Project 7: Enhancing North American Enforcement of IMO Maritime Fuel Sulfur Limits	**Operating Year(s): 2015–2016**
Planned Budget for Two Years: C$250,000 **Year 1: C$125,000** **Year 2: C$125,000**	

Strategic Priority/Subtheme

- Green Growth / Transportation
- Climate Change / Short-Lived Climate Pollutants

How will this project address the cross-cutting themes?

The project assists efforts to improve human health, particularly in vulnerable groups, and the environment by ensuring that international shipping complies with the sulfur limits established by the International Maritime Organization (IMO) for Emission Control Areas (ECAs). The project will facilitate the implementation, coordination and, if appropriate, alignment of processes and policies utilized to assess compliance with the ECA sulfur limit in North America. The project will enhance the gathering, analysis and sharing of information pertinent to compliance monitoring and enforcement of the ECA sulfur limit.

Project Summary (including a clear statement of project goal)

The goal of this new CEC project is to enhance North American capacity to assess compliance with, and enforce as appropriate, the International Maritime Organization's (IMO) maritime fuel sulfur standards, particularly those applicable in Emission Control Areas (ECAs). Annex VI of the IMO's MARPOL Convention established a globally applicable limit on the sulfur content of marine fuel as well as a dramatically more stringent sulfur standard for designated ECAs. Parties to Annex VI may propose the designation of an ECA as a binding amendment to Annex VI when they demonstrate that SOx, PM and/or NOx emissions from international shipping adversely affect air quality, human health, and the environment in specified geographic areas. The US and Canada, having already established the North American ECA, currently are working through the CEC to help Mexico develop an ECA designation proposal for Mexican waters, which—once adopted by the IMO—would effectively yield a truly North American ECA. The CEC Parties now propose to collaboratively work on measures that will increase our confidence that international shipping is, and will be, complying with the ECA sulfur standard. Marine fuel currently accounts for roughly one-half of a typical ship's daily operating costs, and using low-sulfur fuel can increase a ship's daily fuel cost by thousands of dollars. This cost differential will increase when the IMO's sulfur limit for ECA-compliant fuel drops from 1.0 percent to 0.1 percent on 1 January 2015. Evidence from the two sulfur ECAs in Northern Europe indicates that some ship operators know of the limited enforcement regimes there and are intentionally violating the current sulfur standard in order to reduce fuel costs. Cheating on a large scale would compromise and decrease the air quality, health, and environmental benefits associated with the IMO's fuel sulfur standards and competitively harm those maritime carriers that do comply with the standards. Since maritime transport is a truly global industry, and since North America has extensive maritime trade flows, both internally and with the rest of the world, the CEC is well-placed to take steps that will enhance North American enforcement of the IMO sulfur standards.

Short-term Outcomes (at halfway point)

- Enhanced awareness of the need and ways to monitor compliance with and enforce the IMO's ECA and global sulfur standards
- Understanding of common elements of, and differences among, the relevant compliance and enforcement systems in the CEC countries
- Initial description of available compliance monitoring technologies and information security measures

Long-term Outcomes (by the end of the project)

- Greater public awareness of the conduct and efficacy of joint inspection campaigns or other sulfur standard compliance efforts
- Evaluation of available monitoring technologies and best practices, along with key questions/issues requiring further attention
- Proposals for coordinated North American information gathering, analysis, and exchange processes and tools to enhance compliance monitoring and enforcement
- Proposal for potential Mexican consideration on measures to establish and/or enhance its implementation and enforcement system
- Proposal(s) for possible MARPOL Annex VI amendments that would strengthen compliance assurance and enforcement

Longer-term, Environmental Outcomes (post-project)

- Coordinated compliance monitoring and enforcement campaigns to detect and deter cheating
- Significant reductions of maritime air pollution, both criteria pollutants and climate pollutants
- Commensurate improvements in North American air quality, human health, and ecosystems

Performance Measures (quantified SMART measures)

