Environment Canada Environnement Canada

Evaluation of the Regulation of Smog-Causing Emissions from the Transportation Sector

July 2008

Canada

Report Clearance Steps

Planning phase completed	October 2007
Report sent for management response	May 2008
Management response received	June 2008
Report completed	June 2008
Report approved by Departmental Evaluation Committee (DEC)	July 2008

Acronyms used in the report

CACs	Criteria Air Contaminants
CARA	Clean Air Regulatory Agenda
CCME	Canadian Council of Ministers of the Environment
CDSR	Cabinet Directive on Streamlining Regulation
CEPA	*Canadian Environmental Protection Act, 1999*
CO	carbon monoxide
CWS	Canada-Wide Standards
DPR	Departmental Performance Report
EC	Environment Canada
EPA	United States Environmental Protection Agency
EQ	Evaluation Question
ETD	Energy and Transportation Directorate
FRWG	Fuels Regulations Working Group
NO_x	nitrogen oxides
OECD	Organisation for Economic Co-operation and Development
OPG	Outcome Project Grouping
OPP	Outcome Project Plan
PM	particulate matter
RIAS	Regulatory Impact Analysis Statement
RPP	Report on Plans and Priorities
SO_2	sulphur dioxide
VOC	volatile organic compound

Acknowledgments

The Evaluation Project Team including Michael Callahan and Karine Kisilenko and led by Janet King under the direction of the Director, Shelley Borys, would like to thank those individuals who contributed to this project and particularly all interviewees who provided insights and comments crucial to this evaluation. The Team would also like to thank the Evaluation Committee for their guidance and support throughout all phases of the evaluation process. Evaluation Committee members included Pat Wirth, Steven McCauley, Kirk Strand and Lori Fryzuk.

Prepared by the Audit and Evaluation Branch

Table of Contents

EXECUTIVE SUMMARY

Due to the importance of EC's regulatory agenda and the fact that a formal evaluation of regulations had yet to take place, the evaluation of the regulation of smog-causing emissions in the transportation sector was approved in the department's 2007-08 Audit and Evaluation Plan. The evaluation addresses three issues:

1) **effectiveness of the regulations:** the extent to which fuel, vehicle and engine emission regulations have achieved their intended outcomes;
2) **design and delivery of the regulations:** the extent to which the regulations were designed and implemented in the most appropriate way; and
3) **lessons learned:** the identification of lessons learned to improve the effectiveness, design and delivery of current regulatory initiatives in the transportation sector(marine, air and rail), and if applicable, to other regulatory initiatives.

Five regulations are examined as part of this evaluation:

- *Sulphur in Gasoline Regulations*;
- *Sulphur in Diesel Fuel Regulations*;
- *On-Road Vehicle and Engine Emission Regulations*;
- *Off-Road Small Spark-Ignition Engine Emission Regulations*; and
- *Off-Road Compression-Ignition Engine Emission Regulations.*

While the aforementioned regulations contribute to the broader regulatory regime of other federal, provincial and territorial departments, the focus of the present evaluation is on the environmental and related economic and social outcomes of Environment Canada's regulations.

Multiple lines of evidence were used in the conduct of this evaluation, including:

- a document and file review;
- a media scan;
- key informant interviews;
- secondary data and reports;
- a literature review; and
- an expert review.

The overall findings of the evaluation are presented by evaluation issue.

Evaluation Issue 1: Effectiveness *The extent to which the regulations achieved their intended outcomes*	
1.	All five regulations are on track to achieving their intended environmental outcomes. • The standards set out by the regulations have been achieved by the sulphur in fuels regulations and are beginning to be achieved in the case of on-road vehicles. Off-road engines are starting to undergo compliance verification testing to assess the emission performance of products sold in Canada. • The intermediate outcome of reducing smog-causing emissions through the combined effect of cleaner fuels and new vehicles and engines by 2010 is on its way to being achieved, although the measurement of effectiveness is largely qualitative. • It is expected that these achievements will contribute to the ultimate outcome sought by the regulations which is to reduce risks to Canadians, their health and their environment from air pollutants and greenhouse gas emissions.
2.	Qualitative evidence on the economic impacts of the regulations indicates that although the implementation of the regulations has imposed costs on industry, the overall economic impact of the regulations on industry has not been negative. Positive health impacts due to reduced air pollution are expected to occur over time as the vehicle fleet is replaced.
3.	Few unintended outcomes arose during the implementation of the regulations. According to the expert reviewer, the limited number and scope of the unintended outcomes reflects well on the design of the regulations and consultations held with external stakeholders, notably industry groups.
4.	Positive and negative factors outside of the purview of the regulations influenced the achievement of outcomes. • Positive factors affecting the achievement of outcomes under the on-road vehicle and engine emission regulations include: o information on the regulatees was known (e.g., names, addresses) and the number of regulatees was manageable; o the United States Environmental Protection Agency had already conducted research and studies and had stringent regulations governing vehicle and engine emissions that Environment Canada could build on in the design of Canadian regulations; o the existence of an integrated North American market for vehicles and engines and the importance of a harmonized approach to deal with products that flowed across borders; and o increased public awareness of air pollution issues in the transportation sector. • Negative external factors which presented challenges to the achievement of outcomes particularly under the small spark-ignition regulations include:

	o information on the regulatees of smaller and larger motorcycles, passenger vehicles and small spark engines (i.e. chainsaws) from emerging economies is largely unknown; o imports of on-road and off-road and small spark ignition engines from foreign manufacturers and assemblers is growing in an exponential manner; and o the changing nature of the industry and markets is adding complexity to Environment Canada's job of administering and verifying compliance particularly with the small spark-ignition engine emissions regulations.
Evaluation Issue 2: Design and Delivery *The extent to which the regulations were designed and delivered in the most appropriate way*	
5.	Overall, the regulations were designed and delivered in the most appropriate way.
6.	The regulations were consistent with the policies and requirements of the government of Canada and the department in place during the time of their development. The regulations continue to be aligned with recent air quality agreements and policies. For the fuels regulations, roles and responsibilities were clear at both the design and the implementation stages. Despite the introduction of a protocol on vehicle and engine emission testing and enforcement, ambiguity over the roles and requirements of the regulatory administration, testing and enforcement groups persists.
7.	Stakeholder interests were taken into consideration during the regulatory development phase. Provinces and territories, which share jurisdiction with the federal government with respect to air emissions in the transportation sector, were fully consulted and were in favour of a harmonized national approach to regulating air emissions.
8.	Alternatives were fully considered in the Regulatory Impact Analysis Statements for each of the regulations. In each case, regulations were chosen as the preferred approach.
9.	Performance measurement and monitoring is conducted on a phase-by-phase basis. Information on the performance of the regulations is posted on external websites and through public reports (ie., the Reports on Plans and Priorities and the Departmental Performance reports). Information on the status of the deliverables under the regulations is reported to the Environmental Protection Board on an ad hoc basis.
10.	Gaps exist in the information available on the final budget allocations on the development and implementation of the regulations and the related

	expenditures of the compliance promotion and enforcement activities. Factors explaining the gaps in financial information reflect departmental changes in resource allocation decisions and coding practices in 2005-2006 and the reality that compliance and enforcement budgets and expenditures were not typically tracked on a regulation-by-regulation basis.
	With the exception of the enforcement personnel interviewed, all other EC employees interviewed are of the view that the current levels of funding appear to be adequate.
Evaluation Issue 3: Lessons Learned *The identification of lessons learned which could improve the effectiveness, design and delivery of current regulatory initiatives in the transportation sector and, if applicable, to other regulatory initiatives.*	
11.	Regulatory Design and Development a) *Federal/Provincial Alignment*: the support of all provinces, territories and other federal departments for a single national standard for smog-emission was important to avoid federal/provincial/territorial fragmentation, to support a strong negotiating position with industry and to ensure a level playing field for industry within Canada and ultimately to harmonize the vehicle and engine emission regulations with the United States. b) *Canada/US Alignment:* the decision to align Canada's vehicle and engine emission regulations with the United States enabled a level playing field within an already integrated North American market for vehicles and engines, and enabled Canada to build on the research conducted by the United States and to share information. c) *Stakeholder consultation*: early inclusion, good information sharing and extensive dialogue with external stakeholders during the regulatory phase facilitated the support of industry of the regulations. d) *Clear wording of the regulations:* the fuel and vehicle and engine emission regulations used wording that was clear and precise, measureable and enforceable and was designed not to cause an unnecessary burden for regulatees. The wording of the regulations is essential to monitoring results. Regulatory Implementation and Monitoring a) *Strong internal teamwork:* the creation of the Fuels Regulations Working Group to coordinate all phases of the regulatory process was cited as a mechanism which promoted collaboration and strong teamwork among Environment Canada employees both at headquarters and in the regional offices.

	b) *Fragmented views of performance and financial information:* current performance measurement and monitoring systems and financial information provide a fragmented view of the regulatory program. c) *Ambiguity over the internal coordination for the vehicle and engine emission regulations:* despite the existence of a protocol which established the criteria and process for transferring files to enforcement, ambiguity persists over the roles and responsibilities of the administrative, testing and enforcement groups.

Recommendations:

Five recommendations are directed to the Environmental Protection Board for management response.

1. In light of the changing nature of the vehicles and engines industry, re-assess existing compliance and enforcement strategies.

a) Consider if there is an emerging need for emission inspection clinics (federal, provincial or private) or other measures to assess the actual in-service life of the new emissions control systems that vehicle manufacturers have adopted to meet the emissions regulations. Monitoring of emissions over time could help to determine whether technical and/or regulatory steps are needed to ensure that the systems operate well over time; and to inform other fleet emission management strategies.

b) The increase in the volume of imported products and the unknown identity of the regulatee requires a shift in thinking from the traditional scenario where the regulatees are known and manageable in number. The challenges of compliance promotion targeting new manufacturers and assemblers from emerging Asian and other economies is shared with other federal departments and with the United States. Since this challenge is shared with the United States, Environment Canada may have an opportunity to develop a North American strategy (i.e,, Canada may be able to partner with the United States for off-shore compliance promotion). Such a strategy could be effective in obtaining environmental results as well as being efficient in terms of sharing the costs of designing and implementing a strategy.

2. Given the continued ambiguity in testing and enforcement, confirm and communicate the respective roles and accountabilities of the testing facility and enforcement groups to staff and external partners.

In order to establish the validity of the test results of vehicle and engine emissions, Environment Canada's testing group may need to conduct studies with industry counterparts. The specialized and technical work of the testing group needs to be undertaken in a way that does not compromise the requirements of enforcement officials to document and prosecute infractions of industry. Senior managers need to work through the underlying issues with representatives of the testing and

enforcement groups to ensure that the practices of both groups are understood. Once established, this understanding needs to be communicated to staff and external partners.

Mechanisms such as the working group introduced under the fuel regulations could be a useful model to foster an understanding of the objectives and practices of the testing laboratory and the enforcement personnel both at headquarters and in the regions.

3. Integrate the management of the fuels and the vehicle and engine emission regulations.

The regulations are currently managed on a phase-by-phase basis (i.e., development and approval of regulations, administration, compliance promotion, testing and enforcement of regulations, monitoring and reporting of the performance of regulations) and governed by three different boards (Environmental Protection; Strategic Integration and Departmental Management Services boards). While this approach is practical to implement, the question then becomes who is responsible for aggregating and analyzing the information from the separate phases of the regulatory process to the collective or sectoral program level and how could this be done. To support the integrated management of the regulatory program, the department could introduce coordinating mechanisms and processes. For example, the Chief Enforcement Officer could become a member of the Environmental Protection Board. Outcome Project Group leads could meet on a routine basis to assess the ongoing effectiveness, impact, efficiency and costs of the regulatory program and report this information to the boards for decision-making purposes.

4. Support integrated management of the fuels and vehicles and engines regulations through the development of a logic model, performance measures, financial information and monitoring systems.

In order to support the integrated management of the regulations, a logic model, performance measures and means of collecting information should be developed and implemented to link together the different phases of the regulatory process, thereby providing an overarching picture of the management of regulations. Further, financial data on the budget and expenditures must be tracked and reported for all phases of the regulatory program. This information is essential to the ongoing evaluation and performance monitoring of the program to ensure accountability, good stewardship of public funds and where necessary, to reallocate funds.

5. Share information, best practices and lessons learned from this suite of regulations to EC personnel involved in other regulatory initiatives.

Given the department's work on these important and largely successful regulations, the growing nature of Environment Canada's regulatory agenda, and reality of an aging workforce, an opportunity exists for senior regulatory personnel to transfer their knowledge and understanding of the lessons learned to new recruits. Potential strategies for the dissemination, use and monitoring of lessons learned include talks and panel discussions involving senior officers, central agencies, other federal departments and industry representatives who played key roles in the regulatory process and the development of case studies to promote learning. This transfer of

information could be developed, coordinated with the department's regulatory community, the Community of Federal Regulators or though the Canadian School for the Public Service. Topics which could be explored in talks, panel discussions and case studies include principles governing alignment or non-alignment with other jurisdictions, how to engage stakeholders throughout the regulatory process, characteristics of well designed regulations, core competencies for regulatory team members and how to capture the full performance story of regulatory programs.

Management Response
Recommendation 1 a): EP Board agrees

EP Board agrees that there is merit in considering possible measures to assess the in-use emission performance of vehicles.

The Transportation Division will initiate a feasibility study in 2008-09 to assess and develop potential measures that would support this objective. Implementation of in-use emission testing activities will be subject to the outcome of the study and the availability of resources. It is important to note that the Department's "Let's Drive Green" voluntary vehicle emission clinic program was terminated as a result of expenditure review in 2004-05.

Regulations currently require that vehicles and engines be designed to comply with emission standards for a defined "useful life" period (e.g. 10 years or 192,000 km for passenger cars). Experience indicates that the compliance rate of vehicles tested to the On-Road Vehicle and Engine Emission Regulations is high. Since the Regulations came into force in 2004, approximately 100 vehicles that have been tested under these Regulations with only one case of suspected non-compliance being referred to the Enforcement Branch.

Recommendation 1 b): EP Board agrees

EP Board agrees with the general objective of the recommendation and has already initiated and will continue steps towards its achievement.

As part of the Environment Canada – US Environmental Protection Agency Work Plan recently developed under the Canada/U.S. Air Quality Agreement, the development of a joint strategy has been initiated on emissions testing and compliance promotion to address the challenge of imported products from emerging Asian and other economies. Progress on the joint strategy will be reported at the fall meeting of the Canada-US Air Quality Committee. Environment Canada's contribution is being led by the Transportation Division.

In the shorter term, new CARA resource allocations received in 2008-09 are allowing the Department's Transportation Division to undertake testing of off-shore engines referred by Enforcement and to initiate proactive compliance testing and preliminary work with the US EPA. These new resources, along with CARA allocated for future years, provide a first step to begin addressing the challenges identified by this recommendation. In the longer term, it is recognized, however, that increased imports from emerging economies are still in the early stages, and will likely increase even further in the future which will continue to pose significant challenges.

Through the Commission for Environmental Cooperation's (CEC) Enforcement Working Group, to which the Environment Canada's Enforcement Branch is an active member, the

Parties have begun the process of identifying noncompliant engines for receiving priority attention in each country and have embarked on a pilot project to identify and respond to noncompliant imports through cooperation, information sharing and operational support. This pilot is intended to produce quick results and build on existing, enforceable standards for each country. The plan will enhance cross-border collaboration and add value to the respective enforcement efforts of each country. The outcomes of this project will be common threat identification, joint targeting, and coordination of enforcement efforts. This component is in a scoping phase during 2008. Future activities in 2009 and onward will be based on the outcome of the initial scoping effort. Renzo Benocci (National Director, Environmental Enforcement Directorate) is the lead on this project, while Yannick Pouret (Head, Intelligence section, Environmental Enforcement directorate) is the EC focal point.

Recommendation 2: EP Board agrees

EP Board agrees that it is desirable to enhance the communication of respective roles and accountabilities of the regulatory administration, testing facility and enforcement groups to staff and external partners.

Because these regulations are recent instruments that have been largely developed and administered by new staff and under-resourced until CARA resources are fully in place, roles may not have been communicated in a timely fashion. Measures have already been initiated and will be complemented with further actions to achieve the objective of the recommendation.

A step-by-step protocol for the operational management of cases that clearly outlines when a file should be transferred to Enforcement has been developed over the last year and agreed upon by the regulatory administration and enforcement groups. Efforts by the Transportation Division and Enforcement will continue to better communicate and implement this protocol in 2008-09 which will address the challenges identified in the recommendation.

A re-organisation of roles in the Department's Transportation Division was taking place at the time of the evaluation, a factor which contributed to a lack of clarity by external stakeholders on roles and responsibilities. Subsequently, a document clearly outlining the responsibilities and roles within the Transportation Division's regulatory functions on vehicles and engines was prepared and communicated to industry in early 2008.

The departmental Compliance and Enforcement Policy for the *Canadian Environmental Protection Act, 1999 (CEPA 1999)* clearly outlines the enforcement functions/core activities and the powers of enforcement officers. Measures will be undertaken towards ensuring that the regulated community is more broadly aware of the existence and content of this policy, for example through compliance promotion activities undertaken by the Transportation Division and other possible measures.

Recommendation 3: EP Board agrees

EP Board agrees that a coordinative mechanism could be introduced to better support the overall management of the regulatory program.

