

**EVALUATION OF THE REQUIREMENTS
NECESSARY TO INTRODUCE CROSS-
BORDER EMISSIONS CREDIT TRADING
BETWEEN CALIFORNIA AND BAJA
CALIFORNIA, MEXICO**

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Abstract

This analysis identifies barriers and seeks mutually beneficial solutions for implementing a cross-border emissions trading program between California and Baja California, Mexico. This work was conducted under Task 4 of the overall contract for the California-Mexico Border Energy Issues Analysis. Existing and proposed U.S. and Mexican federal and state laws and local/regional regulations in the border region that relate to the permitting of (mainly) criteria air pollutant emission sources, air pollutant emissions, and ambient air quality are described. Barriers impeding a California-Baja California regional cross-border emissions trading program and benefits and opportunities to establish such a program are identified and described. Attributes, limitations, monitoring requirements, enforcement, harmonization of air quality standards across jurisdictions, cost-effectiveness, and functional operation of optimal cross-border emission credit trading schemes are evaluated and compared. Finally, recommendations are made regarding the conditions, actions, and changes needed to implement a California/Mexico emissions credit trading scheme. These recommendations include a phased approach that implements a pilot program used to inform a “go/no-go” decision on phasing in a full cross-border emissions trading program. If the decision were made to move beyond the pilot program, a master implementation plan would be developed to guide the process. The master plan would provide a blueprint for full implementation of, for example, a project-based trading program modeled after the U.S. New Source Review program and/or a full, international cap-and-trade program.

Keywords:

California-Baja California, emission trading, new source review, cap-and-trade

Executive Summary

Background

Many of the cities on both sides of the California-Baja California (CA-BC) border share the same air basin. Sources of air pollution on one side of the border often affect the other side. With rapid industrial, commercial, and population growth on both sides, improvements in the border region's air quality are expected to become increasingly difficult to achieve based on existing air pollution control programs. On the U.S. side, permitting requirements applicable in San Diego and Imperial Counties can make it difficult to site or expand industrial processing or energy infrastructure facilities. Emissions credit trading can be structured to provide regional emission reductions and/or enable economic growth and modernization of equipment and facilities without interfering with existing pollution control strategies.

The team of KEMA, Inc.; Eastern Research Group, Inc.; Sierra Nevada Air Quality Group, LLC; and Alliance Consulting International performed a project to identify barriers and seek mutually beneficial solutions for implementing a cross-border emissions trading program (CBETP) under California Energy Commission (Energy Commission) Contract No. 600-05-011. The objectives of this project, conducted under Task 4 of the contract, are as follows:

- Subtask 4.1: Describe existing and proposed federal and state laws and local/regional regulations in the border region that relate to the permitting of air pollutant emission sources, air pollutant emissions, and ambient air quality.
- Subtask 4.2: Identify and describe barriers impeding a CA-BC regional CBETP emissions trading program and described benefits and opportunities to establish such a program.
- Subtask 4.3: Compare the attributes, limitations, monitoring requirements, enforcement, harmonization of air quality standards across jurisdictions, cost-effectiveness, and functional operation of optimal cross-border emission credit trading schemes.
- Subtask 4.4: Recommend circumstances, conditions, actions, and changes needed to implement a California/Mexico emissions credit trading scheme.

Objectives and Scope

The project scope addresses potential emissions trading mainly pertaining to criteria air pollutants. Greenhouse gas (GHG) emissions are discussed briefly in the context of the emissions trading provisions of California's Assembly Bill 32 (AB 32) (Núñez, Chapter 488, Statutes of 2006) and the Kyoto Protocol.

Current and emerging U.S., Mexican, California, and Baja California air quality regulations were compiled, examined, and summarized. Also, information pertaining to the guiding principles and activities of international programs that shape growth and affect development in the border region were compiled. Data were obtained primarily from the Internet, and as needed, from telephone conversations with various regulatory agency staff. This approach does not duplicate previous similar efforts, but expands on them, provides the authors' additional perspectives, and presents what the authors understand to be the complexity of the evolving regulatory infrastructure related to emissions trading programs.

The approach used for listing and describing the laws and regulations focused on their impact, or potential impact, on cross-border emissions trading in the CA-BC border region. Provisions of the relevant laws and regulations that directly affect the design or operation of a cross-border emissions trading program were listed and examined, and then summarized in matrix format.

The reference to "permitting" was interpreted broadly to include both formal permits issued by air pollution control jurisdictions and other situations or decision points where a jurisdiction has the authority to approve, deny, or conditionally approve a proposed energy project.

To understand and characterize the full range of benefits, opportunities and barriers to a potential cross-border emissions trading program, a list of questions was developed. Examples of some of these questions included the following:

- What are the goals of a cross-border emissions trading program and what benefits are derived directly or indirectly from those goals?
- Among the U.S., California, Mexican, and Baja California agencies, which should be involved in developing and implementing a cross-border emissions trading program?
- What, if any, role would affected private sector interests and public interest groups play in establishing a cross-border emissions trading program?
- Are air quality problems well enough understood in the CA-BC border region to design an effective trading program?
- Are emissions data accurate enough to meet the needs of a trading program? Is the accuracy comparable on both sides of the border?
- How would an international emissions bank or trading exchange be established, and who would operate it?

Next, potential sources of information needed to answer the questions were investigated, and interviews and research were conducted to obtain the information necessary to "answer the questions" and identify specific opportunities and obstacles for establishing a cross-border emissions trading program in the CA-BC border region. During this process, the cross-border emissions trading program benefits were grouped into the following areas: environmental (air quality and emissions), institutional and interagency, business sector, and other (for example, social). Opportunities were characterized in terms of specific projects, which were described,

participants identified, and reasons for success or failure explained. The cross-border emissions trading program barriers were grouped into the following areas: legal, institutional, technical, and practical (implementation related).

The evaluation of requirements necessary to implement a cross-border emissions trading program was based on research pertaining to existing emissions trading programs and their various “attributes,” such as air quality goals, physical boundaries, sources included, allocation method, and organizational approach. A general analysis focused on these various design and implementation attributes: monitoring requirements, enforcement, harmonization of air quality standards, cost-effectiveness, and functional operation.

Although there are several ways to categorize trading programs, most fall into the following general types: cap-and-trade, project-based (or offset), and rate-based credit (or averaging). The rate-based approach has been used as a compliance option in some on-road motor vehicle and off-road mobile source control regulations in California and has been applied to stationary sources in Texas (the El Paso brick kiln replacement project). However, for several reasons, such as California’s strong regulatory tradition of emphasizing on-site emissions reductions from stationary sources and local and regional benefits from on-site emission reductions, a rate-based approach likely is not feasible for cross-border emissions trading. Therefore, a detailed analysis of the various design and implementation attributes focuses on cap-and-trade and project-based types of programs.

The KEMA team approached the overall project with few preconceptions about the efficacy of a cross-border emissions trading program. The team’s conclusions are based on the information and analysis developed under previous subtasks. The result is a set of conclusions about the feasibility of successfully establishing an effective cross-border emissions trading program, a recommended approach, and an example of how the approach could be implemented. The objective of the recommendations is to be as practical as possible in laying out a course of action that appears to have the greatest chance of producing a viable cross-border emissions trading program given the difficulty of doing so.

Conclusions

The conclusions of this analysis are presented below in their entirety as they are presented at the end of each chapter of this report.

Review of Current and Proposed Federal, State, and Local/Regional Laws and Regulations Affecting the CA-BC Border Region

The U.S. Constitution, in Article I, Section 8, Clause 3 (also known as the Commerce Clause), provides the federal government with the authority to negotiate international treaties and regulate air pollution within the United States. This authority has been used to adopt the Federal Clean Air Act (FCAA) and to negotiate environmental agreements with Mexico. The

FCAA provides the U.S. Environmental Protection Agency (U.S. EPA) with the authority to apply federal air quality requirements in California and the discretion to preempt state air quality regulations in some situations. As a result, a cross-border emissions trading program would likely require extensive federal involvement and changes to federal law. However, in California, where many FCAA provisions are deeply embedded in state and local air regulations, and many local regulatory provisions have been included in federally approved air quality plans, federal law and state and local regulations are intertwined and operate together to form the legal environment in which a cross-border emissions trading program would be developed.

The statutes and regulations of the State of California establish a framework that provides for the trading of emissions between sources within an air district and between sources in different air districts and air basins, but not for trading emissions with sources in Mexico. Any program developed to provide for cross-border trading would require changes to California law, although the technical foundation would remain the same. It should be noted that the technical foundations needed for trading programs (emission inventories, enforceable attainment demonstration plans, and enforceable facility permits) may not exist in all cases in Mexico or they may not provide the level of protection or information needed to meet emission trading requirements.

The provisions of California's AB 32 include use of a market trading system to achieve GHG emission reductions by 2020. Market system trading implementation strategies have recently been analyzed by the Governor-appointed Market Advisory Committee (MAC). The MAC's recommendations imply that obtaining offsets from a foreign country should be accepted, but only if the other jurisdictions have an agreement with California to adequately ensure a similar level of environmental integrity and accountability in their emissions control programs. To date, no AB 32 regulations have been made public; therefore, it is not possible to predict how California regulatory statutes might allow and enforce cross-border emissions trading in the CA-BC border region with regard to GHGs.

Mexico, including Baja California, has no environmental laws, regulations, or official standards addressing emissions trading in any substantive manner. The only reference to this issue in statute is contained in the federal General Law, which empowers the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT – Secretariat of the Environment and Natural Resources) to promote emissions trading systems for the prevention and control of air pollution.

The La Paz Agreement's Annex V, Appendix I, contains language requiring the development of recommendations on emissions trading and other economic incentives, but only as a part of air quality programs in the Ciudad Juárez (Chihuahua)-El Paso (Texas)-Doña Ana County (New Mexico) air basin. Another international agreement, the Kyoto Protocol, has a very structured program for estimating emissions for GHGs and trading them between industrialized and developing countries. Even though the United States has not ratified participation in the Kyoto Protocol, the emissions trading program implemented through the Kyoto Protocol could serve as a conceptual model for a future program developed in the CA-BC border region. The Kyoto

Protocol's provisions pertaining to GHG emission estimation using approved protocols, certification of emissions by third parties, banking and accounting of emissions via registries, and so forth, could apply to criteria pollutants the same as for GHGs.

Benefits, Opportunities, and Barriers for Establishing a Cross-Border Emissions Trading Program

The actual benefits realized and the barriers encountered depend heavily on the goals set for the program, as well as how it is designed and implemented. A cap-and-trade program that is designed to improve air quality on both sides of the border, but also has provisions to facilitate the construction of new sources, has more potential benefits than a project-based program. For example, an ambitious cap-and-trade program might yield the following potential benefits:

- Produce significant public health benefits by reducing exposure to ozone and particulate matter on both sides of the border.
- Reduce the overall cost of air quality controls in the CA-BC area.
- Make it easier to site energy-related infrastructure in the CA-BC area.
- Establish a precedent for cross-border trading in other parts of the country.
- Increase U.S. investment in modernizing and reducing emissions at Mexican industrial facilities.
- Enhance air pollution control programs, particularly in Mexico.

The benefits of an effective project-based program that is designed to facilitate the siting of new sources without degrading air quality would be fewer and in some case of reduced magnitude but would still be important. For example, the main potential benefits of a cross-border new source review program would be:

- Easier siting of industrial facilities and energy-related infrastructure in the CA-BC area, particularly on the U.S. side.
- To a lesser extent than cap-and-trade, establish a precedent for cross-border trading in other areas and enhance air pollution control programs in Mexico.

However, there are also legal, institutional, technical, and practical barriers to a cross-border emissions trading program. Many of the same barriers exist for a project-based cross-border emissions trading program as for a cap-and-trade program, but the cap-and-trade barriers tend to be higher. Most barriers exist in both the United States and Mexico, and among them are the following:

- Federal, state, and local laws and regulations will have to be amended in both countries.

- Numerous government agencies at all levels of government in both countries will need to be involved.
- The views of private sector interests, including industry groups and nongovernmental organizations, need to be accommodated.
- Some air quality information will need to be upgraded to provide a reliable technical basis to design a cross-border emissions trading program, including information on the emissions and operation of industrial sources in Mexico. Better technical information is a more pressing need for a cap-and-trade program.
- Political leadership will have to emerge in both countries to garner the resources needed and facilitate effective decisions on cross-border emissions trading program design and implementation.

Certain factors emerge as particularly significant, including the following:

- Creating a basic offset program poses some immediate challenges for Mexico. Air pollution regulatory infrastructure is not as developed in Baja California as in California. For example, there are no mass-based limits on emissions of criteria pollutants, only emission rates and concentration limits. In addition there is no planning process analogous to U.S. State Implementation Plans that integrate source air emission rates and ambient air quality standards. Also, there are no rules on attainment or corresponding penalties for nonattainment in individual air basins.
- Mexico has no experience operating a cap-and-trade program. The development of a more robust emissions reporting system in Baja California is needed. Reliable data on emissions from the sources that are included in the program are essential to meeting U.S. policy and legal criteria for a cross-border emissions trading program and for evaluating the actual potential of emissions reductions from these sources.
- There is no complete precedent for cross-border trading. The El Paso Electric Company brick kiln replacement project provides an interesting demonstration but it bypassed the FCAA and therefore does not provide a legal precedent for a broader cross-border emissions trading program.
- Some project proponents have been challenged by the limited availability of emissions reduction credits in San Diego and Imperial counties, but there are also other factors that affect the decision of where to locate new power plants and other facilities.
- Better quality information on the atmospheric fate and transport of ozone and particulate precursors is needed. This information is needed to deal with key cross-border emissions trading program design issues such as interpollutant and interprecursor trading and to increase public confidence that a cross-border emissions trading program will actually meet air quality goals.
- Convincing the regulated community on both sides of the border that the program is fair, reliable, cost-effective, and mutually beneficial is crucial to success.

- Establishing a viable and stable banking and/or credit market that is both transparent and reliable is essential.

Given the state of air quality regulations in the CA-BC region, the opportunity to create a vital and effective cross-border emissions trading program initially depends on the demand for emission reduction credits on the U.S. side of the border and the supply of potential credits in Mexico. Credits for some pollutants are difficult to come by in California, and there appear to be numerous industrial facilities in Mexico that could reduce their emissions to generate credits. A demand for credits can also emerge in Baja California if future requirements mandate overall emissions reductions from Mexican sources, but the interest in establishing a program at this time is greatest among those who wish to build projects in California and are frustrated by the difficulty of obtaining offset credits.

The information in this report shows why it is difficult to assess objectively the current level of demand for a cross-border emissions trading program in California. There have been no cross-border trades and therefore no real-world test of the concept. Recently, some California power projects have had difficulty assembling sufficient credits, although five peaking plants and a baseload plant have ultimately been approved. Deposits in air district emission reduction credit banks are relatively small, and the actual availability of deposited credits is hard to assess. Anecdotal information indicates that some projects have been delayed or shelved, particularly in Imperial County, due to the inability of acquiring credits. Two major power plants have been sited in Mexico with most of their electricity generation dedicated to serving the U.S. market. While the inability to acquire emission reduction credits in the United States may have been a factor in the decision to locate these facilities in Mexico, there are other reasons as well.

It is even more difficult to quantify the potential supply of credits. The design and implementation of a cross-border emissions trading program will significantly influence the willingness of sources to reduce emissions beyond minimum requirements to generate marketable credits. Regulatory requirements in Mexico are generally less stringent than in California, so there would appear to be opportunities to modernize or control these sources to generate credits. On the other hand, there is insufficient information available about existing sources in Baja California to quantify their ability to reduce emissions.

From available information, it can only be concluded that there is interest in cross-border trading on the California side of the border, which is motivated in part by the difficulty of obtaining sufficient credits to meet New Source Review offset requirements. There appears to be a significant potential for sources in Baja California to generate credits, but more information is needed to objectively assess that potential. The design and implementation of a cross-border emissions trading program will help to determine both demand and supply.

Evaluation of Requirements Necessary to Implement Cross-Border Emissions Trading

To understand the attributes, limitations, characteristics, and operation of an optimal cross-border emissions trading program, existing and proposed programs are identified and discussed, along with the design and implementation elements of project-based and cap-and-trade programs. Much of the focus is on cap-and-trade because only a cap-and-trade program would be capable of achieving the assumed long-term purpose of a cross-border emissions trading program — to improve regional air quality on both sides of the border. However, project-based emissions trading also has a role to play in a cross-border emissions trading program. While expanding New Source Review, a project-based trading program, into Mexico would not in itself bring about significant regional air quality improvements, New Source Review would provide a means of dealing with air quality impacts from the expansion of industrial and infrastructure facilities. Since the ability to site new infrastructure facilities is of particular concern on the U.S. side of the CA-BC region, an optimal cross-border emissions trading program must deal effectively with new sources. To do so, the cross-border emissions trading program would need to allow new sources to be sited in a predictable regulatory environment while ensuring their air quality impact is mitigated.

In addition to dealing with new sources, some preliminary conclusions about the design and implementation of an optimal cross-border emissions trading program are as follows:

- A cross-border emissions trading program could begin on a limited or pilot scale by allowing a limited number of new or expanding sources in California to access emission reduction credits created in Mexico.
- In subsequent phases, the cross-border emissions trading program could be expanded to create a project-based, new source review type program on the Mexican side of the border, and later a cap-and-trade program that would operate alongside New Source review.
- More complete and accurate information on stationary source emissions in Mexico is needed to establish reliable emissions reduction goals for a cross-border emissions trading program, and to issue allocations to individual sources.
- The universe of sources included in a cap-and-trade program will need to be more diverse than the U.S. Acid Rain or Nitrogen Oxides (NO_x) Budget Trading Programs, which focus on energy-generating units.
- Mandatory participation would probably be required for the universe of sources subject to the regional emissions cap or caps.
- More information on cross-border pollutant movement may be needed to set the physical boundaries of the trading area.
- More region-specific information on the relationship among ozone and fine particulate precursors will be needed to determine whether inter-precursor trading should be allowed or at what ratios it should occur.