- **Conduct outreach and awareness raising**
  - Specific: Conduct a workshop on existing compliance/enforcement regimes and best practices, develop a white paper on desirable North American coordination measures and potentially useful MARPOL Annex VI amendments to enhance compliance efforts, develop a white paper on how Mexico might establish or enhance its domestic compliance and enforcement regime, and initiate a public awareness campaign on efforts by the CEC Parties.
  - Measurable: The workshop, workshop summary, and white papers are discrete outputs and activities that can be measured both through their completion and quantifiable changes in the understanding and practices of pertinent government officials in the CEC countries. The public awareness campaign is a discrete activity and output that can be measured in terms of greater public awareness of and support for robust compliance monitoring and enforcement of the IMO sulfur standard for ECAs.
  - Attainable/Achievable/Acceptable/Assignable: The subtasks are attainable and achievable, acceptable and assignable.
  - Relevant/Realistic: These are relevant to the process of improving and aligning ECA implementation and enforcement regimes within the three North American countries, and in identifying North American proposals for possible IMO policymaking. These are realistic because they build upon other outreach and awareness raising programs that influenced the development of the North American and other ECAs.
  - Time-specific/time-limited: The discrete subtasks can be conducted and completed by the end of the project's second year.

- **Promote more standardized gathering and exchange of information on compliance with the IMO ECA sulfur standard in North America**
  - Specific: Review the existing marine sulfur compliance and enforcement regimes in North America and identify core features of such programs; develop a draft standardized sulfur inspection compliance checklist and procedures, along with options for factoring compliance monitoring information on ships in transit into Port State Control inspections; and develop a draft framework for the trilateral exchange of compliance information.
  - Measurable: completion of all work outputs; formal consideration of findings and recommendations.
  - Attainable/Achievable/Acceptable/Assignable: Much of this work has been started, at least within the US and Canada, but no work has started on a North American scale. With support from the CEC, the CEC Parties should be able to develop a draft proposal for a standardized compliance inspection checklist, a process for integrating compliance monitoring information on ships transiting an ECA into a Port State Control inspection, and a framework for the trilateral exchange of sulfur compliance information.
  - Relevant/Realistic: Port State Control officers must address many matters during inspections and will benefit from the time saving procedures and tools meant to assess compliance with Annex VI fuel sulfur standards. Standardized data integration and exchange procedures will maximize the effectiveness and resource-efficiency of compliance/enforcement efforts across North America.
  - Time-specific/time-limited: The work products will be developed in both years and can be completed by the end of the second year. However, key decisions to formally establish a standardized regime in the CEC likely must wait until after the end of the project.

- **Assess and develop monitoring technologies to assist with compliance assurance and enforcement**
  - Specific: Literature reviews of best practices for real-time, in-use sulfur compliance monitoring and information security measures; workshop of government, maritime carriers and technology providers to review and evaluate available monitoring technologies; and white paper on key issues that will require further attention.
  - Measurable: These are discrete outputs and activities. The literature reviews and workshop discussions will result in quantifiable expressions of interest in or support for the different monitoring options.
  - Attainable/Achievable/Acceptable/Assignable: These technologies already exist and need only be proven suitable for use in a maritime transportation context.
  - Relevant/Realistic: This is relevant because compliance information gathered shore-side, i.e., while a ship is at berth, does not necessarily reflect a ship's compliance with the ECA sulfur standard while it operates far from shore (e.g., out to the limit of the 200 nautical mile North American ECA boundary). It is realistic because comparable monitoring systems are used widely in other settings, e.g., on stationary sources.
  - Time-specific/time-limited: The discrete subtasks can be conducted in limited blocks of time, and the work will be completed by the end of the project's second year.

Tasks necessary to reach the environmental outcome:

1) Conduct outreach and raise awareness.
2) Promote more standardized gathering and exchange of information on compliance with the IMO ECA sulfur standard in North America.
3) Identify and exchange information on best practices and technologies for monitoring compliance with the sulfur standard.