A Coordinating Committee will be created to bring together appropriate OPG/OPP's involved in the Program and Enforcement phases of the regulatory spectrum for the

vehicle and engine emission regulations. The Committee will meet periodically to support on-going assessment and monitoring of the transportation regulatory programs and to discuss approaches to address short term and long-term activities, including the issue of increased imports from emerging economies. The initial meeting of the Committee will take place in the fall of 2008.

Recommendation 4: EP Board agrees

EP Board agrees that the development of an integrated logic model and performance measures can support a more integrated approach to the management of these regulations. There are new performance measurement and performance standard requirements for new regulations within the Cabinet Directive on Streamlining Regulations (CDSR). These requirements will be considered when developing performance measurement plan and logic model for these regulations.

As the subject regulations are currently in place, the scope of the efforts would be on the administration, compliance promotion and enforcement activities for these regulations; however, outcomes and performance indicators determined for these regulations will link with the applicable strategic outcomes for the department. EP Board also agrees that it is desirable for the financial data on the budget and expenditures associated with the implementation of these regulations be tracked and reported for all phases of the regulatory spectrum.

The Coordinating Committee identified in the response to recommendation #3 will be an appropriate forum to facilitate these tasks, along with the support of the Department's Regulatory Innovation and Management Systems Division (identified as the centre of expertise for Performance Measurement under the CDSR). A logic model and appropriate performance measures will be completed by the end of 2008-09.

Recommendation 5: EP Board agrees

EP Board agrees with this recommendation and supports initiatives to share information, best practices and lessons learned from this suite of regulations. This has already been done in a number of cases, for example:

- "Case Study: The Sulphur in Gasoline Regulation" was presented at the March 2008 Conference on The Future of Strategic Evidence-Based Regulation;
- "Cost-Benefit Analysis Case Study on Regulations to Lower the Level of Sulphur in Gasoline" was the focus of discussion at the March 2007 TB/Health Canada Seminar
- "Sulphur in Gas Regs are Good Public Policy Case Study" has been presented a number of times at EC Environmental Policy Course (eg. by Barry Stemshorn, 2002/03)

EP Board will draw upon this expertise and, in 2008-09, will seek future opportunities to share information on best practices and lessons learned on vehicle, engine and fuel regulations through its internal Regulatory Affairs and Learning community. Other venues for information sharing will also be explored in the broader regulatory community such as the Community of Federal Regulators and the Treasury Board Center of Regulatory Expertise.

1.0 INTRODUCTION

Environment Canada (EC) manages a diverse and complex regulatory agenda. The department administers nearly 24 acts either in whole or in part and assists other federal departments in the administration of many other acts.[1] Up to 2007-08, a formal evaluation of regulatory initiatives had not been undertaken, although preliminary work had been conducted in the department on some retrospective analyses of the economic impacts of a number of regulatory initiatives. In view of the significance of Environment Canada's regulatory role, the Departmental Audit and Evaluation Committee approved the conduct of an evaluation of a suite of regulations aimed at reducing smog-forming emissions from the transportation sector.[2] The regulations target fuel producers, importers, and sellers of fuel (gas stations), as well as manufacturers, importers, and sellers of vehicles and engines.

The purpose of this evaluation is to examine whether and to what extent this suite of five regulations related to the transportation sector (two fuels regulations and three vehicle and engine emission regulations) has achieved its intended outcomes as well as whether these regulations were designed and implemented in the most appropriate way. The lessons learned that can be derived from the experience with this particular regulatory regime could serve to inform future regulatory initiatives in the transportation sector (i.e., marine, air, and rail) as well as other regulatory programs at Environment Canada.

An evaluation committee of employees from Environment Canada was formed to guide the evaluation through the planning, conducting, and reporting phases. Members of the Evaluation Committee included senior policy advisors and analysts involved in the risk management, regulatory impact analysis, and energy and transportation programs.

This document presents the findings and recommendations of the evaluation and is organized in the following way. Section 2 provides background information on the regulatory policy environment and the evolution and structure of this particular regulatory regime. Section 3 describes the purpose of this evaluation and the methodology used. Section 4 identifies the evaluation's findings. Section 5 presents the conclusions based on the evaluation findings. Sections 6 and 7 contain, respectively, the recommendations and the management response to the recommendations.

[1] Environment Canada. *Acts, Regulations and Agreements.* http://www.ec.gc.ca/default.asp?lang=En&n=48D356C1-1.

[2] Environment Canada. Audit and Evaluation Plan 2007-08 to 2009-10. http://www.ec.gc.ca/ae-ve/034D1A75-2B53-4F0E-BC4B-36704627C9FA/FinalAEPlan.doc. The plan was approved by the Departmental Audit and Evaluation Committee on April 18, 2007.

2.0 BACKGROUND

2.1 Regulatory Requirements

The regulations examined in this evaluation were developed and/or implemented under the 1999 Government of Canada Regulatory Policy.[3] This policy includes high-level requirements to which departments must adhere when developing and implementing regulations. Accompanying the 1999 Regulatory Policy are the Regulatory Process Management Standards, which apply to all federal regulatory authorities. Contained within the standards are requirements for policy development and analysis, consultation, communications, training, documentation, and reporting. Each published Regulatory Impact Analysis Statement (RIAS) must outline the nature of the problem and the proposed regulatory solution relative to other solutions, the major anticipated impacts, a summary of the consultations undertaken, and the proposed compliance and enforcement strategy.[4] In addition, the compliance guide for the Federal Regulatory Process Management Standards lays out the requirements that departments must fulfill as they develop new regulations, including the publication of Regulatory Impact Analysis Statements in the *Canada Gazette*.[5]

In 2001, Environment Canada published the Regulatory Development and Approval Process Manual to guide and outline the roles and responsibilities during all stages of the regulatory process.[6] The process includes four stages: problem identification and assessment, options evaluation, regulatory development and approval, and post-implementation evaluation. Each phase includes a checklist and steps to guide the regulatory process from start to finish. These phases and their checklists reflect the requirements contained within the 1999 Regulatory Policy and its attendant standards. Adherence to the policy is an explicitly stated goal of the Regulatory Development and Approval Process Manual.

2.2 Air Pollution and Smog

The problem of air pollution is a complex and multi-faceted environmental issue; coverage of the issue here is limited to a general discussion of the formation of smog and its link to emissions from the transportation sector.

Air pollution has an important impact on human health, the environment, and the economy. Smog, which occurs as a by-product of air pollution, is formed in the lower atmosphere by a noxious mixture of gases and particles mixed with sunlight, resulting in the yellowish haze

[3] While the *Sulphur in Gasoline Regulations* were promulgated prior to the 1999 Regulatory Policy, the regulations came into force in 2005.

[4] Treasury Board of Canada Secretariat. 1999. Government of Canada Regulatory Policy. 10-12.

[5] Treasury Board of Canada Secretariat.1999. Federal Regulatory Process Management Standards Compliance Guide. 24.

[6] Environment Canada. 2001. Regulatory Development and Approval Process Manual.

often seen in urban areas, particularly in summer. When the pollutants and conditions for producing smog come together, the result can lead to adverse effects on health and the environment. The two primary pollutants in smog are ground-level ozone (O_3) and particulate matter (PM).[7]

Air pollutants result from a number of sources, most notably the combustion of fossil fuels, from virtually all manufacturing processes and from a wide range of everyday activities, including transportation. With respect to the problem of smog, there are many contributing sources. The transportation sector (on- and off-road vehicles and engines), in particular, is a significant source of nitrogen oxides (NO_x), sulphur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO), and direct emissions of particulate matter (PM). In 2000, the transportation sector was the largest contributor to emissions of nitrogen oxides in Canada, accounting for nearly 60% of these emissions.[8]

Air pollution does not respect geographical boundaries, whether provincial/terrioritial, national, or international. Winds can transport pollutants long distances from their source, adding to the levels of air pollution that are generated locally and increasing the intensity of air quality concerns. For instance, the transboundary flow of air pollutants from the United States into Canada is very significant.[9]

2.3 Key Air Quality Agreements and Policies

In light of the importance of transboundary flows of air pollutants from the United States and the fact that improvements in air quality cannot be achieved through domestic measures alone, Canada and the United States signed a plan of action in 1997 to investigate the transboundary smog issue. Beginning in May 2000 this led to the development of the Ozone Annex to the 1991 *Canada–U.S. Air Quality Agreement*. On behalf of the federal government, Environment Canada negotiated the Ozone Annex as part of its commitments under the Canada-Wide Standards (CWS) for Particulate matter (PM) and ozone.[10]

In December 2000, Canada and the United States signed the Ozone Annex to the 1991 Canada–U.S. Air Quality Agreement. The Ozone Annex was intended to secure substantial improvements in air quality and associated public health benefits by reducing american sources of emissions causing ground-level ozone that enter Canada, and vice versa. The inclusion of the Ozone Annex in the *Air Quality Agreement* was considered to be an advancement in bilateral cooperation on air quality as both Canada and the United States made a commitment to a number of domestic and joint actions under the annex.

---

[7] Environment Canada. *Clean Air Online: Smog.* http://www.ec.gc.ca/cleanair-airpur/Smog-WS13D0EDAA-1_En.htm.

[8] Environment Canada. *Clean Air Online: Smog*—Main Emission Sources. http://www.ec.gc.ca/cleanair-airpur/Pollution_Issues/Smog/Main_Emission_Sources-WSC15343DD-1_En.htm.

[9] Environment Canada. Interim Plan 2001 on Particulate Matter and Ozone. http://www.ec.gc.ca/cleanair-airpur/CAOL/air/interim2001/minister_e.html.

[10] http://www.ccme.ca/assets/pdf/accord_harmonization_e.pdf CCME one order of government ; http://www.ccme.ca/assets/pdf/pmozone_standard_e.pdf. The agreement to establish Canada-wide standards to protect the health of Canadians through improved air quality was signed by Environment Canada and all provincial and territorial governments with the exception of the province of Quebec. The standards include a numeric limit and a timeline for attainment, as well as a schedule for reporting on progress.

Environment Canada announced its Clean Air Strategy in 2000 as a 10-year initiative with the goal of meeting the requirements set out in the Ozone Annex. One part of this strategy included the *Federal Agenda on Cleaner Vehicles, Engines and Fuels*, which was published in the *Canada Gazette* in 2001. This agenda committed Environment Canada to:

- align Canadian emission standards for on-road vehicles and engines with those of the U.S. Environmental Protection Agency (EPA);
- develop new regulations and standards for programs for off-road engines to correspond with those of the U.S. Environmental Protection Agency;
- develop a Canadian clean fuels program, including new sulphur content regulations for a variety of fuels; and
- conduct further analysis of the potential for other emission controls and measures.[11]

By combining new standards on vehicle and engine emissions with cleaner (low sulphur) fuels, this agenda was expected to achieve a targeted 90% reduction in smog-forming emissions from new vehicles by 2010.[12] Regulations related to the reduction of emissions in fuels, vehicles, and engines were developed under Part 7, Divisions 4 and 5, of the *Canadian Environmental Protection Act, 1999*.[13]

In the fall of 2006, Environment Canada committed to developing a framework for regulating air emissions through the Clean Air Regulatory Agenda (CARA), which includes regulatory actions for air pollutants or smog-causing emissions as well as for greenhouse gas (GHG) emissions, the principal drivers of climate change.[14] This combined agenda was created since air pollutants and greenhouse gas emissions have many sources in common and a coordinated effort would allow for more cost-effective measures to be taken by industrial sources. In April 2007, as part of the Clean Air Regulatory Agenda, the federal government released the Regulatory Framework for Air Emissions*,* in which actions to reduce emissions from transportation sources formed a key element.[15] With respect to controlling smog-forming emissions from vehicles and engines, the Regulatory Framework established a policy of maintaining alignment with the federal emission standards in the United States in order to build on the foundation of the existing regulations.

[11] *Federal Agenda on Cleaner Vehicles, Engines and Fuels.* Canada Gazette Part I, Vol. 135 , no. 7 (2001-02-17). http://www.ec.gc.ca/CEPARegistry/notices/NoticeText.cfm?intNotice=101&intDocument=562.

[12] *Sulphur in Diesel Regulatory Impact Analysis Statement, Canada Gazette* Part 2, Vol. 136, no. 16 (2002-07-31): 1679.

[13] Environment Canada. 1999. *Canadian Environmental Protection Act*, 1999*;* Part 7: Controlling Pollution and Managing Wastes – *Division 4: Fuels and Division 5: Vehicle, Engine and Equipment Emissions*.

[14] *Notice of Intent to Develop and Implement Regulations and Other Measures to Reduce Air Emissions. Canada Gazette* Part I, Vol. 140, no. 42 (October 21, 2006): 3351–3361. http://canadagazette.gc.ca/partI/2006/20061021/pdf/g1-14042.pdf http://canadagazette.gc.ca/partI/2006/20061021/html/notice-e.html.

[15] Government of Canada. Regulatory Framework for Air Emissions. http://www.ec.gc.ca/doc/media/m_124/toc_eng.htm.

2.4 Stakeholders

Broadly defined, stakeholders are individuals, groups, or organizations likely to be affected by proposed regulatory changes.[16] A multitude of stakeholders are affected by Environment Canada's regulations, including industry organizations, non-governmental organizations, other federal, provincial, and international authorities, and the Canadian public.

Industry stakeholders can be divided into four principal groups: the on-road vehicle engine sector (i.e., the Canadian Vehicle Manufacturers' Association, the Association of International Automobile Manufacturers of Canada, and Motorcycle and Moped Industry Council); the engine sector (i.e., the Engine Manufacturers Association); the off-road machine and equipment sector (i.e., the Outdoor Power Equipment Institute); and the Canadian fuels sector (i.e., the Canadian Petroleum Products Institute). Other economic sectors, such as forestry, agriculture, and tourism, are also affected indirectly by these regulations.

Non-governmental organizations with an interest in these regulations include several health and environmental organizations, most notably Pollution Probe and Friends of the Earth. The Canadian public is also seen as a group with a vested interest in these regulations since they pertain to human health and the environment.

Government departments and agencies from various jurisdictions (i.e., federal, provincial, territorial and international) are also involved in the development and implementation of these regulations. Other federal departments substantially engaged in the regulatory process in this case are Transport Canada, Industry Canada, Natural Resources Canada, and Health Canada. As environmental jurisdiction is shared with the provinces, provincial authorities are implicated in the development of these regulations. As well, the transboundary nature of the smog problem and the alignment of the regulatory agenda with that of the United States ensure the engagement of the U.S. Environmental Protection Agency.

2.5 Governance

Prior to the introduction of Environment Canada's Results Management Structure in 2005, governance of the Vehicle, Engines and Fuels initiative was defined under the Ozone Annex and provided by EC's Clean Environment Business Line[17]. Based on the current departmental horizontal Results Management Structure dated November 2007, the Environmental Protection Board provides direction to and oversees the performance of the Outcome Project Group (OPG) 3C3 - risks associated with air pollution and greenhouse gas emissions from the transportation section are managed. The mandate of the OPG is to develop and implement regulations to reduce air emissions from the transportation sector as part of the government's Regulatory Framework for Air Emissions. The lead program areas for the fuel, vehicle and engine emission regulations being examined fall under two Outcome Project Plans (OPPs) of this OPG:

[16] Privy Council Office. Guidelines for Effective Regulatory Consultations, 4. Definition also appears in 2007 RAS website.

[17] The Clean Environment Business Line was the precursor to the Environmental Protection Board.

- 3C3a - reducing emissions from vehicles and engines; and
- 3C3d - clean and alternative fuels.

The Director General, Energy and Transportation Directorate, is the OPG lead and is responsible for the ongoing management of the work and delivery of the OPPs. The Executive Director of Transportation is the lead for OPP 3C3a and is responsible for the three vehicle and engine emission regulations that will be evaluated. The Director of Oil, Gas and Energy is the lead for the OPP 3C3d on clean and alternative fuels and is responsible for the two fuel regulations. Prior to 2007, these regulations fell under the management of the OPG 3A1- air quality is improved.

The five regulations included within this evaluation have three distinct management components: regulation development and approval, implementation (administration and monitoring, compliance promotion and enforcement) and post implementation evaluation/lifecycle analysis. In this sense, the regulations have many interdependencies and relationships with other OPPs that are necessary for the achievement of OPP results. For example, in the regulatory development phase, the Regulatory Impact Analysis Statement that accompanies each regulation falls under the responsibility of the OPP 7A2c – Regulatory Analysis and Instruments, headed by the Director of the Regulatory Analysis and Instrument Choice Division. This OPP is part of OPG 7A2 - policy research and economic analysis supports decision making, which is led by the Director General of the Economic Analysis Directorate. In addition, the compliance promotion and enforcement functions fall under OPPs 3B2m and 6B4b, respectively.