- One of the key issues in designing a cross-border emissions trading program is to decide whether it would be administered by a centralized, international organization or a decentralized structure that uses existing institutions.
- If a decentralized organizational structure is selected, the second issue is how to ensure that the cross-border emissions trading program will have the consistent monitoring, record-keeping, reporting, and compliance requirements that are so important to an effective program.

Recommendations

The KEMA team approached the overall project with few preconceptions about the efficacy of a cross-border emissions trading program. The team's conclusions are based on the information and analysis developed under previous subtasks. The result is a set of conclusions about the feasibility of successfully establishing an effective cross-border emissions trading program, a recommended approach, and an example of how the approach could be implemented. The bias is to be as practical as possible in laying out a course of action that appears to have the greatest chance of producing a viable cross-border emissions trading program given the difficulty of doing so.

The focus of this entire report is on a cross-border emissions trading program that would deal with traditional or "criteria" air pollutants. Some may suggest that an international trading system for GHGs might emerge in the next few years that would allow trading between the United States and Mexico and pave the way for a cross-border emissions trading program for traditional pollutants. But there are significant differences in the technical aspects of the two environmental problems that have to be reflected in the details of the respective trading programs. Nevertheless, climate change programs are emerging rapidly. For example the Western Climate Initiative is developing a cap-and-trade program for GHGs that will include California, a number of other Western states and at least four Canadian provinces, but to date Mexican states are not partners in the effort. It is useful to monitor the development of GHG trading programs and look for opportunities to merge development efforts, but for now it is prudent to pursue a cross-border emissions trading program that addresses traditional pollutants.

Key Benefits and Barriers

A practical approach to a cross-border emissions trading program requires recognition that while the potential benefits can be significant, the barriers are both real and formidable. The most significant potential benefits are a reduction in ambient pollutant concentrations in the CA-BC border region, with:

- Commensurate reduction in public exposure to harmful levels of air pollutants.

- Enhancement of the opportunity to locate energy generation infrastructure and other facilities in the border region with less environmental impact.

It is difficult to build large infrastructure facilities in the border region, particularly on the California side of the border. Given the current situation, an effective cross-border emissions trading program has the “win-win” potential of achieving regional emissions reductions while facilitating needed energy generation infrastructure.

Unfortunately, an effective cross-border emissions trading program cannot be established without making a number of difficult legal and technical changes. Some of the barriers to making such changes are particularly daunting. For example, there is a substantial disparity between the air regulatory infrastructure in California and Baja California, and it must be narrowed considerably, if not closed, to implement an effective cross-border emissions trading program. A long-term effort and major investment of resources will be needed to close the gap.

On the U.S. side of the border, it is extremely difficult politically to make the changes in law, regulations, and policy that are needed to implement an effective cross-border emissions trading program. In particular, there is reluctance to “open up” the FCAA for amendments. Local authorities and other stakeholders in the border counties can be expected to have reservations and concerns about whether a cross-border emissions trading program would reduce local prerogatives or impair existing air quality improvement efforts.

The situation described above creates a misalignment between the benefits, which are potential by nature and would occur some years in the future, and the barriers, which tend to be more tangible and immediate. To skeptics, a difficult and risky upfront investment in a cross-border emissions trading program would be required to produce an uncertain long-term payoff.

Phased Approach

On balance, these benefits and barriers lead to the conclusion that current political and regulatory realities in both the United States and Mexico make it unlikely that a fully effective cross-border emissions trading program could be established at this time. The recommended alternative is to move forward deliberately with a phased approach that starts with a more limited program that defers and/or circumvents the most difficult barriers until such time as they can be tackled directly. A phased approach could begin with a pilot program that has limited air quality and few legal and institutional risks. The results of the pilot program would inform a “go/no-go” decision on phasing in a full cross-border emissions trading program. If the decision were made to move forward, a master implementation plan would be developed to guide the process. The master plan would provide a blueprint for full implementation of, for example, a project-based trading program modeled after the U.S. New Source Review program and/or a full, international cap-and-trade program.

One of the most important aspects of a phased approach is the opportunity to engage Mexican policy makers, give them the opportunity to learn about the potential benefits and difficulties of emissions trading, and ultimately provide the time required for Mexico to develop the regulatory infrastructure and institutional capacity needed for an effective program with California. Some of the broader advantages to be derived include:

- Promoting the North American Free Trade Agreement's (NAFTA's) stated goal of "upward regulatory harmonization" between the two countries.
- Providing additional resources to accelerate the regulatory development process in Mexico.
- Giving California regulatory agencies practical experience in coordinating activities with their Baja California counterparts.
- Developing a framework for a future cross-border emissions trading program implementation plan.
- Testing the concept of a cross-border emissions trading program before tackling the large barriers.

A Pilot Program

Some of the most difficult barriers to a cross-border emissions trading program could be lowered by implementing a small-scale pilot program that allows a few new or expanding industrial sources in the United States to offset their emissions increase with emissions reductions in Mexico. The supply of banked emissions reduction credits is limited in the two California border air districts, particularly in Imperial County. As a result, a likely objective of a future cross-border emissions trading program is expanding the opportunity to site new and expanding stationary sources, including energy infrastructure facilities, in the border region. Therefore, New Source Review appears to be the appropriate air program niche for a cross-border emissions trading program pilot program between California and Mexico.

There appear to be both a demand for credits on the U.S. side and a supply of potential credits on the Mexican side. There is a number of opportunities to reduce emissions in Mexico. Some preliminary data show many industrial manufacturing facilities and food processing operations emitting NO_x, sulfur dioxide (SO₂), and particulate emissions from burning fuel oil or other higher-polluting fuels. Most sources do not have add-on air pollution controls. The potential demand among Mexican facilities for energy efficiency improvements, which can also lower criteria pollutant emissions, provides another opportunity. On the Mexican side of the border, federal regulatory changes may not be required for a limited scope pilot program. Institutionally, the Secretaría de Protección al Ambiente de Baja California (SPABC) will need to strengthen its permit and enforcement departments to satisfy SEMARNAT's jurisdictional transfer requirements and to document the emission reductions in such a way that they meet the California air districts' criteria for issuing cross-border emission reduction credits to their local sources.

One option for a small-scale pilot cross-border trading program is to limit the scope of the program to a specific and well-known source category, for example, new or expanding power plants. California Air Resources Board comments noted that starting with a familiar, well-regulated source category like power plants would allow the program to take advantage of past technical and policy precedents. It would make it easier to agree on procedures for quantifying emission increases and decreases, select consistent emission factors and testing and monitoring requirements, and develop practical methods to ensure that offsetting emissions reductions are quantifiable, real, enforceable, and permanent. Finally, a pilot program that focused on power plants would promote energy infrastructure development on the California side of the border and directly address the shortage of banked offset credits in Imperial County. Whatever the merits of this option, it would require exemptions from federal law, as well as state law and local air quality regulations. Most power plants have sufficient emissions to be defined as “major sources” under federal law and are therefore regulated by numerous provisions of the FCAA. For this reason, this option would require at least a limited exemption from federal statutory and regulatory provisions

A second option is a pilot program that would be made available to new or expanding sources that have emissions increases large enough to require offsets under local air district rules, but are too small an increase to make the facility a “major source” under federal law. The resulting “window” in which such a pilot program could operate does exist, though it is unfortunately rather small. There is a limited number of existing stationary sources in Imperial County with emissions levels within this window. If these sources wish to expand or if similar new sources are proposed, they would be the potential users of the program. This option would also require some changes in state law and local regulations, but the adjustments could be relatively surgical. The premise of this approach is that it would necessitate no amendments to the FCAA or formal approval by the U.S. EPA.

Regardless which pilot program option is implemented, the specific design and operational details of the pilot program would need to be determined by the appropriate air pollution control agencies in the CA-BC region. On the U.S. side, a project proponent wishing to use the pilot program would submit a permit application to the local air district. The application would propose to use emissions reductions from one or more stationary sources in Mexico to generate the emission reduction credits needed to meet the local air district’s New Source Review offset requirements. The reductions in Mexico would have to meet regulatory criteria contained in an amended version of the air district’s emissions banking rule. The reductions, for example, would have to be shown to be real, quantifiable, permanent, enforceable and surplus. Some amendments to state law and air district regulations and policy would be necessary.

On the Mexican side, the program would operate somewhat differently because of the absence of a comparable permitting and other regulatory infrastructure. For illustration, the scenario might unfold along these general lines:

- One or more existing Mexican stationary sources in Baja California would enter into a voluntary agreement with Secretariat of Environmental Protection of the State of Baja

California to reduce its emissions by installing air pollution controls or other suitable means.

- The Secretariat of Environmental Protection of the State of Baja California would establish procedures to document the emission reductions and enforce their conditions. These conditions would need to be consistent with criteria used by California air districts to issue emission reduction credits, namely that they meet the “real, quantifiable, permanent, enforceable, and surplus” tests.
- The Mexican source would assume ongoing reporting obligations to Secretariat of Environmental Protection of the State of Baja California through the existing Annual Operating Permit.
- Fees would likely need to be levied by relevant Mexican agencies to pay for the management of the program.

While a carefully designed pilot program should provide useful and practical information, there is no guarantee that it will succeed or lead to a broader cross border emissions trading program. For example, many project proponents may find the prospects of successfully using the pilot program too uncertain to take a risk. In the case of the second option, the emissions increase “windows” are small, and few projects may emerge that fit within those windows. Nevertheless, the lessons learned from a pilot program would be highly useful to both California and Mexican authorities in reaching a public policy decision as to whether to proceed to additional phases of a cross border emissions trading program.

If a decision is made to move forward, the potential benefits of the cross border emissions trading program increase, the barriers become more significant, and greater resources and effort are needed. In this complex and difficult situation, a carefully drawn master implementation plan would be extremely useful.

Implementation Issues

The recommended phased approach to the creation of a cross border emissions trading program appears to be the most practical way to move forward, yet a number of important issues remain. Solutions to these issues are in the realm of public policy and show that more decisions are necessary if a cross border emissions trading program in the CA-BC border region is to move forward.

- Who will lead? – Some interested group of stakeholders must move the idea of cross-border emissions trading forward in the public policy arena.
- By what process will a decision be made whether to move forward? – A cross border emissions trading program will affect a large number of government and nongovernmental stakeholders. Informal meetings, workshops, formal hearings,

legislation, or some combination of the above could be used to seek input and reach a decision.

- How to engage Mexico? – In addition to government interactions, there are a wealth of formal and informal social, political, academic, and scientific networks operating on a wide range of issues in the California and Baja California border region. The engagement process across the border will be broad in scope and will not necessarily proceed along a straight and narrow technical definition of a cross border emissions trading program. At the governmental level, there is a number of existing bi-national forums ideally poised to serve as vehicles for information exchange between sister agencies and to provide institutional capacity-building opportunities. The Border 2012 program is the most well-developed and broadly represented on environmental issues. California and Baja California academic institutions have a number of cooperative programs that can assist in developing the scientific and technical underpinnings for the cross-border transport of air pollutants, as well as policy options for legislators and regulators on both sides of the border to evaluate in implementing an effective cross border emissions trading program. In Mexico, an effective strategy should involve all three levels of government—federal, state, and local—and at the same time encourage a broad-based dialogue from the social, political, business, and academic sectors on the merits and challenges of a cross border emissions trading program.
- How will additional information be collected? – It is likely that the outreach and decision-making process will generate additional questions and issues and it will therefore be necessary to conduct additional studies or inquiries. Funding and administration of these studies will be required.

Current political and regulatory realities in both the United States and Mexico make implementing a cross border emissions trading program very difficult and time consuming. The KEMA team recommends a phased approach that starts with a more limited program—one that works within existing limitations until such time as the main barriers can be tackled directly. However, even the phased approach is challenging to implement and will require a strong, well-coordinated effort involving cooperation among numerous stakeholders on both sides of the border.

CHAPTER 1:

Introduction

Table 1 shows the U.S. federal, California, and Mexican ambient air quality standards. Air pollution levels on both sides of the California-Baja California (CA-BC) border generally exceed these ambient air quality standards.

Many of the cities on both sides of the CA-BC border share the same air basin. Sources of air pollution on one side of the border often affect the other side. With rapid industrial, commercial, and population growth on both sides, improvements in the border region's air quality are expected to become increasingly difficult to achieve based on existing air pollution control programs. On the U.S. side, permitting requirements applicable in San Diego and Imperial Counties can make it difficult to site or expand industrial processing or energy infrastructure facilities. Emissions credit trading can be structured to provide regional emission reductions and/or enable economic growth and modernization of equipment and facilities without interfering with existing pollution control strategies. Implementing such a program between California and Mexico faces obstacles, such as the need to coordinate between federal and state statutory laws and regulations, as well as regional and international initiatives.

Objectives

The team of KEMA, Inc.; Eastern Research Group, Inc.; Sierra Nevada Air Quality Group, LLC; and Alliance Consulting International performed a project to identify barriers and seek mutually beneficial solutions for implementing a cross-border emissions trading program (CBETP) under California Energy Commission (Energy Commission) Contract No. 600-05-011. The objectives of this project, conducted under Task 4 of the contract, are as follows:

- Subtask 4.1: Describe existing and proposed federal and state laws and local/regional regulations in the border region that relate to the permitting of air pollutant emission sources, air pollutant emissions, and ambient air quality.
- Subtask 4.2: Identify and describe barriers impeding a CA-BC regional CBETP and described benefits and opportunities to establish such a program.
- Subtask 4.3: Compare the attributes, limitations, monitoring requirements, enforcement, harmonization of air quality standards across jurisdictions, cost effectiveness, and functional operation of optimal cross-border emission credit trading schemes.
- Subtask 4.4: Recommend circumstances, conditions, actions and changes needed to implement a California/Mexico emissions credit trading scheme.

Table 1: U.S. National, California State, and Mexican National Ambient Air Quality Standards^a

Pollutant ^b	Averaging Time	U.S. National	California	Mexican National
Ozone	1 Hour	--	0.09 ppm	0.11 ppm
	8 Hour	0.075 ppm	0.070 ppm	--
TSP	24 Hour			210 µg/m ³
	Annual Arithmetic Mean	--	--	75 µg/m ³
PM ₁₀	24 Hour	150 µg/m ³	50 µg/m ³	120 µg/m ³
	Annual Arithmetic Mean		20 µg/m ³	50 µg/m ³
PM _{2.5}	24 Hour	35 µg/m ³	--	--
	Annual Arithmetic Mean	15 µg/m ³	12 µg/m ³	--
CO	1 Hour	35 ppm	20 ppm	--
	8 Hour	9 ppm	9.0 ppm ^c	11 ppm
NO _x	1 Hour	--	0.18 ppm	0.21 ppm
	Annual Arithmetic Mean	0.053 ppm	0.030 ppm	--
SO ₂	1 Hour	--	0.25 ppm	
	24 Hour	0.14 ppm	0.04 ppm	0.13 ppm
	Annual Arithmetic Mean	0.030 ppm	--	0.030 ppm
Lead	Calendar Quarter	1.5 µg/m ³		1.5 µg/m ³
	30 Day Average	--	1.5 µg/m ³	

a These are "primary" standards which are the levels of air quality necessary, within an adequate margin of safety, to protect the public health.

b In addition to these pollutants, California has ambient air quality standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

c California has a more stringent CO 8-hour standard for Lake Tahoe: 6 ppm (7 mg/m³)

- TSP = total suspended particulate
- PM₁₀ = particulate matter with an aerodynamic diameter of 10 micrometers or less
- PM_{2.5} = particulate matter with an aerodynamic diameter of 2.5 micrometers or less
- NO_x = nitrogen oxides
- CO = carbon monoxide
- SO₂ = sulfur dioxide
- ppm = parts per million by volume
- µg/m³ = micrograms per cubic meter

Sources: U.S. EPA (www.epa.gov/ttn/naaqs/); CARB (www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm); INE (sinaica.ine.gob.mx/estandares.html)

Also, another subtask—Subtask 4.5—is designed to allow KEMA team participation in bi-national meetings to engage officials from the U.S. Environmental Protection Agency (U.S. EPA), California state and local agencies, and Mexican agencies, as well as, other stakeholders to exchange information and seek mutually beneficial solutions regarding cross-border emission credit trading. This subtask has not been completed at the time of the writing of this report.

Air Pollutants

The following types of air pollution emissions are included in the scope of this project:

- Nitrogen oxides (NO_x).
- Sulfur dioxide (SO₂).
- Carbon monoxide (CO).
- Volatile organic compounds (VOC).
- Particulate matter (PM) less than 10 micrometers (µm) in aerodynamic diameter (PM₁₀).
- PM less than 2.5 µm in aerodynamic diameter (PM_{2.5}).
- Mercury.

Also, greenhouse gas (GHG) emissions are discussed briefly in the context of the emissions trading provisions of California's Assembly Bill 32 (AB 32) and the Kyoto Protocol.