Task #1) Conduct outreach and raise awareness				
Subtask	**Project Outputs**	**How does the subtask/output move the project towards the environmental outcome?**	**Timing**	**Budget (C$)** (activities)
1.1 Exchange information on best practices for facilitating compliance and enforcement of the IMO ECA sulfur standard	• Workshop on best practices (year 1) • Workshop summary for public release • Draft white paper on desirable coordination measures and potentially useful amendments to MARPOL Annex VI • Draft white paper with suggestions on how Mexico might establish or enhance its sulfur compliance assurance and enforcement regime	The workshop will help CEC Parties, subnational government entities, and counterparts from European nations with sulfur ECAs learn about and evaluate their respective compliance assurance and enforcement regimes. The workshop discussion will facilitate the development of the white papers, for submission to and consideration by the CEC Parties.	November 2015–May 2016 (for the workshop) July 2016–June 2017 (for white papers)	Year 1: $40,000 Year 2: $30,000
1.2 Public awareness campaign	• Translation of web content for use by the CEC Parties, e.g., on the results of joint sulfur compliance inspection campaigns •	Compliance assurance and enforcement efforts by the CEC Parties will be enhanced through greater public awareness of the efficacy of initial sulfur compliance results.	January 2016–June 2017	Year 1: $5,000 Year 2: $5,000
Task #2) Promote more standardized gathering and exchange of information on compliance with the IMO ECA sulfur standard in North America				
Subtask	**Project outputs**	**How does the subtask/output move the project towards the environmental outcome?**	**Timing**	**Budget (C$)** (activities)
2.1 Review marine sulfur compliance	• Overviews of legal and regulatory authorities and programs	An understanding of the common features and differences of the	November 2015–June 2016	Year 1: $30,000 Year 2: $0

assurance and enforcement regimes in the CEC countries	• List of recommended core features for compliance assurance and enforcement program	compliance assurance and enforcement regimes in the CEC nations is a prerequisite to the consideration of ways to standardize and enhance the gathering, exchange, and action upon compliance information.		
2.2 Review available sulfur compliance checklists and procedures used for Port State Control (PSC) or equivalent inspections	• Compilation and review of models • Draft of standardized inspection checklist and procedures • Draft paper outlining options for integrating compliance monitoring information from a ship that is underway inside the ECA into a PSC inspection when the ship makes a port call	This provides a standardized PSC inspection checklist that the Parties agree will provide meaningful, reliable, and transferable information on a ship's compliance during the ship's port calls. Information from the PSC inspection during a ship's port calls is necessary but not always sufficient for identifying possible sulfur standard violations while the ship is underway within the ECA.	November 2015– November 2016	Year 1: $15,000 Year 2: $15,000
2.3 Develop framework for the trilateral exchange of sulfur compliance information from PSC inspections and monitoring of ships underway in an ECA	• Draft framework and procedures for trilateral information exchange • Identification and assessment of potential legal or regulatory obstacles or impediments • Draft CEC proposal on the exchange of compliance information	A framework that rapidly and reliably exchanges sulfur compliance information and intelligence across the CEC Parties will help to ensure the integrity of the ECAs while maintaining a level playing field for maritime carriers. This subtask builds upon CEC's existing Enforcement Working Group (EWG) work on procedures for the trilateral exchange of enforcement-related information.	December 2016– June 2017	Year 1: $0 Year 2: $30,000

Task #3) Identify and exchange information on best practices and technologies for monitoring compliance with sulfur standard				
Subtask	**Project Outputs**	**How does the subtask/output move the project towards the environmental outcome?**	**Timing**	**Budget (C$)** (activities)
3.1 Identify best practices for real-time, in-use sulfur compliance monitoring	• Literature review of available technologies and best practices • Literature review of standards for ensuring the reliability and security of sulfur monitoring information	CEC Parties require such monitoring to check the compliance of ships that are underway inside the ECA but still well off their coastlines. Without it, compliance and enforcement measures can only be taken against those ships that call at a port. The data gathered and transmitted by such monitoring systems must be secure from hacking or other forms of manipulation in order to provide reliable, actionable information to government enforcement personnel.	November 2015–June 2016	Year 1: $35,000 Year 2: $0
3.2 Evaluation of technologies and best practices	• Two-day workshop to present and review available options • Summary report of workshop, for public dissemination • White paper compiling and describing key questions and issues that require further attention	The workshop facilitates the exchange and evaluation of information on current efforts by self-selected maritime carriers, port authorities, and technology providers to develop and test various monitoring technologies and associated back-end systems, including data transmission by Automatic Identification System (AIS) or other systems.	July 2016–June 2017	Year 1: $0 Year 2: $45,000
			Totals	**Year 1: $125,000** **Year 2: $125,000**

Explain how this project meets the selection criteria adopted by Council in the Strategic Plan (see below)

The goal of all projects funded by the CEC will be to support the efforts of the Parties to conserve, protect and/or enhance the North American environment. The following criteria will guide the Secretariat, Working Groups, Committees, and other appropriate officials of the Parties in considering cooperative activities for Council approval under operational plans. These selection criteria do not apply for activities to be funded through the NAPECA grant program.

