



CALIFORNIA-MEXICO
Memorandum of Understanding on
Climate Change & the Environment

2014-2018
Summary Report

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and the Ministry of Environment and Natural Resources of Mexico*



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Introduction

In July 2014, California Governor Edmund G Brown Jr., Undersecretary Rodolfo Lacy Tamayo and General Director Jorge Rescala Pérez of Mexico’s Ministry of Environment and Natural Resources and its National Forestry Commission, respectively, signed the four-year Memorandum of Understanding (MOU) to Enhance Cooperation on Climate Change and the Environment.¹

The purpose of this agreement was to promote and carry out cooperative activities related to environmental issues including climate change, human and environmental health, air quality, wildfires, and transportation.

The MOU was a four-year effort with four priority action areas: climate change, air quality, clean vehicles, and wildfires. The overall objective of the MOU was to strengthen the capacity of both governments to cope with the challenges of climate change and to protect and preserve natural resources. In April 2015, the parties established a Joint Action Plan² that identified goals and activities to address the four priority action areas. The Joint Action Plan’s overarching goals are based on the principles of equality, reciprocity, information exchange and mutual benefit. These goals and principles remained constant throughout the duration of the MOU.

Working groups formed under each priority action area reported internally on progress every quarter. The specific goals of the working groups, as well as their activities, deliverables and overall progress are presented in the tables that follow. Progress is classified by the metrics: “No Progress,” “Initial Progress,” “Moderate Progress,” “Significant Progress,” and “Deliverable Achieved” (see Progress Key). The report describes the advances and accomplishments that the working groups have made during the four years under the MOU.

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

¹ The original MOU text can be found at: <https://calepa.ca.gov/border-affairs-program/border-affairs-program-publications/> or at SEMARNAT’s website: <http://www.semarnat.gob.mx/temas/agenda-internacional/frontera-norte>

² The Joint Action Plan can be found at CalEPA’s website: <https://calepa.ca.gov/border-affairs-program/border-affairs-program-publications/>

CALIFORNIA MEXICO MOU JOINT ACTION PLAN OVERARCHING GOALS	
Climate Change	<ol style="list-style-type: none"> 1. Work toward development of rigorous measurement, reporting and verification to support carbon pricing or regulatory mechanisms, including potential linkage of carbon markets. 2. Share knowledge, development, and technology experience that enables economic growth while addressing climate change, including reductions in short-lived climate pollutants. 3. Share information and experience on interaction between forestry and the climate, including the potential for sector-based offset credits from reduced deforestation.
Air Quality	<ol style="list-style-type: none"> 1. Coordinate air quality planning efforts for airsheds along the border. 2. Share technical knowledge and information needed to support development of robust air quality planning and mitigation efforts. 3. Improve the comparability of data collected in Mexico and California.
Clean Vehicles	<ol style="list-style-type: none"> 1. Update and design the Mexican vehicle emission standards for greenhouse gas (GHG) and smog pollution based on California's standards. 2. Advance Mexico's efforts on compliance and enforcement of environmental standards for vehicles. 3. Contribute to Mexico's progress on the use of new technologies and strategies for the reduction of vehicular emissions (such as strategy for freight transportation, emissions inventories for mobile sources, vehicular emissions diagnosis and maintenance, on-board diagnostics (OBD) for vehicle inspections, clean and low-carbon fuels, and strategy for the import of used vehicles into Mexico).
Wildfires	<ol style="list-style-type: none"> 1. Foster cooperation for wildfire assistance through the strengthening of technical and institutional capacities on fire management.

Executive Summary

The California-Mexico MOU on Climate Change and the Environment signed in 2014 was a four-year effort with four priority action areas and their respective working groups: climate change, air quality, clean vehicles, and wildfires. The goal of this report is to describe the advances and accomplishments that the working groups made throughout the four years of the MOU.

The Climate Change Working Group worked towards developing a rigorous monitoring, reporting and verification (MRV) framework to support emissions trading system (ETS) design and shared experiences in developing climate change programs that also enable economic growth. This information sharing helped inform Mexico's 2017 pilot ETS simulation and later the design of a national mandatory program. In April 2018, the General Law on Climate Change (GLCC) was amended by the Mexican Congress to align the legal framework with the country's Nationally Determined Contribution and establish the legal basis for a mandatory national ETS, starting with a three-year pilot phase set to begin in 2019.

Over the course of the MOU, the Air Quality Working Group helped strengthen the Particulate Matter 2.5 (PM_{2.5})³ air quality monitoring in Mexicali through air monitoring, audits and training supported by the California Air Resources Board (CARB). A two-year project, the Mexicali PM_{2.5} Study, was completed on April 20, 2018. Currently, CARB is analyzing the PM_{2.5} data to better understand the impacts of sources in Mexicali on PM_{2.5} pollution. CARB additionally received and analyzed ninety-six Particulate Matter 10 (PM₁₀)⁴ mass samples from Baja California, which generated more information about PM₁₀ and how it travels across the border. Lastly, in 2018, Mexico's Secretariat of Environment and Natural Resources, *Secretaría del Medio Ambiente y Recursos Naturales* (SEMARNAT), launched the Program to Improve Air Quality (ProAire) for the State of Baja California. ProAire includes six strategies, 20 measures and 100 actions, such as the regulation of state industries and the design of a sustainable mobility strategy.