Report Organization

This overall project report was compiled from the content of the individual Subtask 4.1, Subtask 4.2, and Subtask 4.3 reports submitted by the KEMA team during 2007, and includes recommendations that is Subtask 4.4. Comments were received from the Energy Commission, the California Air Resources Board (ARB), and the U.S. EPA on the Subtask 4.1 report, and changes addressing the majority of these comments were made when compiling this overall project report. Also, comments were received from the Energy Commission on the Subtask 4.2 and Subtask 4.3 reports, and changes addressing the majority of these comments were made when compiling this overall project report.

In addition to the Executive Summary and Introduction, this report contains the following chapters:

- Chapter 2: Review of current and proposed regulations that may affect implementation of a CBETP.
- Chapter 3: An explanation of the potential benefits, opportunities, and barriers of implementing a CBETP.

- Chapter 4: A comparison of the elements of the various existing emission credit trading schemes.
- Chapter 5: Recommendations for implementing a CBETP in the CA-BC border region.

Each report chapter contains an introduction that describes the objectives and scope of that particular chapter or subtask, the methodology used to perform the work, findings, conclusions, and references.

CHAPTER 2: Review of Current and Proposed Federal, State, Local/Regional Laws and Regulations Affecting the California-Baja California Border Region

This chapter identifies and describes the various regulations affecting the potential implementation of a cross-border emissions trading program (CBETP) in the California-Baja California (CA-BC) border region.

Objectives

The objective of this chapter (Subtask 4.1) is to provide a concise summary of all federal, state, local, and regional laws, regulations, and agreements that pertain to air quality issues in the CA-BC border region. This summary defines the legal environment pertaining to air quality control in the CA-BC region that could potentially affect implementation of a CBETP.

The following laws, regulations, and agreements are examined:

- U.S. Federal Clean Air Act (FCAA).
- California state air emission laws.
- California local air emission laws and regulations.
- Mexican federal air emission standards.
- Baja California laws and regulations.
- Constitutional laws.
- Municipal laws.
- International agreements such as the La Paz Agreement, North American Free Trade Agreement (NAFTA), and the Kyoto Protocol.

The following characteristics of each of the relevant laws, regulations, and agreements are examined:

- Purpose/functions.
- Regulatory authority and responsible entities.
- Compliance and/or sunset dates and other milestone dates.
- Degree of enforcement and penalties.
- Definitions of applicable and exempt emission sources.
- Jurisdiction of all relevant laws and regulations, including the description of overlapping jurisdictions, and conflicts between and pre-emption of jurisdictions.

Method

Current and emerging U.S., Mexican, California, and Baja California air quality regulations were compiled, examined, and summarized. Also, information pertaining to the guiding principles and activities of international programs that shape growth and affect development in the border region were compiled. Data were obtained primarily from the Internet and, as needed, from telephone conversations with various regulatory agency staff personnel. This approach does not duplicate previous similar efforts but expands on them, provides our additional perspectives, and presents what we understand to be the complexity of the evolving regulatory infrastructure related to emissions trading programs.

The approach used for listing and describing the laws and regulations focused on their impact, or potential impact, on CBETP in the CA-BC border region. Provisions of the relevant laws and regulations that directly affect the design or operation of a CBETP were listed and examined, and then summarized in matrix format (see Tables 4, 5, 6, and 7). In some cases, it was possible to go beyond the literal provisions of the law and provide insight as to how key provisions have been interpreted and applied in practice.

The reference to permitting was interpreted broadly to include both formal permits issued by air pollution control jurisdictions, and other situations or decision points where a jurisdiction has the authority to approve, deny, or conditionally approve a proposed energy project. In summary, the goal in this chapter is to describe the statutory and regulatory context in which emissions trading is conducted today in the CA-BC border region and which forms the baseline for development of a CBETP.

Evaluation of Current and Proposed Laws and Regulations

This chapter describes the characteristics of the current laws, regulations, and agreements pertaining to air quality and which could potentially affect emissions trading in the CA-BC border region. The order of discussion is:

- U.S. federal laws and regulations.
- California state laws and regulations.
- California local air district regulations.
- Mexican federal laws and regulations.
- Baja California laws and regulations.
- International agreements.

U.S. Federal Laws and Regulations

As shown below, federal law has a broad reach and partially preempts state and local authority. However, in California, the primacy of federal law should not be equated with a preemptory role for federal government agencies. Many key provisions of the FCAA have been delegated to state and local air pollution control agencies to implement through their legal authority. As a result, many FCAA provisions are deeply imbedded in state and local air regulations. Because of California's historically severe air pollution problems, regulations adopted in many parts of the state are more stringent than the federally prescribed minimum, and these requirements, particularly permitting requirements, are subject to federal oversight through their inclusion in federally approved air quality plans. Consequently, federal law and state and local regulations are deeply intertwined and operate together to form the legal environment.

In addition to citing federal authority, this chapter identifies the possible applications of some statutory provision to a CBETP. The purpose of doing so is to indicate the potential relevance of the provision and not to predict how the law might be applied or interpreted. With one exception, no attempt is made to describe how the courts have or might interpret key provisions.

Constitutional Provisions

A CBETP that is enforceable on both sides of the border would require agreements between Mexican and U.S. authorities. Article II, Section 2, Clause 2 of the U.S. Constitution confers authority to make treaties on the President, with the advice and consent of the Senate. Treaties are considered the supreme law of the land and are binding on the states. The constitution does not define what a treaty is, but the generally accepted definition is any formal instrument which creates reciprocal rights and obligations between nation states.¹ Interpretation and analysis of constitutional law is beyond the scope of this analysis, but on its surface, Article II gives the federal government a preeminent role in establishing a binding cross-border agreement between the U.S. and Mexico and conversely limits the authority of California to act unilaterally.

The legal role of the federal government extends beyond making treaties. The Tenth Amendment to the U.S. Constitution limits the authority of the U.S. Congress to matters specifically delegated to it by the Constitution; the authority to address other matters is left to the states or the people. This constitutional principle is important in understanding the role of the federal government in regulating air pollution.

Article I, Section 8, Clause 3 of the Constitution empowers Congress "to regulate Commerce with foreign Nations, and among several States, and with the Indian Tribes." This provision, generically referred to as the Commerce Clause, has been used as the legal basis for congressional enactment of a variety of environmental laws, including the FCAA (42 U.S.C.

¹ Article on law school website, http://library.kentlaw.edu/tutorials/IntlLaw_Tutorial/FindUS_Treaties.htm, accessed September 11, 2007.

7401 et. seq.). In essence, sources of air pollution are subject to federal regulation because of their effect on interstate commerce. It is the commerce clause that gives the Congress the authority to apply federal air quality requirements in California and the discretion to preempt state air quality regulations in some situations.

Federal Clean Air Act

The most relevant U.S. law is the FCAA, which was initially adopted in 1963 and underwent major amendments in 1970, 1977, and 1990. The FCAA is applicable in all 50 states, the District of Columbia, Indian tribal lands, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Northern Commonwealth of the Marianas. It contains minimal discussion of international air pollution situations and it does not apply to sources or pollutants generated in Mexico.

The FCAA provides the U.S. Environmental Protection Agency (EPA) with considerable authority over emissions trading in California. The U.S. EPA's authority stems from the planning requirements of Title I of the FCAA and the stationary source permitting provisions contained in Titles I, IV, and V.

Title I, Part D establishes minimum air quality planning requirements for states to implement in areas that do not attain ambient air quality standards. One requirement is that states implement programs that require certain major new or expanding sources to offset their emissions increase by reducing emissions from existing sources (FCAA Sections 172 and 173). The statute requires offsetting reductions to occur in the same nonattainment area or in adjacent areas that affect air quality in the nonattainment area where the new or expanding source is located and that the offsetting reductions be surplus of other reductions required by the Act (FCAA Section 173(c)).

The offset requirement is one of the basic planning provisions of the FCAA. The law requires offsetting reductions to occur at ratios ranging from 1.1:1 up to 1.5:1 depending on the pollutant and severity of the air quality problem (for example, 1 ton of a pollutant may be required to be offset by 1.1 tons of the same or similar pollutant) (FCAA Sections 182 and 189). San Diego and Imperial Counties are designated nonattainment areas for the national 8-hour ozone (O₃) standard. Imperial County is also a nonattainment area for national PM₁₀ standards.²

The FCAA requires the U.S. EPA and states to develop permitting programs to apply and enforce a variety of statutory requirements. Among the provisions to be implemented via permit programs are New Source Performance Standards (NSPS) (FCAA Section 111), National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (FCAA Section 112), New Source Review (NSR) programs (FCAA Sections 172 and 173), acid rain provisions (FCAA Section 408), and Prevention of Significant Deterioration (PSD) requirements (FCAA Sections 165 and 169). It should be noted that Sections 111 and 112 allow the U.S. EPA to impose emissions control requirements on specific categories of sources and to address specific

² EPA Region IX website, http://www.epa.gov/region09/air/maps/maps_top.html accessed on September 10, 2007.

pollutants. For example, the U.S. EPA used Section 111 to impose a national cap-and-trade program on power plants to reduce mercury emissions.

Title V, which was added in 1990, requires any source subject to any of these requirements to be issued a federal air permit (FCAA Section 504). The U.S. EPA can delegate the authority to issue Title V permits to the states or their local air agencies, but the permits remain directly enforceable in federal court (FCAA Section 113(a)(3)).

New energy facilities that would be built on the California side of the CA-BC border would be required to obtain FCAA required permits. In most cases, the U.S. EPA has delegated the authority to issue these permits to the Imperial County Air Pollution Control District (ICAPCD) and the County of San Diego Air Pollution Control District (SDAPCD). The permits would contain conditions to implement and enforce the federal requirements described above and would be subject to the oversight of the U.S. EPA and, potentially, federal courts.

There is a major difference between how the NSR and PSD programs for major sources are implemented under the FCAA. For the NSR program, states are required by the FCAA to adopt NSR programs meeting the provisions of the FCAA and regulations promulgated by the U.S. EPA to implement the FCAA. The U.S. EPA promulgated NSR regulations in 40 CFR 51.165. Part 165 specifies the requirements that a state must meet when developing its NSR program. It does not specify requirements that an individual source must meet in generating emission reduction credits (ERCs). If a state (or local) air agency does not adopt and implement a U.S. EPA-approved NSR program, the U.S. EPA is required by the FCAA to implement an NSR program for them. Failure by a state to adopt and implement an NSR program could also result in the imposition of federal sanctions.

By contrast, the U.S. EPA implements the PSD program unless a state (or local) agency adopts regulations that are subsequently included in the State Implementation Plan (SIP), or the U.S. EPA delegates authority to the state (or local) agency to implement the federal program. Historically, in California some air districts have adopted and subsequently incorporated PSD regulations into their SIPs, while others have received delegation or have opted to leave PSD permitting with the U.S. EPA. For most air districts in California, including the ICAPCD and SDAPCD, the U.S. EPA currently implements the PSD program.

While the PSD program does not address emissions trading, its requirements could affect the design of an emissions trading program. For example, if a new or expanded energy facility subject to PSD permitting is shown to have a significant adverse impact on air quality or visibility in a Class I area (national park or wilderness area), a given emissions trade may not provide the level of air quality benefit the PSD program requires.³ However, there are few Class I areas in or near the CA-BC border region, so the probability of PSD requirements affecting an emissions trading program in this area seems small.

³ <http://www.epa.gov/visibility/actions.html>

All air districts in California have their NSR rules approved into the SIP; therefore, pursuant to the FCAA, the U.S. EPA does not implement NSR programs in California. However, the U.S. EPA does have oversight authority and issues many policy and guidance documents that specify their interpretation of the FCAA. There is also a multitude of court decisions that basically rewrite the U.S. EPA's interpretations. The overriding factor here is that the FCAA allows states to adopt requirements more stringent than the federal requirements, and most air districts in California have done so. In California, federal requirements have been incorporated in equivalent or more stringent state and local NSR rules.

There is one major requirement in the U.S. EPA regulations and guidance contained in all California air district NSR rules that would have a major effect on any CBETP. This requirement, which has been adopted into state law and air district rules and regulations, specifies that for purposes of offsets, all emissions reductions must be real, surplus, quantifiable, permanent, and enforceable. These terms are not specifically defined in the FCAA; however, they can be defined in simple terms, as follows:

- Real means the emission reductions come from actual emissions and not from permitted levels of emissions.
- Surplus means that the emission reductions are in excess of those reductions specifically identified in a SIP as necessary to demonstrate attainment in future years. The emissions must also be quantified in the SIP's emissions inventory that projects the impacts of growth and implementation of control measures.
- Quantifiable means that the emission reductions can be determined through source testing, material balance, or some other reliable method.
- Permanent means that the emissions reductions will not be transferred to other similar operations, or be allowed to be emitted again in the future.
- Enforceable means that there are limitations and conditions that the enforcement agency, be it the U.S. EPA or the state or local agency, can legally act on, including rules and regulations, permit conditions, or other legally binding orders.

The most difficult requirements to meet in any cross-border trading scheme would be the surplus, quantifiable, and enforceability requirements. First, SIPs developed in California are based on emissions and emissions reductions only from sources located in California and do not address emissions from sources in Mexico. Furthermore, because emission sources in Mexico are not a part of any California SIP, they are not in the California emissions inventory; therefore, Mexican emissions cannot be considered surplus. The quantifiable requirement involves documenting both past emissions levels and the effectiveness of controls. Documenting past emissions in Mexico could be difficult for some potential sources of offsets, particularly "area" sources. Also, because air districts, the Air Resources Board, and the U.S. EPA have no jurisdiction in Mexico, there would be no legal enforcement mechanism if Mexican sources were to be included in a California SIP.

An added difficulty is the lack of enforceable attainment plans in Mexico that identify both projected growth and the controls needed to attain air quality standards in spite of that growth. Without a comprehensive plan, it would be more difficult in many cases to ensure that emission reduction is permanent as defined above.

There are several other FCAA provisions that affect the legal environment with regard to CBETPs that are worth noting. The statute specifically allows states and, by extension, their local agencies to adopt more stringent air quality requirements and to incorporate those requirements in air permits (FCAA Sections 116 and 506). Moreover, those provisions can become federally enforceable if they are incorporated into the area's plan to attain and maintain national standards, often referred to as the SIP. The FCAA also preserves the authority of states and local agencies to make land use decisions (FCAA Section 131). In combination, these provisions mean that federal law not only protects but, in some cases, also provides a mechanism for enforcing local prerogatives, including the right to attach more stringent requirements to an emissions trading program.

General Conformity requirements prohibit any federal agency from approving, funding, etc. projects that are not consistent with the emissions assumptions (levels of projected growth and control) used in the attainment demonstration in an approved SIP (FCAA Section 176 (a)). A CBETP could be designed to require a federal agency to recognize emissions reductions in Mexico in order to demonstrate General Conformity.

The FCAA has few provisions that address international air quality issues. One requires the EPA to legally recognize situations in which emissions from outside the U.S. affect air quality and delay attainment (Section 179B). The second provides that when the U.S. EPA receives information from an international authority that a U.S. state's emissions are damaging public health across the border or receives a request from the U.S. Secretary of State, the U.S. EPA can direct a state to make revisions to its SIP to address the problem. But this authority applies only to the extent that the foreign country provides "...essentially the same rights with respect to the prevention or control of air pollution occurring in that country as is given that country by this FCAA Section" (FCAA Section 115). With the cooperation of all parties, Section 115 might provide a mechanism for collective action on improving air quality, including an emissions trading program.

Other Federal Laws and Their Interaction

While the FCAA contains the core of federal air quality requirements, there are several other federal laws that can also affect energy projects on the CA-BC border. These laws often interact with each other and the FCAA in complex ways. Energy projects or facilities that are built in California will generally require the funding or approval of one or more federal agencies. Since a CBETP might affect the legal responsibilities these agencies face, these laws become relevant and must be considered.

The National Environmental Policy Act (NEPA) is an example of a federal law that could indirectly affect a CBETP. NEPA requires federal agencies that fund, permit, or approve projects

to evaluate the environmental impacts of their decisions, including their effect on air quality.⁴ NEPA Section 102 includes a requirement to evaluate alternatives.

A federal agency's NEPA responsibilities may interact with its obligations under the FCAA. For example, federal agencies have the responsibility to ensure that their actions conform to a U.S. EPA-approved state air quality plan or SIP (FCAA Section 176). In conducting a NEPA review of its proposed actions, a federal agency will often discuss its conformity responsibilities as well. While conformity requirements are focused on the impact of federal actions within the U.S., at least one court case (discussed below) has indicated that conformity responsibilities applicable on the California side of the border can be directly tied to the operation of facilities on the Mexican side of the border.⁵

The Department of State has established its own permit program for cross-border facilities. The following describes the authority and purpose of the program:

"Executive Order 11423, August 16, 1968 (33 Fed. Reg. 11741) states that '...the proper conduct of the foreign relations of the United States requires that executive permission be obtained for the construction and maintenance at the borders of the United States of facilities connecting the United States with a foreign country.' Such permission is conveyed via a Presidential permit. Permits are required for 'the full range of facilities' on the border, including, inter alia, bridges, pipelines, tunnels, conveyor belts and tramways. Permit applications for most facilities at the border are processed by the Department of State, although other agencies do permit certain cross-border facilities under separate legal authority. In processing permit applications, the Department of State is responsible for coordinating compliance with NEPA (42 U.S.C. Section 4321 et seq.), the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. Section 470f), and Executive Order 12898 of February 11, 1994 (59 Fed. Reg. 7629), concerning environmental justice. To issue a permit, the Department must find that issuance would serve the national interest. The Department consults extensively with concerned federal and state agencies, and invites public comment in arriving at this determination.⁶

Presidential permits for electrical lines and natural gas pipelines are processed by the U.S. Department of Energy (DOE)⁷ in Executive Order 10485 of 1953, as amended by Executive Order 12038, U.S. Government Archives. The Presidential permit program does not exempt

⁴ Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982).

