCCC as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. The group also includes countries that rely heavily on income from fossil fuel production and commerce.

sink—"Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere," as defined by the United Nations Framework Convention on Climate Change. For example, forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis.

United Nations Framework Convention on Climate Change (UNFCCC)—A convention adopted at the 1992 Rio Earth Summit by 192 parties with the objective of stabilizing greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system.

Project Methodology

To support the national audits, the 14 SAIs participating in this coordinated audit developed an audit approach template, including suggested audit objectives, criteria, questions that guide potential audit work, and data collection methods, in the areas of mitigation and adaptation. A flexible, rather than prescriptive, model of cooperation was adopted. Choosing from the template, each SAI designed, carried out, and reported national audits (in some cases, studies and reviews) to respond to its country's climate change priorities and in accordance with its internal practices and standards. This approach has been highly successful in achieving the objective of encouraging and supporting effective national audits of climate change. Appendix A of this report includes abstracts from the audits that were included in the scope of this coordinated project.

Our work together was informed by the INTOSAI WGEA 2007 publication, *Cooperation Between Supreme Audit Institutions: Tips and Examples for Cooperative Audits*, and we recommend this publication to all offices contemplating cooperative work together.

The INTOSAI WGEA 2010 guidance paper, *Auditing Government Response to Climate Change*, provides useful guidance on designing and carrying out audits of climate change. It was developed during the course of this audit and was helpful to a number of SAIs in conducting their work. It also reflects some of the lessons learned during this coordinated project.

Mitigation topics covered by the national audits

The following climate change mitigation topics were addressed by one or more audits and by one or more SAIs:

- Strategies, plans, and targets
- Implementation and results measurement
- Coordination and governance
- Specific policy instruments (for example, emissions trading)
- Specific sectors (for example, forestry)
- Donor funding

Adaptation topics covered by the national audits

The following climate change adaptation topics were addressed by one or more audits and by one or more SAIs:

- Addressing risks and vulnerabilities
- Strategies, plans, and targets
- Implementation and results measurement
- Specific policy instruments (for example, infrastructure programs)
- Specific sectors (for example, agriculture)
- Coordination and governance
- Monitoring and forecasting
- Donor funding

APPENDIX A National audit abstracts

Australia	• The administration of climate change programs • Coordination and reporting of Australia's climate change measures
Austria	• Climate change and energy efficiency • Emission trading system • Achievement of the Kyoto target • Thermo-energetic renovation of buildings
Brazil	• Adaptation measures for climate change scenarios in the agriculture and livestock sector • Adaptation measures for climate change scenarios in the Brazilian coastal zones • Adaptation measures for climate change scenarios in the Brazilian semiarid region regarding water security • Public policies regarding the mitigation of greenhouse gas emissions in the Legal Amazon forest region
Canada	• Managing the federal approach to climate change • Managing air emissions • *Kyoto Protocol Implementation Act*
Estonia	• The State's efforts to reduce greenhouse gas emissions
Finland	• Emissions trading: Flexible mechanisms under the Kyoto Protocol • Supplying property for housing and preventing urban sprawl: The role of a state
Greece	• Climate change—Emissions trading system
Indonesia	• Indonesian forest management in the Department of Forestry Jakarta, Bogor, Riau, and West Kalimantan • Waste management in five municipalities in Indonesia
Norway	• The Office of the Auditor General's investigation into the efforts of the authorities to limit flood and landslide hazards • The Office of the Auditor General's investigation into goal achievement in climate policy
Poland	• Implementation of selected tasks under the provisions of the United Nations Framework Convention on Climate Change
Slovenia	• Achievement of objectives set to protect air and ozone layer and to tackle climate change
South Africa	• Status of climate change initiatives in South Africa

United Kingdom

- European Union Emissions Trading Scheme
- Adapting to climate change
- Programmes to reduce household energy consumption

United States of America

- Climate change adaptation: Strategic federal planning could help government officials make more informed decisions
- Observations on the potential role of carbon offsets in the climate change legislation
- Lessons learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism
- Federal actions will greatly affect the viability of carbon capture and storage as a key mitigation option
- Climate change: Agencies should develop guidance for addressing the effects on federal land and water resources
- Climate change: Financial risks to federal and private insurers are potentially significant

Australia	
The Name of the Audit	The administration of climate change programs
Publication Information	April 2010; available in English at www.anao.gov.au

The national audit objectives

To assess the administrative effectiveness of five climate change programs. Particular emphasis was given to the implementation of good administrative practice and the extent to which the program objectives were being met.

The scope of the audit

- Three grant programs (Greenhouse Gas Abatement Program, Solar Cities, and the Low Emissions Technology Demonstration Fund) and two rebate programs (Solar Homes and Communities Plan and the Renewable Remote Power Generation Program).
- Audit period covered or end date of audit process: 2007 to 2009.
- Audited entities: Department of Environment, Water, Heritage and the Arts and the Department of Resources, Energy and Tourism.

Conclusions of the audit findings and key recommendations

The programs had a total value of AUS$1.7 billion over their lives and were designed to reduce greenhouse gas emissions and/or support the renewable energy industry. Each program had different administrative issues and challenges, and the effectiveness of some of these programs was constrained by weaknesses in program implementation and design. The overriding message for the effective management and success of future climate change programs is that greater consideration needs to be given to the following:

- Setting clear and measurable objectives: The three grant programs had very little specificity in terms of how much was intended to be achieved over the life of the program, making it difficult to target resources and set priorities.
- Assessing and implementing appropriate risk mitigation strategies: The control and management of risks could have been substantially improved. The treatment options for risks or controls did not always mitigate the risks identified, and many of these risks materialised.
- Applying a rigorous merit-based assessment of applications for competitive grants: The assessment and selection process for projects under the Greenhouse Gas Abatement Program was inadequate. Projects failed to meet the government's guidelines and eligibility criteria.
- Effective measuring and reporting on performance: The high-risk, large-value grant programs have achieved minimal results to date. Performance reporting could have been substantially better in terms of accuracy and consistency.

To be effective, future programs will need to implement the key components of grant administration, as outlined in the 2009 *Commonwealth Grant Guidelines*, particularly in terms of program planning

and design and achieving value for public money. This audit has made one recommendation aimed at improving grant administration in the Department of Environment, Water, Heritage and the Arts that could also be taken into account by the Department of Climate Change and Energy Efficiency in terms of the ongoing administration of relevant programs. It has also identified a number of lessons that may apply to other grant programs in the departments concerned.

Responses of the government to the audit recommendation

The Department agreed with the recommendation.

The Name of the Audit	Coordination and reporting of Australia's climate change measures
Publication Information	April 2010; available in English at www.anao.gov.au

The national audit objectives

To assess the coordination of Australian and state/territory government climate change programs and the integrity of measuring and reporting of Australia's greenhouse gas emissions and abatement.

The scope of the audit

- Coordination of Australian government and state/territory climate change programs, the integrity of the national inventory to measure Australia's greenhouse gas emissions, and the integrity of measuring and reporting government abatement measures.
- Audit period covered or end date of audit process: 2006 to 2010.
- Audited entity: Department of Climate Change and Energy Efficiency (DCCEE).

Conclusions of the audit findings and key recommendations

In 2008, there were some 550 climate change related measures across jurisdictions, resulting in the overlap and duplication of programs. In general, the program reviews requested by the Council of Australian Governments (COAG) have resulted in some rationalization and subsequent adjustment to programs to enhance complementarity and consistency with the proposed emissions trading scheme. However, progress in streamlining some state and territory programs has been slower than anticipated by COAG, with some reviews yet to be finalized. There is still considerable scope for further rationalization across jurisdictions. However, this is a matter for consideration by responsible governments.

Australia's national greenhouse gas inventory is well developed and provides a reliable method for measuring and reporting national emissions. Australia's national inventory has been improved over time and provides a sound basis for understanding the sources, trends, and levels of emissions from industry sectors. Technical reviews, overseen by United Nations accredited experts, indicate that the inventory broadly meets international requirements for data preparation and reporting. The

Department has implemented 74 percent of UN recommendations but could improve its process for the ongoing management of outstanding recommendations by documenting required actions, resources, and time frames.

The aggregate impact of all government mitigation actions has been revised by DCCEE over time. The estimated aggregate level of abatement is 74.5 million tonnes of carbon dioxide annually over the five-year Kyoto Protocol period—a 15 percent revision down from 2007. The downward revision reflects a more realistic assessment of program achievements as well as the termination and adjustments to a range of programs. Overall, the methodology employed by DCCEE to estimate the impact of abatement measures provides a reasonable level of assurance as to the integrity of the aggregate abatement. Notwithstanding, improvements could be made in estimating individual abatement measures through a more comprehensive consideration of business-as-usual operations, the attribution of overlap to individual measures, and improvements in the quality and consistency of data provided by delivery agencies.

There is no consistent approach by delivery agencies to estimating abatement. Guidelines and methodology are currently being developed by DCCEE to help agencies calculate the impact of abatement measures and cost new climate change initiatives. The public reporting of achievements for individual measures has also not been consistent across Australian government agencies and has generally been poor. The SAI has made one recommendation aimed at improving the transparency and consistency of reporting climate change abatement.

Responses of the government to the audit recommendations

The Department agreed with the recommendation.

Austria	
The Name of the Audit	Climate change and energy efficiency
Publication Information	September 2009; nine reports for the Laender, e.g., Reihe Wien 2009/6; available in German at www.rechnungshof.gv.at

The national audit objectives

To investigate programs and measures related to energy saving and the contribution of this sector to fulfill the Kyoto Protocol commitment.

The scope of the audit

- Costs and effectiveness of measures dealing with the mitigation of carbon dioxide emissions in energy saving; energy-related advisory service; subsidies to energy-saving projects; contribution of the public buildings sector to reach the Kyoto target.
- Audit period covered or end date of audit process: 2002–2007.
- Audited entities: Governments and administrations in all nine Austrian states (Laender).

Conclusions of the audit findings and key recommendations

The energy strategies of the States of Carinthia, Lower Austria, Upper Austria, Vorarlberg, and Vienna did not provide specific measures, while the other states listed measures, but did not specify quantified objectives or identify competent implementation agencies.

In most cases, the energy reports of the states contained data on energy consumption and the development of the particular energy sources; however, only three out of nine states reported on the implementation of intended reduction measures. The data on carbon dioxide emission reduction were based on different determination methods, so that no meaningful comparison could be made in terms of their climate impact in the different states.

On the basis of the assumptions of the SAI and given a service life of 20 years of the funded projects, grants from the federal government to enterprises to invest in cleaner technology to reduce greenhouse gases amounted to approximately 14 euros per reduced tonne of carbon dioxide. Comprehensive data on the carbon dioxide savings of all funding programs collected on a standardized basis were not available, so no comprehensive evaluation of the funding efficiency could be carried out.

In the Austrian states, reduction potentials should be determined for each funding program, and corresponding carbon dioxide reduction targets should be determined accordingly. The federal government and the states should develop a consistent calculation method for carbon dioxide savings. On that basis, data should be collected on carbon dioxide savings from all programs to allow an evaluation of the funding efficiency.

Responses of the government to the audit recommendations

Discussions and reactions are still to come.

The Name of the Audit	Emission trading system
Publication Information	November 2008; Reihe Bund 2008/11; available in German at www.rechnungshof.gv.at

The national audit objectives

To investigate whether the European Union emission trading system (EU ETS) gives a valuable contribution to reach the obligations of the Kyoto Protocol.