Within the purview of the Clean Vehicles Working Group, CARB provided extensive training to representatives from SEMARNAT and other agencies in Mexico on subjects related to reducing pollutant emissions from on-road motor vehicles, and shared information that helped inform new vehicle standards and programs in Mexico. In September of 2017, SEMARNAT published new standards and test procedures for vehicle emission inspection programs that apply nationally, similar to how programs work within the US. In September of 2018, SEMARNAT published the draft standard, which set mandatory manufacturer fleet average limits on GHG emissions for new light-duty vehicles. Mexico is also developing revised standards for criteria pollutants, with the ultimate goal being the alignment of Mexico's standards with those currently in place in the U.S. for light-duty vehicles. Lastly, revised standards for heavy-duty diesel vehicles were finalized by SEMARNAT in February of 2018. These revisions effectively align Mexico's standards with U.S. standards for 2010 and newer model year heavy-duty engines.

The Wildfire Working Group's main accomplishments include exchanging information and coordinating training opportunities. One such area of collaboration was the exchange of knowledge and informational material on fire management in the wildland-urban interface (WUI), a zone of transition between unoccupied land and human development. California provided a translated version of the Wildland Urban Interface Operating Principles (WUI Principles) that better prepares fire professionals for the challenging task of fighting fire in the WUI. The information contained in this volume can save property, but more importantly, lives. Wildfire trainings were held in both California and Mexico over the course of the MOU. For example, training on S-130/S-190 Wildfire Suppression took place in Tecate, Baja California, which provided Mexican firefighters with entry-level wildland firefighting training, as well as an introduction to wildland fire behavior and personal safety.

³ PM_{2.5} is particulate matter that is 2.5 micrometers or less in diameter. These finer particles pose an increased health risk because they can deposit deep in the lungs and contain substances that are particularly harmful to human health. PM is a mixture of substances that include elements such as carbon and metals; compounds such as nitrates, organic compounds, and sulfates; and complex mixtures such as diesel exhaust and soil. More information can be found at: arb.ca.gov/pm/pm.htm

⁴ PM₁₀ refers to particles with an aerodynamic diameter of 10 microns or smaller. Exposure to PM₁₀ aggravates a number of respiratory illnesses and may even cause early death in people with existing heart and lung disease. More information can be found at: arb.ca.gov/pm/pm.htm

Cooperation on Climate Change

The Climate Change Working Group made great strides toward meeting the MOU goals of developing a rigorous MRV framework to support ETS design, sharing experiences in developing climate change programs that also enable economic growth, and advancing the important role of forestry in addressing climate change through information sharing.

A robust MRV framework is foundational to any carbon-pricing program. The Climate Change Working Group focused its initial information exchange on the policy choices and the technical requirements for building an emissions reporting program. Through regularly scheduled discussions, CARB and SEMARNAT exchanged information about the regulatory development process, choosing sector coverage, and detailed quantification, reporting, and verification requirements of each organization's emissions reporting programs. To support the ongoing development of Mexico's MRV framework, CARB provided SEMARNAT with information about the development of California's GHG accounting system and the California Electronic Greenhouse Gas Reporting Tool as well as verification training materials. SEMARNAT shared its emissions reporting law and regulations related to direct measurements of emissions, as well as its reporting methodologies for covered gases. The working group also held in-person meetings and workshops dedicated to MRV in Sacramento in 2015 and 2018, and in Mexico in 2016 and 2017.

To support the development of Mexico's national emissions trading system, the working group dedicated a significant amount of time to topics that are critical to designing a robust ETS. CARB shared substantial information about its regulatory development process, guidance materials, and process for stakeholder engagement for the implementation of California's Cap-and-Trade Program. At the request of SEMARNAT, the Canadian provinces of Québec and Ontario joined the bi-weekly calls in 2017 to share their experiences in designing their own cap-and-trade programs. This also enabled the working group to conduct deeper dives into the technical requirements that were necessary for harmonization between the programs in California, Ontario, and Québec in order to operate a linked ETS. In addition, the working group devoted time to sharing progress made on broader climate change policies and program implementation in California and Mexico.

In October 2017, SEMARNAT, the Mexican stock exchange (Grupo BMV), and MÉXICO2 (the voluntary carbon platform at the BMV) launched a voluntary ETS simulation for 93 major entities in the power generation, manufacturing, and transport sectors. The simulation aimed to familiarize stakeholders with the concept of emissions trading and to improve corporate readiness. The success of the carbon trading simulation paved the way for a phased roll-out of a national ETS. In April 2018, the General Law on Climate Change (GLCC) was amended by the Mexican Congress to align the legal framework with the country's Nationally Determined Contribution and establish the legal basis for a mandatory national ETS, with a three-year pilot phase set to begin in 2019. The pilot phase plans to cover large industrial facilities, petroleum and natural gas systems, petroleum refining, electricity generation, and other stationary combustion sources. The coverage threshold is 100,000 metric tons of carbon dioxide equivalent per data year.

The Climate Change Working Group also had robust dialogue with the *Comisión Nacional Forestal* (CONAFOR) on Mexico's National Strategy to Reduce Emissions from Deforestation and Forest Degradation (ENAREDD+). CONAFOR has been an integral part of the Climate Change Working Group discussions and a driving force in advancing the role of forestry and indigenous engagement related to climate change. Through the regularly scheduled calls, CONAFOR kept the Climate Change Working Group informed of its forestry policy efforts throughout Mexico. CARB and CONAFOR also exchanged information on California's forestry offsets protocol under the Cap-and-Trade Program, as well as the potential for international sector-based offset crediting under California's program.

To expand the scope of knowledge sharing, a workshop dedicated to forestry was held in Sacramento in 2016 to discuss Mexico's MRV requirements, safeguards for forestry projects, and CARB's forestry offset protocol. In 2017, Mexico then hosted a follow-up workshop between CONAFOR and CARB that included eight Mexican states, as well as non-governmental organizations.