⁵ Border Power Plant Working Group vs. Department of Energy and Bureau of Land Management, Case NO. 02cv513-IE6 (POR), District Court of Southern California, February 8, 2006.

⁶ State Department web site, http://www.state.gov/p/wha/ci/mx/rel_2001/fs/11148.htm as accessed September 13, 2007. The State Department's legal authority to issue Presidential Permits for international bridges, oil pipelines and certain other transboundary facilities is found in Executive Order 11423 of August 16, 1968, as amended by Executive Order 12847 of May 17, 1993 (58 Fed. Reg. 29511) and, to the extent applicable, the International Bridge Act of 1972 (33 U.S.C. Section 535 et seq.).

⁷ Executive Order 10485 of 1953, as amended by Executive Order 12038: <http://archives.gov/federal-register/codification/executive-order/10485.html>.

federal agencies from FCAA or NEPA requirements but allows federal agencies to approve such facilities as pipelines and transmission lines on the U.S. side of the border in consideration of conditions and requirements on the Mexican side.⁸ In one case, where a Presidential permit was used to approve a transmission line to connect electricity generated in Mexico to the Southern California power grid, a U.S. District Court found that the DOE had an obligation to look at emissions across the border to meet its FCAA responsibilities. The DOE had conditioned a Presidential permit for a transmission line on the U.S. side of the border on the installation and operation of air emissions controls on a Mexican power plant. The court determined that these permit conditions allowed the DOE to assert “practical control” of the Mexico plant and incur “ongoing program responsibility” for the plant. As such, the court supported the argument that the DOE also had the responsibility to consider the Mexican plant’s emissions in demonstrating conformity with the applicable SIP for Imperial County.⁹

State of California Laws and Regulations

In general, the requirements contained in state law provide the framework for the air pollution control program in California in a similar manner as federal law defines the air program that states must implement. Also, similar to the federal program, air programs developed by local air agencies must meet the requirements of state statutes but can be more stringent. Therefore, while provisions of state law are outlined below, it must be recognized that there is latitude for the local air agencies to create their own individual programs, as long as they are consistent with state statutes. Also, to the extent that there are inter-jurisdictional impacts, the state plays a significant role.

California Health and Safety Code

The State statutory requirements that affect the ability to trade emissions in California are contained in Division 26 of the California Health and Safety Code (H&SC). H&SC Section 40000 specifically states that local and regional authorities have the primary responsibility for control of air pollution from all sources, other than emissions from motor vehicles. The two local air agencies adjacent to the Mexican border are the ICAPCD and the SDAPCD. The ARB, the agency with the overall responsibility for air pollution control in California, is given authority to oversee the local programs and to develop regulations and guidance where emissions may affect more than one local district (Section 39601).

While the H&SC gives primary authority for control of non-vehicular sources to local air agencies, it also contains numerous provisions that directly affect the ability to trade emissions. The statutory authority for local air districts to create permitting programs is contained in H&SC Section 42301. The stated purpose of the permit system is to ensure the attainment and maintenance of ambient air quality standards. To this end, many provisions of the H&SC address emissions trading between new and modified sources of air contaminants. The

⁸ State Department web site, http://www.state.gov/p/wha/ci/mx/rel_2001/fs/11148.htm as accessed September 13, 2007.

⁹ Border Power Plant Working Group vs. Department of Energy and Bureau of Land Management, as cited.

provisions directly relating to emissions trading, specifically addressing emissions trading between different governmental agencies, are discussed next.

Some H&SC provisions are statutory mandates for the ARB or local districts while others provide the ARB guidance to local air districts. When a provision requires guidance or a methodology to be developed by the ARB, unless otherwise indicated, the guidance or methodology does not have the effect of law, unless a given local district adopts a rule or regulation to legally implement the guidance or methodology.

Section 39607.5 requires that the ARB adopt a methodology for use by air districts to calculate the value of credits issued for emission reductions from stationary, mobile, indirect, and area-wide sources, including those issued under market-based incentive programs when credits are used interchangeably. This methodology was adopted in 1997 and codified in 1998 (Sections 91500 through 91508, Title 17, California Code of Regulations (CCR)).¹⁰

Section 39610 requires the ARB to identify each air basin or subregion thereof in which transported air pollutants from upwind areas outside the air basin or subregion cause or contribute to a violation of the state ambient air quality standard for O₃. The air district in which the transported air pollutants originate must be identified based upon the preponderance of available evidence. The ARB must also, in cooperation with the districts, assess the relative contribution of upwind emissions to downwind ozone levels and establish mitigation requirements commensurate with the level of contribution. The ARB is also required to determine if the contribution level of transported air pollutants is overwhelming, significant, inconsequential, or some combination thereof.

Note that the transport assessment report published by the ARB identifies that significant transport occurs between Mexico and Imperial County and indicates that the city of Mexicali, just across the CA-BC border from Calexico, can overwhelmingly impact air quality in Calexico.¹¹ Also, the report states that Tijuana forms essentially one continuous urban area with San Diego; emissions from Tijuana have been demonstrated to impact air quality in San Diego, and San Diego's emissions can have an impact upon Tijuana's air quality as well.

According to Section 39616, air districts may adopt a market-based incentive program as a SIP element. This program may be implemented in lieu of "command and control" regulations. Section 39053.6 defines a market-based program as one that allows sources to comply with an emissions cap or limit by acquiring marketable emissions credits.

Also, Section 39616 establishes several criteria for market-based incentive programs:

"39616(c)(2) The program will provide a level of enforcement and monitoring, to ensure compliance with emission reduction requirements, comparable with command and control air quality measures that would

¹⁰ ARB Website, <http://www.arb.ca.gov/planning/ierc/pubnot.pdf> accessed on September 12, 2007.

¹¹ ARB Website, <http://www.arb.ca.gov/aqd/transport/assessments/assessments.htm> accessed on September 12, 2007.

otherwise have been adopted by the district for inclusion in the district's plan for attainment.

39616(c)(6) The program will not in any manner delay, postpone, or otherwise hinder district compliance with Chapter 10 (commencing with Section 40910) of Part 3. [District Plans to Attain State Ambient Air Quality Standards].”

Section 40709 requires air districts to establish by regulation a system by which all reductions in the emission of air contaminants that are to be used to offset future increases in emissions be banked before use; offset emissions within the same stationary source do not need to be banked. Air districts that are in attainment for all pollutants do not need to adopt a banking rule. The banking system developed under this section is subject to ARB oversight and can be disapproved if not designed or operated in accordance with state law.

Section 40709.5 requires air districts to develop a program which identifies the banked emissions and analyzes the reductions and increases occurring within the program. Air districts must publish annual reports on the cost of offsets purchased for new or modified sources. Each year, the ARB publishes a report of the offset transactions that have occurred at the district level the prior years and the cost associated with those transactions.¹²

Section 40709.6 specifies that increases in emissions at a stationary source located in an air district may be offset by emission reductions credited to a source located in another air district if the following conditions occur:

- Both sources are located in the same air basin.
- If not located in the same air basin, the reductions are from a source located in an upwind district with a worse attainment status.
- The air basin is classified as overwhelmingly impacting the district with the proposed new or modified source.

These offsets must be appropriately discounted (that is, the value of the credit reduced in proportion to its benefit in the downwind area), and the governing boards of both districts must approve the transaction.

Section 40711 requires air districts with banking rules to maintain a publicly available registry of all emissions reduction credits in the bank. ICAPCD and SDAPCD each maintain such a registry.

Sections 40918 through 40920 require air districts with nonattainment areas to establish stationary source control programs designed to achieve no net increase in emissions of nonattainment pollutants or their precursors from all new or modified stationary sources above

¹² ARB Website, <http://www.arb.ca.gov/nsr/erco/erco.htm> accessed on September 11, 2007.

certain size thresholds. Areas with more severe air quality problems must include small sources in their control program as shown in table 2.

Table 2: Nonattainment Control Program Thresholds

Nonattainment Status	Potential to Emit Emission Threshold (tons per year [TPY])
Moderate	25
Serious	15
Severe	10
Extreme	All sources

Source: Division 26, California Health & Safety Code

Penalties for violation of any rule, regulation, permit, or other order of the ARB or of an air district are specified in Section 42400 et seq. of the H&SC, as follows:

- A misdemeanor offense for violation of a rule, regulation, or permit condition subject to a fine of not more than \$1,000 or imprisonment in the county jail for not more than 6 months.
- A fine not more than \$25,000 or imprisonment for not more than 9 months if a person negligently violates a rule, regulation, or permit condition.
- Fines for specific violations, the most stringent of which is for willfully and intentionally, or with reckless disregard for the risk of great bodily injury, or death, is punishable by a fine of not more than \$250,000 and/or imprisonment for not more than 1 year. If the person is a corporation, the fine can be as high as \$1 million.

In summary, California has an extensive set of laws governing how emission credits must be dealt with at the district and inter-district level. There are currently no provisions in California statutes that expressly deal with or provide for emissions trading between a district in California and Mexico. However, the current framework does exist to implement a trading program if trading were to be specifically allowed. The provisions related to transport of air pollutants and trading between government jurisdictions within California would be the same for cross-border trading schemes.

California Municipal Laws

As noted above, the FCAA does not preempt local planning or zoning requirements. The counties and cities on the California side of the border retain the authority to issue land use permits and set conditions for energy facilities that are located in their jurisdictions. County and city ordinances and policies are therefore part of the legal environment in which a cross-border trading program would operate.

The California Environmental Quality Act (CEQA) applies to local land use decisions and is often the mechanism through which counties and cities apply their environmental policies and ordinances.¹³ Under CEQA, the lead agency must both evaluate and mitigate the air quality impact of a proposed project. Lead agencies typically credit the applicable requirements of local air pollution control district regulations toward their mitigation obligation. California lead agencies have broad authority under CEQA to bring about mitigation, arguably including accepting, rejecting, or conditioning emissions trading as CEQA mitigation.¹⁴

Assembly Bill 32

AB 32 was signed into law by Governor Schwarzenegger on September 27, 2006 (H&SC Section 38500). Also known as the California Global Warming Solutions Act of 2006, this is the first law to comprehensively limit greenhouse gases (GHGs) at the state level. Among other provisions, the law requires reductions in GHGs equal to 1990 levels by 2020.

The Act covers all of the pollutants covered by the Kyoto Protocol (described in Chapter 3 of this report), including:

- Carbon dioxide (CO₂).
- Methane (CH₄).
- Nitrous oxide (N₂O).
- Hydrofluorocarbons (HFCs).
- Perfluorocarbons (PFCs).
- Sulfur hexafluoride (SF₆).

The Act imposes specific requirements pertaining to market mechanisms to achieve its emission reductions, including prevention of increases in toxic and criteria air pollutants when implementing market trading schemes, among others.

The timeline for AB 32 implementation includes the following milestones:

- By 3rd quarter 2007 publish list of “discrete early actions.”
- By 2008 establish 2020 emissions limit and adopt mandatory reporting regulation.
- By 2009 adopt discrete early actions, approve scoping plan (source and sector analysis, identification of reduction measures).
- By 2010 adopt discrete early action enforceable regulations.
- Ongoing: Voluntary GHG emission reductions.

¹³ California Environmental Policy Act, Chapter 1 Policy, website http://www.ceres.ca.gov/ceqa/stat/Ch_1.html, accessed on September 13, 2007.

¹⁴ Title 14 California Code of Regulations, Chapter 3, Article 3, Section 15041, Authority to Mitigate, website http://www.ceres.ca.gov/ceqa/guidelines/15040-15045_web.pdf, accessed on September 14, 2007.

In support of AB 32, the Market Advisory Committee (MAC) was created to develop recommendations pertaining to the design of a market-based program for reducing GHGs in California. The MAC published its final report in June 2007, containing these primary recommendations¹⁵:

- Eventually incorporate all major GHG-emitting sectors of the economy into the cap-and-trade program.
- Take a “first seller” approach to capping emissions associated with electricity (the entity that first sells electricity in the state is responsible for compliance).
- Use a combined approach of free allocation and auctioning of allowances.
- Allow offsets, both within and outside state borders, in a cap-and-trade program.
- Provide linkage opportunities for a California cap-and-trade program with similar policy initiatives in other jurisdictions.

The MAC report makes specific recommendations pertaining to obtaining offsets from jurisdictions outside of California’s boundaries. Specifically, the MAC recommends: “California would only accept offsets from other states or countries if those other jurisdictions have an agreement with California to adequately ensure a similar level of environmental integrity and accountability in their emissions control programs.”

In summary, the scope of AB 32 addresses the necessity of a market-based system in order to meet GHG reductions by 2020. To this end, the MAC has analyzed various types of market-based schemes and made specific recommendations to the ARB. These recommendations include allowing offsets from sources in other countries such as Mexico, but only if the country providing the offsets can ensure their quality.

California Local Air District Laws and Regulations

As previously discussed, local air districts in California have the primary authority to regulate emissions from stationary sources of air pollution within their boundaries. The ICAPCD and the SDAPCD adopted and the U.S. EPA approved into the California SIP rules that meet the requirements of state and federal laws and regulation. The provisions of those rules that deal with emissions trading are discussed next. The applicability of these regulations to new major sources of air pollution is fairly straightforward, while the provisions for dealing with modified sources are complex and not easy to summarize. The complexity involves determining the emissions from the existing source and calculating the increase in emissions that would trigger the rule’s provisions. The summary in this report concentrates on those provisions dealing with new sources.

¹⁵ http://www.climatechange.ca.gov/policies/market_advisory.html

Imperial County Air Pollution Control District

The offset requirements of the ICAPCD are found in District Rule 207. Imperial County is designated moderate nonattainment for both ozone and PM₁₀. Therefore, offsets are required for these pollutants: reactive organic gases (ROG) and NO_x due to ozone nonattainment and PM₁₀, ROG, NO_x, and sulfur dioxide (SO₂) due to PM₁₀ nonattainment. Rule 207 C2 requires that new emissions be offset on a quarterly basis.

Section C.2.a requires offsets be provided for new or modified stationary sources with a potential to emit 137 pounds per day (lb/day) or more of ROG, NO_x, sulfur oxides (SO_x), PM₁₀. Offsets are not required for CO if a source demonstrates that it will not contribute to or cause a violation of an ambient CO standard.

Section C.2.b requires existing stationary sources with potentials to emit 137 lb/day or more, including cargo carriers, to offset all emission increases from any new or modified emissions unit at the stationary source occurring after September 7, 1993.

Section C.2.c applies to sources whose emissions have historically been below 137 lb/day but will exceed that level with the new permit transaction. It requires offsets for all emission increases that cause the stationary source to exceed 137 lb/day. All future emissions from a new or modified source must be offset. If, however, pursuant to federal requirements the emissions from the stationary source exceed 100 tons per year (TPY) (in effect, definition of a federal major source), all emission increases must be offset, not just the emissions which cause the stationary source to exceed 137 lb/day.

Section C.3.a specifies offset ratios based on the distance of the offsetting source from the new or modified source as follows:

- If the offsetting source is within the same source, the ratio is 1:1.
- If the offsetting source is within 50 miles, the ratio is 1.2:1 (that is, 1 ton of emissions from the new/modified source must be offset by 1.2 tons of emissions from the offsetting source).
- If the offsetting source is more than 50 miles from the new or modified source, and within the air basin, the ratio is determined by the Air Pollution Control Officer (APCO), but can be no more than 3:1.

Section 207 C.3.b specifies offsets to be obtained from emission sources located within the same nonattainment area within the District as the proposed source unless:

- The offset source is located within the same air basin and in a nonattainment area with equal or worse nonattainment status.
- Emissions from the offset source have been shown to contribute to the violation of the ambient air quality standard in the vicinity of the proposed source.

Section C.4.a specifies that offsets obtained in a district other than that in which the proposed source is located and within the same air basin may be used only if the APCO has reviewed the permit conditions issued by the air district in which the proposed offsets are obtained, and certifies that such offsets meet ICAPCD requirements and will not be used as mitigation for any other project. Section C.4.b provides for the use of interpollutant offsets on a case-by-case basis.

In summary, there are no existing rules or regulatory provisions of the ICAPCD that provide for offsets to be obtained from across the border in Mexico. The ICAPCD’s staff indicates that the air district is not contemplating any revisions to its NSR rule in the near future.¹⁶

County of San Diego Air Pollution Control District

The SDAPCD is designated in federal serious nonattainment for ozone, but it is in federal attainment for all other pollutants.¹⁷ Therefore, the only pollutants for which federal offsets are required are VOC and NO_x. While the air district rules address all pollutants, only sources of VOC and NO_x are required to provide offsets. The offset requirements are contained in Rule 20.1, New Source Review – General Provisions; Rule 20.3 – New Source Review Major Stationary Sources and PSD; and, Rule 26 – Banking of Emission Reduction Credits.

Rule 20.1 defines major source and major modification as shown in table 3.

Table 3: Major Source and Major Modifications Pollution Thresholds

Pollutant	Major Source Thresholds (TPY)	Major Modification Thresholds (TPY)
PM ₁₀	100	15
NO _x	50	25
VOC	50	25
SO _x	100	40
CO	100	100

Source: County of San Diego Air Pollution Control District, Rule 20.1

Sources emitting above the VOC and NO_x thresholds are subject to offsetting requirements.