The scope of the audit

- Allocation of emission allowances covering the periods 2005–2007 and 2008–2012; actual use of emission allowances during the first period; administration, costs, and benefits of the system.
- Audit period covered or end date of audit process: 2003–2007.
- Audited entity: Federal Ministry of Agriculture, Forestry, Environment and Water Management.

Conclusions of the audit findings and key recommendations

The objective of the EU ETS to reduce carbon dioxide emissions has not yet been achieved in Austria. Due to an excess supply of emissions trading certificates in the European Union, the price for one certificate dropped from 20 to 0.07 euros in the 2005–2007 period. Companies forced to buy certificates had to bear hardly any additional costs. There was no financial incentive to reduce emissions.

For new participants entering the EU ETS in the 2008–2012 period, a fixed reserve of certificates (representing one percent of the total amount of certificates) was established. If that fixed reserve is insufficient, the required certificates will be purchased by an assigned entity and provided to the new participant free of charge (called a “flexible reserve”). In return, the entity will be allocated the quantity of transferred certificates free of charge in the period following 2012. The flexible reserve is in anticipation of the following allocation period and, in the SAI’s opinion, will reduce the number of certificates then available, which may entail a considerable financial disadvantage for the participants. The SAI recommended raising the fixed reserve to match the actual expected needs.

Responses of the government to the audit recommendations

The government implemented all recommendations. Parallel to this there were changes made to the EU legal framework, including the addition of air traffic to the EU ETS.

The Name of the Audit	Achievement of the Kyoto target
Publication Information	November 2008; Reihe Bund 2008/11; available in German at www.rechnungshof.gv.at

The national audit objectives

To investigate whether the obligations of the Kyoto Protocol can be fulfilled and whether the specifications and targets of the Austrian climate strategies were realistic.

The scope of the audit

- Possibility of reaching the commitments of the Kyoto Protocol and EU targets; possible consequences of failing to reach commitments; costs and effectiveness of domestic measures; financing with a stress on the Kyoto flexible mechanisms.
- Audit period covered or end date of audit process: 2002–2007.
- Audited entities: Federal Ministry of Agriculture, Forestry, Environment and Water Management; governments and administrations in all nine Austrian states.

Conclusions of the audit findings and key recommendations

In 2007, Austria's greenhouse gas emissions were 19.2 million tonnes or 27.9 percent higher than the Kyoto target value. Taking into account the scheduled purchase of 9 million tonnes annually in the Kyoto mechanism program as well as other intended measures, an additional 9.5 million tonnes still need to be reduced. In the SAI's opinion, the Kyoto target is unlikely to be achieved when the present course is continued. Achieved reductions in the sectors of waste management, chlorofluorocarbons, and agriculture are outweighed by excessive amounts in the other sectors.

Since flexible mechanisms may only be used to support national measures, an additional 6.8 million tonnes per year have to be reduced by measures in Austria. The SAI emphasized that in addition to reducing emissions by 2012, all excessive amounts in the obligation period will need to be compensated. Environmental subsidies in Austria were almost entirely dedicated to climate-relevant projects, resulting in an annual emission reduction of 4 million tonnes since 2002. Grant applications submitted but not yet processed constituted twice the available annual financial resources. The funding of the Kyoto mechanism program was insufficient to attain the purchase goal defined by law.

The SAI emphasized that the purchase of emission allowances was not a sustainable alternative to national measures, as it had only short-term effects in avoiding sanctions that would be an additional burden and should be avoided at all costs. Austria should aim for appropriate financing of environmental grants.

Responses of the government to the audit recommendations

The government provided additional funding for the Kyoto mechanism program and adopted the legal framework for providing grants.

The Name of the Audit	Thermo-energetic renovation of buildings
Publication Information	June 2009; Reihe Bund 2009/7 and nine additional reports for the Laender; available in German at www.rechnungshof.gv.at

The national audit objectives

To investigate the contribution of the housing sector and the investments of the Austrian states (Laender) to fulfill the Kyoto Protocol commitment in this sector.

The scope of the audit

- Cost and effectiveness of measures dealing with the mitigation of carbon dioxide emissions in housing; technical standards in renovation and thermo-energetic reconstruction; subsidies and loans; legal framework at the federal and state levels; contribution of the sector to reach the Kyoto target.
- Audit period covered or end date of audit process: 2002–2007.
- Audited entities: Federal Ministry of Agriculture, Forestry, Environment and Water Management; governments and administrations in all nine states.

Conclusions of the audit findings and key recommendations

In the housing sector, the emission reduction already achieved by thermo-energetic renovation of residential buildings was compensated by emissions from additional new buildings. Changes need to be made to transform the existing grants into an effective instrument for emission reduction. In the long term, regulatory measures will have to be taken.

The audit found that the EC Directive on the energy performance of buildings was not implemented by all states in due time, and in some states, there was no incentive to use environmentally neutral building materials. Grant amounts often were not related to energy savings.

The audit recommended that the fundamental criteria for housing grants and the corresponding reporting be completed by net present values on a standardized nationwide basis. The specific costs per reduced tonne of carbon dioxide should be determined in a standardized manner. Amounts of assistance for thermo-energetic renovation projects should be based on the greenhouse gas savings achieved.

Responses of the government to the audit recommendations

The recommendations resulted in various amendments to the legal frameworks of the states, changes in the funding and granting systems, and a contract between the federal Ministry and the states dealing with applicable standards.

Brazil	
The Name of the Audit	Adaptation measures for climate change scenarios in the agriculture and livestock sector
Publication Information	October 2009; Brazilian Court of Audit, Judgment N° 2.513/2009 – TCU – Plenary; available in Portuguese at www.tcu.gov.br

The national audit objectives

To verify to what extent the actions of the Federal Public Administration are promoting adaptation of the livestock and agriculture sector to climate change scenarios.

The scope of the audit

- The mapping of main vulnerabilities resulting from the identified risks in the agriculture and livestock area; adaptation actions for the agriculture and livestock sectors in response to the identified risks; and the establishment of appropriate systems of coordination, integration, governance, and accountability for those actions.
- Audit period covered or end date of audit process: 2008.
- Audited entities: Civil Cabinet of the Presidency, Ministry of Environment, Ministry of Agriculture and Livestock, Ministry of Science and Technology, Ministry of Agrarian Development, Brazilian Agricultural Research Corporation, National Institute of Meteorology, National Institute for Space Research, National Water Agency.

Conclusions of the audit findings and key recommendations

Climate change has significant impacts on activity and production in the agriculture sector. It also impacts food safety and the Brazilian balance of trade, and poses the risk of causing serious social problems.

The audit's main finding was deficiencies in the identification of climate change potential risks, mainly due to a lack of access to meteorological data. A large part of that data is still in printed form (books, notebooks, maps, etc.) and needs to be digitized. Also, the identification of the country's vulnerabilities due to climate change scenarios is affected, considering that the identification of risks is harmed by the adoption of less-detailed climate models. The sector's adaptation actions are still at an early stage and are insufficient to deal with problems that could come from climate change. The possible cause for this is the lack of clear instructions to agencies to consider climate change scenarios when planning and implementing public policies for agriculture and livestock. Furthermore, the National Plan on Climate Change does not set guidelines for adaptation actions in the sector.

There were also deficiencies in the coordination, integration, governance, and accountability of the governmental actions regarding climate change, particularly the lack of a more accurate definition of roles to be taken by public agencies and the overlapping activities of institutions.

The SAI recommended that

- guidelines be set regarding adaptation actions for the sector in the National Plan on Climate Change;
- measures be taken to make meteorological data available to research institutions, especially the one responsible for the development of regional climate models; and
- public managers be instructed to consider climate change scenarios when planning and implementing public policies for the sector.

The Name of the Audit	Adaptation measures for climate change scenarios in the Brazilian coastal zones
Publication Information	October 2009; Brazilian Court of Audit, Judgment N° 2.354/2009 – Plenary; available in Portuguese at www.tcu.gov.br

The national audit objectives

To assess the status of the actions led by the Federal Public Administration in order to adapt Brazilian coastal zones to possible impacts of climate change.

The scope of the audit

- Identification of coastal zones' vulnerabilities and the potential risks of climate change in different scenarios; development of actions in response to possible impacts of climate change in the coastal zones; structure and implementation of the defined public policies.
- Audit period covered or end date of audit process: 2008.
- Audited federal entities: Civil Cabinet of the Presidency, Ministry of Environment, Ministry of National Integration, Ministry of the Interior, National Agency of Aquatic Transportation, National Department of Civil Defence, Federal University of Rio de Janeiro, University of Sao Paulo, Brazilian Institute of Geography and Statistics, National Institute for Space Research, Oswaldo Cruz Foundation (Ministry of Health).
- Audited state entities: Pereira Passos Institute (Rio de Janeiro Mayor's office) and the Environmental Sanitation Technological Corporation of the State of Sao Paulo.

Conclusions of the audit findings and key recommendations

The complex characteristics of the national coastal zone are heightened by its vast length, stretching around 8,500 kilometres, and by its demographic density, given that it is home to more than 25 percent of the country's population.

The existing studies on vulnerabilities of coastal zones are not enough to assess climate change risks and impacts. The country does not have a permanent and centralized system to coordinate and store monitoring data on oceanic variables. Monitoring is currently done in a decentralized way by several

public institutions, by universities, and by research institutes. Therefore some oceanic variables important for the construction of scenarios are not monitored. Furthermore, the National Plan on Climate Change does not set guidelines for adapting public policies for coastal zones. The existing public policies in sectors potentially affected, such as the marine shipping sector and civil defence sector, are still at an early stage of planning the inclusion of adaptation actions.

The SAI recommended that

- the institution responsible for implementing the National Plan on Climate Change develop an action plan to implement a permanent system to monitor the oceanic variables and build a data bank that could store this information and the time series necessary to model scenarios of possible climate change impacts;
- the National Council of Water Resources take measures to integrate the management of hydrographic basins to the estuarine systems basins and coastal zones; and
- the National Council of Environment consider possible climate change impacts in the environmental licensing related to projects in the coastal zones.

The Name of the Audit	Adaptation measures for climate change scenarios in the Brazilian semiarid region regarding water security
Publication Information	October 2009; Brazilian Court of Audit, Judgment N° 2.462/2009 – Plenary; available in Portuguese at www.tcu.gov.br

The national audit objectives

To assess to what extent governmental actions regarding water security in the Brazilian semiarid region take into account climate change scenarios. The Brazilian semiarid region covers an area of approximately 900,000 square kilometres, 10 states, and is inhabited by roughly 22 million people. The topic choice was due mainly to the fact that the region is highly vulnerable to climate change effects.

The scope of the audit

- Assessment by governmental institutions on vulnerabilities, impacts, and risks for the water security of the Brazilian semiarid region; government public policies or similar actions to guarantee water security in the semiarid region, in response to possible effects of climate change; preparedness of public institutions responsible for water resource management in the states of the semiarid region to incorporate the guidelines pointed out by the federal government to adapt to climate change effects.
- Audit period covered or end date of audit process: 2008.
- Audited federal entities: Civil Cabinet of the Presidency, National Water Agency, Ministry of Environment, Ministry of the Interior, Ministry of Science and Technology, Ministry of Social

Development and Fight against Hunger, Ministry of National Integration, Ministry of Mines and Energy, and National Health Foundation.

- Audited state entities: Department of Water Resources of the States of Bahia, Ceara, and Piaui.