As part of the workshop, participants visited a Mayan community where local leaders shared their experiences. In 2017, the information exchange on forests also included updates from the Governors' Climate and Forests Task Force (GCF) member states in Mexico on the progress made in subnational programs to reduce emissions from deforestation and forest degradation. In 2018, the discussions focused on approaches and requirements to effectively structure subnational programs within the national climate policy framework.

Through the regularly scheduled calls and periodic in-person meetings, the Climate Change Working Group devoted significant resources to share the important work that each jurisdiction has undertaken to address climate change. Moreover, throughout the course of the MOU, the Climate Change Working Group expanded beyond the initial bilateral information exchange between CARB and Mexico to include program partners in Canada. The multi-year collaboration enabled the group to build solid relationships and gain understanding of the policy choices that each jurisdiction had to consider, and to appreciate the challenges that were shared or unique to each jurisdiction in developing and implementing effective climate change programs. While great strides have been made towards meeting the goals established under the MOU, the Climate Change Working Group recognizes there is more work remaining to sustain the progress made and looks forward to continuing the partnership and the dialogue commenced under the MOU.



PROGRESS ON CLIMATE CHANGE


Climate Change Overarching Goal 1	Working Group Activities	Deliverables	Progress
<p>Work towards development of rigorous MRV to support carbon pricing or regulatory mechanisms, including potential linkage of carbon markets.</p>	<p>Share lessons learned on construction and design (as reporting tools) and data management tools (technical cooperation).</p>	<p>1. Possibility to align Mexico's registry system with California's Annual GHG Reporting System. <i>This possibility, while discussed, is not currently considered a necessary deliverable.</i></p> <p>2. Information sharing.</p> <p>3. Workshop. <i>CARB and SEMARNAT exchanged information on each organization's emissions reporting program, including regulatory development process, sector coverage, quantification, reporting, and verification requirements. The technical exchange was further bolstered with in-person meetings/workshops dedicated to MRV in Sacramento in 2015 and 2018 and in Mexico in 2016 and 2017.</i></p>	<p>● ● ● ○</p>
	<p>Consider standardization of algorithms of quantification methodologies in order to calculate emissions.</p>	<p>1. Information Sharing. <i>This activity has been folded into general discussions of how quantification methodologies work in both California and Mexico.</i></p>	<p>● ● ● ○</p>
	<p>Pursue standardization of verification parameters for emission reports.</p>	<p>1. Information sharing <i>See above.</i></p>	<p>● ● ● ○</p>
	<p>Cooperate to share training for Verifying Entities, or for process verification and/or validation.</p>	<p>1. Information sharing. <i>Shared training materials, including sample verification examinations. To supplement the technical discussions and workshops on MRV described above, CARB also shared training materials for its emissions reporting program with SEMARNAT in 2016. In addition, SEMARNAT and CONAFOR staff attended a weeklong training workshop for verifiers hosted by CARB in 2018.</i></p>	<p>● ● ● ●</p>

Climate Change Overarching Goal 2	Working Group Activities	Deliverables	Progress
<p>Share knowledge, development, and technology experience that enable economic growth while addressing climate change, including reductions in short-lived climate pollutants.</p>	<p>Develop specific recommendations for the design of effective tools for pricing carbon in Mexico and California.</p>	<p>1. Results and recommendations of analysis due within reasonable time frame. <i>The deliverable was replaced by regularly scheduled calls to share regulatory and policy updates that may impact the development of carbon market/climate programs within each jurisdiction.</i></p>	<p>● ● ● ○</p>
	<p>Determine cap threshold and an emissions permit distribution system.</p>	<p>1. Share information on how California has developed its cap in every sector. 2. Discuss external training. 3. Potential future workshops. <i>CARB shared detailed information on the design, development, and implementation of its Cap-and-Trade Program during the regularly scheduled calls.</i></p>	<p>● ● ● ○</p>
	<p>Exchange technical assistance and experiences for the construction of a Carbon Market.</p>	<p>1. Information sharing. <i>See above.</i></p>	<p>● ● ● ○</p>
	<p>Improve capacity of staff of the ministry, through the exchange of information and experiences on vulnerability assessments to climate change in different sectors, as well as the design, implementation and monitoring of measures to adapt to climate change.</p>	<p>1. Possible transfer and development of technology. 2. Share experiences of successful projects to adapt to climate change in the region, monitoring and evaluation tools, development of climate change scenarios, early warning systems, preventive care approach to disaster management and conservation of ecosystems to new climate conditions. <i>This item was ultimately not under the purview of the Climate Change Working Group.</i></p>	<p>○ ○ ○ ○</p>
	<p>Look to create opportunities for biomass energy and biomass energy plants to replace fossil fuels.</p>	<p>Share with bioenergy working group the opportunity of eventual support from this cooperation. <i>This item was ultimately not under the purview of the Climate Change Working Group.</i></p>	<p>○ ○ ○ ○</p>