- **How does the project contribute to achieving Council's strategic objectives as described within the current Strategic Plan, or as related to other priorities subsequently confirmed by Council?**

  This project supports several strategic goals and cross-cutting themes set out in the Draft Definitions of 2015–2020 Cross-Cutting Themes of 16 October 2014. The project will address the transportation focus under the green growth strategic goal by promoting cleaner maritime transportation. Since the transportation sector is the largest consumer of fossil fuels in North America, transportation projects should "aim to improve human and environmental health by limiting emissions from (multimodal) mobile sources, which deplete fossil fuels and contribute to air pollution and climate change." By ensuring that international shipping complies with the sulfur limit while operating inside ECAs, the project also supports a level playing field in the maritime transport sector, minimizes the potential for distortion of trade flows, and eases the burden of North American communities and industries that must comply with air quality standards. The project also supports the strategic goal on climate change, which includes a focus on short-lived climate pollutants in various sectors, including "transport, in order to minimize impact on human health and ecosystems."

  The project also addresses several cross-cutting themes. It will assist vulnerable groups by reducing emissions of harmful air pollutants from ships, which can travel far from their source and impact communities both on coasts and also far inland. The project also helps to align environmental regulatory standards by promoting common policies to address air pollution from ships in North America.

- **Are the proposed objectives North American in scope? In other words, how are the proposed results relevant to protecting the environment in North America? (For example, what would Council members announce to the press at the successful completion of this project?)**

  The proposed objectives are North American in scope, and the results are relevant to protecting human health and the environment throughout North America. Creating a North American ECA represents a decision to utilize the provisions of a globally developed and applicable agreement (MARPOL Annex VI) to establish more stringent and regionally applicable maritime emissions standards in order to best protect human health and the environment in North America with minimal adverse impact on the maritime transportation sector and international trade patterns. Unless the CEC Parties effectively monitor compliance with—and enforce—the ECA sulfur standard, the higher cost of 0.1% sulfur marine fuel, required as of 1 January 2015, could result in significant cheating, particularly by ships that transit the ECA but do not call at North American ports. Such cheating compromises the benefits expected from the ECA and adversely affects competition within the maritime transport sector, which would have the perverse effect of particularly harming the

very companies that voluntarily comply with the sulfur standard. Upon the project's successful completion, Council members would be able to announce to the press and general public that we are collaboratively working to enhance North American enforcement of the ECA(s) in our region to underscore our commitment to improving human health and the environment while continuing to grow our economies and promote international trade. In addition, the work to align North American processes and policies to monitor compliance with and enforce the ECA will establish a critical foundation for the Mexican government's own efforts to implement an upcoming Mexican ECA in the most cost-effective, efficient and timely fashion. This would result, in effect, in a truly North American ECA that would protect health and the environment and set a global precedent for efforts to reduce maritime air pollution in other parts of the world.

- **What specific, clear and tangible results will be achieved and how will progress toward each result be measured over time? Identify performance measures to be used to indicate success at reaching all outcomes and/or performance.**
  - North American utilization and possible revision of the current Port State Control inspection compliance checklist and procedures, as well as the development of a draft North American framework for exchange and integration of inspection-based and other compliance information. Development of proposals for the possible establishment and/or enhancement of a Mexican implementation, compliance monitoring and enforcement regime for the ECA sulfur standard.
  - Identification and evaluation of compliance monitoring technologies for ships operating offshore, along with identification of best practices to assure the reliability and security of information from such monitoring systems.
  - Workshop on best practices, white paper on needed enhancements to ECA implementation and enforcement regimes, and public awareness campaigns will facilitate governmental and stakeholder efforts to characterize and ensure the meaningful compliance with and enforcement of the IMO's sulfur standards.
  - The combined effect of these measures will lead in turn to more competent CEC-wide monitoring and enforcement of the IMO's ECA sulfur standard, with commensurate and reliable reductions in maritime air pollution from ships operating in North American ECAs and the maintenance of a level playing field for maritime carriers.