Conclusions of the audit findings and key recommendations

Responsibilities regarding climate change are dispersed among several public institutions. The lack of a clear definition of roles and responsibilities can compromise management and results. Additionally, there are no climate change risk assessments for the semiarid region produced by the government. Furthermore, development policies related to water management and distribution are not yet taking into account potential effects of climate change. Also, studies conducted by the government that propose guidelines for the implementation of polices for the water sector are not considering climate change impacts.

The SAI recommended that

- the institution responsible for the implementation of the National Plan on Climate Change promote institutional and political coordination between the different sectors of the federal government in order to produce a national climate change risk assessment and to encourage technical research development of climate change impacts on the Brazilian semiarid water resources; and
- the institution responsible for the implementation of environmental policies adopt measures to install the Alert System of Drought and Desertification to foster the development of climate change scenario modelling for the Brazilian semiarid region and to encourage the responsible institutions to plan and implement water resources policies that consider potential climate change impacts.

The Name of the Audit	Public policies regarding the mitigation of greenhouse gas emissions in the Legal Amazon forest region
Publication Information	October 2009; Brazilian Court of Audit, Judgment N° 2.293/2009 – Plenary; available in Portuguese at www.tcu.gov.br

The national audit objectives

To assess public policies on mitigating greenhouse gas (GHG) emissions in the “Legal Amazon” forest region. This topic was chosen because 75 percent of national carbon dioxide emissions come from land-use change and the forestry sector.

The scope of the audit

- Public policies for the Legal Amazon that create relevant negative impacts on the emissions and any mechanisms to compensate or reduce those impacts; public policy planning considering GHG emission mitigation; coordination, integration, governance, and accountability in order to promote GHG emission reduction.

- Audit period covered or end date of audit process: 2008.
- Audited entities: Civil Cabinet of the Presidency, Ministry of Environment, Ministry of Agriculture, Ministry of Transportation, Ministry of Planning, Ministry of Science and Technology, Ministry of Agrarian Development, National Institute of Colonization and Agrarian Reform, and Superintendency of the Amazon Region Development.

Conclusions of the audit findings and key recommendations

Supervision, control, and monitoring actions conducted by the Ministry of Environment and the Ministry of Science and Technology have had significant results in reducing deforestation and, as a consequence, the GHG emissions of the sector. However, actions of other government agencies in the region, such as policies related to agriculture and rural settlements, have generated negative impacts on emissions of greenhouse gases. The audit found that, despite initiatives indicating that these bodies are placing an increasing importance on environmental issues, the initiatives were not enough to obtain significant results in environmental preservation and, therefore, in mitigation of GHG emissions in the region. Also, actions to promote sustainable production activities, important for maintaining a continuous decline in deforestation, are not yet properly structured.

The National Plan on Climate Change was important to identify and organize climate change public policies, bringing the matter into the spotlight. Additionally, specific targets were proposed to reduce GHG emissions for the forest sector. However, the plan did not detail the mechanisms necessary to implement the proposed actions. Furthermore, aspects related to governance and accountability are still at an early stage. This might compromise the expected results, considering the historically low level of cooperation among the federal government institutions responsible for the policies related to deforestation in the Legal Amazon region.

The SAI recommended that

- the institutions responsible for the coordination of the National Climate Change Plan make an action plan with activities, roles, responsibilities, and resources necessary to implement the proposed measures and mitigation targets, as well as make information available on the Internet about actions and results achieved; and
- the ministries with public policies in the region promote conservative environmental measures and sustainable production activities, according to the opportunities for improvement identified in the audit.

Canada	
The Name of the Audit	Managing the federal approach to climate change
Publication Information	2006 September Report of the Commissioner of the Environment and Sustainable Development, Chapter 1 (Office of the Auditor General of Canada); available in English and French at www.oag-bvg.gc.ca

The national audit objectives

- To determine the extent to which the federal government has put in place a suitable management framework for the climate change initiative
- To determine whether the federal government is able to assess its major climate change spending so as to report reliably and fairly on the costs involved in the climate change initiative
- To determine if greenhouse gas emissions reduction strategies, including targets and policy tools for selected sectors, such as transportation and large final emitters, are based on sound data and analysis
- To determine if the federal government is prepared to implement an effective domestic greenhouse gas emissions trading system in Canada
- To assess the federal government's relationship with Sustainable Development Technology Canada (SDTC) and how well SDTC is fulfilling its mandate with respect to its climate change activities

The scope of the audit

- Three central agencies, a foundation, and five departments with a variety of mandates for the management of climate change activities within Canada and internationally. Federal organizations were selected based on their relative contribution to the federal climate change initiative.
- Audit period covered or end date of audit process: Substantially completed on 14 June 2006.
- Audited entities: Canadian International Development Agency, Environment Canada, Department of Finance Canada, Foreign Affairs and International Trade Canada, Natural Resources Canada, Privy Council Office, Sustainable Development Technology Canada, Transport Canada, and Treasury Board of Canada Secretariat.

Conclusions of the audit findings and key recommendations

The government has not created an effective governance structure for managing its climate change activities. This is despite internal commitments made since 2003.

There is no government-wide consolidated monitoring and reporting of spending and performance information on climate change activities. The Treasury Board of Canada Secretariat is developing a system for capturing this information, but it is not yet fully operational, and responsibility for its management has not been assigned. Measures to reduce greenhouse gas emissions in the transportation and industry sectors are not expected to bring emissions below 1990 levels; they may only slow the rate at which greenhouse gas emissions in these sectors continue to grow.

The proposed systems for reducing greenhouse gas emissions from large industrial emitters and for domestic emissions trading are highly complex. Progress to date has been slow, and many issues, such as public disclosure of key data, have yet to be resolved. Distinctive features of the domestic emissions trading system, particularly the CAN$15 per tonne price cap promised to industry, present potentially serious financial risks to the Canadian taxpayer that could range from zero to over CAN$1 billion.

Environment Canada and Natural Resources Canada, the departments sponsoring the Sustainable Development Technology Canada foundation, had taken reasonable steps to oversee the Foundation's climate change activities under its funding agreements. For its part, the Foundation had taken reasonable steps toward fulfilling its climate change mandate. However, the SAI had some concerns with respect to the Foundation's reporting of projected reductions by 2010.

The SAI recommended

- development and implementation of effective governance and accountability for the climate change issue within the federal government;
- verification and public reporting of the results from the automotive sector voluntary agreement and establishment of key content requirements for any future voluntary agreements;
- ensuring that emission reductions from the Large Final Emitter System are real, measurable, verifiable, and transparent;
- requirements for an emissions trading system that would ensure that emission reductions are real, measurable, and verifiable; and
- adopting and alternative approach for reporting greenhouse gas emissions reductions for projects funded by Sustainable Development Technology Canada.

The Name of the Audit	Managing air emissions
Publication Information	2008 December Report of the Commissioner of the Environment and Sustainable Development, Chapter 1 (Office of the Auditor General of Canada); available in English and French at www.oag-bvg.gc.ca

The national audit objectives

To determine whether the responsible departments of the Government of Canada know if certain key policy tools used by the government to control air emissions are achieving actual results. For the purpose of this report the key sub-objectives are

- to determine whether selected departments can demonstrate that, for air emission reduction targets related to selected economic policy instruments, (a) expected reductions have been adequately designed, and (b) procedures are in place to know whether the expected reductions are being achieved; and
- to determine whether responsible departments can demonstrate that they have complied with requirements for implementing selected voluntary agreements.

The scope of the audit

- Fuels regulations, economic measures, and voluntary agreements. Measures were selected based on their materiality, auditability, and significance, as well as reference to them in the responses to environmental petitions submitted to the Auditor General of Canada.
- Audit period covered or end date of audit process: Substantially completed on 6 June 2008.
- Audited entities: Environment Canada, Transport Canada, and Department of Finance Canada.

Conclusions of the audit findings and key recommendations

The federal government could not demonstrate that the results it had reported for the policy tools examined had actually been achieved or that processes were in place to verify the results reported by the private sector.

Environment Canada lowered its initial estimate of annual reductions in greenhouse gas (GHG) emissions from 220,000 tonnes to about 35,000 tonnes expected as a result of the Public Transit Tax Credit—a reduction that would have a negligible impact on Canada's GHG emissions, despite the CAN$635 million reported in the 2007 Budget as the three-year cost of the Tax Credit as of that date.

Environment Canada used flawed analyses to establish the 80-megatonne reduction in GHG emissions it expects from 2008 to 2012 as a result of the Clean Air and Climate Change Trust Fund, which supported provincial and territorial initiatives. Under the Trust Fund, money was transferred to the provinces and territories so that mitigation and/or adaptation actions could be undertaken. Although the 80 megatonnes are included in the total reductions the federal Climate Change Plan will achieve, the Trust Fund has no conditions that allow the federal government to monitor the provinces' results by requiring the provinces to report how they use the funds. Therefore, it is very unlikely that Environment Canada will be able to report real, measurable, and verifiable results.

The three voluntary agreements that were assessed met many of the general expectations for what a voluntary agreement should include. However, the government had not completed the key step of verifying the results reported by the private sector.

The Name of the Audit	*Kyoto Protocol Implementation Act*
Publication Information	2009 Spring Report of the Commissioner of the Environment and Sustainable Development, Chapter 2 (Office of the Auditor General of Canada); available in English and French at www.oag-bvg.gc.ca

The national audit objectives

To determine whether Environment Canada can demonstrate that its annual climate change plans meet the requirements set out in subsection 5. (1) of the *Kyoto Protocol Implementation Act*. The audit also aimed at determining whether

- Environment Canada's annual climate change plans include all applicable elements listed in subsection 5. (1) of the *Kyoto Protocol Implementation Act*;

- Environment Canada, in conjunction with other selected departments, can demonstrate whether the information in the plans pertaining to selected measures is accurate or based on an adequate rationale; and
- Environment Canada can demonstrate that it has systems in place to monitor and report on the greenhouse gas (GHG) emission reductions of the selected measures in the plans.

The scope of the audit

- KPIA Climate Change plans; Regulatory Framework for Industrial Greenhouse Gas Emissions; ecoENERGY for Renewable Power program; proposed renewable fuels content regulations and nine other biofuels measures.
- Audit period covered or end date of audit process: Substantially completed on 9 January 2009.
- Audited entities: Environment Canada, Natural Resources Canada, Agriculture and Agri-Food Canada, and Sustainable Development Technology Canada.

Conclusions of the audit findings and key recommendations

The *Kyoto Protocol Implementation Act* requires that the environment minister prepare and implement an annual plan to reduce GHG emissions in Canada that is to include reduction measures as well as a progress report on the implementation of the previous year's plan. Also, the Act requires the SAI assess Canada's progress in implementing these plans and meeting its Kyoto obligations.

The existing annual climate change plans did not include all of the information required under the Act. Missing information included the dates that some planned reduction measures were to come into effect, the amounts of expected emission reductions from some measures, and whether some measures had been implemented by the projected date.

Environment Canada could not demonstrate that the Regulatory Framework's expected emission reductions were based on an adequate rationale. The plans overstated the reductions that could be reasonably expected during the Kyoto period (2008 to 2012).

For all measures examined, the plans were not fully transparent since they did not disclose how expected emission reductions might be affected by such uncertain factors as future economic conditions.

While Environment Canada had a system in place to report on Canada's total GHG emissions, it had no system for reporting the actual reductions achieved from each measure in the plans—a requirement under the Act. Environment Canada indicated that the monitoring of actual reductions could be technically unfeasible and not necessarily cost effective, and that reductions could be impossible to attribute to a specific measure. However, the Department had not explained why each measure's expected emission reductions can be estimated in advance but actual reductions cannot be measured after the fact.