2.6 Resources

For the four-year period from 2001-02 to 2004-05, Treasury Board approved a total of $45 million for Environment Canada to deliver the vehicles, engines, and fuels component of the Ozone Annex. These resources were allocated to cover regulatory development and implementation (regulatory administration, compliance promotion, testing, and enforcement activities) associated with the vehicle, engine, and fuels regulations and were extended on an ongoing basis through funding under the *Canadian Environmental Protection Act, 1999* at a level of $12 million annually. The expenditures for the 2006-07 fiscal year included $4,900,000 for the vehicles and engines component and approximately $500,000 for fuels, for a total of $5.4 million.[18]

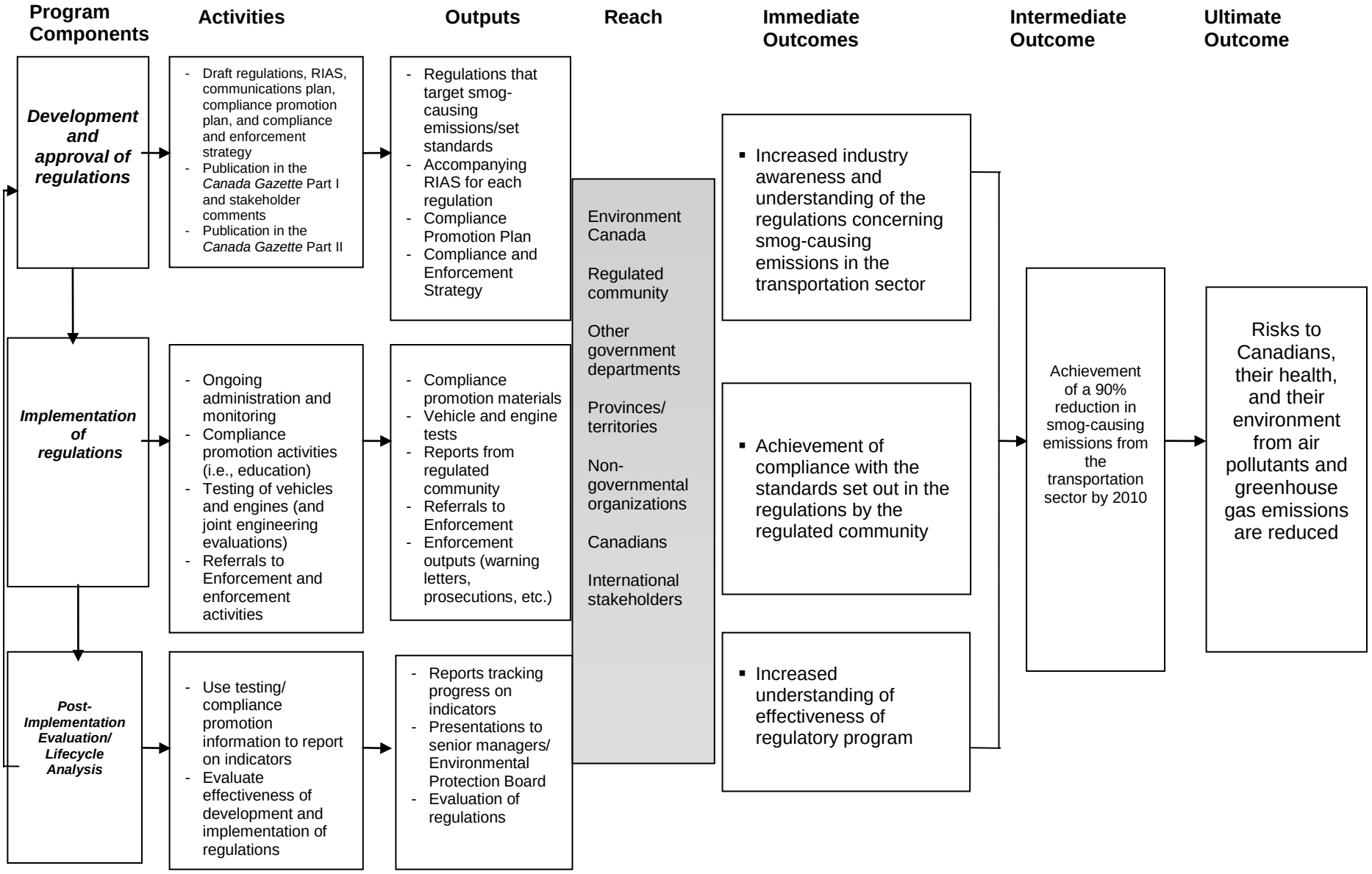
The Enforcement Branch reported that $23,000 was spent in 2006-07 on a multi-instrument compliance verification of a suite of seven fuels regulations, within which the two regulations on sulphur in fuels are included. No enforcement expenditures were reported by the Enforcement Branch for the vehicle and engine emission regulations during that same time period.

[18] This amount does not reflect expenditures made by the Economic Analysis Directorate or the Compliance Promotion and Enforcement divisions of Environment Canada.

2.7 Logic Model

For the purpose of this evaluation, a logic model was created by the Audit and Evaluation Branch to identify the intended outcomes of this suite of regulations. This logic model builds on the Results Management and Accountability Framework for the Ozone Annex developed in 2000-01.The purpose of the logic model is to present a chain of results that demonstrates how the activities of this regulatory program will lead to a reduction in smog-causing emissions in the transportation sector, thereby reducing air pollutants and risks to Canadians, their health, and their environment.

Logic Model: Smog-Causing Emission Regulations in the Transportation Sector



3.0 EVALUATION DESIGN

3.1 Purpose of the Evaluation

The purpose of the evaluation is to examine whether and how a suite of regulations in the transportation sector has achieved its intended outcomes. The regulations form a critical part of the federal agenda aimed at reducing smog-causing emissions from the transportation sector within the broader Clean Air Agenda and the current Regulatory Framework on Air Emissions. As well, this suite of five regulations contributes to the reduction of toxics under the *Canadian Environmental Protection Act, 1999*. Lessons learned from this case study are aimed at informing the development of future regulations in the transportation sector[19] and, if applicable, the development of other regulatory initiatives.

3.2 Scope of the Evaluation

The evaluation focuses on Environment Canada's established regulatory efforts related to decreasing emissions that cause smog through new standards on fuels, vehicles, and engines. The regulations are:

- *Sulphur in Gasoline Regulations*;
- *Sulphur in Diesel Fuel Regulations*;
- *On-Road Vehicle and Engine Emission Regulations* (i.e., passenger vehicles, motorcycles, trucks, and buses);
- *Off-Road Small Spark-Ignition Engine Emission Regulations* (chainsaws, lawn mowers, etc.);
- *Off-Road Compression-Ignition Engine Emission Regulations* (i.e., equipment used in industries such as forestry, construction, and agriculture).

This particular suite of regulations was chosen for two reasons.

1) The regulations being evaluated came into effect after 2000; therefore, information on their design and implementation was readily available.

2) The regulations represent an integrated agenda. The clean fuels work in conjunction with changes made to vehicles and engines to produce an overall environmental benefit. The two types of regulations (fuels and vehicles/engines) are therefore not mutually exclusive and should not be evaluated independently. The 2001 *Federal Agenda on Cleaner Vehicles, Engines and Fuels* and the 2006 Clean Air Regulatory Agenda link the two together as an integrated agenda. In achieving the overall target of reducing smog-causing emissions from new vehicles by 90 per cent, each regulation has its own individual set of emission targets. These targets were achieved or will be achieved at different stages depending on their date of entry into force and/or according to vehicle class of

[19] Under the Clean Air Regulatory Agenda, regulations have been or are being developed in the on-road, off-road, marine, air, and rail sectors.

engine/vehicle type. For example, the individual target set for the *Sulphur in Diesel Regulations* was 15 ppm (parts per million) of sulphur per kilogram of on-road diesel fuel; this target came into effect June 1, 2006. A full list of individual targets and dates for each of the regulations may be found in Annex 1.

Parameters of the Evaluation:

While the aforementioned regulations contribute to the broader regulatory regime[20] of other federal departments and provincial governments, the focus of the present evaluation is on the environmental and related economic and social impacts of Environment Canada's regulations.

3.3 Evaluation Approach and Methodology

The evaluation examines three issues:

1) **effectiveness -**the extent to which the regulations achieved their intended outcomes;

2) **design and delivery -**the extent to which the regulations were designed and delivered in the most appropriate way; and

3) **lessons learned -**the identification of lessons learned to improve the effectiveness, design, and delivery of current regulatory initiatives in the transportation sector and, if applicable, other regulatory initiatives.

The supporting questions for these issues may be found in Annex 2 of the present document. The answers to these questions have been aggregated and analyzed to address the statements posed at the issue level. Annex 2 also identifies indicators,[21] informational sources, and methods of enquiry.

The evaluation involved the use of multiple lines of evidence. These methodological approaches are described below in Table 1.

[20] For the purposes of this evaluation, a regulatory regime is considered to include voluntary measures and programs.

[21] An indicator is a specific item of information that measures a program's success in achieving intended results. An indicator is an observable and measurable characteristics or change that represents the success of a policy, program, or initiative. Modified from Measuring Program Outcomes: A Practical Approach, the United Way of Canada, 1996.

Table 1: Methodological Approaches

Methodology	Description
Document and File Review	This research involved a review and analysis of policy, planning, and reporting documents, regulations, Regulatory Impact Analysis Statements, consultation plans and products, compliance strategies and plans, enforcement plans, communication strategies, and other documents on the CEPA Environmental Registry (www.ec.gc.ca/CEPARegistry). Findings from this research were used to describe the evolution of smog-causing emission regulations related to fuels and vehicle and engine emissions, the intended outcomes of the regulations, the stakeholders involved or affected by the regulations, the efficiency of regulatory processes, and other management issues. Key correspondence records were reviewed to track consultation with stakeholders and stakeholders' engagement in, awareness of, and understanding of as well as compliance with Environment Canada's regulatory instruments in the transportation sector. Key environmental, economic, societal, statistical, and financial data were obtained from departmental files, documents, and databases. A list of key documents is presented in Annex 3.
Media Scan	A media scan was conducted in order to provide further information regarding stakeholder perspectives of initiative impacts/effects. The media scan used GreenInSight and Infomart[22] as primary search tools for articles on the smog-causing emission regulations, further refined to include only articles that pertain specifically to the regulations. As the GreenInSight archives were limited, this search included only articles from January 2005 to October 2007. Articles from 1998 to 2007 were found in FPinformart.ca, which is a large media monitoring search engine that includes more that 1500 news sources from across Canada. A total of 25 relevant articles was found and analyzed.
Interviews	In order to receive feedback from key stakeholders, a total of 38 interviews was conducted by the Evaluation Team with key informants from the following categories: ▪ Environment Canada: o senior management (3) o program staff (19)

[22] FPinfomart.ca is a provider of media monitoring, financial, and corporate data which include more than 1,500 news, blog, and online sources from across Canada and abroad.

	▪ federal partners and stakeholders (4) ▪ provincial and municipal stakeholders (2) ▪ international partners and stakeholders (2) ▪ industry organizations (6) ▪ other non-governmental organizations (2) The master list of interview questions is presented in Annex 4. Interview guides containing questions appropriate for each stakeholder group were developed from the master list of interview questions. Some questions were addressed to only small sub-groups of specialists who, for the most part, were involved in the design and/or implementation of the project throughout much of the duration of the project.
Secondary Data and Reports	Although not previously incorporated into the plan for this evaluation, this methodology was used to collect performance information. The supplemental information was provided by Environment Canada interviewees either through email or reports prepared by Environment Canada interviewees for this purpose.
Literature Review	Studies that helped to benchmark Environment Canada's activities and practices against the activities and practices of other related regulatory agencies or organizations (e.g., the United States Environmental Protection Agency, the European Environment Agency, the European Union, and international associations (e.g., the Organisation for Economic Co-operation and Development (OECD)) were taken into account. A list of key studies is also included in Annex 3.
Expert Review	An independent review of the credibility of the findings and the applicability of lessons learned to other regulatory initiatives was conducted.

3.4 Evaluation Limitations

1. **Difficulty in Measuring Long-Term Outcomes (attribution and timing):** Environmental regulations have an impact on the environment, people's health, and the economy. Individually these are very complex systems with a multitude of variables, in addition to the regulations, that influence them over time. Therefore, it is difficult to establish conclusively the incremental impacts of specific smog-causing emission regulations on long-term environmental and societal outcomes. Even when methods such as statistical analysis exist to try to control for other influences, it is extremely challenging to obtain quality data and reach solid conclusions. Moreover, it is very difficult to establish a baseline for comparison by predicting what would have happened if the regulations had not been put in place. In addition, although the regulations currently being evaluated were published between 1999 and 2004, many of the environmental standards contained within the regulations did not come into force until several years after publication, and

some of the standards have not yet come into force.[23] It is, therefore, too early to provide an overall measure of the effectiveness of the regulations. Environmental impacts of the regulations can be modelled but the measurement of intermediate and ultimate outcomes are difficult to quantify.

The strategy for overcoming these challenges was to utilize multiple methods and multiple data sources. Specifically, primary data were obtained from interviews with key informants representing a range of perspectives and this evidence was supplemented with an analysis of secondary data from documents, files, databases, and media reports. Findings from all lines of evidence were triangulated to corroborate key findings and to help resolve any inconsistent or contradictory results.

2. **Limited Financial Information (Environment Canada Budget and Expenditures):** Financial information from final budget and expenditures for all phases of the regulatory program are incomplete and at various levels of detail. Gaps in financial information prevented a comprehensive view of the financial cost of the development, implementation and post implementation phases of the regulations and an assessment of the adequacy of funding.

3.5 Evaluation Ratings

For each evaluation question, a rating has been assigned that denotes the level of progress made in achieving intended results. This information is intended to provide the reader with an overall view of the performance of the regulatory program. A summary of ratings for the evaluation questions is presented in Annex 5. The ratings are based on a judgement of whether the findings indicate that:

- the intended outcomes have been achieved;
- progress has been made toward the intended outcomes but attention is needed;
- little progress toward the intended outcomes has been achieved and priority attention is required; or
- it is too early in the regulatory program to see results.

A rating was not assigned if the evaluation questions did not relate to the achievement of outcomes.

[23] See Annex 1 for the coming into force dates for these regulations.

4.0 FINDINGS

Below are the findings of this evaluation presented by evaluation issue (effectiveness, design and delivery, and lessons learned) and by the related evaluation questions as presented in Annex 2. The findings at the overall issue level are presented first, followed by the findings for each evaluation question.

4.1 Effectiveness

Evaluation Issue 1: Effectiveness
The extent to which the regulations achieved their intended outcomes

Overall Findings:

- All five regulations are on track to achieve their intended environmental outcomes. The standards set out by the regulations have been achieved by the sulphur in fuels regulations and are beginning to be achieved in the case of on-road vehicles. Off-road engines are starting to undergo compliance verification testing to evaluate the emission performance of products sold in Canada against the emission limits that have been put in place. The intermediate outcome of reducing smog-causing emissions through the combined effect of cleaner fuels and new vehicles and engines by 2010 is on its way to being achieved, although the measurement of effectiveness is largely qualitative. These achievements contribute to the ultimate outcome sought by the regulations—to reduce risks to Canadians, their health, and their environment from air pollutants and greenhouse gas emissions.

- Qualitative evidence concerning the economic impacts of the regulations indicates that although the implementation of the regulations has imposed costs on industry, the overall economic impact of the regulations on industry has not been negative. Positive health impacts as a result of reduced air pollution are expected to occur over time as the vehicle fleet is replaced.

- Few unintended outcomes arose during the implementation of the regulations.

- External factors that were found to have an impact on the outcomes of the regulations were the existence of an integrated North American market, increased public awareness of air pollution issues, the increasing number of new regulatees in vehicles and engines, and the changing nature of the engine manufacturing and assembling industry, especially with increasing imports from the Asian market.

Evaluation Issue: Effectiveness Achievement of intended environmental results	**Indicator(s)**	**Rating**
1. To what degree did the regulations achieve their intended environmental results?	▪ Evidence of the achievement of intended short-term and long-term environmental results	~Achieved[24]

Detailed Findings:

Regulatory Objectives

- The purpose of the set of regulations is to reduce emissions of smog-causing pollutants (nitrogen oxides, sulphur dioxide, particulate matter, carbon monoxide, and volatile organic compounds) through the introduction of new maximum limits for sulphur content in fuels (gasoline and diesel) and for allowable emissions from vehicles and on-road and off-road engines. Each of the regulations has specific targets of allowable smog-causing emissions that come into force in different phases as well as according to vehicle/engine class. The complete list of these targets and dates is included in Annex 1. The linkages between the activities of this regulatory program and the immediate, intermediate, and ultimate outcomes are demonstrated in the logic model found in Section 2.7. The expert reviewer notes, "the degree of clarity in defining intermediate outcomes of the regulations is not common in regulatory work and provides a model to emulate."[25]
- Reductions in these pollutant emissions are expected to reduce the formation of smog and ground-level ozone in the atmosphere. For diesel fuel and gasoline, the level of sulphur present in fuels that are refined in Canada or imported into Canada is reduced under these regulations. For vehicles and engines, the regulations place new limits on the maximum allowable emissions of various pollutants (nitrogen oxides, particulate matter, carbon monoxide, and volatile organic compounds). The regulations work in conjunction with each another to produce an overall reduction in smog-causing emissions; in fact, the improved emission performance of vehicles and engines through the introduction of advanced technologies cannot work properly without the low-sulphur fuels.
- The intermediate goal of reduced smog-causing emissions brought about by lowering the allowable emission levels from new vehicles by approximately 90% as a result of the combination of the *On-Road Vehicle and Engine Emission Regulations* and the sulphur in fuels regulations has been estimated by modelling the effects that the regulations will have as the older vehicle fleet is replaced by new, cleaner vehicles and engines.[26]

[24] ~Achieved: Although there is compelling subjective evidence that the program is doing well in the given issue area, a complete assessment cannot be done due to lack of performance data.

[25] The expert reviewer adds, "the nature of the regulated activity lends itself to this sort of quantification, something which can be more difficult with biological systems in areas such as wildlife conservation, food safety or animal health."

[26] Source: *Sulphur in Diesel Regulatory Impact Analysis Statement, Canada Gazette* Part II, Vol. 136, no. 16 (July 31, 2002): 1679.