- **Explain why the CEC is the most effective vehicle for the Parties to use in undertaking this project, considering these points:**

  - The value-added of doing it under the CEC cooperative program: The best way to implement, monitor and enforce the IMO ECA sulfur standard is through a continent-wide effort; smaller-scale and/or poorly coordinated efforts will be less effective and more costly in the end. The CEC Parties have significant maritime trade flows among themselves and with other countries around the world. Moreover, a significant portion of global shipping traffic transits North American waters without visiting a North American port. All of this maritime traffic is subject to the IMO's sulfur standards, particularly within North American ECAs. In addition, the proposed project builds on the ongoing CEC project to support the development of a Mexican ECA under IMO auspices, the CEC's longstanding effort to promote effective regional implementation and enforcement of critical environmental standards and agreements, and the work of the CEC's Enforcement Working Group (EWG) to facilitate the trilateral exchange of enforcement-related information.
  - Any other public, private or social organizations that work on such activities: No other organizations operating in North America are working to support the continent-wide enforcement of ECA standards and/or the establishment of a Mexican ECA. The California

Air Resources Board (CARB) is working to implement and enforce its own sulfur standard, which requires the use of 0.1% sulfur in marine fuels used in all ships operating within 24 nautical miles of California's coastline. CARB has committed to 'sunset' its sulfur standard after the ECA's 0.1% sulfur standard takes effect and once CARB has determined that the implementation of the North American ECA will reliably generate the reductions in maritime air pollution needed to improve air quality in California. In addition, government entities and major maritime carriers based in Europe are beginning to work on ways to support compliance monitoring and enforcement of the sulfur standard. Although their initial focus may have been on the sulfur ECAs in the Baltic Sea and the North Sea and English Channel, they have expressed a clear desire to coordinate with North American partners in order to ensure robust implementation and enforcement of all ECAs.

- Opportunities to cooperate and/or leverage resources with such organizations: CARB has committed to support EPA and other project participants by sharing its experiences and tools in conducting sulfur inspections or otherwise monitoring compliance with the State of California's existing 0.1% sulfur requirement for ships within 24 nautical miles of the coast. European counterparts such as the Danish Maritime Authority and comparable government entities in other Northern European nations, as well as the European Commission, support the establishment, through the CEC, of a North American complement to their own nascent efforts to coordinate ECA enforcement. The Danish Maritime Authority has invited Canada and the US to participate in a meeting (tentatively scheduled for 25–26 February 2015) to identify possible opportunities for enhancing and coordinating European and North American compliance monitoring and enforcement of the ECA fuel sulfur standard. Finally, we already have clear expressions of interest from major maritime transportation industry leaders (e.g., Maersk), port authorities (e.g., Los Angeles, Long Beach, and Norfolk), academics and NGOs (e.g., ICCT) to participate in and support the CEC's work on enforcing maritime sulfur standards.

- **Does the project propose a clear timeline for implementation of the activities, including a target end-date for CEC involvement? Where applicable, describe how the work will continue after CEC involvement ends.**

  - The project timeline is two years, beginning in July 2015 and ending in June 2017. CEC engagement is expected to begin with the development and publication of the Request for Proposals (by winter 2015) and continue through the remainder of the project. It is hoped that the results of this CEC project will include the first concrete steps toward greater coordination and alignment of ECA compliance monitoring and enforcement mechanisms in North America. It is worth noting that a single two-year CEC project will not be enough to identify and promote the establishment of the range of potentially appropriate measures that could enhance and coordinate North American compliance monitoring and enforcement of the sulfur standard.
  - Upon the project's completion in 2017, it is hoped that the work will inform Mexico's decisions concerning the establishment and/or improvement of a Mexican regime for implementing and enforcing an ECA. This underscores the strong connection between this project proposal and the proposal for Phase II of the current CEC project to support the establishment of a Mexican ECA.
  - By the time this project ends, the CEC Parties will be actively coordinating, both among themselves and with European counterparts, in gathering, exchanging and analyzing information to undertake intelligence-led enforcement of the ECA sulfur standard.
  - Over the longer term, the information and products generated through this project could inform the IMO's consideration and decision in 2018 of when to lower the globally-applicable fuel sulfur limit to 0.5%. Although this decision will be based primarily on the ability of the global refining industry to supply adequate quantities of compliant fuel, it seems appropriate to factor sulfur

standard compliance results into the decision-making process. As such, this CEC project—along with related efforts in Europe—could provide a vital and very timely contribution to the IMO's policymaking.