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

PROGRESS ON CLIMATE CHANGE

Climate Change Overarching Goal 3	Working Group Activities	Deliverables	Progress
<p>Share information and experience on interaction between forestry and the climate, including the potential for sector-based offset credits from reduced deforestation.</p>	<p>Discuss methodologies with the potential of producing offsets for both regions.</p>	<ol style="list-style-type: none"> 1. Exploration of methodologies from California. 2. To analyze methodologies in order to include them into an eventual Mexican accreditation system. 3. Share information about CONAFOR's efforts 4. Potential workshops. <p><i>Through the regularly scheduled calls, CONAFOR kept the Climate Change Working Group informed of its forestry policy efforts throughout Mexico. CARB and CONAFOR also exchanged information on California's forestry offsets protocol under the Cap-and-Trade Program, as well as the potential for international sector-based offset crediting under California's Program.</i></p> <p><i>In 2016, a workshop dedicated to forestry was held in Sacramento to discuss Mexico's MRV requirements, safeguards for forestry projects, and CARB's forestry offset protocol. A follow-up workshop between CONAFOR and CARB that also included eight Mexican states as well as SEMARNAT and non-governmental organizations was held in Mexico in 2017. The approaches and requirements to effectively structure subnational programs within the national climate policy framework as well as linkage requirements in California were discussed.</i></p>	
	<p>Explore the inclusion of offsets from Mexico in the California market.</p>	<p><i>A workshop between CONAFOR and CARB was held in Mexico in 2017 and the approaches and requirements to effectively structure subnational programs within the national climate policy framework as well as linkage requirements in California were discussed.</i></p>	

Climate Change Overarching Goal 3 (cont.)	Working Group Activities	Deliverables	Progress
<p>Share information and experience on interaction between forestry and the climate, including the potential for sector-based offset credits from reduced deforestation.</p>	<p>Collaboration of programs on forest management and reducing emissions from deforestation and forest degradation, with a view to incentivizing forest carbon approaches.</p>	<ol style="list-style-type: none"> 1. Establish Core Team. 2. Review existing Governors' Climate and Forests Task Force documentation. 3. Technical meetings. 4. Determine whether California could help develop interest in subnational/regional linking within Mexico (i.e., Chiapas, Yucatan, Quintana Roo, and Jalisco efforts) to include sectoral offsets in the California market. 5. Encourage exchanges between Mexican and Californian universities. 6. Examine possibility of link-age between national and subnational policies. <p><i>See above. In addition, starting in 2017, information exchange on forests also included updates from the Governors' Climate and Forests Task Force member states in Mexico regarding subnational programs to reduce emissions from deforestation and forest degradation.</i></p>	

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

Cooperation on Air Quality

The Air Quality Working Group was comprised of agency stakeholders from CARB, SEMARNAT, and SEMARNAT's National Institute of Ecology and Climate Change, *Instituto Nacional de Ecología y Cambio Climático* (INECC). The working group focused on priorities to improve the air quality in the U.S.-Mexico border region – which is defined in the La Paz Agreement as the area of land being 100 kilometers or 62.5 miles north and south of the international boundary. Specifically, the goals of the working group were to: coordinate Mexico-California air quality planning efforts for air sheds along the Mexico-California border; share technical knowledge and information needed to support development of robust air quality planning and mitigation efforts; and improve the comparability of data collected in Mexico and California. The working group provided quarterly reports to the California Environmental Protection Agency and SEMARNAT on the status of each priority.

Over the course of the MOU, CARB staff helped strengthen the PM2.5 air quality monitoring in Mexicali through air monitoring, audits and training. A two-year project, the Mexicali PM2.5 Study, was completed on April 20, 2018. Real-time hourly data was made available to the public and stakeholders via the AirNow and CARB's Air Quality and Meteorological Information System (AQMIS) websites. The reviewed and validated hourly PM2.5 mass and meteorological data has been submitted to the United States Environmental Protection Agency (U.S. EPA) air quality data repository, the Air Quality System (AQS), for the study period. As part of the project, PM2.5 speciation samples were collected. PM2.5 speciation can provide clues as to the sources of PM2.5 pollution. To date, all of the PM2.5 speciation samples have been received by the laboratory and analyzed. So far, the results through calendar year 2017 have been submitted to AQS by CARB's laboratory. Currently, CARB staff are analyzing the PM2.5 data to better understand the impacts of sources in Mexicali on PM2.5 pollution. Furthermore, CARB staff are pursuing the continuation of the Mexicali PM2.5 Study. In addition to the Mexicali PM2.5 Study, CARB received and analyzed ninety-six PM10 mass samples from Baja California in the fourth quarter of 2017. CARB participated in the audits of air monitoring sta-

tions owned by the Secretariat for the Environment of Baja California, *Secretaría de Protección al Ambiente* (SPA). These audits were performed by the INECC in June of 2018 to ensure proper functioning of SPA's air monitoring equipment. CARB also trained INECC staff on conducting performance audits using CARB methodology.

CARB has been and continues to be an active participant in meetings related to border issues. CARB participated in the Imperial-Mexicali Air Quality Task Force meeting in Calexico on September 7, 2017, and presented on Salton Sea air quality, including the PM10 and toxics monitoring network around the Sea, dust control pilot projects, and the Phase 1 Salton Sea Management Plan to identify areas of the Sea for initial dust mitigation and habitat restoration. CARB participated in a San Diego-Tijuana / California-Baja California Air Quality Task Force Meeting on September 13, 2017, in San Diego that covered the following topics: the status and update of air quality monitoring networks; prioritizing topics for bilingual air quality training efforts; updates of Baja California's ProAire; and U.S. EPA Border 2020 updates. CARB also participated in the Imperial-Mexicali Air Quality Task Force meeting in Mexicali on November 9, 2017, and February 8, 2018, providing updates on the Mexicali PM2.5 Study.




In 2018, SEMARNAT published the ProAire for the State of Baja California. ProAire includes six strategies, twenty measures and one hundred actions. Goals include: the regulation of state industries, designing a sustainable mobility strategy, strengthening the Vehicle Verification Program (Inspection and Maintenance Program), implementing a program to reduce emissions generated by vehicles at border crossings, developing an Atmospheric Contingency Program, developing a risk communication strategy for air pollution, and strengthening the Atmospheric Monitoring System.