- One way of measuring whether this goal is on track to being achieved is by examining the rate of compliance with the regulatory standards that have come into force thus far. If high levels of compliance with the regulations already in place are taken to indicate the achievement of short-term environmental objectives, the compliance rates can serve as a proxy for the assessment of the degree to which the long-term environmental result is being achieved. However, as some forms of compliance represent the fulfillment of administrative requirements only (i.e., reporting obligations), compliance rates alone cannot serve as an indicator of the achievement of environmental outcomes. Despite this limitation and although high compliance rates do not guarantee that environmental results are being achieved, high compliance rates for the vehicle and engine emission regulations and the fuels regulations, can, by inference, be expected to help reduce the amount of smog-causing emissions in Canada over the longer term.
- While environmental impacts of the regulations can be modelled, the measurement of intermediate and ultimate outcomes is difficult to quantify and an assessment of achievement is therefore based heavily on qualitative evidence.

Compliance with the Sulphur in Fuels Regulations

- Between 2001–02 and 2004–05, the fuels industry demonstrated a high level of compliance, although approximately half of the fuel refineries and importers received a written warning from the Enforcement Branch during this period.[27] However, approximately two-thirds of the written warnings[28] relate to issues of late reporting or missing information. Seven of the written warnings pertain to excess levels of sulphur.[29]

Compliance with the On-Road Vehicle and Engine Emission Regulations

- According to interviews, a high level of conformity has been found with the vehicles tested thus far under the *On-Road Vehicle and Engine Emission Regulations*, with only one referral to the Enforcement Branch out of over 100 vehicles tested.[30]
    - Some referrals have been made to the Enforcement Branch for instances of non-conformity with the reporting requirements under the regulations (i.e., late reporting). Regulatees are required to report on the fleet average nitrogen oxides emissions for every model of new on-road light-duty vehicle sold in Canada no later than May 1 after the end of the model year.

[27] According to the 2005 Sulphur in Liquid Fuels Report, there were 32 fuel refineries and importers under the *Sulphur in Gasoline Regulations* and 35 under the *Sulphur in Diesel Fuel Regulations.* There are 320 fuel refineries and importers in total for all seven fuels regulations. Some written warnings are coupled with infractions relating to fuels regulations that are not part of the current evaluation. The 33 written warnings represent about half of the total number of warnings for the fuels regulations. Source: Fuels Regulations Enforcement Log.

[28] Twenty-one out of 33 written warnings in total.

[29] Almost half of the warning letters for sulphur level exceedances (three of seven) came following the new standard for sulphur in diesel as of June 1, 2006: 15 parts per million (ppm) (down from 500 ppm).

[30] Over 100 vehicles have been tested since the regulations came into force in 2004–05.

Compliance with the Off-Road Engine Emission Regulations

- The level of compliance with the off-road engine emission regulations is less certain as these regulations are relatively new. Some of the standards came into force in 2006 and later and they apply to previously unregulated sectors. The achievement of these regulations' short-term objectives cannot yet be measured.
- Interviews and secondary data indicate that the Enforcement Branch receives very few referrals of off-road vehicles and engines that do not meet the emission standards, yet information received by the Enforcement Branch from other sources indicates that non-compliant off-road vehicles and engines are being imported into Canada.
- In addition, internal interviewees state that the department lacks the resources to identify and engage the large number of regulatees covered by these regulations adequately as well as monitor their compliance levels. Nevertheless, testing of small spark-ignition engines began in 2007–08.

Evaluation Issue: Effectiveness Realization of expected economic and social impacts	**Indicator(s)**	**Rating**
▪ 2. What were the related economic and/or societal impacts of the regulations?	▪ Evidence of the positive or negative impact of regulations on the economy and society	~Achieved[31]

Detailed Findings:

Regulatory Requirements

- The objective of the 1999 Regulatory Policy is to "ensure that the use of the government's regulatory powers results in the greatest net benefit to Canadian society".[32] Specific to the economic impacts of regulatory initiatives, there is a requirement under the policy to ensure that the benefits of the regulations outweigh the costs for Canadians, industry, and the government. As well, the regulations are to be designed in such a way that the economy is not adversely affected and the regulatory burden is minimized.[33]

- In fulfillment of this requirement, the department carries out an assessment of the costs and benefits of each regulation under development. This assessment forms part of the Regulatory Impact Analysis Statement that accompanies the publication of each regulation. Each Regulatory Impact Analysis Statement for this suite of regulations includes an assessment of the costs and benefits and gives an overview of the economic and/or social impacts that are expected to result from implementation of the regulations. By comparing the expected results with the actual results, we can

[31] ~Achieved: Although there is compelling subjective evidence that the program is doing well in the given issue area, a complete assessment cannot be done due to lack of performance data.

[32] Treasury Board Secretariat of Canada. 1999. Government of Canada Regulatory Policy, 2.

[33] Treasury Board Secretariat of Canada. 1999. Government of Canada Regulatory Policy, 3.

assess the overall effectiveness of these regulations with respect to economic and social impacts.

Realization of Expected Economic and Social Impacts

- A review of the documentation and literature[34] revealed few studies examining the economic and social impacts of these regulations after they came into force. This is not uncommon, as an *ex post*[35] assessment of regulatory impacts is rare relative to *ex ante* analysis.[36] Although not a requirement under the 1999 Regulatory Policy and beyond the scope of this evaluation, *ex post* studies would nonetheless be helpful for the evaluation of economic and social outcomes of the regulations. Without *ex post* studies, it is difficult to confirm the extent to which expected economic and social outcomes were realized.[37]

- At a qualitative level, interviewees from across all interview groups agree that although the implementation of the regulations has imposed costs on industry, the overall economic impact of the regulations on industry has not been negative. The implementation of the regulations has enhanced industry competitiveness by encouraging innovation and new technologies; as well, by aligning Canadian regulations with those of the U.S. Environmental Protection Agency, these regulations have levelled the playing field and have helped to maintain an integrated North American market.

Economic impacts of the Sulphur in Gasoline Regulations

- The *Sulphur in Gasoline Regulations*, which were the first and most controversial regulations within this suite, are the only regulations for which *ex post* analysis is available. A joint industry/government study[38] looked at the economic and environmental impacts of the regulation. By comparing the results of this study and the expected impacts outlined in the Regulatory Impact Analysis Statement, the following can be concluded:
    - the industry impacts with respect to costs associated with complying with the regulations appear to be very close to the predicted amount;[39]
    - closures of refineries were found to be less than predicted;[40] and

[34] See Annex 3 for a list of key documents reviewed under this evaluation.

[35] An *ex post* assessment of a regulation is done after it has come into force in order to assess actual impacts, while an *ex ante* assessment is done prior to a regulation coming into force to predict its impact.

[36] One of the main reasons for the lack of *ex post* studies around the world is the difficulty in obtaining the necessary information and data.

[37] The conduct of *ex post* studies was beyond the scope of the evaluation.

[38] Purvin and Gertz Inc. 2004. Economic and Environmental Impacts of Removing Sulphur from Canadian Gasoline and Distillate Production.

[39] These costs are approximately equal to $2 billion in capital investments and $160 million per year in operating costs.

[40] The Regulatory Impact Analysis Statement predicted up to four possible refinery closures; one closure was reported.

  - the slight increase in the cost of reducing sulphur in gasoline that was passed on to the consumer was predicted in the Regulatory Impact Analysis Statement.[41]

- The estimated benefits of the regulations still exceed the costs by a wide margin.[42]

- The media scan and especially the study conducted with the *Sulphur in Gasoline Regulations* suggest that the economic impacts are in line with the predicted impacts. The media scan confirms the study's findings on refinery closures and the perception that benefits far outweigh the costs.

- The expert reviewer notes, "the *ex post* review of the *Sulphur in Gasoline Regulations* offers important case study material to support learning. The outcomes contrast markedly with the arguments presented in 1999 by industry leaders who aggressively resisted these regulations, predicting severe impacts on fuel prices, fuel supply and jobs".

Social impacts of the Sulphur in Gasoline Regulations

- Social impacts of these regulations pertain primarily to the reduction in health problems associated with smog pollution, such as respiratory disease and premature mortality of the Canadian population. Health problems such as respiratory disease and premature mortality are expected to fall over time as the vehicle fleet is replaced.

- As with economic impacts, the anticipated social impacts of the *Sulphur in Gasoline Regulations* were estimated through various studies. Under the Sulphur Panel Process, the Health and Environmental Impact Assessment Panel Report estimated the avoided effect that different levels of sulphur in gasoline would have on health effects such as asthma symptom days, acute and chronic respiratory symptoms, and hospital admissions associated with respiratory problems.[43]

- The media scan provided further evidence that industry agreed that reducing the sulphur content in gasoline and diesel fuel would generate positive societal impacts such as cleaner air and reduced health-related illnesses associated with emissions. For example, articles reviewed that pertained to the sulphur in fuels regulations cite representatives from the oil refining industry as stating that the regulations are a necessary step to achieving the desired societal impacts. The media scan showed that little attention was paid to the negative economic impacts of the regulations.

---

[41] Gasoline price increased by approximately 1.2 cents per litre. Source: Purvin and Gertz Inc. 2004. Economic and Environmental Impacts of Removing Sulphur from Canadian Gasoline and Distillate Production, II-5.

[42] Health benefits are estimated at approximately $6–8 billion vs. $3–4 billion in approximate costs over 20 years.

[43] National Round Table on the Economy and the Environment. Health, Environment and the Economy. 1999. Reducing Sulphur in Gasoline and Diesel – A Case Study.

Evaluation Issue: Effectiveness Unintended outcomes of the regulations	**Indicator(s)**	**Rating**
3. Have there been any unintended (positive or negative) outcomes?[44] Were any actions taken as a result of these impacts?	▪ Presence/absence of unintended impacts	N/A

Detailed Findings:

- When evaluating the effectiveness of a program, it is necessary to assess the presence of impacts beyond those which were identified as expected outcomes during the design and development phases of the regulatory program. Hence, a standard question asked by the program evaluation community is whether there have been unintended (positive or negative) outcomes, and, if so, what actions were taken as a result of these impacts.

  Interviews, the document review, and the media scan revealed few unintended outcomes. The expert reviewer notes that the limited number and scope of unintended outcomes reflect well on the care taken in consulting with stakeholders and designing the regulations.

Positive Outcome

- **Industry innovation to overcome challenges posed by the regulations:** Environment Canada interviewees noted that industry innovation has been used to solve unforeseen technical problems. For example, since both crude oil and the finished product were shipped through the same trans-mountain pipeline, residual sulphur deposits were left in the line. In order to prevent contamination of the desulphurized fuel, industry came up with an innovation to modify the pipeline.

Negative Outcome

- **Delayed introduction of cleaner vehicle models as an indirect result of the regulations:** Interview findings indicate that vehicle manufacturers did not produce some 2007 models of on-road vehicles in order to allow more time to meet the standards in the regulation for 2008, suggesting that some standards were difficult for manufacturers to meet by the date on which they came into force. As well, some fleet managers were reported to be inclined to "pre-purchase" the 2006 models of trucks because the later models were going to be more expensive as a result of the regulations. As a result of both of these factors, a limited number of higher emitting older vehicles may be more prevalent on the roads because of the regulations.

[44] Unintended outcomes refer to outcomes related to the regulations which were not expected in the regulatory planning phase (i.e., in the Regulatory Impact Analysis Statement).

Evaluation Issue: Effectiveness External factors affecting the regulations	**Indicator(s)**	**Rating**
4. What external factors (outside of the regulations), either positive or negative, influenced the achievement of environmental and economic outcomes?	▪ Evidence of factors outside of the regulatory process which have influenced the achievement of intended outcomes	N/A

Detailed Findings:

- External factors beyond the control of the regulatory program had an impact on the achievement of the intended outcomes of the regulations or the degree to which the regulations could be effectively implemented.

Positive External Factors

- Interview findings from across all interview groups, most notably respondents from industry organizations, noted that the existence of an integrated North American market for vehicles and engines contributed positively to the success of the regulations. Interviewees were of the view that without this integrated market, alignment with the U.S. Environmental Protection Agency regulations would have been less meaningful and effective.
    - A point related to the integrated North American market mentioned frequently by internal interviewees was the fact that the U.S. Environmental Protection Agency conducted background research and studies that Environment Canada could build upon in the design of its regulations, especially in the area of the vehicle and engine emission regulations. A representative of the Energy and Transportation Directorate (ETD) is of the view that it was not the existence of an integrated North American market for vehicles and engines that contributed to the success of the regulations but rather the fact that the regulatory structure took these factors into account that led to the successful implementation of the regulations.

- Increased public awareness of air pollution and its link to the transportation sector in addition to attitudes in favour of environmental protection may have influenced the success of the regulations. According to an Environment Canada Border Air Quality Survey published in November 2005,[45] Canadians who report encountering at least some level of air pollution were most likely to feel it comes from automobiles and traffic (63%). In addition, most Canadians see themselves as being somewhat familiar with various air quality issues, including the health effects of air pollution (82%). In particular, car exhaust (47%) and industrial emissions (35%) are most often cited as the sources of air pollution that have the greatest negative impact on the health of Canadians, according to Canadians' Attitudes and Opinions toward Environmental Issues.[46] A number of internal and external interviewees believe that this increased awareness on the part of the Canadian public led to a political environment that was favourable to the adoption of these regulations.

[45] Environment Canada. 2006. Environmental Trends.

[46] Environment Canada. 2004. Environmental Trends.

Negative External Factors

- Internal interviewees note that one negative external factor that may have influenced the achievement of outcomes was the increasing number of new regulatees in vehicles and engines. The number of regulatees in on-road vehicles and engines is relatively stable, but the number of regulatees in smaller and larger motorcycles and passenger-type vehicles from emerging economies is growing. A large increase in vehicle and engine manufacturers adds complexity to Environment Canada's job of administering and verifying compliance with the regulations. Without being able to identify the full list of regulatees, monitoring the rates of compliance with these regulations as well as the achievement of environmental outcomes becomes problematic.

- A related negative external factor identified by internal interviewees and industry organizations is the increase in imports from a previously unregulated market. For example, imports of on-road and off-road engines from Chinese manufacturers and assemblers have grown from under $2 million in 2001 to over $450 million in 2005. Overseas companies are not necessarily aware of Canada's regulations, and the full list of regulatees is not yet populated. This reality can translate into a serious administrative challenge for the department as well as possibly having an impact on environmental outcomes, especially as new regulations in the transportation sector continue to be introduced.

4.2 Design and Delivery

Evaluation Issue: Design and Delivery
The extent to which the regulations were designed and delivered in the most appropriate way.

Overall Findings:

- Overall, the regulations were designed and delivered in the most appropriate way.
- The regulations are consistent with the policies and requirements that were in place at the time of development and they continue to be aligned with recent air quality agreements and policies.
- For the fuels regulations, the roles and responsibilities of Environment Canada and stakeholders are clear at both the design and the implementation stages. Despite the introduction of a protocol on vehicle emission testing and enforcement, ambiguity concerning the roles of the different groups involved in regulatory administration, testing, and enforcement at Environment Canada persists.
- Stakeholder interests were taken into consideration during the regulatory development phase. Provinces and territories, which share jurisdiction with the federal government with respect to air emissions in the transportation sector, were fully consulted and were in favour of a harmonized national approach to the regulation of air emissions.
- Alternatives were considered in the Regulatory Impact Analysis Statements for each of the regulations; regulations were chosen as the preferred approach in each case.
- Performance monitoring and reporting of results were conducted on a phase-by-phase basis rather than at an integrated program level.
- Funding appears to be adequate for all phases of the regulatory spectrum with the exception of the enforcement function.

Evaluation Issue: Design and Delivery Fulfillment of policies and requirements	**Indicator(s)**	**Rating**
5. To what extent have the regulations fulfilled the policies and requirements of the Government of Canada and the department?	▪ Evidence that the regulations are or are not consistent with Government of Canada requirements	Achieved

Detailed Findings:

Regulatory Requirements

- The regulations are clearly aligned with the principal statement of the Regulatory Policy, which states, "Canadians view health, safety, the quality of the environment, and economic and social well-being as important concerns. The government's regulatory activity in these areas is part of its responsibility to serve the public interest".[47] The requirements of the Regulatory Policy and Management Standards have been fulfilled for these regulations and have been addressed through stakeholder consultation and analyses published in the Regulatory Impact Analysis Statements.[48]

Air Quality Agreements, Policies, and Agendas

- The document review of agreements, policies, and agendas of Environment Canada regarding regulations and smog-causing emissions in the transportation sector[49] indicates that this suite of regulations is aligned with the specific agendas on cleaner vehicles, engines, and fuels. The regulations were developed under the 2001 *Federal Agenda on Cleaner Vehicles, Engines and Fuels.* This agenda follows efforts and initiatives that were developed throughout the previous decade in the area of air pollution and smog emissions in the transportation sector, such as the 1990 NO_x/VOC Management Plan, the 1995 Cleaner Vehicles and Fuels Program of the Canadian Council of Ministers of the Environment (1995), the 1997 Phase 2 Federal Smog Management Plan, and the 2000 Ozone Annex to the Canada–United States Air Quality Agreement leading to the Canada-Wide Standards for Particulate Matter (PM) and Ozone.