Rule 20.1 (d)(5) specifies that major source emission offsets are to be provided on a TPY basis. More importantly, though, for cross-border trading is a requirement that all offsets shall be located in San Diego County.

Rule 20.3 provides the offsetting requirements for new and modified major stationary sources.

Rule 20.3 (d)(5) specifies that a permit shall not be issued unless emission offsets are provided at a ratio of 2:1 for ozone precursors. It also specifies that interpollutant offsets may be used for

¹⁶ Reyes Romero, Deputy APCO, Planning Department, Imperial County Air Pollution Control District, telephone conversation with author, September 12, 2007.

¹⁷ http://www.arb.ca.gov/desig/adm/s_classif.pdf

ozone precursors at a 1:1 ratio, except at a ratio of 1.2:1 for ozone precursors when trading VOC reductions for NO_x increases.

Under Rule 20.3 (d), a permit is denied unless the applicant demonstrates through an Air Quality Impact Analysis (AQIA) that the project will not cause a violation of a state or federal ambient air quality standard anywhere that does not already exceed such standard. Also, emissions from the proposed source must not cause an additional violation anywhere the standard is already exceeded nor cause a new exceedance. An AQIA is not required for NO_x or VOC until adequate procedures exist for determining the impact of NO_x and VOC on ambient ozone.

Rule 26 is the District's banking rule, which specifies what an applicant must do to bank emissions for future use, and what the District's responsibilities are with respect to issuing banking certificates and maintaining a registry.

SDAPCD revised its NSR rules in August 2008 to expressly provide for the use of mobile source emission reduction credits to offset emission increases from new and expanding sources. While the rule change opens the door to mobile source credits somewhat, there are major limitations. The credits can only be generated in San Diego County or nearby coastal waters, only certain types of mobile source reductions qualify, only NO_x credits can be generated, they can only be used to offset NO_x increases, and each transaction requires EPA approval.

Mexican Laws and Regulations

Mexico's preeminent environmental statute, the General Law of Ecological Balance and Environmental Protection (General Law), was promulgated by the Mexican Congress in 1988.¹⁸ The General Law has undergone a number of modifications and reforms (most recently in July 2007). The law establishes areas of federal jurisdiction over environmental matters and assigns certain responsibilities to states and local governments. It also established Secretaría de Desarrollo Urbano y Ecología (SEDUE—Secretariat of Urban Development and Ecology) to act as the administering agency within the executive branch. SEDUE was the predecessor federal agency to the current Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT – Secretariat of Environment and Natural Resources).

The General Law was initially supported by these four major implementing regulations:

- Environmental Impact.
- Air Pollution.
- Hazardous Waste.
- Environmental Planning (Ordenamiento Ecológico).

¹⁸ General Law of Ecological Balance and Environmental Protection. Official Journal of the Federation, January 28, 1988 (Last reform published on July 5, 2007).

In the ensuing years, Environmental Auditing and Pollution Release and Transfer Registry regulations were issued by SEMARNAT and, most recently, the Hazardous Waste Regulation was superseded by a new General Law for Integral Waste Management and its implementing regulation. This abrogated all of the waste clauses in the original General Law.

The Mexican regulatory framework also includes Normas Oficiales Mexicanas (NOMs – Official Mexican Standards). These are rules issued by federal agencies that typically contain specific numeric or procedural compliance standards. The nomenclature includes the initials of the issuing agency, such as in NOM-043-SEMARNAT-1993 (the federal air emission standard for PM from fixed sources issued by SEMARNAT in 1993).

Mexican states may issue their own environmental laws and regulations, provided they are at least as strict as their federal equivalents. Most states have issued state environmental laws and some regulations. These typically mirror the General Law, in some if not all of their sections. In the case of Baja California, the law and regulations address a few areas not contained in federal law, such as the regulation of VOC emissions.

In addition, the General Law provides for federal-state coordination agreements that can transfer jurisdictional authority to the states over certain kinds of regulatory activities.

Municipalities may also issue environmental ordinances to regulate activities allowed by state and federal laws, such as vehicular emission testing programs.

Emissions trading is not addressed in any substantive manner in the current federal or Baja California state environmental laws, regulations, or official standards. However, SEMARNAT is empowered by statute to promote such systems for the prevention and control of air pollution.

The following paragraphs summarize the Mexican federal and state laws and regulations that could play a role in the development of a CBETP.

The General Law of Ecological Balance and Environmental Protection

Article 5 of the General Law establishes federal jurisdiction in matters that affect the environment in areas between Mexican states or beyond any one state. It applies to all environmental media, activities, and issues. As such, it establishes federal preemption of international environmental agreements between Mexican states and foreign countries.

In the specific issue of air pollutants, the General Law states in Article 111 that SEMARNAT is empowered to promote systems for transferable rights to pollutant emissions, in coordination with the competent authority, in order to prevent, reduce, or control air pollution. This clause establishes federal jurisdiction over emission trading schemes and regulations.

Articles 7 and 8 establish state and local jurisdiction, respectively, over air pollution sources not under federal jurisdiction. States can approve and regulate certain industrial fixed sources, while municipalities can control commercial and service operations, as well as mobile sources not under federal jurisdiction.

Article 112 specifies the obligations of state and local governments in terms of prevention and control of air pollution in sources under their jurisdiction. These include, among others,

enforcing federal emission standards, compiling emissions inventories for sources under their control, applying fines and penalties against violators, and reporting to the federal agency on their activities. One important obligation of states and municipalities in this regard is their sole authority to define in urban zoning plans the areas where pollution sources may be located.

The types of air emission sources that fall exclusively under federal jurisdiction are listed in Article 111-bis, and represent 11 major industrial sectors listed below. These types of sources may only be approved and permitted by SEMARNAT:

- Cement and lime manufacturing.
- Chemical manufacturing.
- Paints and inks manufacturing.
- Metal products and manufacturing.
- Automotive parts manufacturing.
- Pulp and paper manufacturing.
- Asbestos mining and manufacturing.
- Glass manufacturing.
- Electrical energy generation.
- Hazardous waste treatment.
- Petroleum extraction and petroleum/petrochemical manufacturing.

Article 11 of the General Law allows for federal-state coordination agreements to transfer jurisdictional authority to the states over fixed and mobile air emission sources that would normally fall under federal oversight.

Article 12 establishes the conditions under which such transfers can take place. These require the state to petition for the transfer and to demonstrate that it has the necessary personnel, material and financial resources, as well as the institutional organization to manage the federal oversight role. The clause also establishes the specific terms of the agreement, the roles and responsibility of each agency, as well as the communication and technical capabilities that will ensure effective enforcement and compliance.

Enforcement actions, penalties and administrative sanctions for noncompliance with the General Law and its regulations are addressed in Title VI, Articles 160 through 188. These can range from fines and administrative arrest for up to 36 hours to partial and temporary or total and permanent closure of a violator's facility. SEMARNAT, through its enforcement arm Procuraduría Federal de Protección al Ambiente (PROFEPA – Federal Attorney for Environmental Protection), can issue fines and penalties, but must refer criminal violations to PROFEPA for prosecution.

The implementing regulation of the General Law's air pollution clauses provides additional detail in terms of compliance requirements.¹⁹

Article 3 establishes federal jurisdiction in matters that affect the environment that originate in other countries and affect Mexico or that originate in Mexico and affect other countries. In effect, this confirms federal preemption of states' rights in matters of transboundary air pollution between Mexico and foreign countries. This concept is further reinforced by Article 11, which establishes federal jurisdiction over sources located in Mexico, which affect the environment of other countries.

Article 11 further defines the areas and sources under federal jurisdiction. In addition to those listed in the General Law, they include the following:

- Federal airports.
- Railroad, bus, and marine terminals.
- Industrial parks located in federal areas.
- Federal maritime coastal zone.
- Emission sources in one state that can affect the air quality of another state.

Articles 46 through 52 in Chapter V refer to enforcement actions, penalties, and administrative sanctions for regulatory violations. These are consistent with those described in the General Law. This regulation makes no mention of emission trading systems.

The environmental impact regulation requires project developers to submit an Environmental Impact Manifest (EIM) to SEMARNAT before engaging in activities which may cause potential environmental impacts.²⁰ Article 4 establishes SEMARNAT's authority to assess environmental impacts and issue authorization for projects in sectors under federal jurisdiction. From a practical standpoint, construction permits may not be issued until the EIM has been authorized by SEMARNAT.

Proposed projects are subject to either a Regional or Particular EIM study. The Regional EIM scope applies to certain specific types of projects, such as industrial parks, dams, and large agricultural projects, as well as those listed in urban development plans, and those that have the potential to cause cumulative, synergistic, or residual environmental impacts. The Particular EIM scope applies to all other projects.

The review process evaluates proposed mitigation measures for all identified potential impacts. Although this regulation does not address emissions trading per se, the concept would need to be established as an acceptable mitigation measure for air quality impacts from particular projects.

¹⁹ Regulation of the General Law of Ecological Balance and Environmental Protection in the Matter of Prevention and Control of Air Pollution. Official Journal of the Federation, November 25, 1988.

²⁰ Regulation of the General Law of Ecological Balance and Environmental Protection in the Matter of Environmental Impact Assessment. Official Journal of the Federation, May 30, 2000.

Article 5 lists 23 general categories of projects that come under federal jurisdiction:

- Water works
- Transportation and communications
- Oil and gas pipelines
- Oil industry
- Petrochemicals
- Chemicals
- Iron and steel
- Paper
- Sugar
- Cement
- Mining
- Hazardous and radioactive waste
- Forestry
- Forest plantations
- Coastal real estate developments
- Protected natural areas
- Fisheries
- Aquaculture
- Livestock and agriculture
- Industrial parks housing high hazard facilities
- Power generation
- Wetlands, mangroves, lagoons, rivers, lakes, and tidelands.
- Land use changes in forest, jungle, and arid areas

All other activities are state regulated, although they may be subject to similar requirements contained in state environmental regulations.

Penalties, enforcement actions, and administrative sanctions similar to those in the General Law are described in Chapter IX, Articles 55 through 64.

State of Baja California – Environmental Protection Law

The Environmental Protection Law defines the air quality program for the State of Baja California.²¹ Article 8 of the law gives the state Environment Secretariat the power to promote economic incentives to improve compliance with environmental policy objectives.

Title VI Articles 176 through 208 describe the enforcement mechanism and the fines and penalties that may be levied for violations of the law. These range from nonmonetary admonitions to partial, temporary or permanent closure of the pollution source and fines ranging from 200 to 20,000 times the daily minimum wage. Environmental felonies are referred to the State Attorney for prosecution. In addition, the law obligates violators to repair the damages to the environment. This statute and its implementing regulation make no mention of emissions trading.

²¹ Environmental Protection Law for the State of Baja California. Official Newspaper of Baja California No. 53, November 30, 2001.

International Agreements

The international agreements having emissions trading provisions that would impact the CA-BC border region are summarized below.

La Paz Agreement

The “Agreement between The United States of America and The United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area,” also known as the La Paz Agreement, was established in 1983.²² It consists of five annexes addressing the transboundary movement of hazardous materials, hazardous waste, and air and water pollution between the two countries. The Agreement defines the border as the area in each country within 100 kilometers of the U.S-Mexico border.

Annex V of the Agreement, entitled “Regarding International Transport of Urban Air Pollution,” specifically lists the following air pollutants/impacts as matters of mutual concern:

- Ozone.
- NO_x.
- Nonmethane hydrocarbons (NMHC).
- CO.
- SO_x.
- PM.
- Lead (Pb).

Appendix I of Annex V established a Joint Advisory Committee (JAC) for the improvement of air quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Basin. As part of its Scope of Activities in item (e), the JAC created an Air Work Group to develop recommendations on emissions trading and other economic incentives, as well as improving the compatibility of air quality programs in the air basin.

There are no enforcement mechanisms or penalties. The La Paz Agreement is of indefinite duration unless one party notifies the other through diplomatic channels of its intention to terminate. In that event, the Agreement will be terminated 6 months after official notification.

Border 2012 program is the most recent initiative to be implemented under the La Paz Agreement. Border 2012 was preceded by the Border XXI, a 5-year program that ended in 2000. The mission of Border 2012 is to protect the environment and public health in the U.S.-Mexico

²² Agreement between The United States of America and The United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area (La Paz Agreement), Annex V, Regarding International Transport of Urban Air Pollution, Appendix I. August 14, 1983. (<http://www.epa.gov/usmexicoborder/docs/LaPazAgreement.pdf>)

border region, consistent with the principles of sustainable development (Border 2012 website). Border 2012 has six goals; the second goal is to reduce air pollution.

The Border 2012 program is organized into workgroups and task forces. There are regional (example given, CA-BC) workgroups and border-wide workgroups. Also, task forces address specific issues by region, such as the air quality task forces for San Diego/Tijuana and Imperial Valley/Mexicali. Border 2012 is currently the primary bilateral platform for vetting border environmental matters.

Border 2012 works in conjunction with the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADBank). The BECC works to preserve, protect, and enhance human health and the environment of the U.S.-Mexico border region, by strengthening cooperation among interested parties and supporting sustainable projects through a transparent bi-national process in close coordination with NADBank, federal, state and local agencies, the private sector, and civil society (BECC website). NADBank is a bi-national financial institution capitalized and governed equally by the United States and Mexico for the purpose of financing environmental projects certified by the BECC (NADBank website). BECC and NADBank work together with communities and project sponsors in both countries to develop and finance infrastructure necessary for a clean and healthy environment for border residents.

North American Agreement on Environmental Cooperation

The North American Agreement on Environmental Cooperation (NAAEC), between the governments of Canada, Mexico, and the United States, was negotiated as part of the NAFTA.²³ One of the NAAEC's objectives stated in Article 2 is "to promote the use of economic instruments for the efficient achievement of environmental goals." As with the La Paz Agreement, NAAEC is of indefinite duration and may be terminated by any of the parties upon official notification of the North American Commission on Environmental Cooperation (NACEC) (NACEC website).

The NAAEC created the NACEC, which is composed of a council to oversee the terms of the Agreement, a Secretariat to manage its operations, and a Joint Public Advisory Committee to provide for public participation. Article 10(2)(g) states that "the Council may develop recommendations on transboundary and border environmental issues, such as the long-range transport of air and marine pollutants."

In 2002, the NACEC undertook a project to review the Article 13 provisions (Secretariat Reports) of the NAAEC addressing a continental approach to electricity generation and transmission; recommendations from that study suggested a follow-on examination of the key issues that should be taken into account when considering a multi-pollutant emissions trading

²³ North American Agreement on Environmental Cooperation Between the Government of Canada, the Government of the United Mexican States and the Government of the United States of America, 1993. Commission for Environmental Cooperation.
http://www.cec.org/pubs_info_resources/law_treat_agree/naaec/index.cfm?varlan=english

regime that includes all three NAFTA countries. A working paper examined the environmental challenges and opportunities of the evolving North American electricity market, including the design and legal considerations for emissions trading (Russell 2002). The working paper summarized experiences with emissions trading in North America, described the “desirable” design elements of a tri-national emissions trading scheme, identified potential trade issues under NAFTA, and recommended further work in order to understand these specific areas (among others): current trading mechanisms, how to integrate a non-Kyoto trading system with a Kyoto trading system, use of a pilot study possibly focusing on SO₂ trading first and then on NO_x trading, and the “asymmetrical relationship with North America in terms of resource capacity.”

Article 14 describes the NAAEC’s enforcement mechanisms, while Part Five, Articles 22- 36, detail the process for consultation and dispute resolution. Suspension of NAFTA tariff benefits is the ultimate enforcement instrument after the dispute resolution process has been exhausted.

The NAAEC’s enforcement principles found in Article 37 state, “Nothing in this Agreement shall be construed to empower a Party’s authorities to undertake environmental law enforcement activities in the territory of another Party.”

Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC) took effect in 1994. Under Articles 4 and 12, the relevant decisions of the Conference of Parties (COP), national GHG emission inventories are submitted to the Climate Change Secretariat.²⁴ The GHGs reported including CO₂, CH₄, N₂O, PFCs, HFCs, and, SF₆.

Emissions are estimated according to the guidelines issued by the Intergovernmental Panel on Climate Change (IPCC).²⁵ All GHGs are reported in terms of CO₂ carbon dioxide equivalents (CO₂e) based on their global warming potential (GWP) relative to CO₂, which is considered to have a GWP of 1.0.

In 1997, the UNFCCC was augmented by a stricter set of demands affecting GHGs, the Kyoto Protocol, which was “entered into force” in February 2005.²⁶ To date, 176 out of the world’s 178 countries have ratified, accepted, approved, or accessed the Kyoto Protocol; only Kazakhstan and the U.S. have not approved the Protocol in any form.

The Kyoto Protocol contains GHG reduction targets for the world’s industrialized countries. These targets have the overall goal of reducing GHGs by at least 5 percent below 1990 levels during the commitment period of 2008 through 2012. Mandatory targets are expected for commitment periods beyond 2012.

Flexibility is allowed in how GHG reductions are achieved, including the ability to partially compensate for emissions by increasing “sinks” (forests that remove CO₂ from the atmosphere).

²⁴ <http://unfccc.int/2860.php>

²⁵ <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm>

²⁶ http://www.unfccc.int/kyoto_protocol/background/items/2879.php

The Protocol contains three “flexibility mechanisms” designed to lower costs of reducing GHGs, which include the following:

- Clean Development Mechanism: Allows industrialized countries to partially meet emission reduction targets through credits earned by sponsoring GHG reduction projects in developing countries.
- Joint Implementation: Allows industrialized countries to partially meet emission reduction targets through credits earned by sponsoring GHG reduction projects in other industrialized countries.
- Emission Trading: Allows counties having GHGs to spare (emissions permitted but not used) to sell this excess to counties that exceed their GHG targets. This creates a global carbon market.