It was recommended that the Department's future plans include

- all the information required under the Act;
- the quantitative and qualitative uncertainties related to the expected GHG emission reduction for each measure; and
- an explanation of how GHG emissions for each measure will be monitored and reported, and if this is not possible, an explanation of why not.

Estonia	
The Name of the Audit	The state's efforts to reduce greenhouse gas emissions
Publication Information	26 November 2009; available in Estonian and English at www.riigikontroll.ee and www.environmental-auditing.org

The national audit objectives

To assess whether the state has used its skills and resources to contribute to the reduction of greenhouse gas (GHG) emissions generated in Estonia.

The scope of the audit

- Greenhouse gas inventories; measures planned by the state for reducing greenhouse gases and their impact; greenhouse gas projections; and the European Union's Emissions Trading Scheme, because this measure for reducing greenhouse gases affects Estonian enterprises and thus the entire economy the most out of all other GHG mitigation measures.
- Audit period covered or end date of audit process: 2005–2008.
- Audited entities: Ministry of the Environment, Ministry of Economic Affairs and Communications, Ministry of Agriculture, Environment Information Centre, and Estonian Environmental Board.

Conclusions of the audit findings and key recommendations

The SAI concluded that Estonia lacks climate policy targets. The Minister of the Environment has failed to prioritize the need for reducing GHGs, mainly because the goal set out in the Kyoto Protocol had already been achieved at the time of signing the protocol. Problems now arise from the following omissions:

- The state has no up-to-date action plan for coordinating the reduction of GHGs and thus has no clear goals and objectives.
- There is a lack of knowledge about the effects of the measures for reducing GHGs implemented thus far and therefore there is also a lack of realistic projections of future emissions.
- The current calculations of GHG emissions (inventories) need to be improved. Most likely Estonia has declared the GHG levels lower than actual due to problems in the accounting of emissions.

In relation to European Union GHG emissions trading, the main conclusion is that the state has supported over allocation of quotas. The state did not encourage companies to invest the money earned from the sales of trading units into cleaner technologies. Thus the state supported earning short-term profits but did not succeed in using trading as a tool to reduce GHG emissions. The European Commission cut the allowances given in the EU emissions trading national allocation plan proposal for 2008–2012 by a half, thus giving a negative assessment of the practice so far. The disputes following the decision cause uncertainty among the traders, and the enterprises involved in the trading system suffer due to poor performance of the state. A further problem with the emission trading arises

from the fact that the emissions of the enterprises participating in the emissions trading scheme are not verified in full accordance with the EU rules.

The key recommendations are aimed toward improving the governance and coordination of GHG mitigation policies and analyzing the impacts of those policies, and also toward creating credible GHG emission projections and improving the inventory data. For the EU emissions trading, the SAI recommends improving the verification of GHG emission data submitted by the facilities by assigning the task to accredited verifiers.

Responses of the government to the audit recommendations

The ministers agreed with the SAI's recommendations. However, it is too early to assess the implementation of the recommendations.

Finland	
The Name of the Audit	Emissions trading: Flexible mechanisms under the Kyoto Protocol
Publication Information	December 2009, Performance Audit Reports, 200/2009; available in Finnish and English at www.vtv.fi

The national audit objectives

To evaluate the functioning and effectiveness of Finland's mechanism purchases.

The scope of the audit

- In evaluating functioning, the audit focused on the planning and organization of activities, the use of personnel resources, financing practices, and the monitoring of activities. In evaluating effectiveness, the audit focused on the purchase of emissions allowances and their cost.
- Audit period covered or end date of audit process: 2005–2008.
- Audited entities: Ministry of Employment and the Economy, Ministry for Foreign Affairs in Finland, Ministry of the Environment, and the Finnish Environment Institute.

Conclusions of the audit findings and key recommendations

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 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 description 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 credits have been cheaper than bilateral purchases of emission credits.

The SAI considers that the Ministry of Employment and the Economy, which is responsible for preparing legislation regarding the Kyoto Protocol mechanisms, should carry out more detailed calculations—particularly concerning the expected yield and costs of funds—and document these in connection with the monitoring of activities. In calculating the costs of bilateral purchases, the Ministry of Employment and the Economy 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 SAI 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.

The Name of the Audit	Supplying property for housing and preventing urban sprawl: The role of a state
Publication Information	May 2010; available in Finnish with a summary in English at www.vtv.fi

The national audit objectives

To examine whether the state has succeeded in preventing urban sprawl in the surroundings of the fastest-growing cities.

The scope of the audit

- The legal framework, state-owned land, performance of regional authorities, and two state grant systems. A main concern was whether the state has acted horizontally and coherently in preventing urban sprawl and promoting compact community structure.
- Audit period covered or end date of audit process: 2002–2009.
- Audited entities: Ministry of the Environment, Ministry of Agriculture, Ministry of Finance, Ministry of Transport and Communication, and Regional Environmental Centres.

Conclusions of the audit findings and key recommendations

A compact community structure is widely recognized as an important question in various strategies and targets in the Finnish land-use planning system. Despite this, building that is scattered outside growing cities is very common. In some of the city regions, almost half of the new single-family houses are built outside the areas requiring planning. The scattered settlement structure is more expensive as it increases traffic and thus negative climate impacts. It also adds infrastructure building costs as well as costs related to municipal social services, such as school transport or home care for the elderly. The audit found that there is not enough knowledge about the costs related to urban and rural physical structure.

The legal framework would in principle provide municipalities with tools to control the urban sprawl. The tools are, however, not all-embracing and municipalities are not using them to the degree required. The basic shortcoming is that the Finnish legislation still respects the old tradition of one's right to build on the land one owns.

Regional environmental authorities have a right to appeal some of the land-use decisions municipalities have made. The audit found that there are differences between how the regional environmental centres react to municipalities' decisions that are obviously contributing to community sprawl. An additional problem is that the state-led traffic planning system and land-use planning, which are the responsibility of municipalities, are not optimally coordinated.

The audit also scrutinized the state's two grant systems. There is a grant system in place to promote the building of local infrastructure, which is intended to make communities more complementary. At the same time, a subsidy system for water supply systems has accelerated urban sprawl. There are also other grant systems that potentially lead in the wrong direction from the perspective of community structure and climate targets.

The audit found that the state's actions that have an influence on urban and rural community structure are not sufficiently coordinated. The state needs a horizontal strategy that gives responsibilities to all sectors of the government.

Greece	
The Name of the Audit	Climate change—Emissions trading system
Publication Information	May 2010; available in Greek at www.elsyn.gr

The national audit objectives

To investigate whether the greenhouse gas (GHG) emissions trading system and the state's efforts to reduce GHG emissions provide a valuable contribution to meet the obligations of the Kyoto Protocol.

The scope of the audit

- Allocation of emission allowances during the periods 2005 to 2007 and 2008 to 2012; actual use of emission allowances during the first period; administration, costs, and benefits of the system.
- Audit period covered or end date of audit process: 2003–2009.
- Audited entity: The former Ministry for the Environment, Physical Planning and Public Works.

Conclusions of the audit findings

In 2007, GHG emissions increased 22.42 percent compared with emissions in the base years (1990 for carbon dioxide, methane, and nitrous oxide; and 1995 for "f-gases," such as hydrofluorocarbons and perfluorocarbons), and therefore Greece is expected to be in compliance with its Kyoto Protocol target of a maximum increase of 25 percent for the period 2008–2012.

The audit reviewed the application of the Joint Ministerial Decision that has incorporated into Greek legislation the European Union Directive regarding the EU Emissions Trading Scheme along with the framework of the second National Programme for Climate Change. This framework addresses emissions from the main greenhouse gas-emitting sectors (energy supply and use, including the energy industry; fugitive emissions (emissions that are not emitted through an intentional release through a stack or vent); energy use by industry and by other sectors; transport; industrial processes; waste; agriculture; and solvents). Various emissions reduction actions have been planned in an attempt to achieve the Kyoto national target. The National Programme prioritizes and emphasizes the achievement of the targets through national actions without using the Kyoto Protocol's flexible mechanisms. The maximum possible reduction of emissions is pursued through national policies and measures; however, it has not yet been determined how much each of the actions contributes to emissions reduction. It is also not possible to assess the contribution of each specific reduction target to the overall national target, as there is a lack of information on the effectiveness of measures in each sector. Moreover, there is no overall system for tracking all costs and revenues of mitigation measures.

The Ministry for the Environment, Physical Planning and Public Works had not fulfilled its role as it should have. GHG mitigation has been a low priority; however, the monitoring system has been improved. This is due to the government aiming for “green development” since October 2009 and creating a new Ministry for the Environment, Energy and Climate Change. The new ministry has scheduled the development of a central database that will include most of the data required for monitoring GHG emissions, and that is expected to provide more valuable information in the near future.

The emissions reduction measures adopted so far include promotion of natural gas use, improvements in the conventional power generation system, promotion of renewable energy sources, improvement of new car fuel efficiency, and recovery of biodegradable waste. The total realistic GHG emissions reduction potential from the implemented policies and measures is estimated at 28.3 metric tonnes of carbon dioxide equivalent for 2010, and at 37.6 metric tonnes of carbon dioxide equivalent for 2015.

Indonesia	
The Name of the Audit	Indonesian forest management in the Department of Forestry Jakarta, Bogor, Riau, and West Kalimantan
Publication Information	23 February 2009; Audit Report No. 32/LHP/XVII/02/2009, No. 33/LHP/XVII/02/2009, and No. 34/LHP/XVII/02/2009

The national audit objectives

- To assess whether the Internal Control System has been designed and implemented properly with respect to forest inventory, forest area stipulation, climate change mitigation, forest utilization and forest area concession, logging and the reporting of logging activities, forest area safeguarding and protection, and forest revenue management.
- To assess whether forest inventory, forest area stipulation, climate change mitigation, forest utilization and forest area concession, logging and the reporting of logging activities, forest area safeguarding and protection, and forest revenue management have been in accordance with the applicable provisions.

The scope of the audit

- Forest inventory, forest area stipulation, climate change mitigation, forest utilization and forest area concession, logging and the reporting of logging activities, forest area safeguarding and protection, and forest revenue management.
- Audit period covered or end date of audit process: 2006–2008 (1 December 2008).
- Audited entities: Ministry of Forestry, local government in West Kalimantan and Riau Province (province, district/city level), and related companies.

Conclusion of the audit findings and key recommendations

The Ministry of Forestry has not fully performed Indonesia's climate change commitments, so the implementation of climate change programs is not focused, measurable, or achievable in accordance with the targets. The government cannot optimally make use of climate change mechanisms such as the Clean Development Mechanism (CDM) and Reducing Emissions from Deforestation and Degradation (REDD) as sources of funding for forest development and management, and it is difficult for the government to control and monitor policies in relation to stakeholder efforts for adapting to and mitigating climate change.

The Carbon National Inventory in the forestry sector has not been conducted, which results in programs or activities conducted by the Ministry of Forestry for reducing the rate of deforestation and carbon emission due to deforestation without any baseline, target, or benchmark of success. It also results in the fact that the amount of potential funds that can actually be absorbed from the CDM and REDD mechanisms in the forestry sector is not clearly known.

In terms of land use policy, certain companies and/or the local community illegally used forest area for development of plantation estates, mining, and ponds. This action causes the loss of forest, damage to the function of the conservation area, and the loss of the hydrological function of forests, which may lead to flood and drought.