    - The *Sulphur in Gasoline Regulations* were drafted on the recommendation of the Canadian Council of Ministers of the Environment (CCME) Task Force on Cleaner Vehicles and Fuels, which took into account the findings from various expert panels on the health, atmospheric, and economic impacts of imposing

[47] Treasury Board of Canada Secretariat. 1999. Government of Canada Regulatory Policy, 2.

[48] For further detail on how specific Management Standards have been fulfilled, refer to evaluation questions 2, 7, 8, and 9.

[49] Documents include the Government of Canada Regulatory Policy (1999), the *Canadian Environmental Protection Act, 1999*, the *Federal Agenda on Cleaner Vehicles, Engines and Fuels* (2001), the NO_x/VOC Management Plan, the Phase 2 Federal Smog Management Plan (1997), and the Canadian Council of Ministers of the Environment Cleaner Vehicles and Fuels Program (1995).

a standard on sulphur in gasoline.[50] The other four regulations in this suite were developed under the *Federal Agenda on Cleaner Vehicles, Engines and Fuels*, and with these regulations the department fulfilled the following agenda objectives:

- align Canadian emission standards for on-road vehicles and engines with those of the U.S. Environmental Protection Agency;
- develop new regulations and standards for off-road engines to correspond with those of the U.S. Environmental Protection Agency; and
- develop various fuels initiatives, including new sulphur content regulations for a variety of fuels.[51]

- Interviews with senior managers and staff at Environment Canada indicate that this suite of regulations is highly consistent with the objectives and mandate of the department and the Government of Canada, especially with the adoption of the 2006 Clean Air Regulatory Agenda, which clearly aligns the regulations with a government-wide agenda on clean air. In addition to being in compliance and aligned with the policies and agendas in existence at the time the regulations were drafted, the suite of regulations continues to be aligned with the more recent Environment Canada policy agenda on clean air, with regulations in the transportation sector forming an important part of the Clean Air Regulatory Agenda and the 2007 Regulatory Framework for Air Emissions.

Evaluation Issue: Design and Delivery Clarity of roles and responsibilities	**Indicator(s)**	**Rating**
6. Who is accountable for the regulations? Are the roles and responsibilities of all groups involved clear and implemented?	▪ Evidence of a defined and applied management structure for the development, implementation, and monitoring of regulations	Progress made, attention needed

Detailed Findings:

Roles and Responsibilities

- The group with the heaviest involvement in the development and approval of regulations is the lead program area responsible for the substantive content of the regulations. This group is responsible for demonstrating the need for regulatory intervention and then drafting the regulations with assistance from other groups. In the regulatory development phase, other groups that are involved include the Economic Analysis Directorate, the Enforcement Branch, Legal Services, the Communications Branch, Treasury Board Secretariat, and external stakeholders such as industry and non-governmental organizations that respond to the publication of the proposed regulations in the *Canada Gazette,* Part I.

[50] National Round Table on the Economy and the Environment. Health, Environment and Economy Program. 1999. Reducing Sulphur in Gasoline and Diesel Fuel – Case Study, 11.

[51] *Federal Agenda on Cleaner Vehicles, Engines and Fuels. Canada Gazette* Part I, Vol. 135, no. 7 (February 17, 2001). www.ec.gc.ca/CEPARegistry/notices/NoticeText.cfm?intNotice=101&intDocument=562.

- Once revisions are made and the final regulations are published in the *Canada Gazette,* Part II, the regulations can then be implemented. During the regulatory implementation phase, the lead program area is responsible for overseeing the proper implementation and the ongoing monitoring of the regulations. The Compliance Promotion and Permitting Directorate and regional offices of the Environmental Protection Operations Directorate are responsible for assisting the lead program with the development of resources that can be used for implementing the compliance promotion strategy (i.e., informing regulatees of their need to comply with the regulations and providing educational tools). Cases of non-conformity with the regulations are referred to the Enforcement Branch, in accordance with procedures outlined in each regulation's enforcement plan. Enforcement officers utilize a variety of legal tools[52] to enforce the regulations.
- For this suite of regulations:
    - the lead program areas for the fuels and vehicles/engines regulations fall under the Energy and Transportation Division under OPP 3C3d (Clean and Alternative Fuels) and OPP 3C3a (Transportation), respectively;
    - the development of the compliance promotion strategies falls under the Compliance Promotion and Permitting Directorate and regional offices under OPP 3B2m; and
    - enforcement (inspections to verify compliance, investigations of violations and measures to compel compliance) fall under the Enforcement Branch and OPP 6B4b.
        - In the case of the fuels regulations, a draft compliance promotion strategy[53] has been developed by the Fuels Regulations Working Group (FRWG), and compliance promotion activities are carried out by program officers in the regions. Enforcement activities such as inspections and cases of potential non-compliance (i.e., late reporting) or sulphur level excesses are identified and conducted by the Enforcement Branch.
        - With respect to the vehicle and engine emission regulations, the Energy and Transportation Directorate operates a vehicle and engine testing facility which conducts a series of evidence of conformity tests on a selected number of vehicles and engines. The vehicles and engines that are acquired for emissions verification testing are selected based on a risk assessment that weighs factors such as whether the vehicle or engine is unique to Canada, the popularity of the model, and whether the manufacturer has had compliance problems in the past. The results from the testing facility are captured in a database and reported back to the Energy and Transportation Directorate. Where test results suggest non-conformity with the regulations, the directorate forwards this information to the Enforcement Branch. The Enforcement Branch then decides if a joint engineering evaluation is required. A joint

[52] Legal tools are prescribed in the Compliance and Enforcement Policy for the Canadian Environmental Protection Act, 1999.

[53] Enforcement Branch. 2005. Draft Compliance Strategy for Seven Fuel Regulations under the *Canadian Environmental Protection Act*, *1999*. (April 2005).

engineering evaluation determines whether the defect lies with the vehicle/engine or with the test itself and is conducted by Environment Canada's testing group and the manufacturer.

- The document review and interview findings indicate that Environment Canada's protocol for the design and development of regulations is clearly articulated and carried out. Internally, this process is understood through the regulatory process and approval flowchart,[54] which outlines each phase and responsible party from regulatory strategy through to publication. Externally, interview findings indicate that roles and responsibilities for this suite of regulations were clear to outside stakeholders.
- During the phases of regulatory implementation, the clarity of roles and responsibilities for the fuels regulations differed from that for the vehicle and engine emission regulations.

1) Fuels regulations

- Environment Canada staff that were interviewed most commonly cited the Fuels Regulations Working Group as a positive example of a mechanism that assists in the implementation of the fuels regulations. Its membership, which consists of the lead program area and enforcement personnel from headquarters and the regions, allows for a consistent and formal interaction among the various parties carrying out the implementation and ongoing monitoring of compliance with both of the sulphur in fuels regulations.

2) Vehicle and engine emission regulations

- Interviews with Environment Canada staff working in the administration of the vehicle and engine emission regulations suggest that there is some ambiguity about where the role of regulatory operations/testing ends and where the role of enforcement begins. Emission testing at Environment Canada is a highly technical and specialized field. On-road light-duty vehicle and engine emission tests are conducted at two intervals: the first test is conducted at 3500 km for screening with the second test occurring at 6400 km for validation. If the test result exceeds the applicable emission standards, the vehicle is referred to the Enforcement Branch for enforcement action. At this point, the Enforcement Branch may request that Environment Canada's testing group conduct a joint engineering evaluation with the manufacturer to ensure that the test result is a function of the manufacturer's emission control systems and not the testing process. Similar procedures with their own specificities apply to all other regulated types of vehicles and engines. The Enforcement Branch can also refer off-road vehicles and engines suspected of non-compliance directly to the testing facility.
- The Enforcement Branch's role in receiving referrals of potential non-conformity from the testing group and in carrying out enforcement activities was considered by some interviewees to be fragmented. Despite the existence of an internal protocol[55] that demarcates the roles of testing and

[54] Environment Canada. 2001. EC Regulatory Development and Approval Process Manual, 37.

[55] Vehicle Emissions Testing and Enforcement of Regulations – Path Forward: Draft. 2007.

enforcement, confusion persisted among some internal interviewees. These interviewees remark that this current approach is disjointed and could be streamlined to function more effectively, while other interviewees suggest that the ambiguity is a result of the different disciplines and cultures underlying the testing and enforcement functions.

- Other Environment Canada interviewees disagree, saying that there is no ambiguity about where the role of regulatory operations and testing ends and where the role of enforcement begins, particularly given the existence of the protocol. Some Enforcement interviewees express concern over the legal implications (i.e., loss of continuity of evidence) of joint engineering evaluations. Some enforcement interviewees add that information received by the Enforcement Branch from other sources indicates that non-compliant off-road vehicles and engines are being imported into Canada.
- External stakeholders such as industry associations cite a lack of clarity of roles and responsibilities within Environment Canada once the regulatory development phase is complete. For example, industry associations representing regulatees of vehicles and engines state that they do not have a clear breakdown of who is responsible at Environment Canada for answering ongoing implementation questions and issues or an Environment Canada contact list.
- Both Environment Canada staff and industry interviewees note that the department's responsibilities in the area of compliance promotion are not being fully realized, in the sense that compliance promotion activities need to be more proactive in regulatee education, especially in the case of the off-road engine emission regulations. Internally, regulatory administration has not populated the regulatee list for the *Off-Road Small Spark-Ignition Engine Regulations*, precluding the department's ability to carry out outreach and education activities. Manufacturers of small on-road vehicles (i.e., motorcycles) were also identified through interviews as being in need of more education in order to ensure a high level of compliance.

Evaluation Issue: Design and Delivery of key stakeholders considered during regulatory development	**Indicator(s)**	**Rating**
7. To what degree were the interests of key stakeholders taken into consideration in the development and implementation of the regulations?	▪ Involvement/engagement of relevant stakeholders in the development of the regulations ▪ Evidence that stakeholder views were reflected in the development and implementation of regulations	Achieved

Detailed Findings:

Stakeholder Groups

- The key stakeholders for this set of regulations are other federal and provincial/territorial departments, the fuel, automotive, and engine industries, and non-governmental organizations. In Canada, responsibility for the management of air

issues is shared by the Government of Canada and the provinces and territories.[56] While other government departments and provinces are interested primarily in issues concerning shared responsibilities and jurisdictions as well as avoiding any duplication of effort, industry interests centre on minimizing the economic burden of regulatory initiatives, and non-governmental organizations are interested in achieving the highest level of environmental protection.

Consultation with Stakeholders

- The evaluation finds that the interests of key stakeholders were taken into consideration in the development and implementation of the regulations. The Environment Canada process of regulatory development requires a public consultation period for stakeholders to respond to the publication of the proposed regulation in the *Canada Gazette*, Part I. Revisions are then made to the regulations based on the comments received from stakeholders, and consultations continue throughout the regulatory development process. Stakeholder views regarding how the implementation of the regulations would occur were taken into account while the regulations were being developed, but there is no formal requirement to consider stakeholder views once the regulations enter the implementation stage.

- The document review indicates that Environment Canada has placed emphasis on stakeholder consultation. Policy documents, such as Our Commitment to Effective Consultations*,* include checklists for managers to use in the various stages of the consultation process during the regulatory development phase.[57] The Environment Canada Regulatory Development and Approval Process Manual also includes a description of how stakeholder consultations should take place.[58]

- Interview findings (internal and external stakeholders) and the document review (including the Regulatory Impact Analysis Statements) confirm that Environment Canada's regulatory development process for these regulations included rigorous engagement of external stakeholders, including other government departments, provincial authorities, industry organizations, and other non-governmental organizations.

- The provincial and territorial governments were consulted and agreed to a harmonized national approach to the regulation of smog-causing emissions in the transportation sector. There is overlap in the jurisdiction of the provinces and territories and the federal government in the area of emissions in the transportation sector; however, through consultations with the Canadian Council of Ministers of the Environment, the provinces/territories decided upon the creation of a harmonized national approach as the most efficient and effective means of achieving the desired outcomes. In 1995, the Council endorsed the Final Report of the Task Force on Cleaner Vehicles and Fuels*,* leading to the endorsement of the Canada-Wide Standards for Particulate Matter (PM) and Ozone in June 2000. The Canada-Wide

[56] Environment Canada. Clean Air Online: Activities to Reduce Smog. http://www.ec.gc.ca/cleanair-airpur/Pollution_Issues/Smog/Activities_to_reduce_Smog-WS157B1974-1_En.htm.

[57] Environment Canada. Our Commitment to Effective Consultations, 24-32.

[58] Environment Canada. 2001. Regulatory Development and Approval Process Manual*,* 10.

Standards rest on the principle that responsibilities be assumed by the best-situated order of government.[59]

- The expert reviewer notes that being able to reach a consensus with the provinces and territories through the Canadian Council of Ministers of the Environment was important in avoiding fragmentation among the various governments. In terms of industry support, the expert reviewer is of the view that "industry's support in the latter phases of the sulphur in diesel fuel regulations was markedly better than for the initial period that saw an aggressive lobbying effort against the sulphur in gasoline regulations by industry. Industry stakeholders learned lessons from the experience and made a deliberate effort to engage regulators more constructively on subsequent issues, most notably the work on air emissions from refineries".

Evaluation Issue: Design and Delivery Exploration of alternative and complementary tools	**Indicator(s)**	**Rating**
8. To what degree were alternative ways of achieving the objectives of the regulations considered? Were other tools used to complement the use of regulations?	▪ Evidence of analysis of alternative solutions to the use of regulations ▪ Opinions of stakeholders as to how the use of other tools could have minimized the regulatory burden	Achieved

Detailed Findings:

Regulatory Standards

According to the Regulatory Process Management Standards appended to the 1999 Regulatory Policy, "[a]lternative regulatory solutions must also be analyzed to ensure the most effective and efficient is chosen".[60] This requirement was fulfilled by Environment Canada through an assessment of the options prior to a regulation being selected as the appropriate policy instrument. A section of each Regulatory Impact Analysis Statement summarizes this assessment and generally includes a review of the status quo scenario as well as various alternatives to regulating.

Consideration of Alternatives to the Regulatory Approach

- Documentation and interview findings both confirm that alternative approaches and tools for achieving the environmental objectives of the regulations, such as voluntary and financial measures, were adequately considered in the Regulatory Impact Analysis Statement for each of the regulations in this suite before the decision was made to pursue regulations, which are widely regarded by internal interviewees as the most appropriate tool.

[59] Environment Canada. Interim Plan 2001 on Particulate Matter and Ozone. www.ec.gc.ca/cleanair-airpur/CAOL/air/interim2001/minister_e.html.

[60] Government of Canada. 1999. Government of Canada Regulatory Policy, 10.

- Initially, a voluntary approach and memoranda of understanding were utilized to control the level of sulphur in on-road diesel fuel. This approach was unsuccessful as it resulted in an unlevel playing field within industry. A review of documentation shows that the refining industry was in favour of regulations, since regulations would level the playing field and would remove any competitive advantage/disadvantage.[61]

- External stakeholders interviewed (i.e., provinces and industry associations) also agreed that regulations were the most appropriate tool for this issue and were necessary in order to achieve a level playing field.

    - As such, no other major tools have been put in place by Environment Canada to date to accompany these five regulations. However, several smaller complementary programs are housed within the department and they work towards objectives similar to those set out in the regulations. First, the Let's Drive Clean Program provided voluntary vehicle emission inspection clinics across the country. Secondly, vehicle scrappage programs aimed at permanently removing older, high-emitting vehicles from Canadian roads are already in place at the provincial level, with a federal program expected to be launched soon. The federal regulations for new vehicles are noted as being complementary to some provincial programs for in-use vehicles.[62]

- Although economic instruments (such as trading systems or fiscal measures) were identified in the various Regulatory Impact Analysis Statements as a possible means of achieving the goals of these regulations, with the exception of the *On-Road Vehicle and Engine Emission Regulations*, economic instruments were not selected because they were determined, for a variety of reasons, to be unsuitable in the specific context of each regulation. In the case of the *On-Road Vehicle and Engine Emission Regulations,* provisions for the generation of nitrogen oxides emission credits and the trading of such credits between companies, as a mechanism for compliance flexibility, were included. Limited trading, however, has taken place under these regulations.

- In looking to the future, the expert reviewer queries whether there is an emerging need for emission inspection clinics (federal, provincial, or private) or other means of assessing the actual in-service life of the new emission control systems that vehicle manufacturers have adopted to meet the emission regulations (their lifespan may be affected by fuel additives, driving practices, etc). Data gathered from ongoing emission clinics could be used to inform other fleet emission management strategies.

[61] Office of the Auditor General. 2000. Smog–Our Health at Risk. Chapter 4 of the Report of the Commissioner of the Environment and Sustainable Development.

[62] As the focus of this evaluation was on the suite of regulations, the list of complementary programs is not exhaustive; it is rather a sample of the primary program activities that have an objective similar to the regulations.

Evaluation Issue: Design and Delivery Comprehensive monitoring and reporting system in place	**Indicator(s)**	**Rating**
9. Was a comprehensive monitoring and reporting system in place to capture and share pertinent information?	▪ Presence of performance measurement systems and population of data into systems ▪ Use of performance information in reporting and decision making at a functional and board level	Progress made, attention needed

Detailed Findings:

Regulatory Requirements

- The Government of Canada Regulatory Policy (1999) provides only a general reference to performance monitoring and reporting. Regulatory authorities are responsible for:
    - o reviewing their performance and reporting to their senior management on how they have met the Management Standards; and
    - o reporting on results of the regulatory plans in the annual Departmental Performance Reports (DPR) to Parliament.[63]

Performance Measurement/Monitoring

- The document review indicates that a logic model, performance indicators, and a performance measurement strategy were developed for programming funded under the Ozone Annex. In 2005, a compliance promotion and enforcement framework was developed for off-road small and large spark-ignition engine emissions. This framework identified elements of a logic model.