To participate in these mechanisms, a county must have ratified the Kyoto Protocol, calculated their assigned GHG emissions amount in terms of CO₂e emissions, and have in place a national system for estimating annual emissions and removals of GHGs along with a national registry to record and track the creation and movement of eligible CO₂e emissions.

Although the U.S. has not accepted the Kyoto Protocol, the U.S. EPA does publish an annual national emissions inventory of GHGs.²⁷ Also, although there is currently no U.S. national registry to record and track GHGs, one is in the development stages, and is referred to as “The Climate Registry”.²⁸ The Climate Registry participants include the California Climate Action Registry²⁹ and the Eastern Climate Registry³⁰, as well as most U.S. states, the Mexican state of Sonora, and the Canadian provinces of British Columbia and Manitoba.

Conclusions

This section summarizes in tabular format the laws, rules, regulations and agreements discussed above. Also, final conclusions are presented based on how these legal provisions address, or could potentially address, cross-border emissions trading.

Tables 4 through 7 summarize the U.S. federal (Table 4), California state and local (Table 5), Mexican federal and Baja California state (Table 6), and international (Table 7) treaties, laws, and regulations in the study area.

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<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissions.html>

²⁸ <http://www.theclimateregistry.org/>

²⁹ <http://www.climateregistry.org/Default.aspx?refreshed=true>

³⁰ <http://www.easternclimateregistry.org/>

The U.S. Constitution provides the federal government with the authority to negotiate international treaties and regulate air pollution within the U.S. This authority has been used to adopt the FCAA and to negotiate environmental agreements with Mexico. In California, where many FCAA provisions are deeply embedded in state and local air regulations and many local regulatory provisions have been included in federally approved air quality plans, federal law and state and local regulations are intertwined and operate together to form the legal environment in which a cross-border trading program would be developed. The statutes and regulations of California establish a framework that provides for the trading of emissions between sources within an air district and between sources in different air districts and air basins but not for trading emissions with sources in Mexico. Any program developed to provide for cross-border trading would require changes to California law, although the technical foundation would remain the same. It should be noted that the technical foundations needed for trading programs (emission inventories, enforceable attainment demonstration plans, enforceable facility permits) may not in all cases exist in Mexico or that they may not provide the level of protection or information needed to meet emission trading requirements.

The provisions of California's progressive climate change law (AB 32) include use of a market trading system to achieve GHG emission reductions by 2020. Market system trading implementation strategies have recently been analyzed by the Governor-appointed MAC. The MAC's recommendations imply that obtaining offsets from a foreign country should be accepted but only if the other jurisdictions have an agreement with California to adequately ensure a similar level of environmental integrity and accountability in their emissions control programs. To date, no AB 32 regulations have been promulgated, therefore it is not possible to predict how California regulatory statutes might allow and enforce a CBETP in the CA-BC border region with regard to GHGs.

Mexico and Baja California have no environmental laws, regulations, or official standards addressing emissions trading in any substantive manner. The only reference to this issue in statute is contained in the federal General Law, which empowers SEMARNAT to promote emissions trading systems for the prevention and control of air pollution.

The La Paz Agreement's Annex V, Appendix I contains language requiring the development of recommendations on emissions trading and other economic incentives, but only as a part of air quality programs in the Ciudad Juárez (Chihuahua)-El Paso (Texas)-Doña Ana County (New Mexico) air basin. Another international agreement, the Kyoto Protocol, has a very structured program for estimating emissions for GHGs, and trading them between industrialized and developing countries. Even though the United States has not ratified participation in the Kyoto Protocol, the emissions trading program implemented through the Kyoto Protocol could serve as a conceptual model for a future program developed in the CA-BC border region. The Kyoto Protocol's provisions pertaining to GHG emission estimation using approved protocols, certification of emissions by third parties, banking and accounting of emissions via registries, etc., could apply to criteria pollutants the same as for GHGs.

Table 4: Characteristics of U.S. Federal Air Pollution Laws Pertaining to Emissions Trading

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Federal Clean Air Act (FCAA), 42 U.S.C. 7401 et. seq.	All air pollutants	Establishes modern national air pollution control program for U.S.	Applies to states, Indian tribes, the District of Columbia, Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, and the Northern Commonwealth of the Marianas.	Does not sunset. Provides authority for the U.S. EPA to set numerous deadlines.	Federal requirements binding on states and sources of air pollution. Authority stems from impact of air pollution on interstate commerce.	Civil and criminal penalties. Federal preemption of state authority and sanctions on states under some circumstances.
FCAA, Title I, Part D, Subpart 2, Sections 182 and 189	Ozone (O ₃) and PM less than 10 μm in aerodynamic diameter (PM ₁₀)	Establishes enforceable means of ensuring that new or expanding sources do not interfere with reasonable further progress toward attainment. Subject sources must offset emissions increases of nonattainment pollutants and precursors by ratios of 1.1 to 1.5.	Applies to select new and expanding sources in ozone and PM ₁₀ nonattainment areas.	Applies until standards are attained and as long thereafter as needed to maintain standards.	Federal requirements binding on states and sources of air pollution.	Civil penalties, sanctions on states.
FCAA, Title I, Part D, Subpart 1, Sections 172 and 173	All criteria pollutants in nonattainment areas	Requires certain new or expanding sources to obtain permits. States must include New Source Review (NSR) permit program in their State Implementation Plans (SIPs).	Applies to states.	N/A	Federal requirements binding on states and sources of air pollution.	Civil penalties, sanctions on states.
FCAA, Title I, Part D, Subpart 1, Section 176(a)	All criteria pollutants in nonattainment and maintenance areas	General conformity requirements prohibit any federal agency from approving, funding, etc. projects that are not consistent with the levels of projected growth and control) used in the attainment demonstration in an approved SIP.	Applies to federal agencies that permit, approve or fund projects and activities.	Applies until standards are attained and as long thereafter as needed to maintain standards	Federal requirements assigning responsibility to federal agencies	Self-enforced but subject to court oversight.

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
FCAA, Title V, Section 504	All regulated pollutants	Requires certain sources to obtain "federal" permit that includes all applicable regulatory requirements.	Applies to any stationary source that is subject to any of the following federal permit requirements: New Source Review (NSR) New Source Performance Standards (NSPS) National Emission Standards for Hazardous Air Pollutants (NESHAPs) Prevention of Significant Deterioration (PSD) Acid Rain	N/A	Federal requirements binding on states and sources of air pollution.	Civil and criminal penalties.
FCAA, Title I, Part A, Section 113	All regulated pollutants	Allows the U.S. EPA to enforce FCAA requirements pertaining to NSPS, NESHAPs, Title I permit requirements and Title V permits.	Applies to the U.S. EPA.	N/A	Federal requirements binding on sources of air pollution.	Civil and criminal penalties.
FCAA, Title I, Part A, Sections 110 & 116	All regulated pollutants	Protects right of states to adopt more stringent requirements than FCAA requires and include them in SIPs.	Applies to states.	N/A	State discretion.	N/A
FCAA, Title I, Part A, Section 131	All regulated pollutants	Preserves state authority and discretion.	Applies to states, but does not affect land use authority of states or local governments.	N/A	State discretion.	N/A
FCAA, Title I, Part A, Section 115	All criteria pollutants in nonattainment areas	Addresses impact of U.S. pollution on other countries in some circumstances.	If Secretary of State finds that U.S. emissions are endangering health in another country, then the U.S. EPA can require a state to reduce its emissions, but only when the affected country has a reciprocal policy.	N/A	Federal requirements binding on states.	Unknown

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
National Environmental Policy Act (NEPA), 42 U.S.C., 4321-4347	General impacts on environment	Requires projects to obtain approval of federal agencies regarding environmental consequences. Federal agencies must consider impacts of their funding decisions, permits and approvals and publish written findings.	Applies to federal agencies.	N/A	Statutory requirements binding on federal agencies.	Civil suits, courts order federal agencies to comply before taking proposed action.

N/A = Not applicable and/or no date is specified in the law/regulation.

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Table 5: Characteristics of California State and Local Air District Air Pollution Laws and Regulations Pertaining to Emissions

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Health & Safety Code (H&SC), Division 26	All air pollutants	Establishes an air pollution control program in California.	Applies to all air pollution control programs at the state and local level.	N/A	Sets up authority for the California Air Resources Board (ARB), and local districts to control sources of air pollution.	Sections 42400 et seq specify fines for persons ranging from \$1,000 and up to six months in jail all the way up to \$250,000 and up to 1 year in jail. For corporations, the fines can be as high as \$1,000,000. Each day of a violation is a separate offense.
H&SC, Section 40000 – Statutory Authority	N/A	Divides responsibility between state and local air pollution control agencies.	Applies to ARB and local and regional air districts.	N/A	ARB and local air districts	N/A
H&SC, Section 42301 – Permit Programs	All air pollutants	Establishes permitting programs.	Local and regional air districts	N/A	Local air districts	N/A
H&SC, Section 39607.5 – Value of Credits	Criteria pollutants	Establishes methodology for creating interchangeable emission reduction credits (ERCs).	ARB	N/A	ARB	N/A
H&SC, Section 39610 – Air Pollution Transport	Ozone and its precursors	Identifies where transport of pollutants from air basin to air basin cause or contribute to violations of state ambient air quality standard for ozone.	ARB	Has been met by ARB.	ARB	N/A
H&SC, Section 39616 – Market-based incentive programs	Criteria pollutants	Provides authority to adopt market-based incentive programs to attain standards.	Local air districts	N/A	Local air districts	N/A
H&SC, Section 40700 – Emissions banks	Nonattainment pollutants	Requires local air districts to establish a system for banking ERCs. Districts that have no nonattainment pollutants do not need to establish such a system.	Local air districts	No date set by which local district must establish such a system.		N/A

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
H&SC, Section 40700.5 – Emissions reduction credit tracking	Nonattainment pollutants	Identifies the availability and cost of ERCs.	Applies to local air districts. Also, requires ARB to publish annual report on the cost of offsets for the previous year.	Annually	Local air districts	N/A
H&SC, Section 40709.6 – Interdistrict trading	Nonattainment pollutants	Provides for trades between air districts based on meteorology and severity of air quality.	Applies to sources within air districts using interdistrict offsets.	N/A	Local air districts	N/A
H&SC, Section 40711 – public availability of info on credits	Nonattainment pollutants	Requires air districts to maintain registries of available credits and make that registry publicly available.	Local air districts	N/A	Local air districts	N/A
H&SC, Section 40818 – offset requirements moderate area	Nonattainment pollutants	Requires air districts with a moderate air quality classification to adopt a program that ensures no net increase in emissions from sources which emit 25 tons per year (TPY) or more.	Local districts classified as moderate	N/A	Local air districts	N/A
H&SC, Section 40819 – offset requirements serious area	Nonattainment pollutants	Requires air districts with a serious air quality classification to adopt a program that ensures no net increase in emissions from sources which emit 15 TPY or more.	Local districts classified as serious	N/A	Local air districts	N/A
H&SC, Section 40819 – offset requirements severe area	Nonattainment pollutants	Requires air districts with severe air quality classification to adopt a program that ensures no net increase in emissions from sources which emit 10 TPY or more.	Local districts classified as severe	N/A	Local air districts	N/A

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
H&SC, Section 40819 – offset requirements extreme area	Nonattainment pollutants	Requires air districts with an extreme air quality classification to adopt a program that ensures no net increase in emissions from all new and modified stationary sources.	Local districts classified as extreme	N/A	Local air districts	N/A
H&SC, Section 38500 – Assembly Bill 32 (AB 32) (Global Warming Solutions Act of 2006)	Carbon monoxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), sulfur hexafluoride (SF ₆)	Reduces California greenhouse gases (GHGs) to 1990 levels by 2020. Requires market-based approaches to be implemented.	Applicability is currently being determined through development of regulations implementing GHG reporting.	By 2008: Establish 2020 emission target and adopt mandatory reporting rule. By 2009: Approve scoping plan (source and sector analysis, reduction measures). By 2020: Meet reduction goals.	ARB	None yet defined, but regulations are currently being developed.
County of San Diego Air Pollution Control District (SDAPCD)						
Rule 10 – Permit Required	Any air contaminant	Identifies air emission sources.	Applies to any source with long list of exemptions for minor sources.	Ongoing	County of San Diego Air Pollution Control District (SDAPCD)	The district operates under H&SC Section 42400 et seq. as described above.
Rule 20.1 – New Source Review – General Provisions	All regulated pollutants	Defines projects covered, definitions, and calculation procedures for potential emissions, and emission reductions.	New major sources above specific thresholds. Major modifications to sources above specific thresholds. Offsets are to be provided on an annual basis and must be located in San Diego County.	Ongoing	SDAPCD	N/A

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Rule 20.3 – NSR – Major Sources and PSD Sources	NO _x and VOC	Specifies offset ratios: VOC – 1.2:1.0 NO _x – 1.2:1.0 Offsets required for nonattainment pollutants and their precursors.	Offsets are required for NO _x and VOC. Inter-pollutant offsets are specifically allowed.	Ongoing	SDAPCD	N/A
Rule 26.1 through Rule 26.10	All regulated pollutants	Establishes procedures for banking and use of emission reduction credits (ERCs).	Applies to sources banking ERCs for future use.	Ongoing	SDAPCD	N/A
Imperial County Air Pollution Control District (ICAPCD)						
Rule 201 Permit Required	Any air contaminant	Identifies emitting sources.	Applies to any source with long list of exemptions for minor sources.	Ongoing	Imperial County Air Pollution Control District (ICAPCD)	The district operates under H&SC, Section 42400 et seq. as described above.
Rule 207 C.2	All regulated pollutants	Provides preamble to offset requirements.	(See C.2a, C.2b, C.2c)	Ongoing	ICAPCD	N/A
Rule 207 C.2a	Reactive organic gases (ROG), NO _x , SO _x , carbon monoxide (CO), and PM ₁₀	Defines sources subject to offsets.	Applies to all sources emitting >137 pounds per day (lb/day)	Ongoing	ICAPCD	N/A
Rule 207 C.2.b	ROG, NO _x , SO _x , CO, and PM ₁₀	Requires offsets from new or modified units occurring after 9/7/93.	Applies to sources emitting >137 lb/day	Ongoing	ICAPCD	N/A
Rule 207 C.2c	ROG, NO _x , SO _x , CO, and PM ₁₀	Specifies how sources that may emit >137 lb/day in the future are to be treated. Applies to major sources emitting >100 tons/year	Major sources (>100 tons/year) must offset all increases occurring since 9/7/93, not just those that cause the source to exceed 137 lb/day.	Ongoing	ICAPCD	N/A

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Rule 207 C.3.a	ROG, NO _x , SO _x , CO, and PM ₁₀	Species offset ratios: Same source = 1:1 Within 50 miles = 1.2:1 Within air basin, ratio to be determined by Air Pollution Control Officer (APCO) but not to exceed 3:1	Applies to all sources emitting >137 lb/day	Ongoing	ICAPCD	N/A
Rule 207 C.3.b	ROG, NO _x , SO _x , CO, and PM ₁₀	Specifies location where offsets may be obtained: Same nonattainment area unless, same air basin and in nonattainment area with same or worse nonattainment status, and demonstrated to contribute to violation of ambient air quality in area of proposed source.	Applies to all sources emitting >137 lb/day	Ongoing	ICAPCD	N/A
Rule 207 C.4.a	ROG, NO _x , SO _x , CO, and PM ₁₀	Ensures compliance will offset requirements. APCO must certify offsets in another district meet requirements of ICAPCD.	Applies to all sources emitting >137 lb/day	Ongoing	ICAPCD	N/A
Rule 207 C.4.b	ROG, NO _x , SO _x , CO, and PM ₁₀	Provides for the use of inter- pollutant offsets, but APCO must approve them on a case-by-case basis.	Applies to all sources emitting >137 lb/day	Ongoing	ICAPCD	N/A

N/A = Not applicable and/or no date or no enforcement mechanism is specified in the law/regulation.