The National Action Plan for Climate Change (NAPCC) was found to be not legally binding and has not been evaluated or monitored. This condition not only causes NAPCC to become a voluntary policy that can be implemented based only on the related entities' commitment and will, but it also impacts the result, and therefore the effectiveness of the implementation cannot be measured properly.

In regards to illegal logging, companies cut undersized trees outside the allowable limit set by the authorities. To ensure forest sustainability, regulations limit the trees of a certain diameter that can be cut for every type of forest.

The SAI recommended that the Minister of Forestry

- coordinate with Indonesia's National Council on Climate Change and other related entities to formulate integrated, achievable, measurable, and directed national policies, strategies, programs, and activities in managing climate change in the forestry sector, and create policy to regulate carbon trade mechanisms including the mechanism to manage the fund related to climate change;
- support the implementation of climate change policies and regulations and improve coordination with other related entities; and
- determine the methodology to calculate carbon and conduct national carbon inventory and national carbon accounting in the forestry sector.

The SAI further recommended that

- the central government, together with the local government, terminate the licence given to the agricultural, pond, and mining companies and other parties that were proven to be illegally occupying or converting a forest area;
- the Chairman of the National Council on Climate Change (NCCC) enforce the implementation of NCCC programs and activities;
- the State Ministry of Environment coordinate with other institutions to develop and establish regulations to implement the National Action Plan for Climate Change and enforce the implementation of those regulations; and
- the central government, together with the local government, impose sanctions on companies for illegally cutting trees.

The Name of the Audit	Waste management in five municipalities in Indonesia
Publication Information	10 March 2010; Audit Report No. 26 to 28/LHP/XVII/03/2010; 12 March 2010; Audit Report No. 30/LHP/XVII/03/2010

The national audit objectives

To assess the effectiveness of government policies and public waste management services in achieving the following targets (as stated in the 2004–2009 Medium Term National Development Plan):

- Collect 75 percent of municipal solid waste generated and transport it to a solid waste disposal site.
- Improve the existing management of the sanitary landfill systems in big cities and controlled landfill systems in small and medium-sized cities.

The scope of the audit

- National and local government policies and their implementation in waste management; and the policies, implementation, and monitoring of the Clean Development Mechanism (CDM) in the waste sector.
- Audit period covered or end date of audit process: 2005–2009.
- Audited entities: National Development Planning Agency (NDPA), Ministry of Public Works, Ministry of Environment (MoE), and five local governments (Province of Jakarta, cities of Bekasi, Bandung, and Denpasar, and District of Gianyar).

Conclusions of the audit findings and key recommendations

The SAI identified positive responses of institutional development by the Government of Indonesia in mitigating and adapting climate change. The institutions are two ministries (NDPA and MoE) and three ad hoc organizations that are responsible for policy development and coordination to mitigate climate change. The three ad hoc organizations are the National Committee on Climate Change, National Committee for Clean Development Mechanism (CDM Committee), and the National Council on Climate Change. The examination of the roles and responsibilities of the five institutions has produced the following findings:

- There is unclear segregation of duties, authorities, functions, and coordination related to adaptation and mitigation of climate change. For example, MoE, NDPA, the National Committee on Climate Change, and the National Council on Climate Change are all responsible for formulating policies to control climate change impacts.
- After the National Council on Climate Change was established in 2008, the National Committee on Climate Change, which had been established in 2003, was not dissolved, even though both ad hoc organizations have exactly the same tasks. The SAI reported this finding in its Audit Report No. 32/LHP/XVII/02/2009 dated 23 February 2009, and had recommended that the President of the Republic of Indonesia review the establishment of the National Council on Climate Change.

- The members of the three ad hoc organizations are representatives of several ministries and agencies: Environment, Energy and Mineral Resources, Forestry, Foreign Affairs, Home Affairs, Agriculture, Transportation, Trade, Industry, Finance, and NDPA.
- The National Action Plan for Climate Change (NAPCC), which was developed in November 2007, has never been fully implemented by the ministries. Instead, in 2009, MoE developed the National Strategies and Action Plans in Mitigating GHG (Greenhouse Gas) Emissions to replace NAPCC.

These problems in institutional development caused risks of overlapping duties, authority, activities, and financing that further impacted the efficiency and effectiveness of government efforts in adapting and mitigating climate change.

The CDM Committee, as the national authority that approves CDM project proposals, did not optimally perform its tasks, as shown in the following findings:

- The design of the CDM Committee affected the approval process of CDM project proposals. The organization consists of 14 high-ranking officials (for example, with the title of director general or managing director) and a technical team that represents 14 government institutions. Thus, it is difficult to evaluate and approve the proposals since these tasks are additional work for committee members, who are already full-time employees in their institutions.
- From 2005 to 2009, the CDM Committee approved 90 CDM project proposals; 8 of them were in waste management. Only 5 of the 8 projects were approved within 11 weeks of the proposal submission, which is the standard time for project approval. Only 6 out of 90 were monitored and evaluated during the project's operation.
- The examination of the Gikoko Bekasi LFG Flaring Project (methane gas combustion project) showed that the CDM Committee did nothing despite of some irregularities in the implementation of the project design document, such as the lack of a waste water disposal permit, pollution of groundwater due to leakage from a waste water treatment plant, and no control and monitoring of the environmental impact assessment.
- The status of projects on the CDM Committee website are not up-to-date.

These problems have resulted in a lower number of CDM projects in Indonesia compared with other Asian countries, such as China, India, and Malaysia, and a risk of decreasing the private sector's interest in CDM projects.

Furthermore, the Ministry of Public Works contracted a consulting agency to conduct a study on the implementation of CDM in solid waste management from June to November 2008. The expected outputs of the study were maps of potential greenhouse gases in some solid waste disposal sites (SWDS), study and analysis of the solid waste composition and SWDS management, a CDM feasibility study on each SWDS, and recommendations for follow-up. The audit showed that the outputs of the study have not been followed up by the ministry. Thus, there is no concrete action in implementing CDM projects in waste management.

The SAI recommended that the Government of Indonesia

- review and reformulate the roles and responsibilities of organizations involved in adapting and mitigating climate change; dissolve the National Committee on Climate Change; and review the existing strategies, plans, and activities related to climate change;

- reform the organization of the CDM Committee, develop its performance evaluation system and review its work mechanism, and improve the cooperation with local governments in monitoring the approved CDM projects; and
- review the criteria in planning CDM activities, ensuring that sustainability is one of the criterion, and develop a clear and measurable action plan for implementing CDM projects in the studied SWDS.

Norway	
The Name of the Audit	The Office of the Auditor General's investigation into the efforts of the authorities to limit flood and landslide hazards
Publication Information	15 April 2010; available in Norwegian and English at www.riksrevisjonen.no

The national audit objectives

To consider how the national authorities, through the Ministry of Petroleum and Energy and the Ministry of the Environment, work to reduce the dangers of flood and landslide. The audit addresses climate change with regards to the unknown impact it will have on floods and landslides in the future.

The scope of the audit

- Prevention of flood and landslide, natural hazards, flood inundation maps, landslide maps, quick-clay maps, municipal planning, adaptation, and geographical information systems (GIS).
- Audit period covered or end date of audit process: 1995–2009.
- Audited entities: Ministry of the Environment and Ministry of Petroleum and Energy.

Conclusions of the audit findings

Floods and landslides are recurring events that cannot be easily prevented. Good practices in land use planning are the most cost-effective and environmentally sound way of reducing risk of damage from hazards, including flooding and landslides. Adaptation is not the main focus of the audit, but climate change is an important aspect as it may influence the frequency of floods and landslides in the future.

Use of GIS has given the audit an overview of areas in Norway that are at risk of flood or landslide, and the number of inhabitants and buildings in such areas.

Land use planning depends on detailed surveys of areas prone to flood or landslide. The survey results in maps showing potential flood or landslide areas, and is the responsibility of the Norwegian Water Resource and Energy Directorate. The directorate is subordinate to the Ministry of Petroleum and Energy. The audit concluded that these maps do not take climate change into account, making them less effective as a tool for planning.

The main responsibility for preventing floods and landslides lies with local municipalities, making their competence vital for effective policies. The audit has shown that municipalities have limited knowledge about consequences of future climate change at the local level. Local municipalities asking the government for advice on the effects of climate change are not satisfied with the answers received, considering them to be too general and not easily applied to local conditions.

The Name of the Audit	The Office of the Auditor General's investigation into goal achievement in climate policy
Publication Information	15 April 2010; available in Norwegian and English at www.riksrevisjonen.no

The national audit objectives

To consider goal achievement with respect to Norway's international climate commitments and the national authorities' efforts to implement the climate policy decisions.

The scope of the audit

- The Kyoto Protocol target and national targets for 2020; policy measures: taxes, emissions trading, Clean Development Mechanism (CDM), and legislation; sectors: energy and petroleum, road transport, agriculture, forestry, and industry; science and technology (including carbon capture and storage); and the initiative to reduce deforestation in developing countries.
- Audit period covered or end date of audit process: 1998–2009.
- Audited entities: Ministry of the Environment, Ministry of Finance, Ministry of Petroleum and Energy, Ministry of Trade and Industry, Ministry of Agriculture and Food, Ministry of Transport and Communications, and Ministry of Foreign Affairs.

Conclusions of the audit findings

National emissions of greenhouse gases (GHGs) increased by 8.4 percent from 1990 to 2008, and are expected to exceed the Kyoto target (which allows a 1 percent increase from 1990) by 5.7 million tonnes in 2010. Among other things, the oil industry has not been provided free allowances in the European Union (EU) Emissions Trading Scheme, and the industry will purchase sufficient allowances for Norway to meet the Kyoto target. CDM credits purchased through the state program can also be used to fulfill the Kyoto target, but the progress has been slower than anticipated and the results are uncertain. The national objective to strengthen the Kyoto target by 10 percent through contributing to emission reductions in other countries will likely not be met by 2012 by acquiring primary CDM credits, but can be met by purchasing more expensive credits from the secondary CDM market.

Use of the flexible mechanisms reduces the costs of achieving climate policy targets. However, there is evidence from the literature that the real emission reductions from CDM are smaller than claimed. It is questionable if all projects are additional (see the definition of *additional* in the Glossary); also, emissions may increase elsewhere as a result of CDM.

Norway implemented a carbon dioxide tax on energy use in 1991. While the tax has been efficient in stimulating emissions-reducing measures in the oil and gas extraction sector, the effect of the tax is smaller in other sectors. Gradually, regulation through the emissions trading system replaces taxes. However, the price of allowances in the EU emissions trading scheme has been low, and thus the incentives to national emission reductions are smaller in most sectors compared with previous regulation through tax.

The audit shows that the ministries responsible for sectoral policies have had insufficient focus on the reduction of GHGs, policy measures have not been directed at reducing GHG emissions, and many goals that could contribute to reducing emissions of GHGs are likely to not be met. In particular, the results and implementation of policy measures in the energy sector do not fully support the long-term climate targets. Cost-effectiveness has been an important objective of the climate policy. A key conclusion is that the considerations of cost-effectiveness have not taken into account the expected rise of carbon prices in line with long-term climate targets. Conflicting goals are a major challenge. Development of technology for carbon capture and storage from power plants is a high priority in Norway. Implementation of carbon capture and storage will be important for achieving the climate targets, but it is costly and technologically challenging.