- Currently, the performance measurement and monitoring of these regulations are housed within the individual regulatory program areas. Each program area measures and tracks different aspects of the implementation of the regulations.

- The performance information tracked by the various branches and groups responsible for implementing the regulations is identified below.

    1) Environmental Stewardship Branch, Energy and Transportation Directorate, Compliance, regional offices

    - o **Fuels:** Annual reporting of sulphur content in fuels is submitted by the regulatees to Environment Canada. These results are posted on the CEPA Environmental Registry website in the Sulphur in Liquid Fuels report, which is produced annually.
    - o **Vehicles:** Fleet average nitrogen oxides levels by vehicle model are reported to Environment Canada. A summary of these results is also posted on the

[63] Government of Canada. 1999. Government of Canada Regulatory Policy, 4.

CEPA Environmental Registry website.

- **Vehicle/Engine Testing Facility:** A series of tests on selected models of vehicles and engines, measuring levels of the various smog-causing emissions (nitrogen oxides, volatile organic compounds, carbon monoxide, and particulate matter) under different driving conditions and temperatures, is conducted at the Environmental Science and Technology Centre. The results of these tests are not published on the CEPA Environmental Registry but are reported back to the lead program area.

- According to some Environment Canada staff, the Compliance Promotion Database remains under-utilized for these regulations. The database operated by the compliance promotion group currently contains only relevant enforcement information concerning these regulations. Efforts are underway to expand this database into an integrated tool that more program lead areas could utilize in tracking the performance and compliance of their regulations in a coordinated manner.

2) Science and Technology Branch, Science and Risk Assessment Directorate

- The Criteria Air Contaminants Emissions Summaries, which summarize the trends of various smog-causing emissions over time, are produced by the data collection group of the Science and Technology Branch. A review of documentation found that the Criteria Air Contaminants (CAC) inventory is a relevant reporting mechanism because it reports on the main smog-causing emissions (in tonnes) for Canada from 1990 onwards. The information provides a breakdown by sector, including the transportation sector.[64] This information indicates that total emissions from regulated vehicles and engines are forecast to decline over the coming years as a result of the regulations. Environment Canada staff reports, "[w]hile these trends may not be outlined in a formal report describing the progress of the regulations, the positive trends are often highlighted in correspondence, and presentations given by the department in various fora".

3) Enforcement Branch, headquarters and regional offices

- The Enforcement Branch uses its NEMISIS database to track enforcement actions taken on the regulations it is responsible for enforcing. Enforcement actions made under the *Canadian Environmental Protection Act, 1999* are posted on the CEPA Environmental Registry website. Enforcement information posted on the registry pertains to the sulphur in fuels regulations.

Reporting on Performance

- The Reports on Plans and Priorities (RPP) from 1999–00 through 2007–08 provide information to the Canadian public on regulatory initiatives planned for the coming

[64] www.ec.gc.ca/pdb/cac/Emissions1990-2015/2006/2006_canada_e.cfm.

year.[65] From 2003–04 onwards, a section containing updates on planned regulatory initiatives was included.

- The Departmental Performance Reports of 2004–05 and 2005–06[66] provide information to the Canadian public on the implementation of the regulations.
- Information on the status of the deliverables under the fuels and the vehicle and engine emission regulations were reported to the Environmental Protection Board.

Evaluation Issue: Design and Delivery Resource allocations and expenditures reflect regulatory needs	**Indicator(s)**	**Rating**
10. Did the resource allocations and expenditures reflect needs of the regulatory spectrum (e.g., development, implementation, compliance promotion, enforcement, and monitoring)?	▪ Funding was based on areas of greatest need	Progress made, attention needed

Detailed Findings:

Regulatory Requirements

- The Regulatory Policy generally requires that "[s]ystems are in place to manage regulatory resources effectively". Specifically, the policy identifies the enforcement function only with respect to resources, in that regulatory authorities must ensure that "…resources have been approved and are adequate to discharge enforcement responsibilities effectively and to ensure compliance where the regulation binds the government".[67]

Resources Allocated and Tracking of Resources

- Although an approximate high-level summary of total yearly budget and expenditures between 2000–01 and 2007–08 was available, there were some gaps in the available financial information.
    - There was a breakdown of initial departmental budgets and final expenditures made in the lead project areas of fuels and vehicle and engine emissions, including regulatory development, administration, vehicle and engine testing, and research, but no information on final budget allocation was available.[68]
    - There was initial departmental budget information but no final budget allocation or expenditure information available for other aspects of the program (i.e., compliance promotion and enforcement), with the exception of some enforcement expenditure information on the fuels regulations from 2006–07.

[65] Environment Canada. Reports on Plans and Priorities. http://www.ec.gc.ca/rpp/index_e.htm.

[66] Environment Canada. Departmental Performance Reports. http://www.ec.gc.ca/dpr/index_e.htm.

[67] Government of Canada. 1999. Government of Canada Regulatory Policy, 4.

[68] Refer to section 2.6 of this report for details.

  - Without information on how much funding was received relative to the amount budgeted, no definitive conclusion can be reached regarding the allocation and use of funds. When asked, staff suggested that departmental restructuring and changing of financial codes contributed to these gaps in the financial system.

- The regulatory process is managed by component: regulatory development and approval; implementation of regulations (administration, monitoring, compliance promotion, and enforcement); and post-implementation evaluation/lifecycle analysis. At the level of the lead program areas, the resources allocated for this suite of regulations are organized under the Energy and Transportation Directorate of the Environmental Stewardship Branch. However, resources that were allocated to Compliance Promotion and to Enforcement under the Ozone Annex are not tracked by these two groups by regulation.

Resource Requirements

- Internal interviewees are of the view that resource allocations and expenditures did not fully reflect the needs of all phases of the regulatory spectrum and have placed limits on the ability of staff members to carry out their responsibilities, particularly in the areas of implementation (specifically, administration, monitoring, and enforcement).

  - Given current resource levels, in the case of the *Off-Road Small Spark-Ignition Engine Emission Regulations*, the large number of potential regulatees as well as the increasing proportion of overseas imports has limited Environment Canada's ability to administer and monitor the regulations effectively.

    - Environment Canada interviewees acknowledge that additional resources, including FTEs being granted to the department under the Clean Air Regulatory Agenda beginning in 2007–08 and continuing through 2010–11, will assist in addressing, in particular, the challenges faced in the implementation and administration of the off-road regulations.

  - At the time the evaluation was conducted, additional funding of the enforcement function was being sought in part to address the need for increased inspections and investigations of the current vehicle and engine emission regulations.

  - The expert reviewer notes that very significant resources were allocated to the development and implementation of the regulations, including construction of the new vehicle testing facility, and that these resources were a key factor in the success of the regulations of new vehicle and engine emissions.

4.3 Lessons Learned

Evaluation Issue 3: Lessons Learned
The identification of best practices and lessons learned to improve the effectiveness, design, and delivery of current regulatory initiatives in the transportation sector and, if applicable, of other regulatory initiatives.

Evaluation Issue: Best Practices and Lessons Learned	Indicator(s)	Rating
11. What are the best practices and lessons learned which are applicable to current regulatory initiatives in the transportation and other sectors?	▪ Identified lessons learned and best practices for each phase of regulation: development, implementation, compliance promotion, enforcement and monitoring ▪ Factors/challenges that contribute to/detract from the achievement of results	Not Applicable

Overall Findings:

- The lessons learned identified during this evaluation can be grouped into issues that pertain to either the regulatory development phase or the regulatory implementation phase (including administration, monitoring, compliance promotion/testing, and enforcement) of the regulatory process.
- Exemplary practices include the alignment of the regulations with those of the U.S. Environmental Protection Agency, the external communication and consultations undertaken by the developers of the regulations, and the careful wording of the regulations to ensure their enforceability.
- Under the regulatory implementation and monitoring phase, one best practice identified includes the creation of a coordinating mechanism, the Fuels Regulations Working Group, as a means of supporting internal communications and monitoring of the progress of the sulphur in fuels regulations.
- In terms of areas that need improvement, the key lessons learned include the importance of an integrated performance monitoring system and of strong internal coordinating mechanisms, the need to improve the clarity of roles and responsibilities for the vehicle/engine emission regulations, and the requirement for financial information to determine the adequacy of resources allotted to implement the off-road vehicle and engine emission regulations.

Detailed Findings:

1) Regulatory Design and Development

a) ***Federal/provincial alignment:*** According to the expert reviewer, an important factor in the success of these regulations was "the support of all provinces and other federal departments for a single national standard for smog emissions from vehicles to be established through federal regulations. This agreement, developed through the Canadian Council of Ministers of the Environment, was required to support a strong negotiating position with the industry and to ensure a level playing field within Canada. Federal and provincial/territorial alignment enabled the Government of Canada to align its regulations with the U.S. national regulations. The CCME process was important in avoiding federal/provincial/[territorial] fragmentation."

b) ***Canada/U.S. alignment:*** Both interviewees and the expert reviewer identified the alignment of Canadian regulations for vehicle and engine emissions with those of the United States strategy as important and appropriate for a number of reasons.[69]

1) The regulations deal with products (fuels and engines) which flow across national borders.

2) The alignment of the fuels and of the vehicle and engine emission regulations facilitated a level playing field for industry. Because of the integrated nature of the vehicle and engine industry in Canada and the United States and because the standards adopted by the U.S. Environmental Protection Agency are some of the most stringent in the world, these regulations provide a high level of national environmental performance. The majority of all interviewees agreed that alignment with the United States was a major factor in the success of the regulations in terms of process (information sharing/coordination) and overall effectiveness (competition/environmental outcomes).

3) Canada was able to build on the research that had been conducted by the United States and, as recent experience shows, the United States can benefit from having a partner like Canada conduct aligned but distinct operations and share the results of the operations/research.

c) ***Stakeholder consultation:*** This suite of regulations was characterized by early inclusion, good information sharing, and extensive dialogue with external stakeholders during the regulatory development phase. The majority of all interviewees were satisfied with the level of stakeholder engagement in the development of the regulations. The document review and the media scan both confirm that there was ample opportunity for stakeholders, such as industry representatives, provincial authorities, and other federal government departments, to participate in the regulatory process, which facilitated a positive atmosphere of dialogue.

The expert reviewer notes that "…the limited number and scope of unintended outcomes reflects well on the care taken during the consultation and design work. Examples of the custom work required to address Canadian realities range from the pipeline issues mentioned in the draft report to the challenges of fuel distribution and storage in Northern communities that are re-supplied only during short summer shipping seasons."

The literature review of best practices indicates that stakeholder involvement in the regulatory process improves the quality of the regulation by providing an additional source of important data and by subjecting the resulting analysis to critical assessment, helping to identify poor assumptions, faulty reasoning, and unanticipated effects. Reports by the California Air Resources Board and the California Environmental Protection Agency and the Organisation for Economic

[69] The alignment of regulations with other jurisdictions may not always be appropriate. For examples of guiding principles, refer to Government of Canada. Policy Research Initiative. 2003. Convergence Analytical Framework for Evaluating Canada/U.S. Environmental Performance. Policy Research Initiative - Robowtham.

Co-operation and Development suggests that the Canadian system is exemplary with regard to this criterion.[70]

d) ***Clear wording of the regulations:*** Both Environment Canada interviewees and the expert reviewer highlight the importance of the wording of the regulations. The fuels and the vehicle and engine emission regulations used wording that was clear, precise, measurable, and enforceable yet workable. The wording and the design of the regulations ensured that the regulations would not generate an unnecessary burden for the regulatees (i.e., asking only for essential information) and balanced many needs, including political factors. Further, the wording of the regulations is essential to their proper implementation, especially when monitoring results.

2) Regulatory Implementation and Monitoring

a) ***Strong internal teamwork:*** Environment Canada interviewees also point to the role of mechanisms that coordinate all phases of the regulatory process such as the Fuels Regulations Working Group.[71] The majority of interviewees were satisfied with the Fuels Regulations Working Group, whose members, including representatives from the regions as well as headquarters, worked and communicated very well with each other in the development of the regulations and preparation of reports. This was viewed as an effective way to coordinate regulatory work through good communication and information sharing.

b) ***Fragmented performance and financial information*****:** Performance measurement and monitoring are important in gauging the level of success of the regulations and in demonstrating accountability and effective stewardship of public funds. Current performance measurement and monitoring systems report on the individual aspects of the regulatory program, thus providing a fragmented view of the regulatory program. This fragmented approach inhibits the ability to tell the full performance story and resource requirements of the program and how the story and requirements relate to other strategic outcomes of the department.

Some interviewees suggest that less activity was undertaken in the implementation and enforcement of the vehicle and engine emission regulations than could have been had resources and staffing been at a higher level. The Enforcement Branch in particular cites an insufficient number of Intelligence and Enforcement Officers. This lack of staff prevented the branch from being more proactive and strategic in its work. In order to determine the level of the resources needed (i.e., financial as well as human), information needs to be shared among the regulatory phases and budgets, and expenditures need to be tracked in a centralized manner.

---

[70] California Air Resources Board and the California Environmental Protection Agency. 2006. A Post Regulatory Evaluation of the Cost and Economic Impact Estimates of Air Pollution Control Regulations.

Organisation for Economic Co-operation and Development. 2002. Government Capacity to Assure High Quality Regulation in Canada. http://www.oecd.org/dataoecd/47/42/1960472.pdf.

[71] Environment Canada interviewees note that one of the reasons the working group worked was that it involved a critical mass of related regulations.

c) ***Ambiguity concerning the internal coordination of the vehicle and engine emission regulations:*** While for the most part, good internal communication and coordination were the norm throughout the development of these regulations, a small number of the interviewees believed that the relationship between enforcement and testing under the vehicle and engine emission regulations needed improvement. Despite the existence of a protocol which establishes the criteria and process for transferring files to enforcement, some interviewees suggest that there was inadequate communication/relationship between testing and enforcement (i.e., testers are in effect assisting in inspections, while the Enforcement Branch cannot do inspections unless it receives a referral from the testing facility). A minority of interviewees suggested that there was a lack of understanding of the roles and responsibilities of the Enforcement Branch. For example, there were concerns relating to whether or not the Enforcement Branch should be notified immediately when there is an issue of non-compliance, which, as has been suggested, could have legal ramifications. However, in the case of the vehicle and engine emission regulations, testing is an extremely technical and complex undertaking, and cases of potential non-compliance are verified jointly with the manufacturer through joint engineering evaluations with the testing facility.

The expert reviewer notes that there is a need for strong internal teamwork amongst policy, program design, legal, communications, regional, and operational personnel at headquarters. Core competencies for the regulatory team must include the development of effective working relationships with other specialized members of the regulatory team.

4.4 New Regulatory Requirements: The Cabinet Directive on Streamlining Regulations

In April 2007, the Cabinet Directive on Streamlining Regulation (CDSR) replaced the 1999 Regulatory Policy. The CDSR introduces a more comprehensive management approach that includes clear requirements for the development, implementation, evaluation, and review of regulations. It emphasizes the importance of taking a lifecycle approach to managing regulatory programs and the need to support strategic decision making and to drive continuous improvement with evidence-based performance information. In particular, departments are required to:
a) identify the intended results of regulation and time-based performance indicators for significant regulatory activities;
b) take measures to ensure that monitoring and reporting activities are effective while imposing the least possible burden on government, business, and Canadians;
c) integrate performance measures that can be used to adjust compliance plans; and
d) collect performance information on the results of existing regulations.

The CDSR also specifies that departments are required to evaluate regulatory programs in accordance with the Treasury Board of Canada Secretariat Evaluation Policy.

5.0 CONCLUSIONS

Overall, the fuels and the vehicle and engine emission regulations examined have achieved or are on the way to achieving the intended environmental outcomes. The regulations are relevant to departmental and government-wide policies and requirements, and are well designed and supported by stakeholders. Some concern remains over the roles of the testing and enforcement personnel in implementing the off-road engine emission regulations. Performance measurement and financial information exists in pockets and provides a disjointed rather than a comprehensive view of the environmental performance of the regulations and the associated resource costs and requirements. The Cabinet Directive on Streamlining Regulations, which took effect after the fuels and the vehicle and engine emission regulations were in place, sets out important directions which apply to amended regulations and serves to strengthen the management of any regulatory program. As a result, the Cabinet Directive serves to focus the following recommendations.

6.0 RECOMMENDATIONS

Five recommendations are directed to the Environmental Protection Board for management response.

1. **In light of the changing nature of the vehicles and engines industry, re-assess existing compliance and enforcement strategies.**

   a. Consider if there is an emerging need for emission inspection clinics (federal, provincial, or private) or other means to assess the actual in-service life of the new emission control systems that vehicle manufacturers have adopted to meet the emission regulations. Monitoring of emissions over time could help to determine whether technical and/or regulatory steps are needed to ensure that the systems operate well over time and to inform other fleet emission management strategies.

   b. The increase in the volume of imported products and the unknown identity of the regulatee community requires a shift in thinking from the traditional scenario where the regulatees are known and manageable in number. The challenges of compliance promotion targeting new manufacturers and assemblers from emerging Asian and other economies are shared by other federal departments and the United States. Since this challenge is shared with the United States, Environment Canada may have an opportunity to develop a North American strategy (i.e., Canada may be able to partner with the United States on off-shore compliance promotion). Such a strategy could be effective in obtaining environmental results as well as efficient in terms of sharing the costs of designing and implementing a strategy.