- **Where applicable, identify with reasonable specificity:**

  - **Linkages with other relevant CEC projects, past or present, in order to create synergies, capitalize on experience, or avoid duplication**: This project links closely with the ongoing CEC maritime shipping project, started in OP13-14, which is focused on conducting the technical analyses needed for Mexico to submit an ECA designation proposal to the IMO to establish a Mexican ECA. The experience gained through this project, as well as the existing designation of project leads in each country, will help to facilitate the enforcement project's work. Moreover, this enforcement project will identify best practices and lessons learned that should assist Mexico in rapidly designing and establishing its capacity to implement a Mexican ECA. Finally, the framework for gathering, analyzing, and sharing compliance information on a North American scale will lead to improved and better coordinated enforcement of the sulfur standard. Accordingly, this project hopes to build on some of the lessons learned and networks established by the CEC's Enforcement Working Group.
  - **The target audience, as well as its receptivity and capacity to use the information that may be produced as a result of the project**: The primary target audience is the enforcement, compliance assurance, and maritime policy teams within the governments of the three Parties. The teams from the US and Canada are receptive to using the information and work products that will be generated through this project, and we anticipate that the Mexican government's entity responsible for implementing an eventual Mexican ECA will be as well. In addition, the California Air Resources Board is a target audience in that this project—and the resultant improvement in the enforcement of the North American ECA—will increase CARB's confidence that maritime emission reductions will continue in California's waters even after CARB sunsets its 24 nautical mile 0.1% sulfur standard for maritime shipping. Other target audiences include North American port authorities and air quality management districts in areas with significant maritime activity and air quality management challenges, in that the efficacy of their air quality management programs will be influenced by the success of this project. Moreover, port authorities that have established incentive schemes to promote greener shipping (e.g., Vancouver, Los Angeles, and Long Beach) may be able and willing to integrate ship-specific compliance information generated through this project into the scoring matrices they use to select the recipients of their financial incentives. While this clearly goes well beyond the measures set out in MARPOL Annex VI, it can amplify and facilitate the efforts of the CEC Parties to ensure compliance with and enforcement of the IMO sulfur standard.
  - **The beneficiaries of capacity building activities that the project may include**: primarily, the government entity in Mexico responsible for implementing and enforcing a future Mexican ECA. Canada and the US will benefit indirectly in that their own enforcement of the ECA standard will be strengthened by the existence of a well-trained, competent, and capable Mexican ECA implementation and enforcement regime. This reflects the considerable amount of cross-nation maritime transport activity within North America, as well as with the rest of the world.
  - **The relevant stakeholders, with particular attention to communities, academia, NGOs and industry, and their involvement and contribution to a successful outcome**:
    - Communities, particularly those with air-quality management challenges and/or vulnerable populations with high exposure to maritime air pollution, in that robust enforcement of the sulfur limit will ease the air-quality management burden of these communities while ensuring reduced exposures and impacts on human health and the environment.

- Academia: their expertise will be useful in developing robust, secure monitoring technologies and back-end platforms, among other things.
- NGOs: awareness raising and outreach.
- Industry: awareness raising, ship vetting metrics, platforms for proof-of-concept testing of key monitoring technologies, provision of intelligence on possible violations, and provision of information on the utility of current and proposed enforcement regimes in maintaining a level playing field in the maritime transportation sector.
- Port authorities: some port authorities may partner with project participants and key industry leaders to conduct tests of monitoring and tracking technologies; all interested port authorities could engage in awareness raising, in addition to linking information from the project's compliance assurance and enforcement findings to port-based green shipping incentive schemes.