The Ministry of Environment faces substantial challenges as the coordinator of the climate policy. The responsibilities for targets and policy measures are shared between several ministries and are not clearly assigned. The Ministry of Environment has an important role as a driving force in climate policy, but it has not been sufficiently visible. The trend of increasing GHG emissions is projected to continue, and the audit concludes that given current policy instruments and challenges there is a high risk of long-term targets not being met toward 2020.

Poland	
The Name of the Audit	Implementation of selected tasks under the provisions of the United Nations Framework Convention on Climate Change
Publication Information	November 2009; available in Polish at http://nik.gov.pl

The national audit objectives

To examine the status of the implementation in Poland of selected provisions of the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and Directive 2003/87/EC of the European Parliament and Council establishing a scheme for greenhouse gas (GHG) emission allowance trading within the Community and amending Council Directive 96/61/EC.

The scope of the audit

- The performance of research and observations on climate change, actions taken to mitigate the ongoing climate change by decreasing greenhouse gas emission levels and the enhancement of the capacity of those gases' sinks, the achieved reduction of the greenhouse gas emissions, and the reporting of activities carried out and effects achieved to the Climate Convention Secretariat and European Commission.
- Audit period covered or end date of audit process: 2006–2008.
- Audited entities: Ministry of the Environment, Ministry of Economy, Institute of Environmental Protection, Energy Regulatory Agency, and 16 industrial plants that emitted the highest amounts of carbon dioxide in selected regions.

Conclusions of the audit findings and key recommendations

As a result of the audit, the SAI pronounced a positive opinion on the status of implementation in Poland of selected provisions of the United Nations Framework Convention on Climate Change, despite the irregularities disclosed. In addition, the SAI noted the effectiveness of the actions taken, as a result of which, even with the growing economy, the following results were observed:

- The level of GHG emissions was reduced by 29 percent compared with 1988 as the base year, whereas in the Kyoto Protocol, Poland committed to achieving a 6 percent reduction of the greenhouse gas emissions by 2012.
- The amount of energy generated by renewable energy sources was increased by 46.8 percent.

The irregularities disclosed in the audit included

- delays in issuing three ordinances by the Minister of the Environment and failure to issue one ordinance by the Minister of the Environment and one by the Minister for Economy;
- failure to specify in the regulations the deadline for making payments for entries into the National Emission Allowance Registry;

- delays in developing reports for presentation to the United Nations Framework Convention on Climate Change Secretariat and European Commission; and
- delays and missing reports by the operators of GHG-emitting installations.

The causes of the irregularities found in the ministries included insufficient staffing and long time frames for report clearance, while among installations operators the irregularities resulted from incomplete legal regulations.

The SAI issued recommendations for the Minister of the Environment, the Minister of Economy, and the chief executives of the industrial plants participating in the national Emission Allowance Trading Scheme. The recommendations addressed, for example, the issue of the lack of regulations, the organization of the system for observing and forecasting the effects of climate change, and the timely submission of annual, verified reports accounting for the use of the emission allowances to the National Administrator of the Emission Allowance Trading Scheme.

Responses of the government to the audit recommendations

In response to the audit recommendations, heads of the audited units informed the SAI about adequate organizational and legislative steps to be taken toward removing the irregularities disclosed in the audit.

Slovenia	
The Name of the Audit	Achievement of objectives set to protect air and ozone layer and to tackle climate change
Publication Information	June 2008; available in Slovenian with an English summary at www.rs-rs.si

The national audit objectives

- To verify if a comprehensive policy to tackle climate change was adopted in Slovenia, on the basis of which it will be possible to successfully achieve the objectives set.
- To assess whether based on projections of the emissions levels it will be possible to achieve the objectives set, to what extent the planned measures were implemented, and what their effects are.

The scope of the audit

- Comprehensiveness and completeness of the climate change mitigation policy; assessment of achieving set objectives and efficiency of implementing measures in the energy, industry, transport, and agricultural sectors; assessment of possible achievement of emission target values in the period between 2008 and 2012.
- Audit period covered or end date of audit process: 2005–2007 and also the beginning of 2008, which affected the achievement of set objectives.
- Audited entities: Ministry of the Environment and Spatial Planning (hereinafter: Ministry); Ministry of Agriculture, Forestry and Food; Ministry of Transport; Ministry of the Economy; and Slovenian Environmental Public Fund.

Conclusions of the audit findings and key recommendations

The Slovenian policy on climate change does not contain long-term projections of greenhouse gas (GHG) emissions, thus it is not possible to plan long-term policy to mitigate and adapt to climate change. It is not clear whether the government adopted the most cost-efficient measures to reduce GHGs. The national policy to tackle climate change does not contain measures to adapt to the consequences of climate change, and it is not adequately harmonized with other national sectoral strategic development documents. The Ministry did not adequately monitor implementation of measures to tackle climate change.

The reduction of GHG emissions in key sectors is not being carried out in accordance with the planned implementation of measures. Therefore the planned reduction of emission values will not be achieved. The implementation of most planned measures is expected in the target period; therefore, the effects in most cases will occur after 2012. The lack of budget funds allocated to finance the implementation of measures to reduce GHG indicates that the implementation of this policy in Slovenia is not given adequate priority despite the fact that the country signed the international agreement to achieve the agreed reduction of emissions.

The SAI requested that the Ministry prepare a strategy and a plan to implement the tasks of the Climate Protection Office and to assure enough budgetary funds to allocate planned subsidies for the efficient use of energy.

The SAI recommended to audited entities that they

- prepare a new action plan to reduce GHG emissions based on long-term emission growth projections;
- consistently evaluate the effects of the current implementation of measures, and in the case of future allocation of emission allowances, examine the possibility of allocating larger quantities of allowances through an auction;
- identify all sectoral measures that may contribute to the reduction of GHG emissions;
- determine their possible effects as the objective; and
- ensure consistent monitoring of this objective.

Responses of the government to the audit recommendations

The Ministry of the Environment prepared a strategy and a plan to implement the tasks of the Climate Protection Office and assured enough budget funds to allocate planned subsidies for energy efficiency.

South Africa	
The Name of the Audit	Status of climate change initiatives in South Africa
Publication Information	January 2010; available in English at www.agsa.co.za

The national audit objectives

To report on the status of climate change initiatives in South Africa.

The scope of the audit

- Status of mitigation and adaptation measures at the national level.
- Audit period covered or end date of audit process: Current status as at September 2009.
- Audited entity: Department of Environmental Affairs.

Conclusions of the audit findings and key recommendations

As a party to the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, South Africa is bound by all obligations under the convention and protocol. However, as a non-Annex I (developing country) party, South Africa is not legally bound to reach a quantified greenhouse gas emissions target.

Legislation has been implemented to protect and regulate the environment and promote sustainable development, and it contains provisions for greenhouse gas emissions regulation. To govern climate change initiatives and to administer the national policy process in South Africa, a number of forums and interdepartmental and multi-stakeholder coordination forums and mechanisms have been established.

Strategies and plans have been developed, among others, to fulfil the country's obligations per article 4 of the UNFCCC. South Africa is in the process of developing a National Climate Change Response Policy, which it is committed to publishing by December 2010 and translating into regulatory and fiscal packages by 2012.

The Department of Environmental Affairs did work on specific emission reduction instruments and is developing a National Greenhouse Gases Information Management System. National Treasury has recently begun to put budgetary measures in place that encourage energy conservation and reduce the use of environmentally unfriendly technologies.

South Africa established a mechanism to deal with Clean Development Mechanism (CDM) projects. As at 13 July 2009, 125 CDM projects had been submitted to the Designated National Authority. The projects covered bio-fuels, energy efficiency, waste management, cogeneration, fuel switching and hydro power, and sectors such as manufacturing, mining, agriculture, energy, waste management, housing, and residential. However, only 15 projects have been registered as CDM projects.

The SAI made the following recommendations:

- The performance of climate change actions by all responsible agencies should be monitored and reported on to enable government to adjust these efforts and thereby improve the status of performance and achievement of targets. The effectiveness of oversight functions provided by government over the responsible agencies should be evaluated and reported on.
- Government should report regularly in a transparent way on performance against targets.
- The turnaround time for registering CDM projects should be improved and criteria should be developed to assess the CDM projects' contribution to technology transfer.
- The Greenhouse Gas Inventory Management System should be developed in such a way that emission records and forecasts are maintainable and credible.
- The Department of Environmental Affairs should measure the efficiency and effectiveness of mitigation and adaptation policy instruments and report on the achievement thereof.

United Kingdom	
The Name of the Audit	European Union Emissions Trading Scheme
Publication Information	April 2009; available in English at www.nao.org.uk

The national audit objectives

To provide briefing to a Parliamentary Committee giving information on the European Union (EU) Emissions Trading Scheme, covering developments since the Committee last reported on the topic in 2007. The briefing was to support a Committee inquiry and did not therefore provide recommendations. The Committee produced its own report in February 2010 to which the government has replied.

The scope of the audit

- The structure and operation of the EU Scheme; the impact of the Scheme to date, incorporating full emissions data from Phase I; and the negotiations of Phase III of the Scheme.
- Audit period covered or end date of audit process: The period of Phase I from 2005 to 2007, and the likely outcomes of Phase II (2008–2012).
- Audited entities: The government (led by the Department of Energy and Climate Change), which manages the allocation of allowances at the national level, although the policies are formulated at the EU level.

Conclusions of the audit findings

Verified emissions in Phase I were significantly below the EU-wide cap and the UK was one of only four Member States that exceeded their allocation. The Phase II EU cap is tighter but if all companies take up the amount of credits allowed for emission reduction projects in developing countries, it would not require an absolute reduction in emissions compared with Phase I and would represent an increase in emissions compared with 2005.

In the UK, the Phase I allocation amounted to an 8 percent reduction compared with business as usual, and the Phase II allocation represented a reduction compared with Phase I. In Phase II, project credits may represent up to 60 percent of the reduction effort required by the cap. There are inherent difficulties assessing the impact of the Scheme, as overall changes in emissions may be affected by wider economic factors and other policy instruments. In Phase I, the Scheme may have initially encouraged the power sector to switch back to gas from coal, but subsequently, the use of coal increased. At the installation level 40 percent of UK sites in non-power sectors had emissions higher than their allocation, so at the installation level the cap may have had some influence on company behaviour.

Companies reported that the Scheme had achieved a functioning carbon market and 40 percent considered it had had some or significant impact. They reported that trading had impact on their board's consideration of carbon and energy efficiency and they identified technological investments that were partly incentivised by the Scheme. However, the price of carbon has been lower than

anticipated and significantly lower than the level required to incentivise major investments in low carbon technology.

Phase II of the Scheme may not result in significant reductions in emissions, as the impact of the recession on emissions is likely to dwarf the impact of the Scheme. The decision to allow Phase II allowances and project credits to be carried forward to Phase III may help to prevent a repetition of the collapse of the market for allowances in Phase I but would reduce the effectiveness of the Phase III cap.

Previous weaknesses have been addressed in Phase III in the centralised approach to setting the overall cap and its future trajectory, greater use of auctioning, harmonisation of many aspects, and the inclusion of aviation.

Responses of the government to the audit

The government has said it will take note of the Committee's recommendations and that it is committed to working to improve the efficient functioning of the EU Emissions Trading Scheme, including working for a move towards all allowances being auctioned.

The Name of the Audit	Adapting to climate change
Publication Information	July 2009; available in English at www.nao.org.uk

The national audit objectives

To provide briefing to a Parliamentary Committee on government policy on adapting to climate change and progress across government departments in identifying and managing risks from future climate change impacts. The briefing was to support a Committee inquiry (taking place in 2009–10) and did not therefore provide recommendations. The Committee produced its own report to which the government has replied.