2. **Given the continued ambiguity in testing and enforcement, confirm and communicate the respective roles and accountabilities of the testing facility and enforcement groups to staff and external partners.**

   In order to establish the validity of the test results of vehicle and engine emissions, Environment Canada's testing group may need to conduct studies with industry counterparts. The specialized and technical work of the testing group needs to be undertaken in a way that does not compromise the requirements of enforcement officials, who need to document and prosecute infractions. Senior managers need to work through the underlying issues with representatives of the testing and enforcement groups to ensure that the practices of both groups are understood. Once established, this understanding needs to be communicated to staff and external partners.

   Mechanisms such as the working group introduced under the fuels regulations could be a useful model to foster an understanding of the objectives and practices of the testing laboratory and the enforcement personnel both at headquarters and in the regions.

3. Integrate the management of the fuels and the vehicle and engine emission regulations.

The regulations are currently managed on a phase-by-phase basis (i.e., development and approval of regulations, administration, compliance promotion, testing and enforcement of regulations, monitoring and reporting of the performance of regulations) and governed by three different boards (Environmental Protection; Strategic Integration and Departmental Management Services boards). While this approach is practical to implement, the question then becomes who is responsible for aggregating and analyzing the information from the separate phases of the regulatory process to the collective or sectoral program level and how could this be done. To support the integrated management of the regulatory program, the department could introduce coordinating mechanisms and processes. For example, the Chief Enforcement Officer could become a member of the Environmental Protection Board. Outcome Project Group leads could meet on a routine basis to assess the ongoing effectiveness, impact, efficiency and costs of the regulatory program and report this information to the boards for decision-making purposes.

4. Support integrated management of the fuels and the vehicle and engine regulations through the development of a logic model, performance measures, and financial information and monitoring systems.

In order to support the integrated management of the regulations, a logic model, performance measures, and means of collecting information should be developed and implemented to link together the different phases of the regulatory process, thereby providing an overarching picture of the management of regulations. Further, financial data on the budget and expenditures must be tracked and reported for all phases of the regulatory program. This information is essential to the ongoing evaluation and performance monitoring of the program to ensure accountability and good stewardship of public funds, and, where necessary, to reallocate funds.

5. Share information, best practices, and lessons learned from this suite of regulations with Environment Canada personnel involved in other regulatory initiatives.

Given the department's work on these important and largely successful regulations, the growing nature of Environment Canada's regulatory agenda, and the reality of an aging workforce, an opportunity exists for senior regulatory personnel to transfer their knowledge and understanding of the lessons learned to new recruits. Potential strategies for the dissemination, use, and monitoring of lessons learned include talks and panel discussions involving senior officers, central agencies, other federal departments, and industry representatives who played key roles in the regulatory process and the development of case studies to promote learning. This transfer of information could be coordinated with the department's regulatory community, the Community of Federal Regulators, or the Canada School of Public Service. Topics which could be explored in talks, panel discussions, and case studies include principles governing alignment or non-alignment with other jurisdictions, how to engage stakeholders throughout the regulatory process, characteristics of well-designed regulations, core

competencies for regulatory team members, and how to capture the full performance story of regulatory programs.

7.0 MANAGEMENT RESPONSE

Recommendation 1 a): EP Board agrees

EP Board agrees that there is merit in considering possible measures to assess the in-use emission performance of vehicles.

The Transportation Division will initiate a feasibility study in 2008-09 to assess and develop potential measures that would support this objective. Implementation of in-use emission testing activities will be subject to the outcome of the study and the availability of resources. It is important to note that the Department's "Let's Drive Green" voluntary vehicle emission clinic program was terminated as a result of expenditure review in 2004-05.

Regulations currently require that vehicles and engines be designed to comply with emission standards for a defined "useful life" period (e.g. 10 years or 192,000 km for passenger cars). Experience indicates that the compliance rate of vehicles tested to the On-Road Vehicle and Engine Emission Regulations is high. Since the Regulations came into force in 2004, approximately 100 vehicles that have been tested under these Regulations with only one case of suspected non-compliance being referred to the Enforcement Branch.

Recommendation 1 b): EP Board agrees

EP Board agrees with the general objective of the recommendation and has already initiated and will continue steps towards its achievement.

As part of the Environment Canada – US Environmental Protection Agency Work Plan recently developed under the Canada/U.S. Air Quality Agreement, the development of a joint strategy has been initiated on emissions testing and compliance promotion to address the challenge of imported products from emerging Asian and other economies. Progress on the joint strategy will be reported at the fall meeting of the Canada-US Air Quality Committee. Environment Canada's contribution is being led by the Transportation Division.

In the shorter term, new CARA resource allocations received in 2008-09 are allowing the Department's Transportation Division to undertake testing of off-shore engines referred by Enforcement and to initiate proactive compliance testing and preliminary work with the US EPA. These new resources, along with CARA allocated for future years, provide a first step to begin addressing the challenges identified by this recommendation. In the longer term, it is recognized, however, that increased imports from emerging economies are still in the early stages, and will likely increase even further in the future which will continue to pose significant challenges.

Through the Commission for Environmental Cooperation's (CEC) Enforcement Working Group, to which the Environment Canada's Enforcement Branch is an active member, the Parties have begun the process of identifying noncompliant engines for receiving priority

attention in each country and have embarked on a pilot project to identify and respond to noncompliant imports through cooperation, information sharing and operational support. This pilot is intended to produce quick results and build on existing, enforceable standards for each country. The plan will enhance cross-border collaboration and add value to the respective enforcement efforts of each country. The outcomes of this project will be common threat identification, joint targeting, and coordination of enforcement efforts. This component is in a scoping phase during 2008. Future activities in 2009 and onward will be based on the outcome of the initial scoping effort. Renzo Benocci (National Director, Environmental Enforcement Directorate) is the lead on this project, while Yannick Pouret (Head, Intelligence section, Environmental Enforcement directorate) is the EC focal point.

Recommendation 2: EP Board agrees

EP Board agrees that it is desirable to enhance the communication of respective roles and accountabilities of the regulatory administration, testing facility and enforcement groups to staff and external partners.

Because these regulations are recent instruments that have been largely developed and administered by new staff and under-resourced until CARA resources are fully in place, roles may not have been communicated in a timely fashion. Measures have already been initiated and will be complemented with further actions to achieve the objective of the recommendation.

A step-by-step protocol for the operational management of cases that clearly outlines when a file should be transferred to Enforcement has been developed over the last year and agreed upon by the regulatory administration and enforcement groups. Efforts by the Transportation Division and Enforcement will continue to better communicate and implement this protocol in 2008-09 which will address the challenges identified in the recommendation.

A re-organisation of roles in the Department's Transportation Division was taking place at the time of the evaluation, a factor which contributed to a lack of clarity by external stakeholders on roles and responsibilities. Subsequently, a document clearly outlining the responsibilities and roles within the Transportation Division's regulatory functions on vehicles and engines was prepared and communicated to industry in early 2008.

The departmental Compliance and Enforcement Policy for the *Canadian Environmental Protection Act, 1999 (CEPA 1999)* clearly outlines the enforcement functions/core activities and the powers of enforcement officers. Measures will be undertaken towards ensuring that the regulated community is more broadly aware of the existence and content of this policy, for example through compliance promotion activities undertaken by the Transportation Division and other possible measures.

Recommendation 3: EP Board agrees

EP Board agrees that a coordinative mechanism could be introduced to better support the overall management of the regulatory program.

A Coordinating Committee will be created to bring together appropriate OPG/OPP's involved in the Program and Enforcement phases of the regulatory spectrum for the

vehicle and engine emission regulations. The Committee will meet periodically to support on-going assessment and monitoring of the transportation regulatory programs and to discuss approaches to address short term and long-term activities, including the issue of increased imports from emerging economies. The initial meeting of the Committee will take place in the fall of 2008.

Recommendation 4: EP Board agrees

EP Board agrees that the development of an integrated logic model and performance measures can support a more integrated approach to the management of these regulations. There are new performance measurement and performance standard requirements for new regulations within the Cabinet Directive on Streamlining Regulations (CDSR). These requirements will be considered when developing performance measurement plan and logic model for these regulations.

As the subject regulations are currently in place, the scope of the efforts would be on the administration, compliance promotion and enforcement activities for these regulations; however, outcomes and performance indicators determined for these regulations will link with the applicable strategic outcomes for the department. EP Board also agrees that it is desirable for the financial data on the budget and expenditures associated with the implementation of these regulations be tracked and reported for all phases of the regulatory spectrum.

The Coordinating Committee identified in the response to recommendation #3 will be an appropriate forum to facilitate these tasks, along with the support of the Department's Regulatory Innovation and Management Systems Division (identified as the centre of expertise for Performance Measurement under the CDSR). A logic model and appropriate performance measures will be completed by the end of 2008-09.

Recommendation 5: EP Board agrees

EP Board agrees with this recommendation and supports initiatives to share information, best practices and lessons learned from this suite of regulations. This has already been done in a number of cases, for example:

- "Case Study: The Sulphur in Gasoline Regulation" was presented at the March 2008 Conference on The Future of Strategic Evidence-Based Regulation;
- "Cost-Benefit Analysis Case Study on Regulations to Lower the Level of Sulphur in Gasoline" was the focus of discussion at the March 2007 TB/Health Canada Seminar
- "Sulphur in Gas Regs are Good Public Policy Case Study" has been presented a number of times at EC Environmental Policy Course (eg. by Barry Stemshorn, 2002/03)

EP Board will draw upon this expertise and, in 2008-09, will seek future opportunities to share information on best practices and lessons learned on vehicle, engine and fuel regulations through its internal Regulatory Affairs and Learning community. Other venues for information sharing will also be explored in the broader regulatory community such as the Community of Federal Regulators and the Treasury Board Center of Regulatory Expertise.

Annex 1
Emission Standards by Regulation

Regulations	Code	Purpose of Regulation	Smog-Related Substances	Emission Standards and Date of Entry into Force
Sulphur in Gasoline	SOR 99-236	To specify sulphur content limits for gasoline that is produced or imported for use in Canada and for gasoline that is sold or offered for sale.	Fine particulate matter (PM_{10}), sulphur dioxide (SO_2), nitric oxide (NO), nitrogen dioxide (NO_2)	The regulations limit sulphur in gasoline to an average level of 30 mg/kg, with a never-to-be-exceeded maximum of 80 mg/kg, commencing January 1, 2005.
Sulphur in Diesel Fuel	SOR 2002-254	To ensure that the amount of sulphur in diesel fuel used in on-road vehicles in Canada will not impede the effectiveness of stringent exhaust emission standards to be introduced in 2007.	Fine particulate matter (PM_{10}), sulphur dioxide (SO_2), nitric oxide (NO), nitrogen dioxide (NO_2)	Reducing the maximum allowable limit for sulphur in on-road diesel fuel to 15 mg/kg of fuel, equivalent to 15 parts per million (ppm), commencing June 1, 2006.
On-Road Vehicle and Engine Emission	SOR 2003-2	To establish smog-forming air pollutant emission standards for various categories of on-road vehicles and engines manufactured in or imported into Canada, in alignment with those of the U.S. Environmental Protection Agency.	Fine particulate matter (PM_{10}), oxides of nitrogen (NO_x) (nitric oxide (NO) and nitrogen dioxide (NO_2)), ozone (O_3), volatile organic compounds	The regulated substances in the exhaust emission standards (measured in grams per mile, converted into kilometres) are oxides of nitrogen (NO_x), non-methane organic gases, carbon monoxide (CO), formaldehyde, and particulate matter (PM).[72] The regulations came into force on January 1, 2004.
Off-Road Small Spark-Ignition Engine Emission	SOR 2003-355	To establish smog-forming air pollutant emission standards for various categories of off-road small spark-ignition engines manufactured in or imported into Canada, in alignment	Fine particulate matter (PM_{10}), oxides of nitrogen (NO_x) (nitric oxide (NO) and nitrogen dioxide	The regulations came into force on January 1, 2005, and apply to off-road engines of model year 2005 and later that use sparkplugs and develop no more than 19 kW (25 hp) of power. The emission

[72] Date of entry into force:

- Tier 2 standards: 2004–2007 model years for light-duty vehicles and light light-duty trucks.
- Tier 2 standards: 2004–2009 model years for heavy light-duty trucks and medium-duty passenger vehicles.
- Phase 1 standards: 2005 for complete heavy-duty vehicles; 2004–2006 model years for heavy-duty engines.
- Phase 2 standards: 2008–2009 model years for complete heavy-duty vehicles; 2007–2010 for heavy-duty engines.

Regulations	Code	Purpose of Regulation	Smog-Related Substances	Emission Standards and Date of Entry into Force
		with those of the U.S. Environmental Protection Agency.	(NO_2)), ozone (O_3), volatile organic compounds	standards are divided into seven classes based on engine displacement and usage in either a handheld or non-handheld application. The regulations establish a maximum level of carbon monoxide emissions and combined emissions of hydrocarbon and oxides of nitrogen for each engine class. These standards are defined as mass of pollutant per unit of engine work expressed in grams per kilowatt-hour (i.e., brake-specific emissions). Emission reductions and commensurate benefits: by 2025, the regulations will result in a 44% reduction in combined emissions of hydrocarbons and oxides of nitrogen, which can be translated in terms of health impacts and environmental damages avoided.[73]
Off-Road Compression-Ignition Engine Emission	SOR 2005-32	To establish smog-forming air pollutant emission standards for various categories of off-road compression-ignition engines manufactured in or imported into Canada, in alignment with those of the U.S. Environmental Protection Agency.	Fine particulate matter (PM_{10}), sulphur dioxide (SO_2), oxides of nitrogen (NO_x) (nitric oxide (NO) and nitrogen dioxide (NO_2)), ozone (O_3), volatile organic compounds	The regulations came into force on January 1, 2006. Maximum levels of carbon monoxide, of fine particulate matter, and of non-methane hydrocarbon and oxides of nitrogen combined have been established under the regulations for engine power ranges. Emission standards for the three regulated substances are regulated through maximum allowable emissions expressed in grams per kilowatt-hour. The standards vary depending on the engine power and the tier, tier 3 being the strictest emission standards.[74]

[73] Date of entry into force: Depending on engine class; 7/7 classes: 2005 and later; some exceptions on 2/7 classes: 2006, 2007, and later models.

[74] Date of entry into force: Tier 2, 2006, 2007, and later; Tier 3, 2006, 2007, 2008, and later, depending on engine class.

Annex 2
Evaluation Issues and Questions

Question	What is to be observed	Indicators
Effectiveness – The extent to which the regulations achieved their intended outcomes		
1. To what degree did the regulations achieve their intended environmental results?	▪ Regulations set out environmental objectives/targets.	▪ Evidence of the achievement of intended short-term and long-term environmental results
2. What were the related economic and/or societal impacts of the regulations?	▪ Regulatory Impact Analysis Statement analyzes the potential impacts of regulations.	▪ Evidence of the positive or negative impact of regulations on the economy and society
3. Have there been any unintended (positive or negative) outcomes? Were any actions taken as a result of these impacts?	▪ Unintended outcomes are present and can be attributed to the transportation regulations. ▪ Where appropriate, actions taken to address unintended impacts.	▪ Presence/absence of unintended impacts
4. What external factors (outside of the regulations), either positive or negative, influenced the achievement of environmental and economic outcomes?	▪ Factors outside of the regulatory process can have an influence on the achievement of outcomes.	▪ Evidence of factors outside of the regulatory process which have influenced the achievement of intended outcomes
Design and Delivery – The extent to which the regulations were designed and delivered in the most appropriate way.		
5. To what extent have the regulations fulfilled the policies and requirements of the Government of Canada and the department?	▪ Regulations are consistent with federal regulatory policies.	▪ Evidence that the regulations are or are not consistent with Government of Canada requirements
6. Who is accountable for the regulations? Are the roles and responsibilities of all groups involved clear and implemented?	▪ Roles, responsibilities, and accountabilities are clearly established and implemented.	▪ Evidence of a defined and applied management structure for the development, implementation, and monitoring of regulations
7. To what degree were the interests of key stakeholders taken into consideration in the development and implementation of the regulations?	▪ Regulations reflect the interests of stakeholders.	▪ Involvement/engagement of relevant stakeholders in the development of the regulations. ▪ Evidence that stakeholder views were reflected in the development and implementation of regulations

Question	What is to be observed	Indicators
8. To what degree were alternative ways of achieving the objectives of the regulations considered? Were other tools used to complement the use of regulations?	▪ Alternative regulatory solutions must be analyzed to ensure that the most effective and efficient solution is chosen.	▪ Evidence of analysis of alternatives to the use of regulations. ▪ Opinions of stakeholders as to how the use of other tools could have minimized the regulatory burden
9. Was a comprehensive monitoring and reporting system in place to capture and share pertinent information?	▪ Performance data are collected against activities and outcomes. ▪ Performance data are used to make decisions.	▪ Presence of performance measurement systems and population of data into systems. ▪ Use of performance information in reporting and decision making at a functional and board level
10. Did the resource allocations and expenditures reflect needs of the regulatory spectrum (e.g., development, implementation, compliance promotion, enforcement, and monitoring)?	▪ Resources (salary, O&M, capital) are allocated based on areas of highest importance in the regulatory spectrum.	▪ Funding was based on areas of greatest need
Lessons Learned – The identification of lessons learned which could improve the effectiveness, design, and delivery of current regulatory initiatives in the transportation sector and, if applicable, of other regulatory initiatives.		
11. What are the lessons learned which are applicable to current regulatory initiatives in the transportation and other sectors?[75]	▪ Lessons learned can be transferred to other regulatory initiatives.	▪ Identified lessons learned and best practices for each phase of regulation: development, implementation, compliance promotion, enforcement and monitoring ▪ Factors/challenges that contribute to/detract from the achievement of results

[75] EQ 11 changed to "What are the best practices and lessons learned which are applicable to current regulatory initiatives in the transportation and other sectors?"