PROGRESS ON AIR QUALITY

Air Quality Overarching Goal 1	Working Group Activities	Deliverables	Progress
Coordinate Mexico-California air quality planning efforts for airsheds along the Mexico-California border.	Coordinate development and implementation of Baja California ProAire and California air quality planning efforts.	Information sharing and coordination. <i>In 2018, SEMARNAT published the Baja California's ProAire (2018-2027). This ProAire includes: 6 strategies, 20 measures and 100 actions.</i>	● ● ● ○

Air Quality Overarching Goal 2	Working Group Activities	Deliverables	Progress
Share technical knowledge and information needed to support development of robust air quality planning efforts.	Implement emissions reporting system for Baja California.	Information sharing. <i>Training is pending the sharing of relevant SEMARNAT statutes and regulations describing their current regulatory authority and progress which will allow CARB to develop targeted suggestions to build on SEMARNAT's existing inventory programs.</i>	● ● ○ ○
	Strengthen Baja California air toxics regulations.	Information sharing. <i>Training is pending the sharing of relevant SEMARNAT statutes and regulations describing their current regulatory authority and progress which will allow CARB to develop targeted suggestions to build on SEMARNAT's toxics regulations.</i>	● ● ○ ○

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

Air Quality Overarching Goal 3	Working Group Activities	Deliverables	Progress
<p>Improve the comparability of data collected in Mexico and California.</p>	<p>Strengthen the air quality monitoring network in Baja California.</p>	<p>Provide training and information sharing on various technical aspects of air quality monitoring including field operations, quality control activities and data management and reporting.</p> <p><i>CARB has conducted several training sessions. CARB also conducted training with SPA staff on data review and validation procedures. CARB participated in the audits of the SPA air monitoring stations performed by INECC in June of 2018 to ensure proper functioning of the equipment and to train INECC staff on performance audits using CARB methodology.</i></p>	
	<p>Capacity building and improved understanding of cross-border air quality and emissions sources.</p>	<p>Enhance air monitoring stations in Mexicali with continuous PM2.5 monitors and a PM2.5 speciation sampler. These monitors were used in a two-year PM2.5 study of the Mexicali/Imperial County region.</p> <p><i>The Mexicali PM2.5 monitoring study ended in April 2018. CARB is preparing an analysis of the data to send to U.S. EPA. Through additional Grant 105 funding received, CARB staff is working to reinstate a two-year contract to continue monitoring PM2.5 in Mexicali at the two sites.</i></p>	
	<p>Improve auditing of the Baja California air quality monitoring network.</p>	<p>Provide training on how to conduct performance audits of air monitoring instruments and samplers.</p> <p><i>CARB participated in the audits of the SPA air monitoring stations performed by INECC in June 2018 to ensure proper functioning of the equipment and to train INECC staff on using CARB methodology.</i></p>	

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

Cooperation on Clean Vehicles

The Clean Vehicles Working Group involved technical staff from both SEMARNAT and CARB. The group participated in quarterly conference calls, and frequently exchanged information and updates.

Over the course of the MOU, CARB staff provided extensive training to representatives from SEMARNAT and other agencies in Mexico on subjects related to reducing emissions from on-road motor vehicles. In April of 2015, CARB staff participated in a workshop in Mexico City and gave presentations about the development and implementation of new vehicles standards for smog forming criteria pollutants and GHG pollutants. CARB staff also gave presentations on California's Smog Check Program and highlighted the use of vehicle on-board diagnostic (OBD) systems as the basis for a strong and efficient vehicle inspection program. In August of 2015, CARB staff participated in a workshop on fuel regulations in Mexico City. The focus of the workshop included the characteristics of clean fuel formulations, the need for clean fuels to enable the use of advanced emission controls, the enforcement of fuel standards, and lessons learned in the U.S. on motor vehicle fuels issues. Representatives from SEMARNAT traveled to Sacramento for two days in September of 2016 to participate in an in-depth training on California's OBD II program and the use of OBD systems in the California Smog Check Program. The California Bureau of Automotive Repair (BAR) assisted CARB staff in conducting the training. The group visited a local smog check station and watched testing demonstrations at BAR's headquarters. The training also covered how equipment for vehicle inspections is designed and used in the Smog Check Program, how California addresses program fraud, and how California's Smog Check database is designed.

In September of 2017, SEMARNAT published new standards and test procedures for vehicle emissions inspection programs that apply nationally. The procedures make greater use of vehicle OBD systems in the inspection process, similar to how programs work within the U.S. The new rules were published as the Mexican standard "NOM-167-SEMARNAT-2017." The new rules will provide for the better identification and repair of in-use vehicles with emission-related malfunctions. SEMARNAT has also made progress in updating Mexico's new light-duty vehicle standards for GHG and criteria pollutants. Modelling, feasibility, and economic impact studies have been completed for the GHG pollutants and draft regulations are expected by the end of 2018. Revised standards are also under development for criteria pollutants, with the ultimate goal being the alignment of Mexico's standards with those currently in place in the U.S. for light-duty vehicles.

Revised standards for heavy-duty diesel vehicles were finalized by SEMARNAT in February of 2018. These revisions effectively align Mexico's standards with U.S. standards for 2010 and newer model year heavy-duty engines. New requirements are also under development for aftermarket catalytic converters. These revised requirements will better ensure that replacement of aftermarket catalytic converters installed on in-use vehicles will durably perform at high levels of pollutant conversion efficiency, minimizing excess emissions from the fleet.