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Table 6: Characteristics of Mexican Federal and Baja California State Air Pollution Laws Pertaining to Emissions Trading

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
General Law of Ecological Balance and Environmental Protection (General Law), Article 5, items III and IV., and incorporating reforms published on July 5, 2007	All environmental pollutants	Establishes federal jurisdiction in matters that affect the environment in areas between states or beyond any one state.	Applies to all environmental issues between Mexico and other countries.	Permanent until law is modified.	Federal preemption of international agreements between Mexican states and foreign countries.	Title VI, Article 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 7, item III	All air pollutants	Establishes state jurisdiction over air pollution sources not under federal jurisdiction.	Applies to all industrial, fixed sources and mobile sources not under federal jurisdiction.	Permanent until law is modified.	State jurisdiction of all industrial fixed sources and mobile sources not under federal jurisdiction.	Title VI, Article 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 8, item III	All air pollutants	Establishes local jurisdiction over commercial- or service-related fixed air pollution sources, and mobile sources not under federal jurisdiction.	Applies to all commercial and service sources and mobile sources not under federal jurisdiction.	Permanent until law is modified.	Local jurisdiction of all commercial and service-related fixed sources and mobile sources not under federal jurisdiction, with the participation of the state.	Title VI, Article 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 11, item VI	All air pollutants	Allows states to enter into coordination agreements with federal government Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) to assume control of fixed and mobile air emission sources under federal jurisdiction	Applies to fixed sources and mobile sources under federal jurisdiction.	Permanent until law is modified.	State control of sources under federal jurisdiction.	Title VI, Article 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 12	All air pollutants	Establishes conditions under which states can petition to assume federal regulatory oversight duties over fixed and mobile sources.	Applies to fixed sources and mobile sources under federal jurisdiction.	Permanent until law is modified.	State control of sources under federal jurisdiction.	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
General Law, Chapter II, Article 111. item XI	All air pollutants	Promotes coordination with competent authority systems for transferable rights to pollutant emissions.	Applies to all emissions trading systems.	Permanent until law is modified.	Federal jurisdiction over emission trading agreements.	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 111-bis	All air pollutants	Defines fixed emission sources under federal oversight.	Applies to 11 industrial sectors under federal jurisdiction.	Permanent until law is modified.	Federal jurisdiction over permitting and emission limits for fixed sources in the listed sectors.	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 112, item I	All air pollutants	Establishes state and local jurisdiction over fixed emission sources not specifically identified under federal oversight.	Applies to all industrial, commercial and service sources not under federal jurisdiction.	Permanent until law is modified.	State and local jurisdiction of all industrial and commercial fixed sources not under federal jurisdiction	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 112, item II	All air pollutants	States and municipalities define zoning for citing pollution sources in urban development plans.	Applies to all air pollution sources under federal, state or local jurisdiction.	Permanent until law is modified.	State and local jurisdiction over zoning.	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.
General Law, Chapter II, Article 112, item VII	All air pollutants	Establishes state and municipality control of mobile emission sources	Applies to mobile air pollution sources not under federal jurisdiction.	Permanent until law is modified.	State and local jurisdiction over mobile sources.	Title VI, Articles 160-188 on enforcement actions, penalties and administrative sanctions.
Regulation of the General Law of Ecological Balance and Environmental Protection in the Matter of Prevention and Control of Air Pollution (Air Pollution Regulation), Article 3, items III, IV and V.	All air pollutants	Establishes federal jurisdiction in matters that affect the environment, which originate in other countries and affect the nation, or vice-versa.	Applies to all environmental issues between Mexico and other countries.	Permanent until law is modified.	Federal pre-emption of states in matters between Mexican states and foreign countries.	Chapter V, Articles 46 to 52, regarding enforcement actions, penalties and administrative sanctions.
Air Pollution Regulations, Article 11, item II (e).	All air pollutants	Establishes federal jurisdiction over sources located in Mexico affecting the environment of other countries.	Applies to all air pollution sources	Permanent until modified.	Federal pre-emption of international agreements between Mexican states and foreign countries.	Chapter V, Articles 46 to 52, regarding enforcement actions, penalties and administrative sanctions.

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Regulation of the General Law of Ecological Balance and Environmental Protection in the Matter of Environmental Impact Assessment (Environmental Impact Regulation), Article 4, items III, IV and V.	All environmental pollutants	Establishes SEMARNAT's authority to assess environmental impacts and issue authorization for the realization of projects in sectors of federal jurisdiction.	Applies to sectors under federal jurisdiction for environmental impact assessments.	Permanent until modified.	Federal jurisdiction over issuance of environmental impact permits in the listed sectors.	Chapter IX, Articles 55 to 64, regarding enforcement actions, penalties and administrative sanctions.
Environmental Impact Regulation, Article 5.	All environmental pollutants	Lists sectors and projects that require SEMARNAT's prior authorization with regard to environmental impact.	Applies to 23 sectors. In energy sector, includes power generation plants, substations, transmission lines, and cogeneration plants greater than 3 megawatts (MW)	Permanent until modified.	Federal jurisdiction over prior approval of projects in the listed sectors	Chapter IX, Articles 55 to 64, regarding enforcement actions, penalties and administrative sanctions.
Baja California						
Environmental Protection Law for the State of Baja California, Article 8.	All environmental pollutants	Promotes economic incentives to improve compliance with environmental policy objectives.	Applies in all matters of state environmental policy.	Permanent until modified.	State power to develop economic incentives.	Title VI, Articles 176 to 208.

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Table 7: Characteristics of International Agreements Pertaining to Air Pollution and Emissions Trading

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Agreement between The United States of America and The United Mexican States on Cooperation for the Protection and Improvement of the Border Area (La Paz Agreement), Annex V, Regarding International Transport of Urban Air Pollution, Appendix I, Scope of Activities, item (e).	Ozone, NO _x , nonmethane hydrocarbons (NMHC), CO, sulfur dioxide (SO ₂), PM, and lead (Pb)	Creates an Air Work Group to develop recommendations on emissions trading and other economic incentives as well as improving the compatibility of air quality programs in the air basin	Applies to Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua-El Paso, Texas-Doña Ana County, New Mexico air basin.	Indefinite, unless one party notifies the other of intention to terminate agreement, then after 6 months.	International Treaty, Congressional Act.	None
North American Agreement on Environmental Cooperation (NAAEC) between the Government of Canada, the Government of the United Mexican States and the Government of the United States of America, Article 2.	All encompassing	Promotes use of economic instruments for the efficient achievement of environmental goals	Applies to all activities of the Parties.	Indefinite, unless one party notifies the other of intention to terminate agreement, then after 6 months.	International Agreement, North American Free Trade Agreement (NAFTA).	Article 14, Submission of Enforcement Matters; Part Five, Articles 22- 36, Consultation and Resolution of Disputes; Suspension of NAFTA benefits.
NAAEC, Article 10 (2)(g)	All encompassing	Allows Council to develop recommendations on transboundary and border environmental issues, such as the long-range transport of air and marine pollutants	Applies to all activities of the Parties.	Indefinite, unless one party notifies the other of intention to terminate agreement, then after 6 months.	International Agreement, NAFTA.	Article 14, Submission of Enforcement Matters; Part Five, Articles 22- 36, Consultation and Resolution of Disputes; Suspension of NAFTA benefits.

Law/Regulation (Description, Citation)	Pollutants	Purpose	Applicability, Exemptions	Compliance, Sunset, Milestone Dates	Jurisdiction, Regulatory Authority	Enforcement Mechanism(s), Penalties
Border 2012 Program	All encompassing	Focuses on cleaning the air, providing safe drinking water, reducing the risk of exposure to hazardous waste, and ensuring emergency preparedness along the U.S.-Mexico border.	Applies to all activities of the Parties. Parties include "numerous bi-national entities" (for example, U.S. EPA, SEMARNAT, ARB, New Mexico Department of the Environment, Texas Commission on Environmental Quality [TCEQ], etc.)	Commitment period is 10 years (2002 – 2012)	International Agreement, La Paz	No penalties. Water/air/waste/land use projects are identified and implemented by workgroups and task forces.
Kyoto Protocol, United Nations Framework Convention on Climate Change	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	Reduce GHGs based on specific targets for industrialized countries. Overall goal is to reduce GHGs by 5% below 1990 levels.	Applies to industrialized countries that have ratified, approved, accepted, or accessed the Protocol, plus developing countries choosing to participate in carbon market incentives.	Commitment period is 2008 to 2012 to reduce emissions to 1990 levels.	None, although ratification of Protocol general implies that country will meet targets for reductions.	None

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

CHAPTER 3: Benefits, Opportunities, and Barriers for Establishing a Cross-Border Emissions Trading Program

The chapter identifies and analyzes the potential benefits, opportunities, and barriers of a cross-border emissions trading program (CBETP) in the California-Baja California (CA-BC) region.

Objectives

The objectives of this chapter are to describe the benefits and barriers to a CBETP. Also, a sub-objective is to identify specific projects that have or will be impacted by the lack of or potential of a CBETP in the CA-BC region, in terms of:

- Where, if any, are projects that have occurred that used emissions trading along the U.S.-Mexico border.
- Projects that could not proceed due to a lack of available emission reduction credits (ERCs).
- Sites or sources that are candidates for emission trading in the future.

Current “banked” ERCs within San Diego and Imperial Counties are shown in table 8. To provide some perspective on the size of existing bank deposits, this table also shows the emissions for a typical 500-megawatt (MW) power plant. The typical plant emissions were based on the annual emissions from three plants recently evaluated by the Energy Commission (natural gas-fired, combined-cycle, low-nitrous-oxide [NO_x] burners, selective catalytic reduction [SCR], and oxidation catalysts): Palomar Power Project, Inland Empire Energy Center, Blythe Energy Project – Phase II.^{31, 32, 33} The annual emissions for each of the three power plant projects were converted from tons per year (TPY) to pounds per megawatt-hour (lb/MWh). For each pollutant, an average, maximum, and minimum emission rate in lb/MWh was calculated. The average, maximum, and minimum emission rates were then converted to TPY for the 500-MW hypothetical plant (assuming full operation of 8,760 hours per year).

If a new power plant were to be built in either Imperial or San Diego County, offsets would be required; both counties are nonattainment for ozone (that is, requiring NO_x and volatile organic compound [VOC] offsets) and Imperial County is also nonattainment for particulate matter less than 10 µm in aerodynamic diameter (PM₁₀). As shown in table 8, emissions for a typical 500-

³¹http://www.energy.ca.gov/sitingcases/palomar/documents/2003-01-24_PALOMAR_FSA.PDF

³² http://www.energy.ca.gov/sitingcases/inlandempire/documents/2003-05-23_INLAND_FSA.PDF

³³ <http://www.energy.ca.gov/2005publications/CEC-700-2005-007/CEC-700-2005-007.PDF>

MW plant would exceed banked PM₁₀, NO_x, and VOC deposits in Imperial County and a substantial portion of banked NO_x credits in San Diego County.

Table 8: Summary of Banked ERCs in San Diego and Imperial Counties

Classification of ERCs	Tons per Year				
	NO _x	SO _x	VOC	CO	PM ₁₀
San Diego Air Pollution Control District					
Class A - Active emission reduction credits (ERCs) ^a	158.24	15.91	307.97	207.09	156.36
Imperial County Air Pollution Control District (ICAPCD)					
Stationary Source Available ERCs ^b	89.98	13.63	3.33	27.26	2.73
Emissions From a Typical 500 MW Gas-Fired Power Plant Operated in California ^c					
Minimum Emissions Based on 90% Capacity Factor	111.1	10.4	21.6	284.9	58.8

a As of January 2, 2007. Subject to verification.

b As of October 15, 2007.

c Estimated based on average emissions from staff assessments for Palomar, Inland Empire, and Blythe (Phase II) power projects.

Source: Romelczyk, Stan, County of San Diego Air Pollution Control District, October 15, 2007; Dessert, Matt, Imperial County Air Pollution Control District, October 17, 2007

While the cost and availability of emissions reduction credits and related air quality requirements is one element of a project proponent's decision as to where to locate a facility, there are other important considerations. For example, the following are some of the many items that might be considered, in addition to basic economic and business factors, in deciding where to site a new electrical generating plant:³⁴

- The availability of a suitably sized parcel of land with compatible surrounding land uses.
- The proximity of the site to a reliable fuel supply, such as a natural gas pipeline.
- The distance to transmission lines with available capacity.
- The availability of an adequate and reliable supply of cooling water.
- Other regulatory requirements that apply due to the proposed location.

³⁴ Some of the items listed below were described in a personal conversation between Alberto Abreu, Director, Permitting, Environment & Safety, Sempra Global, and Enrique Medina. October 19, 2007.

Method

To begin this subtask, a list of questions was compiled, to which the answers might identify specific potential benefits, opportunities, and barriers to a CBETP. Examples of some of these questions included the following:

- What are the goals of a CBETP and what benefits derive directly or indirectly from those goals?
- Which of the U.S., California, Mexican, and Baja California agencies should be involved in developing and implementing a CBETP? How would this interaction occur, and what would be the motivation to ensure participation by all parties?
- What role, if any, would the affected private sector interests and public interest groups play in establishing a CBETP?
- Are air quality problems understood well enough in the CA-BC border region to determine offset ratios, particularly inter-pollutant or inter-precursor ratios?
- Are emissions data accurate enough to meet the needs of a trading program? Is the accuracy comparable on both sides of the border? For example, is information available to quantify pre- and post-control emissions; obtain historical operating hours; provide accurate combustion, process, and control equipment descriptions; identify fuel types and quantities combusted and load factors; etc.?
- How would an international emissions bank or trading exchange be established and who would operate it?

Next, potential sources of information needed to answer the questions were listed and distributed among team members to investigate. These included interviews with agency staff, other papers and studies that address emissions trading, Department of Energy (DOE) documents, Air Resources Board (ARB) and U.S. Environmental Protection Agency (EPA) emissions and air quality data, etc.

During this process, the project team organized the CBETP benefits into the following areas: environmental (air quality and emissions), institutional and inter-agency, business sector, and other (for example, social). The project team also organized the CBETP barriers into the following areas: legal, institutional, technical, and practical (implementation related). Opportunities were characterized in terms of specific projects, which were described, participants identified, and reasons for success or failure explained.

Then, interviews and research were conducted to obtain the information necessary to “answer the questions” and identify specific opportunities and obstacles for establishing a CBETP in the CA-BC border region.

Potential Benefits and Opportunities for Establishing a Cross-Border Emissions Trading Program

This chapter discusses the potential benefits of establishing a CBETP, as well as some specific projects (that is, case studies) that demonstrate how the legal, institutional, technical, and implementation implications have affected or may affect the environment in which a CBETP would be developed and implemented.

To place the discussion of benefits and opportunities in context, it is important to acknowledge that there is a variety of ways in which a CBETP could be designed and implemented. As noted earlier, the U.S. EPA divides trading programs into three types: cap-and-trade, project-based trading, and rate-based trading³⁵; these types of trading programs will be discussed in more detail in other parts of this report. The U.S. EPA points out that the three types of programs share some basic similarities:

“...trading provides companies with the incentive to develop cost effective emission reduction strategies. Companies may elect to control emissions more than required and sell surplus allowances or credits to other facilities that may face more expensive options to reduce emissions. All three types of trading can include provisions to allow companies to save extra allowances or credits for use in future years (banking).”³⁶

The U.S. EPA is a proponent of emissions trading and has used the cap-and-trade approach on several major rulemakings in recent years, including its national rule for reducing mercury emissions from electrical generating units. The U.S. EPA’s views on the characteristics of a well-designed and implemented trading program are as follows (U.S. EPA Clean Air Markets website):

- Strict limits on emissions yielding dramatic pollution reductions.
- High levels of compliance, transparency, and complete accountability.
- Regulatory certainty and flexibility for sources.
- Incentives for early pollution reduction and innovations in control technologies.
- Compatibility with state and local programs.
- Significant, widespread, and guaranteed human health and environmental benefits.
- Efficient use of government resources.
- More benefits at less cost.³⁷

³⁵ <http://www.epa.gov/airmarkets/cap-trade/docs/tradingtypes.pdf> U.S. EPA Website page accessed on October 22, 2007.

³⁶ U.S. EPA Website as cited, page 2.

³⁷ <http://www.epa.gov/airmarkets/cap-trade/index.html> U.S. EPA Website accessed on October 22, 2007

As stated elsewhere, a premise of this analysis is that the most likely goal of the CBETP, whatever its form, would be to achieve an air quality benefit in both the United States and Mexico. Additional goals of a CBETP might be to:

- Ensure emissions increases from new and expanding stationary sources do not degrade air quality.
- Facilitate energy reliability in both countries and energy security in the United States.
- Enhance cost-efficient air program development, particularly in Mexico.
- Be sufficiently stringent to support the Federal Clean Air Act (FCAA), California state and local air district, Mexican federal, and Baja California state policies and goals.

In the CA-BC region, the air quality focus of a CBETP would likely be O₃ and PM₁₀, the pollutants that most often exceed ambient air quality standards. In addition to directly emitted PM, the program would likely address SO₂ as a particulate precursor, and NO_x and ROG as both ozone and particulate precursors. The ARB evaluated ozone transport in the border areas and identified transport between Calexico and Mexicali and between San Diego and Tijuana.³⁸

Potential Benefits of Cross-Border Emissions Trading

The potential benefits of the trading program described above are as follows:

- Reduce adverse health effects from exposure to ozone, particulate matter, and possibly other air pollutants on both sides of the border.
- Reduce the overall cost of meeting air quality goals in both countries by providing the flexibility to select lower cost means of meeting emissions reductions goals.
- Encourage the development and use of more effective air pollution control technologies and the use of cleaner fuels.
- Facilitate siting of clean energy and industrial facilities on both sides of the border.
- Provide an opportunity to increase energy reliability in both countries and energy security in the United States.
- Provide a precedent for other trading programs. This would include a potential CBETP involving Mexico and other U.S. states. The Baja California experience could also be beneficial to Mexico as a whole in developing a domestic emissions trading system beyond the border region and into Mexico's interior.
- Provide an opportunity for enhancing the institutional capacity of Baja California's environmental agency by requiring much closer coordination with its counterparts in California. The Secretaría de Protección al Ambiente de Baja California (SPABC – Secretariat of Environmental Protection of the State of Baja California) will need to

³⁸ "Ozone Transport: 2001 Review", Air Resources Board, April 2001, pp. 34-35.

invest additional resources in information management, permit processing, inspections, enforcement, modeling, program administration, and communication. These additional capabilities will be available to strengthen its local program and constitute a benefit in terms of fulfilling its current mission.