Annex 3
Key Documents: Background Information and Supporting Documentation

Document Title	Date (if known)	Format (e.g. hard copy, electronic, website)
Government of Canada Documents		
Government of Canada Regulatory Policy	November 1999	Electronic copy
Regulatory Process Management Standards	November 1999	Electronic copy
Framework for the Triage of Regulatory Submissions	31 May 2006	Electronic copy
Cabinet Directive on Streamlining Regulation	2007	Electronic copy
Implementing the Cabinet Directive on Streamlining Regulation: Performance Measurement	29 March 2007	Electronic copy
The Cabinet Directive on Streamlining Regulation (ppt)	18 May 2007	Electronic copy
Canadian Cost-Benefit Analysis Guide	1 July 2007	Electronic copy
Selected Toxic Substances Issues Status Report	February 2008	Electronic copy
Regulating Sulphur in Fuels, Environmental Petitions Chapter	February 2008	Electronic copy
Guidelines on International Regulatory Obligations and Cooperation		Electronic copy
Assessing, Selecting and Implementing Instruments for Government Action		Electronic copy
Privy Council Office Guidelines for Effective Regulatory Consultations		Electronic copy
Environment Canada Documents		
Toxic Substances Management Policy	1995	Electronic copy
EC: Our Commitment to Effective Consultations	1996	Electronic copy
ENVIRONMENTAL AGREEMENTS - Environmental Effectiveness	1997	Electronic copy
Canadian Environmental Protection Act, 1999	1999	Electronic copy
Sulphur in Gasoline Regulation	4 June 1999	Hard and electronic copies
Sulphur in Gasoline Regulatory Impact Analysis Statement	23 June 1999	Hard and electronic copies
Interim Plan 2001 on Particulate Matter and Ozone	2001	www.ec.gc.ca/cleanair-airpur/CAOL/air/interim2001/minister_e.html
Compliance and Enforcement Policy for the Canadian Environmental Protection Act, 1999	2001	Electronic copy
Regulatory Development and Approval Process Manual	March 2001	Electronic copy

Document Title	Date (if known)	Format (e.g. hard copy, electronic, website)
Federal Agenda on Cleaner Vehicles, Engines and Fuels	17 February 2001	Electronic copy
Sulphur in Diesel Fuel Regulations	17 July 2002	Hard and electronic copies
Sulphur in Diesel Fuel Regulatory Impact Analysis Statement	31 July 2002	Hard and electronic copies
On-Road Vehicle and Engine Emission Regulation	12 December 2002	Hard and electronic copies
On-Road Vehicle and Engine Emission Regulatory Impact Analysis Statement	1 January 2003	Hard and electronic copies
Off-Road Small Spark-Ignition Engine Emission Regulations	6 November 2003	Hard and electronic copies
A Retrospective Analysis of the Cost Impacts on the Petroleum Industry in Canada of the Sulphur in Gasoline Regulation (DRAFT)	21 March 2003	Electronic copy
Published Costs of Meeting the Sulphur in Gasoline Regulations	May 2003	Electronic copy
The Sulphur in Gasoline Regulation – Post Cost Review (ppt)	August 2003	Electronic copy
Off-Road Small Spark-Ignition Engine Emission Regulatory Impact Analysis Statement	19 November 2003	Hard and electronic copies
Canadians' Attitudes and Opinions Toward Environmental Issues	2003	Electronic copy
Environment Canada Departmental Performance Reports	2003–04, 2004–05	www.ec.gc.ca/rpp/index_e.htm
Economic and Environmental Impacts of Removing Sulphur from Canadian Gasoline and Distillate Production	4 August 2004	Electronic copy
Sulphur in Liquid Fuels 2005 (Environment Canada- Environmental Stewardship Branch)	2005	Hard copy
Off-Road Compression-Ignition Engine Emission Regulations	8 February 2005	Hard and electronic copies
Off-Road Compression-Ignition Engine Emission Regulatory Impact Analysis Statement	23 February 2005	Hard and electronic copies
Formative Evaluation of CEPA 1999 – Fuels and Vehicles/Engines section	March 2005	Electronic copy
Compliance Strategy for Seven Fuels Regulations under the Canadian Environmental Protection Act, 1999	April 2005	Hard copy & Electronic copy
Compliance Promotion and Enforcement Framework - Regulatory Requirements and Resources: Off-Road Small (and Large) Spark-Ignition Engine Emission	June 2005	Hard copy & Electronic copy
Environment Canada Border Air Quality Survey	November 2005	Electronic copy
Draft Compliance Strategy	December 2005	Hard copy & Electronic copy
Qualitative Screening of Management Tools (QSMT) Methodology	March 2006	Electronic copy

Document Title	Date (if known)	Format (e.g. hard copy, electronic, website)
Guidance on Performance Measurement for Compliance Promotion and Enforcement	8 May 2006	Electronic copy
Compliance Strategy for Seven Fuels Regulations	July 2006	Hard copy & Electronic copy
Sulphur in Liquid Fuels 2006	November 2006	Electronic copy
Compliance Promotion Information Package for the Seven CEPA 1999 Fuels Regulations	December 2006	Hard copy
Summary Table of Smog-related CEPA Measures	1 December 06	Electronic copy
Regulatory Framework for Air Emissions	April 2007	(http://www.ec.gc.ca/doc/media/m_124/report_eng.pdf)
Regulatory Process and Approvals Flowchart	11 April 2007	Electronic copy
Cost-Benefit Analysis Case Study on Regulations to Lower the Level of Sulphur in Gasoline	9 July 2007	Electronic copy
Fuels Regulations Enforcement Log 1998-2007	13 July 2007	Electronic copy
Transportation Regulations Expenditures 06/07	September 2007	Electronic copy
Vehicle Emissions Testing and Enforcement of Regulations – Path Forward: Draft	2007	Electronic copy
Overview of the Testing Program	1 May 2008	Electronic copy
Reducing Sulphur in Gasoline and Diesel Fuel — Case Study		Electronic copy
Priority Setting Compliance Promotion and Enforcement Work Planning over the Next 2 Years: Fiscal 2007-2008 and Fiscal 2008-2009		Hard copy & Electronic copy
FRWG Mandate and Terms of Reference		Hard copy
Level of Sulphur in Gasoline and Diesel Fuels (Environment Canada website: Clean Air Online)		Hard copy
Backgrounder: Industry Impacts of Alignment with US		Electronic copy
Ozone Annex RMAF		Electronic copy
CEPA Environmental Registry		http://www.ec.gc.ca/CEPARegistry/
Other Documents		
Enforcing Canada's Pollution Laws: The Public interest Must Come First! - The Government Response to the Third Report of the Standing Committee on Environment and Sustainable Development	October 1998	Electronic copy
Report of the Commissioner of the Environment and Sustainable	May 2000	Electronic copy

Document Title	Date (if known)	Format (e.g. hard copy, electronic, website)
Development (Office of the Auditor General) - Chapter 4: Smog – Our Health at Risk		
Organisation for Economic Co-operation and Development – Regulatory Reform in Canada	2002	Electronic copy
Organisation for Economic Co-operation and Development - Government Capacity to Assure High Quality Regulation in Canada	2002	Electronic copy
Organisation for Economic Co-operation and Development - Product Market Competition and Economic Performance in Canada	30 March 2005	Electronic copy
Comparing the Ex Ante and Ex Post Costs of Complying with Regulatory Changes	14 March 2006	Electronic copy
A Post Regulatory Evaluation of the Cost and Economic Impact Estimates of Air Pollution Control Regulations - California Air Resources Board and the California EPA	April 2006	Electronic copy
Organisation for Economic Co-operation and Development – Instrument Mixes Addressing Regional Air Pollution	2007	Electronic copy
Learning and Capacity Building for Environment Canada Regulators; Presentation to Strategic Integration Board	August 2007	Electronic copy
Environment Canada. 2003. Convergence Analytical Framework for Evaluating Canada / U.S. Environmental Performance. Canada/US. Environmental Performance. Government of Canada, Policy Research Initiative.	February 2003	Electronic copy
Evaluation Documents		
Audit and Evaluation Plan 2007-08 to 2009-10, Audit and Evaluation Branch	April 2007	http://www.ec.gc.ca/ae-ve/034D1A75-2B53-4F0E-BC4B-36704627C9FA/FinalAEPlan.doc
Evaluation Plan for the Smog-Causing Emission Regulations in the Transportation Sector – A Case Study Approach: Final, Audit and Evaluation Branch	October 2007	Hard copy

Annex 4
List of Interview Groups and Interview Guides

Interview Group	Interview Population	# of Refusals	# Completed
1A: Assistant deputy ministers/senior managers	3	0	3
1B: Directors/program staff	19	1	19
2: Federal partners/stakeholders	5	1	4
3A: Provincial stakeholders	3	1	2
3B: International stakeholders	2	0	2
4: Industry organizations	9	2	6
5: Non-governmental organizations	3	1	2
Total	**44**	**6**	**38**

EVALUATION OF SMOG-CAUSING EMISSION REGULATIONS IN THE TRANSPORTATION SECTOR INTERVIEW QUESTIONS – MASTER GUIDE

Introduction:

The Audit and Evaluation Branch of Environment Canada is conducting an evaluation of smog-causing emission regulations in the transportation sector. The purpose of this evaluation is to assess the effectiveness and design and delivery of the regulations as well as lessons learned.

The evaluation focuses on the following five regulations, which were developed under Environment Canada's (EC's) authority set out in the *Canadian Environmental Protection Act* (1999) and were to be guided by the Government of Canada's Regulatory Policy and attendant standards (1999):

- Sulphur in Gasoline Regulations (SOR 99-236);
- Sulphur in Diesel Regulations (SOR 2002-254);
- On-Road Vehicle and Engine Emission Regulations (SOR 2003-2);
- Off-Road Small Spark-Ignition Engine Emission Regulations (SOR 2003-355); and
- Off-Road Compression-Ignition Engine Emission Regulations (SOR 2005-32).

As one component of the research, we are conducting key informant interviews in order to obtain a range of perspectives from those who are or who have been involved in the regulations. The questions below serve to guide this interview process. In answering the questions, please specify which regulation(s) you are referring to. If you are unable to answer a specific question, please tell the interviewer and we will skip that question.

Introductory Question:

1. Please briefly describe the nature of your involvement/role with the smog-causing emission regulations in the transportation sector. How long have you been involved?

a) Which particular regulations have you been most involved with?

- Regulations related to fuels?
- Regulations related to vehicles and engines?

b) For these regulations, who are the primary stakeholders with whom you have been involved?

Effectiveness Questions:

2. You mentioned in Question 1 that you have been most involved with the following smog-causing emission regulations:
To the best of your knowledge, to what degree have these regulations achieved their specified emission standards and environmental targets? (See Annex 1) **(EQ1)**

a) Is the overall environmental target of a 90% reduction in emissions of sulphur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs), and particulate matter (PM) from new vehicles by 2010 as a dual result of the fuels and engines regulations on track to being achieved? Please explain why or why not. **(EQ1)**

b) To what extent have the smog-causing emission regulations for fuels, vehicles and engines contributed to: **(EQ1)**

- Environment Canada strategic outcomes?
- Board/Table-level outcomes?
- Government of Canada strategic outcomes?

3. To what degree have these regulations had any *economic* impacts, either positive or negative? Please describe. **(EQ2)**

- Costs to industry associated with the regulations?
- Impacts on employment and competitiveness of industry?
- Impacts on the price of fuel?
- Impacts on the price of engines and vehicles?
- Impacts on the agricultural or other sectors?
- Other economic impacts?

4. To what degree have these regulations had any other *societal* impacts, either positive or negative? Please describe. **(EQ2)**

   - Impacts on the incidence of health problems and premature mortality?
   - Impacts on healthcare costs?
   - Impacts on labour productivity?
   - Other societal impacts?

5. What external factors (outside of the regulatory process), either positive or negative, have influenced the achievement of the intended *environmental* outcomes of these regulations? **(EQ4)**

   a) What have been the impacts of these external factors?

   b) Were any actions taken to address the negative external factors? If yes, please describe.

6. What external factors (outside of the regulatory process), either positive or negative, have influenced the expected *economic impacts* of these regulations? **(EQ4)**

   a) What have been the impacts of these external factors?

7. Have these smog-causing regulations in the transportation sector had any unintended or unexpected impacts, either positive or negative? If yes, please describe. **(EQ3)**

   a) Were any actions taken to address these unintended impacts? If yes, please specify. **(EQ3)**

Design and Delivery Questions:

8. To what extent are the regulations consistent with federal regulatory policies and requirements (e.g., the Government of Canada Regulatory Policy, 1999)? **(EQ5)**

   a) To what degree are the regulations consistent with the requirements and priorities of Environment Canada? **(EQ5)**

9. Are the roles, responsibilities and accountabilities for the development, implementation and monitoring of the regulations clearly specified? **(EQ6)**

   a) To what degree have the roles, responsibilities and accountabilities for the regulations been implemented as specified? **(EQ6)**

10. To what degree were each of the following stakeholder groups involved and engaged by Environment Canada in the development of the regulations? Please describe how they were engaged. **(EQ7)**

    - Industry – on-road vehicle and engine sector

- Industry – off-road vehicle and engine sector
- Industry – Canadian petroleum fuels sector
- Industry – other sectors (e.g., forestry, agriculture and tourism)
- Non-governmental organizations (e.g., environmental and consumer groups)
- Other federal departments – Transport Canada, Industry Canada, Natural Resources Canada and Health Canada
- Provincial and territorial governments
- United States Environmental Protection Agency

a) To what degree were the views and interests of stakeholders taken into consideration in the development and implementation of the regulations? Please provide some examples. **(EQ7)**

11. To what degree was your organization sufficiently involved and engaged by Environment Canada in the development of the regulations? Please describe how you were engaged. **(EQ7)**

a) To what degree were your organization's views and interests taken into consideration in the development and implementation of the regulations? Please provide some examples. **(EQ7)**

12. To what degree were alternative approaches/tools analyzed before deciding on the regulations as an effective and efficient solution? **(EQ8)**

a) Have other tools been used to complement the use of these regulations? If yes, please describe. **(EQ8)**

b) In your opinion, would the regulations be more effective if additional tools were in place too? If yes, what types of additional tools and why?**(EQ8)**

13. Thinking of the regulations that you are most familiar with, to what degree are these regulations the most effective approach/tool to achieve their objectives? Please explain. **(EQ8)**

a) In your opinion, would the use of alternative approaches/tools have minimized the regulatory burden while still being effective? If yes, please explain. (**EQ8)**

b) In your opinion, would the regulations be more effective if additional tools were in place too? If yes, what types of additional tools and why? **(EQ8)**

14. Has performance data been collected and reported against the activities and outcomes of the smog-causing emission regulations? Please provide specific examples. **(EQ9)**

a) If yes, how has the performance information been used? **(EQ9)**

b) How useful has the performance information been? Are there any major gaps in the available performance information? If yes, please specify. **(EQ9)**

15. Were adequate resources (salary, O&M, capital) allocated to reflect the need for funding and importance of each of the following phases of the regulatory spectrum? Please explain. **(EQ10)**

- Regulation development
- Regulation operations (i.e., verification and administration)
- Compliance promotion and enforcement
- Performance monitoring

Lessons Learned Questions:

16. What are some best practices and lessons learned from the smog-causing emission regulations in the transportation sector that may be applicable to other current regulatory initiatives? Please consider best practices and lessons learned for each of the following phases: **(EQ11)**

- Regulation development
- Regulation operations (i.e., verification and administration)
- Compliance promotion and enforcement
- Performance monitoring

a) What are the key factors that *contribute to* the achievement of results for these regulations? **(EQ11)**

b) What are the major factors that *detract from* the achievement of results? **(EQ11)**

Concluding Question:

17. Do you have any final comments to add?

Annex 5 Summary of Findings

Evaluation Question (EQ)	Achieved ~	Progress Made, Attention Needed	Little Progress, Priority for Attention	Too Early To See	Not Applicable (a rating is not applicable)[76]
Effectiveness:					
EQ1 Achievement of intended environmental results	~√				
EQ2 Occurrence of related economic and/or societal impacts					√
EQ3 Unintended outcomes					√
EQ4 External factors influencing achievements					√
Design and Delivery					
EQ5 Fulfillment of Government of Canada and departmental policy requirements	√				
EQ6 Clarity of roles and responsibilities		X			
EQ7 Involvement/ engagement of stakeholders	√				
EQ8 Consideration of alternatives	√				
EQ9 Performance measurement, monitoring, and reporting		X			
EQ10 Resource allocations and expenditures reflect needs			~X		
Lessons Learned					
EQ11 Applicability of lessons learned					√

Legend: ~ Although there is compelling subjective evidence that the program is doing well in the given issue area, a complete assessment cannot be done owing to a lack of performance data.

[76] As EQ3, EQ4, and EQ11 do not relate to the achievement of results, no rating could be assigned.