PROGRESS ON CLEAN VEHICLES

Clean Vehicles Overarching Goal 1	Working Group Activities	Deliverables	Progress
Update and design the Mexican vehicle emission standards for GHG and smog pollution based on California's standards.	Improve the Mexican regulatory requirements for vehicular criteria pollutant emissions: Develop the standards for light vehicle emissions in 2015 and beginning of 2016 and the standards for heavy-duty vehicles in 2016 and 2017 (for new and in-use vehicles including motorcycles).	Draft Mexican Official Norms and Regulatory Impact Study. <i>Impact studies and initial draft regulations have been created for the GHG standards. Significant foundational work has been done for criteria pollutants, and public consultation for the Draft Standard was completed -- on September 28, 2018, Standard NOM-163-SEMAR-NAT-ENER-SCFI-2013 was published in the Mexican Official Journal.</i>	
Clean Vehicles Overarching Goal 2		Deliverables	Progress
Clean Vehicles Overarching Goal 2	Advance Mexico's efforts on Dirección General de Fomento Ambiental, Urbano y Turístico (DGFAUT) compliance and enforcement of environmental standards for vehicles.	Publication of an "Emission Standards Equivalence Guide" (DGFAUT). <i>The idea of a guide was replaced by making amendments to the regulations for inspection and maintenance directly. Therefore, further work on the guide has been canceled.</i>	
Clean Vehicles Overarching Goal 3		Working Group Activities	Deliverables
Contribute to Mexico's progress on the use of new technologies and strategies for the reduction of vehicular emissions (e.g. strategy for freight transportation, emissions inventories for mobile sources, vehicular emissions diagnosis and maintenance, OBD for vehicle inspections, clean and low-carbon fuels and strategy for the import of used vehicles into Mexico).	Develop an integrated strategy on freight transportation for improving SEMARNAT's Clean Transportation Program: learn from California's experience about the implementation of measures to prevent and control the emissions in this sector.	Collaboration with SEMARNAT staff who will visit California to discuss the freight trucks program and exchange experiences. <i>SEMARNAT staff received all needed training from federal agencies in the U.S.</i>	

Progress Key	No Progress	
	Initial Progress	
	Moderate Progress	
	Significant Progress	
	Deliverable Achieved	

Clean Vehicles Overarching Goal 3 (cont.)	Working Group Activities	Deliverables	Progress
<p>Contribute to Mexico's progress on the use of new technologies and strategies for the reduction of vehicular emissions (e.g. strategy for freight transportation, emissions inventories for mobile sources, vehicular emissions diagnosis and maintenance, OBD for vehicle inspections, clean and low-carbon fuels and strategy for the import of used vehicles into Mexico).</p>	<p>Training and experience exchange on the elaboration of an emissions inventory for vehicular and off-road mobile sources.</p>	<p>Development of a methodology for the emissions inventory estimation for vehicular and off road sources for Mexico.</p> <p><i>In 2016, INECC published the National Inventory of Emissions of Gases and Greenhouse Compounds, base year 2013.</i></p>	
	<p>Training and experience exchange on methods to ensure compliance with mobile source standards.</p>	<p>Collaboration between California and Mexican technical personnel (DGFAUT).</p> <p><i>SEMARNAT staff received extensive training on emissions inspection and maintenance programs that took place both in Mexico City and in California.</i></p>	
	<p>Establish a workgroup to define the environmental criteria for the import of used vehicles into Mexico.</p>	<p>1. Environmental criteria for the definitive import of used vehicles into Mexico.</p> <p>2. Collaboration between California and Mexican personnel on options for strategy development for imported vehicles and mitigation of their environmental impact in Mexico.</p> <p><i>After some collaboration, SEMARNAT proposed to eliminate this activity from the work plan.</i></p>	
	<p>Training on the OBD Systems: training and experience exchange for the application of OBD as part of Vehicle Emissions Verification Programs.</p>	<p>Criteria and technical specifications for the reliable use of OBD systems during the process of Vehicular Emissions Verification.</p> <p><i>Extensive training was provided to SEMARNAT, and updated OBD based vehicle inspection test procedures were published for Mexico.</i></p>	
	<p>Experience exchange related to strategies for introducing and promoting the use of alternative fuel and vehicular technologies.</p>	<p>Work document that includes California's experience to promote the production and use of alternative vehicular fuel and technologies.</p> <p><i>Training was provided by CARB staff at a workshop in Mexico City. SEMARNAT concluded that this training was enough to meet its needs under this activity.</i></p>	

Cooperation on Wildfires

Due to climate change, wildfires in California and Mexico have been increasing in frequency, intensity and duration. As the climate warms, moisture and precipitation levels are changing, with wet areas becoming wetter and dry areas becoming drier. High temperatures cause soils to be drier for longer, increasing the likelihood of a longer wildfire season, which has been the case in both California and Mexico. In recent years, California has faced the worst wildfires in its history, causing the loss of lives, damage to property and the environment, and economic impacts in the billions of dollars.

Since the inception of the MOU, the Wildfire Working Group met once in San Diego to develop the MOU Action Plan and discuss training opportunities, followed by several video conferences to continue collaboration. One key area of cooperation was the exchange of knowledge and material on wildland-urban interface (WUI) strategy. With the support of the California Environmental Protection Agency, the California Department of Forestry and Fire Protection (Cal FIRE) Wildland Urban Interface Operating Principles (WUI Principles) was translated into Spanish and provided to CONAFOR. The WUI Principles are intended as a reference to provide readers with the tools necessary to better respond to, command, and understand incidents involving the WUI, which refers to the zone of transition between unoccupied land and human development. These lands and communities adjacent to and surrounded by wildlands are at a greater risk of wildfires. This guide better prepares fire professionals for the challenging task of fighting fire in the WUI, with its unique combination of wildfire attack and structure defense demands. The knowledge compiled in this volume can save property, but more importantly, lives — of both civilians and firefighters. In addition, in July 2016, a Spanish-translated copy of the California Governor's Office of Emergency Services (Cal OES) FIRESCOPE WUI Structure Protection guide was also provided to CONAFOR. This guide provides a general overview of strategies and guidelines for fire behavior forecasting and tactics, as well as structure protection and triage.