The scope of the audit

- The implications of the *Climate Change Act 2008* and the cross-government Adapting to Climate Change programme; and the results of a survey carried out in April 2009 of government departments' self-assessments of their current capacity to assess and manage climate change risks, using a framework for effective climate change risk management developed for this purpose by the SAI.
- Audit period covered or end date of audit process: 2008–2009.
- Audited entities: The briefing provides an overview of government policy (led by the Department for Environment, Food and Rural Affairs) in England and the rest of the UK, for matters not devolved to Scotland, Wales, and Northern Ireland.

Conclusions of the audit findings

The *Climate Change Act 2008* (the Act) established a statutory framework for work on climate change adaptation, including the requirements to undertake a UK-wide Climate Change Risk Assessment (CCRA) and report on it within three years of the Act coming into force (that is, in January 2012) and to set out a statutory National Adaptation Programme as soon as practically possible after publication of the CCRA and report on it at two yearly intervals.

The cross-government Adapting to Climate Change Programme (ACC Programme) was established in 2008 to bring together and drive forward work in government and the wider public sector on adaptation in England and the rest of the UK for reserved matters.

The ACC Programme is currently undertaking the groundwork for the statutory National Adaptation Programme and developing a more robust and comprehensive evidence base about the impacts and consequences of climate change on the UK, including "adaptation economic analysis" to improve understanding of the costs and benefits of adaptation measures, to give an overall indication of the scale of the challenge, and to help identify priority areas for action.

Climate change adaptation, and assessment of risks from future climate change impacts, is a relatively new issue for most departments, but departments' responses to the SAI survey showed signs of growing awareness and understanding, progress in identifying and assessing risks, and examples of individual policy responses.

Some departments' self-assessment of their current capacity to assess and manage climate change risks considered they were at the stage of implementing climate change risk management strategies; others reported that they were at an earlier stage in developing their capacity to manage these risks.

Responses of the government to the audit

The government has acknowledged the value of the audit and in particular the clarity of the thinking on departmental capacity to address climate change adaptation. The Parliamentary Committee welcomed the briefing. The government has accepted that it needs to step up engagement on adaptation across government and said that the Committee's report would inform its consideration of the priority to be given to adaptation in its comprehensive review of government spending.

The Name of the Audit	Programmes to reduce household energy consumption
Publication Information	July 2008; available in English at www.nao.org.uk

The national audit objectives

To audit government policy on addressing household energy consumption and progress towards meeting the relevant targets.

The scope of the audit

- Government's targets and expectations, progress to date, and the significant issues influencing the cost-effectiveness of the four major programmes in this field.
- Audit period covered or end date of audit process: 2004–2007.
- Audited entities: A wide range of government and non-governmental organisations responsible for the programmes government has put in place to reduce energy consumption in England, including UK-wide programmes, but excluding programmes specific to Scotland, Wales, or Northern Ireland. The key ones included the Department for Environment and Rural Affairs, the Department for Business Enterprise and Regulatory Reform, the Department for Communities and Local Government; and non-government organizations including the Energy Savings Trust.

Conclusions of the audit findings and key recommendations

Government programmes that have been in place since the early to mid-1990s have contributed to improvements in household energy efficiency but, until very recently, overall household energy consumption has risen.

The government expects to meet (and just exceed) the pro-rata target for the household sector for 2010 and expects to meet, by more than double, the 2016 target.

Obligations on suppliers that require them to promote household energy efficiency measures to consumers have been successful, particularly in targeting vulnerable homes. But there are concerns about the capacity of the energy efficiency industry to meet the required installation rates of key measures, and about the level of consumer demand required to drive expected future energy savings, particularly in private households.

There has been progressive tightening of building regulations for new homes, but there remain questions over their enforcement. Even by 2050, two thirds of the housing stock will have been built before 2005, so there is a need to focus on existing housing as well as new homes.

Programmes to move consumer choice to more energy-efficient appliances through design and labelling schemes have had some effect although the UK lags behind others in Europe.

Programmes will also need to address householder behaviour. There remains a significant gap between householder awareness and behaviour. There is limited information about the outcomes of information programmes and thus about their cost-effectiveness, or how they could be better designed in the future.

The SAI's key recommendations were the following:

- The government needs to improve the data on which progress is monitored, and undertake evaluations of effectiveness based on real practice in homes so that programmes can be responsive and kept on track.
- The government needs to monitor the progress of current programmes in addressing the poor energy performance in many older and privately owned homes and consider whether further intervention is required.
- The government needs to review whether the policy mix is sufficiently addressing all of the known barriers to action.

Responses of the government to the audit recommendations

The government launched a new Heat and Energy Saving Strategy consultation, which led to the publication of the Household Energy Management Strategy in February 2010.

United States of America	
The Name of the Audit	Climate change adaptation: Strategic federal planning could help government officials make more informed decisions
Publication Information	7 October 2009; GAO-10-113; available in English at www.gao.gov

The national audit objectives

To examine

- what actions federal, state, local, and international authorities are taking to adapt to a changing climate;
- the challenges that federal, state, and local officials face in their efforts to adapt; and
- actions that the US Congress and federal agencies could take to help address these challenges.

The scope of the audit

- Strategies, plans, and targets; assessing risks and vulnerabilities (including specific sectors); coordination and governance.
- Audit period covered or end date of audit process: September 2008–October 2009.
- Audited entities: US Global Research Program, Federal Emergency Management Agency, Environmental Protection Agency, National Oceanic and Atmospheric Administration, and the Executive Office of the President.

Conclusions of the audit findings and key recommendations

A key question for decision makers in both Congress and the administration is whether to start adapting now or to wait until the effects of climate change are more obvious and widespread. Given the complexity and potential magnitude of climate change and the lead time needed to adapt, preparing for these impacts now may reduce the need for more costly steps in the future. Adaptation, however, will require making policy and management decisions that cut across traditional sectors, issues, and jurisdictional boundaries. It will mean developing new approaches to match new realities. Old ways of doing business—such as making decisions based on the assumed continuation of past climate conditions—will not work in a world affected by climate change. Certain state and local authorities on the “front lines” of early adaptation efforts understand this new reality and are beginning to take action. The SAI found that federal, state, and local officials face numerous challenges when considering adaptation efforts. To be effective, federal efforts to address these challenges must be coordinated and directed toward a common goal.

The SAI recommended the development of a national adaptation plan that

- defines federal priorities related to adaptation;
- clarifies roles, responsibilities, and working relationships among federal, state, and local governments;

- identifies mechanisms to increase the capacity of federal, state, and local agencies to incorporate information about current and potential climate change impacts into government decision making;
- addresses how resources will be made available to implement the plan; and
- builds on and integrates ongoing federal planning efforts related to adaptation.

Responses of the government to the audit recommendations

The Council on Environmental Quality within the Executive Office of the President generally agreed with the recommendations and has taken steps toward developing the recommended adaptation plan.

The Name of the Audit	Observations on the potential role of carbon offsets in climate change legislation
Publication Information	5 March 2009; GAO-09-456T (congressional testimony); available in English at www.gao.gov

The national audit objectives

To examine

- challenges in ensuring the quality of carbon offsets in the voluntary market;
- the effects of and lessons learned from the Clean Development Mechanism (CDM); and
- matters for congressional consideration in developing regulatory programs.

The scope of the audit

- Strategies, plans, and targets; audit of CDM projects.
- Audit period covered or end date of audit process: 2008–2009.
- Audited entities: The SAI did not audit US government agencies as part of this work.

Conclusions of the audit findings and key recommendations

While carbon offsets have the potential to lower compliance costs in a cap-and-trade scheme, their use for compliance could undermine the program's integrity if the offsets lack credibility. The voluntary market for offsets in the United States is largely unregulated, lacks transparency, and provides market participants with limited information on the credibility of offsets. The SAI's work on CDM identifies challenges with using carbon offsets in a mandatory emissions reduction program despite the use of rigorous quality assurance procedures. The experience with the voluntary market and CDM demonstrates the importance of ensuring the credibility of offsets, but this remains a challenge because of the inherent uncertainty associated with estimating emissions reductions relative to projected business-as-usual baselines. Using offsets in a mandatory emissions reduction program would involve fundamental tradeoffs between offset credibility and compliance costs.

Congress may wish to establish

- clear rules about the types of offset projects that regulated entities can use for compliance, as well as standardized quality assurance mechanisms for these allowable project types;
- procedures to account and compensate for the inherent uncertainty associated with offset projects, such as discounting or overall limits on the use of offsets for compliance;
- a standardized registry for tracking the creation and ownership of offsets; and
- procedures for amending the offset rules, quality assurance mechanisms, and registry, as necessary, based on experience and the availability of new information over time.

In addition, regarding CDM, Congress may wish to consider that

- the existing program may not be the most direct or cost-effective means of achieving reductions in emissions;
- the use of carbon offsets in a cap-and-trade system can undermine the system's integrity, given that it is not possible to ensure that every credit represents a real, measurable, and long-term reduction in emissions; and
- while proposed reforms may significantly improve the CDM's effectiveness, carbon offsets involve fundamental tradeoffs and may not be a reliable long-term approach to climate change mitigation.

Responses of the government to the audit recommendations

GAO's findings are helping to inform Congressional decision making on climate change policy.

The Name of the Audit	Lessons learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism
Publication Information	18 November 2008; GAO-09-151; available in English at www.gao.gov

The national audit objectives

To examine the effects of and lessons learned from

- Phase I of the European Union's Emissions Trading Scheme (ETS) and
- the Kyoto Protocol's Clean Development Mechanism (CDM).

The scope of the audit

- Strategies, plans, and targets; audit of CDM projects.
- Audit period covered or end date of audit process: October 2007–November 2008.
- Audited entities: The SAI did not audit US government agencies as part of this work.

Conclusions of the audit findings and key recommendations

Understanding the lessons learned from the international experience with the ETS and the CDM provides the US Congress with an opportunity to draw on this experience as it considers legislation intended to limit emissions of greenhouse gases. While the ETS and the CDM are the largest existing international programs to address climate change, they are very different programs with unique strengths and limitations. Nonetheless, both programs provide insights into important program design and implementation issues that are central to the climate change policy proposals currently under consideration in the United States. Specifically, the lessons learned from the ETS—the importance of reliable data on emissions, the need for long-term certainty, and the impact of allowance allocation on wealth transfers—relate directly to the development of a domestic cap-and-trade system, which has already been considered by the US Senate. Similarly, considering the lessons learned from the CDM—that it may be possible to achieve the CDM's goals more cost-effectively through other means; that carbon offsets are inherently uncertain and can potentially undermine the integrity of a cap-and-trade scheme; and that potential reforms, while promising, may not address fundamental tradeoffs—may prove useful in informing congressional deliberations over the use of CDM credits or other types of carbon offsets in domestic climate change programs.

Congress may wish to consider the lessons identified above to help ensure that it develops policies that achieve the intended results in a cost-effective manner.

Responses of the government to the audit recommendations

GAO's findings are helping to inform congressional decision making on climate change policy.

The Name of the Audit	Federal actions will greatly affect the viability of carbon capture and storage as a key mitigation option
Publication Information	30 September 2008; GAO-08-1080; available in English at www.gao.gov

The national audit objectives

To examine

- key economic, legal, regulatory, and technological barriers impeding commercial-scale deployment of carbon capture and storage (CCS) technology; and
- actions the Department of Energy (DOE), Environmental Protection Agency (EPA), and other agencies are taking to overcome barriers to commercial-scale deployment of CCS technology.