In 2016 and 2017, instructors from Cal FIRE and CONAFOR provided training to 180 Mexican firefighters in both California and Mexico. In October 2016, Cal FIRE partnered with CONAFOR to host the International Wildland Firefighting training in Ensenada, Baja California. Topics of instruction included Atmospheric Pressure, Topography, Fire Behavior, Fire Prevention, Fire Investigation, Incident Command System, Communication, Aviation, Firefighter Safety and Survival, Firing Devices, and Finance. Additional training on Wildfire Suppression was held in Tecate, Baja California, which provided Mexican firefighters with entry-level wildland firefighting training, as well as an introduction to wildland fire behavior and personal safety.



In 2017, the Wildfire Working Group participants collaborated on five training opportunities from March through November where training was provided to over 100 Mexican firefighters in both California and Mexico. Training topics included Wild Preparedness, Engine Operations & WUI, Helicopter Operations/Crew Members, and Incident Command System, among others.



PROGRESS ON WILDFIRES

Wildfires Overarching Goal 1	Working Group Activities	Deliverables	Progress
Wildfire Suppression	To exchange human resources and materials to collaborate on wildfire suppression within the Baja California - California border region.	Share best practices, expertise, and technical assistance with Mexican wildfire firefighters through international exchange programs, site-visits, and training courses to further improve the suppression of wildfires. <i>Several training courses were provided along the CA/Baja CA border region (for specific courses see above).</i>	● ● ● ●
Wildfires Overarching Goal 2	Working Group Activities	Deliverables	Progress
Capacity Development	Provide Incident Command System (ICS) training to Mexican technical personnel in California.	Train several Mexican trainers (train-the-trainer) on ICS and provide the opportunity to observe the incident management teams on ICS during real time. <i>Several training courses were provided along the CA/Baja CA border region (for specific courses see above).</i>	● ● ● ●
		Training and working alongside to establish a history of successfully working together in an effort to establish future joint activities. <i>Several training courses were provided along the CA/Baja CA border region (for specific courses see above).</i>	● ● ● ○

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●


PROGRESS ON WILDFIRES




Wildfires Overarching Goal 2 (Cont.)	Working Group Activities	Deliverables	Progress
Capacity Development	Participation of technical personnel on fuel management methods (mechanical, prescribed burns and others): Mexican trainers to participate in prescribed burning to expand their technical knowledge and enhance their experience in fuel management.	For Mexican Leader's Program (One time): <ol style="list-style-type: none"> 1) Sharing experiences/lessons learned to establish a prescribed burning program. 2) Strategy of social communication. 3) Cost analysis of a prescribed burning program/fuel management program. 4) Requirements to establish an equipment and technical training program. 5) Other fuel management methods to reduce fuel loads on forest. <p><i>Initial progress made - the WUI Principles were translated and shared with CONAFOR and include information on fuel management.</i></p>	
		For Mexican trainers (each year): <ol style="list-style-type: none"> 6) Review plans for natural resource management and fire management plans. 7) Review / Formulate burning plans and objectives. 8) Participation of Mexican technicians with prescribed fire brigades of CA. 9) Participation of Mexican technicians with fuel management brigades of CA. <p><i>Initial progress made - the WUI Principles were translated and shared with CONAFOR and include information on fire management. Trainings led by Cal Fire and CONAFOR in Ensenada and Tecate, Baja California addressed fire behavior and wildfire suppression.</i></p>	

Wildfires Overarching Goal 2 (Cont.)	Working Group Activities	Deliverables	Progress
Capacity Development	Provide training for utilization and operation of water pump truck engines.	Exchange lessons learned between CAL FIRE technicians and Mexican Leader Program: 1) Process to establish a fire engine program for fighting fires and prescribed burn. 2) Policies and procedures in short, medium and long term to run a fire engine program (including decision-maker's actions before, during and after fire season). 3) Developing capacities strategy in México under the concepts used by CALFIRE. 4) What the decision makers must do before, during and after fire season <i>Initial progress made - the WUI Principles provided information on fire engines; in 2017 a training was provided on engine operation.</i>	
		For Trainers: 5) Allow Mexican trainers to participate in fire engine use courses in CA. 6) Train several Mexican trainers on fire engine use in real time. 7) Process to establish preventive and corrective fire engine maintenance program (including what crew engines must do before, during and after fire season). <i>Initial progress made - the WUI Principles provided information on fire engines; in 2017 a training was provided on engine operation.</i>	

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

PROGRESS ON WILDFIRES

Wildfires Overarching Goal 2 (Cont.)	Working Group Activities	Deliverables	Progress
Capacity Development	Exchange technical information about Emergency Operations Centers, dispatching protocols and mobilization, statistics management, inter-institutional coordination, among others.	1) Providing technical information and exchange on emergency operation centers, dispatching protocols and mobilization. 2) Statistics management, hardware and software, communications protocols, interagency coordination. 3) Visit CA emergency operation centers to share lessons learned. <i>Initial progress made - the WUI Principles provided technical information about the Emergency and Joint Operations Centers and inter-institutional coordination, and Cal Fire trainings were given on the Incident Command System.</i>	

Wildfires Overarching Goal 2 (Cont.)	Working Group Activities	Deliverables	Progress
Capacity Development	Conduct joint training regarding Wildland Urban Interface issues.	For Mexican Leader Program: <ol style="list-style-type: none"> 1) Development of the Urban Interface Strategy, implementation, policies and procedures 2) Provide training for Mexican trainers on how to develop educational actions on wildland urban interface issues. 3) Process to develop fire severity zone maps. 4) Share lessons learned on interagency coordination for law enforcement, wildfire prevention engineering, owner's participation, and wildland hazards/building codes. <p><i>The WUI Principles were translated into Spanish and provided to CONAFOR to address WUI strategies, procedures, and training for firefighters.</i></p>	
		For trainers: <ol style="list-style-type: none"> 1) Train several Mexican trainers on: <ol style="list-style-type: none"> a) Procedures for fighting fires on Wildland urban interface zones. b) Safety issues for fighters, owners and public. <p><i>The WUI Principles were translated into Spanish and provided to CONAFOR to address WUI strategies, procedures, and training for firefighters.</i></p>	
Wildfires Overarching Goal 3	Working Group Activities	Deliverables	Progress
Capacity Development/Equipment	Equipment and tools donations.	Support Mexican Fire Program with equipment, hand tools and Personnel Protective Equipment through CA surplus donations. <p><i>No progress was made. Equipment and tools were not available to donate.</i></p>	

Progress Key	No Progress	○ ○ ○ ○
	Initial Progress	● ○ ○ ○
	Moderate Progress	● ● ○ ○
	Significant Progress	● ● ● ○
	Deliverable Achieved	● ● ● ●

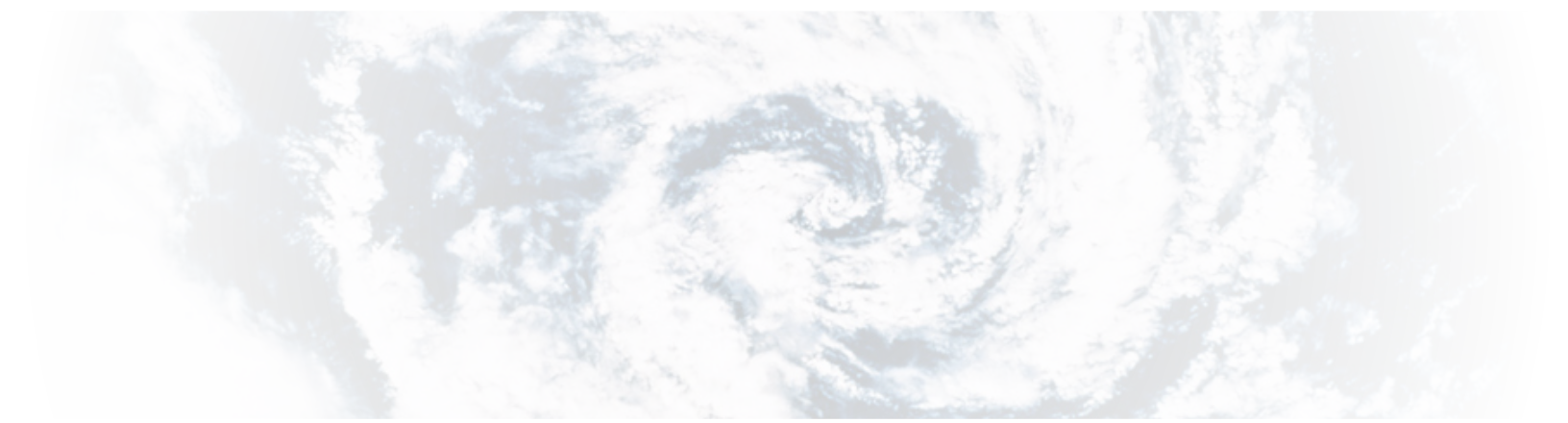
Looking Forward

The California-Mexico MOU on Climate Change and the Environment has been a model of success for operationalizing the State of California's agreements with an international government entity. Both parties to the MOU have invested considerable time, effort and resources towards implementing the MOU, ranging from technical cooperation and information sharing to participation in face-to-face trainings and workshops to political coordination and documentation of progress.

Given the success of this agreement, MOU participants from both California and Mexico hope to see continued cooperation on these and other important issues in the coming years. While any new agreement would reflect the priorities of both governments at the time, there is still a significant amount of work that could be undertaken within the existing areas of cooperation:

- On climate change, potential areas of future cooperation could include the development and implementation of emissions trading systems in each jurisdiction, the development and implementation of jurisdictional forest offset programs (e.g., avoided deforestation) and support for integration of sector-based offset programs into national or international GHG emissions programs.
- Cooperation on clean vehicles could include continued work to fully align Mexico's light-duty vehicle standards with U.S. standards for both criteria pollutants and GHG emissions, coordination on new emission standards and OBD requirements for motorcycles and ideas for inspection and maintenance of in-use motorcycles, and evaluation of existing emission-related requirements for the import of used vehicles.
- On the issue of air quality, potential topics could include further work on emissions inventories, air monitoring, border air quality, education and collaboration on air quality programs, and reducing emissions from open burning and combustion.
- Regarding wildfires, future cooperation might entail an extension of training opportunities and a continuation of the sharing of best practices and technical expertise on wildfire management and prevention.

Regardless of the details of future agreements, the parties should place a high importance on continuing the existing model for cooperation, which has succeeded in opening the lines of communication between the technical staff in California and Mexico and facilitating a regular flow of information both ways. Continued collaboration between California and Mexico is key to addressing the most important environmental issues of our time and should be enhanced in the future for both governments to benefit mutually from each other's successes, challenges and lessons learned. We would like to thank staff from both California and Mexico for their dedication and commitment these past four years on this important work.



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