The scope of the audit

- Strategies, plans, and targets; technology development and deployment.
- Audit period covered or end date of audit process: October 2007–September 2008.
- Audited entities: Department of Energy and the Environmental Protection Agency.

Conclusions of the audit findings and key recommendations

Recent federal and international assessments indicate that the United States will need to rely on carbon capture and storage as a mitigation option to achieve appreciable reductions in greenhouse gas emissions. Federal agencies whose action—or inaction—will greatly affect the prospects for timely CCS deployment have taken early steps that address some barriers to CCS, but have left critical gaps that impede the understanding of CCS's full potential for reducing carbon dioxide emissions and that could affect CCS deployment on a broader scale. DOE has recently begun to shift its approach in a way that also emphasizes development of CCS technology for existing coal-fired power plants. EPA has begun to address some of the regulatory and legal uncertainties that will need resolution for a national CCS program to move forward, but other key issues associated with other environmental statutes have not been addressed. An array of other issues need to be resolved if the technology is to be deployed within a time frame scientists believe is needed to address climate change. Many of the technical and regulatory issues fall within the domain of two key agencies (DOE and EPA), but other issues cross the jurisdictions of other agencies in a manner that would require further collaboration.

The SAI recommended that

- the Department of Energy place greater emphasis on carbon dioxide capture at existing power plants;
- the Environmental Protection Agency examine how its authority can be used to address barriers to deployment of CCS technology; and
- the Executive Office of the President develop an interagency task force to identify and address impediments to large-scale deployment of CCS technology.

Responses of the government to the audit recommendations

In February 2010, the President signed a Memorandum establishing the task force recommended by this report. The Department of Energy and the Environmental Protection Agency also took actions responding to the specific recommendations directed toward them.

The Name of the Audit	Climate change: Agencies should develop guidance for addressing the effects on federal land and water resources
Publication Information	7 August 2007; GAO-07-683; available in English at www.gao.gov

The national audit objectives

To obtain experts' views on

- the effects of climate change on federal resources, and
- the challenges managers face in addressing climate change effects on these resources.

The scope of the audit

- Adaptation—assessing risks and vulnerabilities; strategies, plans, and targets; specific sectors; coordination and governance.
- Audit period covered or end date of audit process: May 2006–July 2007.
- Audited entities: Bureau of Land Management, Fish and Wildlife Service, Forest Service, National Oceanic and Atmospheric Administration, and the National Park Service.

Conclusions of the audit findings and key recommendations

Climate change has already begun to adversely affect federal resources in a variety of ways. Most experts with whom the SAI spoke believe that these effects will continue—and likely intensify—over the coming decades. Some federal resources, depending on a variety of factors, may be more vulnerable than others. However, federal resource management agencies have not yet made climate change a high priority. Federal agencies are generally authorized, but not specifically required, to address changes in resource conditions resulting from climate change in either their resource management actions or planning efforts. However, none of these agencies has specific guidance in place advising its managers how to address the effects of climate change in either its resource management actions or planning efforts. The resource managers with whom the SAI spoke stated that they are unsure whether or how to take the effects of climate change into account when carrying out their responsibilities. In this light, at a minimum, guidance on addressing the effects of climate change would allow resource managers to better take into account one of the key factors that is likely to affect all aspects of the resources they manage.

The SAI recommended that federal agencies develop guidance incorporating agencies' best practices, which advises managers on the resources they manage, and gather the information needed to do so.

Responses of the government to the audit recommendations

Federal agencies have started responding to GAO's recommendations by, among other things, identifying best management practices, incorporating climate change considerations into strategic planning efforts, and identifying high-priority climate change actions for agencies to consider and address.

The Name of the Audit	Climate change: Financial risks to federal and private insurers are potentially significant
Publication Information	16 March 2007; GAO-07-285; available at www.gao.gov

The national audit objectives

- To describe how climate change may affect future weather-related losses.
- To determine past insured weather-related losses.
- To determine what major private insurers and federal insurers are doing to prepare for potential increases in such losses.

The scope of the audit

- Adaptation—assessing risks and vulnerabilities; strategies, plans, and targets; specific sectors; coordination and governance.
- Audit period covered or end date of audit process: February 2006–January 2007.
- Audited entities: Climate Change Science Program, Department of Agriculture, and Federal Emergency Management Agency.

Conclusions of the audit findings and key recommendations

Recent assessments by leading scientific bodies provide sufficient cause for concern that climate change may have a broad range of long-term consequences for the United States and its citizens. While a number of key uncertainties regarding the timing, location, and magnitude of impacts remain, climate change has implications for the fiscal health of the federal government, which already faces other significant challenges in meeting its long-term fiscal obligations. Two major federal programs, as a consequence of both future climate change and substantial growth in exposure, may see their losses grow by many billions of dollars in coming decades. To carry out their primary missions, these public insurance programs must focus on the near-term goals of ensuring affordable coverage for individuals in hazard-prone areas. Nonetheless, the two programs are uniquely positioned to provide strategic information on the potential impacts of climate change—information that would be of value to key decision makers charged with such a long-term focus. Most notably, in exercising its oversight responsibilities, the US Congress could use such information to examine whether the current structure and incentives of the federal insurance programs adequately address the challenges posed by potential increases in the frequency and severity of catastrophic weather events. While the precise content of these analyses can be debated, the activities of many private insurers already suggest a number of strong possibilities that may be applicable to assessing the potential implications of climate change on the federal insurance programs.

The SAI recommended that two federal agencies analyze the potential long-term fiscal implications of climate change for flood and crop insurance programs and report their findings to Congress.

Responses of the government to the audit recommendations

The agencies agreed with the report's recommendations and have since taken steps to incorporate climate change considerations into their long-term risk management planning.

APPENDIX B EUROSAI audit on climate change

In 2009, 10 supreme audit institutions (SAIs) of the European Organisation of Supreme Audit Institutions (EUROSAI), a regional working group of INTOSAI, undertook joint audit work related to climate change. The participating SAIs represented Azerbaijan, Cyprus, Denmark, Estonia, Israel, the former Yugoslav Republic of Macedonia, Poland (audit coordinator), Russia, Switzerland, and Ukraine. The following material is adapted from the executive summary that is included in the full report, *EUROSAI Audit on Climate Change—Joint Final Report*, which is available at www.eurosaiwgea.org.

The aim of the audit was to assess the actions taken in the countries of the cooperating SAIs to implement the provisions of the United Nations Framework Convention on Climate Change and its Kyoto Protocol, Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the European Community, and the requirements of national legislation. The audit examined

- the performance of observations on climate change and its effects,
- actions taken to mitigate climate change,
- forecasts and assessments of the actual man-made greenhouse gas emission and absorption levels, and
- reporting on the scope of the actions taken and planned to be taken in order to mitigate climate change and the achieved effects of these actions.

During the period from 2006 to 2008, all the countries of the cooperating SAIs made climate change observations that covered climate variables along with analysis and interpretation of the research results. The scope and frequency of the research carried out in the individual countries was different, but in all of them the basic climate variables were tested. The observation results were published in the reports of government agencies and statistical reports and they were also made available on the websites of government institutions or meteorological services. All the countries were involved in international cooperation in research and an exchange of observation data, for example, through their participation in international networks, research projects, and training courses, and their work at the technical commissions of the World Meteorological Organization. Climate change observations were funded from national budgets, international funds, and non-budgetary resources provided by self-financing institutions from the state sector.

In all the countries of the cooperating SAIs, measures were taken to mitigate climate change by limiting their greenhouse gas emissions and enhancing the capacity of the sinks and reservoirs of these gases. Bodies responsible for taking measures to mitigate climate change were established. In eight countries, national and sectoral strategies, programs, or action plans necessary to stabilize and limit greenhouse gas emissions were prepared and in two countries their preparation began. In seven countries, the greenhouse gas emissions were reduced by between 3 and 53 percent with respect to the base year under the Kyoto Protocol (1988, 1990, 1995, or 2000, depending on the country), and in one country the emissions grew by 85.3 percent. The per capita levels of human-induced greenhouse gas emissions varied between 5.1 and 16.4 metric tonnes of carbon dioxide equivalent.

In the EU member countries, the provisions of the Emissions Trading Scheme Directive were implemented. National emission allowance allocation plans were developed, an emission allowance trading scheme was established, and the required registries were kept. Of the six countries of the cooperating SAIs that were not EU members, only one country traded emission allowances pursuant to the Kyoto Protocol.

Six countries among the cooperating SAIs—Azerbaijan, Cyprus, Denmark, Israel, the former Yugoslav Republic of Macedonia, and Switzerland—were involved in the implementation of Clean Development Mechanism projects, and five countries—Denmark, Estonia, Poland, Russia, and Ukraine—participated in joint implementation projects. International cooperation in the mitigation of climate change effects also included the implementation of educational projects, support for legislative activities, and participation in the working groups of international agencies. The activities within the framework of international cooperation were funded with national resources and from international financial institutions, such as the World Bank and the United Nations Development Programme.

In all the countries of the cooperating SAIs, the measures to mitigate climate change were monitored. The required reports were prepared and submitted to the United Nations Framework Convention on Climate Change Secretariat and the European Commission. Some reports were submitted with a delay.

The EUROSAI *Joint Final Report* presents descriptions of the general audit findings and summaries of the national audit reports of the participating SAIs.

APPENDIX C Coordinated audit participants by supreme audit institution

Supreme Audit Institution	Participants	
Project Leader		
Canada—Office of the Auditor General of Canada	John Reed	
Auditors		
Australia—Australian National Audit Office	Christina Bagot Michelle Johnson	Peter McVay*
Austria—Rechnungshof	Dr. Heinrich Lang*	
Brazil—Tribunal de Contas da União	Fernando Antonio Dorna Magalhães	Carla Ribeiro da Motta Juliana Cardoso Soares*
Canada—Office of the Auditor General of Canada	Richard Arseneault Dr. Sylvie Marchand	George Stuetz*
Estonia—Riigikontroll	Airi Andresson*	Kairi Treufeldt
Finland—Valtiontalouden tarkastusvirasto	Dr. Vivi Niemenmaa* Petri Soppi	
Greece—Ελεγκτικό Συνέδριο	Antonios Froudas Theologia Gnardelli*	Athanasia Sidiropoulou
Republic of Indonesia—Badan Pemeriksa Keuangan	Edward G. H. Simanjuntak* Dewi Sukmawati	Dwi Sabardiana Juska Meidy Enyke Sjam
Norway—Riksrevisjonen	Camilla Fredriksen Sigmund Nordhus Helge Strand Østtveiten	Dr. Kristin Rypdal* Kristine Lien Skog
Poland—Najwyższa Izba Kontroli	Dr. Alicja Gruszecka*	
Slovenia—Računsko sodišče	Dr. Igor Šoltes Jerneja Vrabič*	Klementina Zapušek
South Africa—Auditor General of South Africa	San-Mari Beukman Pramesh Bhana Alan-Bari Coetzer	George Lourens Wynand Wentzel*
United Kingdom—National Audit Office	Joe Cavanagh Nia Davies Jill Goldsmith*	Amanda Simpson Nicola Thomas
United States of America—Government Accountability Office	Steven Elstein Michael Hix*	
Editing, Graphics, and Layout		
Canada—Office of the Auditor General of Canada	Rose Hum Laurel Hyatt	Jocelyn Lefèvre Marc Lalande

*Key SAI contact