- Reduce or prevent situations in which pollution is effectively exported from the U.S. to Mexico to the detriment of air quality in both countries. This occurs whenever a facility is built primarily to service the U.S. market plant and produces higher emissions than it would have if it had been sited in the United States.
- Encourage U.S. investments in reducing emissions and in some instances modernizing Mexican energy and industrial facilities. This could involve improvements in infrastructure, vehicle fleets, industrial pollution control equipment, and energy efficiency.
- Increase California's access to cleaner energy sources, thereby reducing the state's dependence on importing coal-based electrical power.
- Reduce the pressure to meet future demand by building electrical generating capacity in California's worst air quality areas, especially the San Joaquin Valley, the South Coast Air Basin, and downwind desert areas.

The goals, design and operation of the CBETP will determine the degree to which the potential benefits listed above will actually materialize.

Table 9 compares the potential benefits of a project-based trading program versus a cap-and-trade program in the United States and Mexico. For purposes of the comparison in Table 9, it is assumed that a project-based program would be in place on both sides of the border, would operate in a manner that is similar to a U.S. New Source Review (NSR) program, and that its primary goal would be to prevent new and expanding sources from degrading air quality. For purposes of table 9, the cap-and-trade program is also assumed to apply on both sides of the border. Further, the cap-and-trade program would apply to a diverse group of stationary sources, would operate similarly to the South Coast Regional Clean Air Incentives Market (RECLAIM) program, and would serve the goal of improving regional air quality. The NSR and RECLAIM programs are described in more detail later in this report, as are other trading program alternatives.

Table 9: Cross-Border Emissions Trading: Comparison of Potential Benefits of Project-Based and Cap-and-Trade Programs

CBETP Goals	Project Based		CAP and Trade	
	Benefits to U.S.	Benefits to Mexico	Benefits to U.S.	Benefits to Mexico
Improve air quality and thereby reduce adverse health effects from exposure to ozone, particulate matter, and possibly other air pollutants on both sides of the border.	No regional benefit, though adverse effects of new sources mitigated.	Same as U.S.	Beneficial. The magnitude depends on program goals.	Same as US.
Reduce the overall cost of meeting air quality goals in both countries by providing the flexibility to select lower cost means of meeting emissions reductions goals.	Minor benefit. Cost of obtaining offsets could be less.	Minor benefit. As more offsets become available, the cost of obtaining offsets could be less.	Beneficial. The magnitude depends on program goals.	Same as U.S.
Encourage the development and use of more effective air pollution control technologies and the use of cleaner fuels.	No benefit. Ample supply of offsets reduces pressure to use advanced technology.	Benefit would start small but grow over time. Program would introduce emissions controls on many sources that are relatively uncontrolled.	Unlikely to benefit because sources are already well controlled.	Major Benefit. Program would introduce emissions controls on many sources that are relatively uncontrolled.
Facilitate the siting of clean energy and industrial facilities on both sides of the border.	Highly likely. Would increase supply of emission reduction credits (ERCs).	Likely. Would reduce opposition from U.S.	Highly likely	Likely
Provide an opportunity to increase energy reliability in both countries.	Highly likely	Highly likely. To the extent that it facilitates siting of energy projects in the U.S., it presents another source of energy for BC, if needed.	Highly likely	Highly likely. To the extent that it facilitates siting of energy projects in the U.S., it presents another source of energy for BC, if needed.
Provide energy security.	Highly likely	Highly likely	Highly likely	Highly likely
Provide a precedent for other trading programs. This would include potential cross-border emissions trading program (CBETP) involving Mexico and other U.S. states.	Likely	Likely	Likely	Likely

CBETP Goals	Project Based		CAP and Trade	
	Benefits to U.S.	Benefits to Mexico	Benefits to U.S.	Benefits to Mexico
The Baja California experience could encourage development of a domestic emissions trading system in Mexico beyond the border region and in the interior.		Likely		Likely
Provide an opportunity for enhancing the institutional capacity of Baja California's environmental agency by requiring much closer coordination with its counterparts in California.		Some potential benefits due to coordination on projects.		More benefits due to extensive coordination required.
Reduce or prevent situations in which pollution is effectively exported from the U.S. to Mexico to the detriment of air quality in both countries.	Likely	Likely	Likely	Likely
Encourage U.S. investments in reducing regional emissions.	Small benefit. Investment limited to reducing Mexican emissions to offset increases on U.S. side	Likely where U.S. companies pay to reduce Mexican emissions.	Likely but magnitude depends on program design.	Likely where U.S. companies pay to reduce Mexican emissions.
Encourage U.S. investments in modernizing Mexican energy and industrial facilities.		Likely where U.S. companies pay to reduce Mexican emissions.		Likely where U.S. companies pay to reduce Mexican emissions.
Increase California's access to cleaner energy sources, thereby reducing the State's dependence on importing coal-based electrical power.	Likely to the extent more energy is produced in border area.		Likely to the extent more energy is produced in border area.	

Blanks indicate "not applicable."

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Potential Opportunities (Past and Present) for Cross-Border Emissions Trading

This section describes past and present projects that were in some way impacted by ERC availability, and in one case, actually benefited from cross-border ERC trading with Mexico.

El Paso Electric Brick Kiln Replacement Project

In 2003, Texas state law required El Paso Electric Company (EPE) to reduce NO_x emissions from its Newman Station power plant. The law allowed EPE to either retrofit its own natural gas-fired boilers with NO_x control systems or obtain comparable reductions at other facilities to offset Newman Station emissions. EPE was concerned about the cost of meeting the required emissions levels and successfully lobbied to change the law to allow them to achieve emission credits from reductions generated in Mexico. Ciudad (Cd.) Juárez, directly across the border from El Paso, contained approximately 350 highly polluting brick kilns, which commonly burned wood, sawdust, tires, or other refuse as fuel to fire bricks. EPE replaced 20 of the brick kilns in Cd. Juárez with cleaner kilns. The new kilns were also more efficient than those that were replaced. Based on testing by New Mexico State University using U.S. EPA methodology, each replacement resulted in approximately 3.3 tons per year of NO_x credit. The replacement program also produced substantial particulate reductions. The old kilns were dismantled and EPE was required to provide annual reports documenting the operation of the new kilns to the Texas Commission on Environmental Quality (TCEQ).³⁹ The EPE offset experience demonstrates how a cross-border trade can simultaneously reduce emissions, lower compliance costs on the U.S. side, and modernize industrial facilities in Mexico.⁴⁰ However the brick kiln replacement is a limited precedent for a broader CBETP. The trade was possible legally only because it was made in compliance with Texas law and essentially bypassed the FCAA. The U.S. EPA did not approve the trade; its involvement was limited to technical guidance on how to measure kiln emissions. The NO_x reductions were not creditable toward attaining national ambient air quality standards or any other requirement of federal law.⁴¹

California-Based Energy Projects. Since 2001, several small electric generation “peaking” plants have been approved on the California side of the CA-BC Border. Three of the plants, all in San Diego, are operational. Only one of the three, Wildflower-Larkspur, had to obtain emissions offset credits. Two other small plants, both in Imperial County, are awaiting construction. During this time, only one major base load generating plant has been approved—

³⁹ SCERP 2004 (Southwest Consortium for Environmental Research and Policy). *The U.S.-Mexican border environment: Improving Transboundary Air Quality with Binational Emission Reduction Credit Trading* (SCERP Monograph 10). San Diego, CA. San Diego State University Press. 2004. Pg. 16 and 107.

⁴⁰ Note that the U.S. EPA, through the Border 2012 program, has funded the construction of four gas-fired kilns located to the west of Tecate, although offset credits were not involved in any way. Source: Dave Fege, U.S. EPA Region 9, telephone conversation with author, October 12, 2007.

⁴¹ Jim Yarborough, U.S. EPA Region 6, telephone conversation with author, September 21, 2007.

the 510-MW Otay Mesa plant in San Diego. After several delays, the Energy Commission reports that the Otay Mesa plant is once again under construction.⁴²

Since the mid-1990s, the basic air quality requirements facing new electric generating units (EGUs) in California have been relatively consistent. Even during the energy crisis, the temporary measures taken by Governor Davis to expedite the approval of additional generating facilities did not change underlying requirements. When the U.S. EPA changed its policy and reduced the number of instances when federal law required offsets, California passed legislation that prevented relaxation of California rules.⁴³

New or expanding facilities must install the best available control technology (BACT) on their equipment and, in most cases, offset increased emissions of nonattainment pollutants and precursors. The history of power plant proposals within California during the same period shows intermittent periods of intense activity and relative quiet, thereby suggesting that air quality requirements are not the determining factor in the timing of project proposals. Nevertheless, NSR requirements and the federal and California policies that govern them are extremely important considerations for any project proponent.

⁴² The California Energy Commission website is the source of information on all plants approved since 2001, http://www.energy.ca.gov/sitingcases/all_projects.html#construction, accessed October 25, 2007.

⁴³ The Protect California Air Act of 2003 (SB 288, Sher) amended Health and Safety Code sections 42500 through 42507, and Vehicle Code section 9250.11 in response to changed federal regulations.

State and federal law require EGUs and other stationary sources to obtain air permits before they can be constructed or begin to operate. Air pollution control districts cannot issue air permits to any affected source unless it meets applicable NSR offset requirements. Electrical generating plants greater than 50 MW are actually reviewed, evaluated and “permitted” by the Energy Commission. However, the Energy Commission works closely with air districts and incorporates NSR and other air district requirements in its approval process. Access to ERCs is therefore essential for any affected project proponent.

State law requires all California air districts to operate “banks” in which approved emissions reduction credits are deposited.⁴⁴ Since credits must be approved by the air district and deposited in the bank before they can be sold and used by third parties, the quantity of credit deposits of each pollutant is one indication of a project proponent’s ability to find offsets in an air district. Table 8 shows the deposits currently in the ICAPCD and the SDAPCD banks. However, many banked ERCs are not actually available to project proponents. Owners may be unwilling to sell credits because they are retaining them as financial assets or for their own future use. Owners may have committed the credits they own to a project under construction, as is the case with the Otay Mesa credits in the SDAPCD bank. Some credits may be restricted to limited use by the air pollution control district or be vulnerable to reductions in value from oversight agencies.⁴⁵ Actual credits available to proponents of new projects are therefore less than shown in Table 8. A final factor is that the Energy Commission sometimes requires offsets to mitigate project impacts even when the Air Pollution Control District (APCD) does not require them for NSR purposes.⁴⁶

The peaking plants that were required to obtain offset credits were able to do so, as did the Otay Mesa plant. Otay Mesa, however, did have some problems. Pacific Gas and Electric’s National Energy Group, the plant’s original proponent, was initially unable to acquire sufficient ERCs from the SDAPCD bank. They worked with a number of entities to create new credits and were finally able to create 74 tons of NO_x credits from some unconventional sources. They subsidized the purchase of cleaner-fueled sanitation trucks instead of diesel-fueled trucks and the retrofit of several harbor craft with cleaner diesel engines. These credits were approved after deliberation among the regulatory agencies and are currently deposited in the SDAPCD bank as “Mobile Emissions Reduction Credits.” These credits will be formally retired when the plant is completed and begins to operate.

The use of mobile source reductions to offset power plant emissions was controversial and cannot be considered a reliable precedent for future project proponents. The window of opportunity is closing to reduce mobile source emissions in the same manner as Otay Mesa did

⁴⁴ Health & Safety Code Sections 40709 and 40709.5

⁴⁵ While air pollution control districts approve credits and operate their banks, both ARB and the U.S. EPA have oversight authority and can object to the validity and value given to credits by the APCD.

⁴⁶ The California Energy Commission is planning on requiring PM offsets for the recently proposed Orange Grove Energy project in San Diego County, though APCD rules would not do so. Personal conversation between Ray Menebroker, Sierra Nevada Air Quality Group, and Roger Johnson, California Energy Commission, on October 12, 2007.

in 2000-2001. The U.S. EPA and the ARB have adopted more stringent emissions reductions for new heavy-duty diesel engines. In addition, ARB is in the process of adopting a series of regulations to require fleets of heavy-duty vehicles and harbor craft to be retrofitted with cleaner engines. The U.S. EPA has also proposed stricter emissions limits on new marine engines. These regulatory actions will likely make the type of reductions used by Otay Mesa ineligible for use as emissions reduction credits in the future.⁴⁷

The current status of the emissions bank and recent history show that it can be difficult to assemble sufficient credits to site additional energy generating facilities on the California side of the border. The ICAPCD reports a shortage of available credits in their jurisdiction.⁴⁸ A CBETP could significantly increase the number of available credits and reduce the challenge of assembling sufficient credits for a proposed project. An increased supply could also lower the cost of credits, which have been rising statewide, particularly for NO_x and PM₁₀ credits, since 2000. In recent years, most NO_x credits in San Diego County have sold in the range of \$95,000 to \$140,000 per ton.⁴⁹

Mexicali Power Plants. Two new power plants were brought on-line in 2003 and are owned by U.S. companies. The background behind these plants can be useful towards understanding how future opportunities for cross-border emissions trading may unfold.

Termoeléctrica de Mexicali. Termoeléctrica de Mexicali (TDM) is a 625 MW combined-cycle, natural gas-powered, electrical generating plant located in Mexicali, Baja California, Mexico. TDM, a wholly owned subsidiary of Sempra Energy, was built by Sempra Generation at a cost of \$350 million and went on line in July 2003. TDM is located approximately 10.8 miles west of Mexicali and 3 miles south of the U.S.-Mexico border in the Imperial Valley-Mexicali area. TDM's power is sold exclusively to the U.S. market, connecting to the U.S. electrical system via a 9-mile transmission line. The facility is equipped with pollution control technologies consistent with U.S. regulatory requirements at the time, including SCR systems to reduce NO_x emissions and an oxidizing catalyst system to reduce CO emissions. The plant obtains raw wastewater from the nearby Mexicali sewage treatment plant and treats it for use in the cooling process. The first phase of the project was designed to produce 500 MW, with a phased expansion to 1,000 MW based on future market demand.

Key Mexican federal agencies involved in the TDM permitting process included: Comisión Reguladora de Energía (CRE – Energy Regulatory Commission) as the lead agency, Secretaría de Energía (SENER – Energy Secretariat) for permitting guidance, Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT – Secretariat of Environment and Natural Resources) for environmental impact authorizations, Comisión Nacional del Agua (CNA – National Water Commission) for water conveyance and industrial discharge permits, and Comisión Federal de Electricidad (CFE – Federal Electrical Commission) for interconnection to

⁴⁷These reductions will no longer be “surplus” of existing control requirements.

⁴⁸ Brad Poiriez, APC Senior Manager, Imperial County APCD, Presentation to CDAWG, October 19, 2006

⁴⁹ The ARB Website contains annual reports on the cost of emission reduction credits, <http://www.arb.ca.gov/nsr/erco/erco.htm>, accessed on October 25, 2007.

the national electrical network. State and local agencies involved included Comisión Estatal de Servicios Públicos de Mexicali (CESPM – Mexicali office of the State Public Services Commission) for supply of untreated wastewater and the municipal land use department for the zoning designation.

On the U.S. side, the lead agency was the DOE, which under federal rules sets the terms of the U.S. presidential permit needed for cross-border facilities, such as electrical transmission lines. DOE also had to conduct an environmental assessment of the transmission lines, and issued a no-significant-impact declaration. Also, the Federal Energy Regulatory Commission (FERC) has jurisdiction over interstate wholesale sales of natural gas and electric power. To sell power into the U.S. market, Sempra's Mexican corporation, TDM, was required to file with FERC as a power marketer.

TDM was the first project of its kind sited in Mexico solely to supply electrical power to the United States. The availability of affordable land in Mexicali near the U.S.-Mexico border, an existing cross-border transmission line (which had to be upgraded), and sufficient water for cooling were the three major factors in its success, along with Mexico's more streamlined permitting process and time frame. Another major strategic factor was the development of the Gasducto del Norte (GDN—Northern Gas Pipeline), a Sempra-owned 212-mile pipeline, extending from the California/Arizona border to Mexicali to supply natural gas to Baja California.

From an institutional and legal perspective, changes to the Mexican energy regulations at the time allowing private entities to participate in the generation of electrical energy within the modes of independent production, small-scale production, self-supply, and cogeneration allowed this project to proceed. Similarly, guidelines established by the CRE allowed projects that intended to utilize natural gas as the primary energy source the option of contracting for the fuel supply with Petróleos Mexicanos (PEMEX—the Mexican national oil company) or with a private company engaged in distribution of natural gas in the area.

La Rosita Energy Facility. The La Rosita Power Complex (LRPC) is a 1,060 MW natural gas-fired, combined-cycle power facility located near the TDM plant in Mexicali, Baja California. InterGen was awarded a contract to build, own, and operate a 750 MW power project for Mexico's CFE in June 2000. The estimated cost of the LRPC was approximately \$748 million. InterGen invested \$20 million in the construction of a sewage treatment facility in Mexicali to treat raw wastewater from the local sewage treatment plant for use as cooling water. The first unit went on line in July 2003.

The LRPC consists of two natural gas-fired combined-cycle units with a total capacity of 1,060 MW. The first unit provides two-thirds of its 750-MW capacity to CFE, with the remaining one-third available for export to the United States. The second unit has a generating capacity of 310 MW, all of which is designated for export to the U.S. market. The facility is connected to both the Mexican national grid and to the U.S. grid through the same transmission corridor as the TDM plant. Natural gas for the turbines is transported through the GDN. Originally, only the

second unit was designed to include SCR, but as of April 7, 2005, all four of the combustion turbines within the two units have been equipped with these systems to control NO_x emissions.

In terms of permitting process, CFE played the most prominent role as the plant was built under contract to CFE to supply domestic energy needs and was connected to the national electrical grid. The plant was originally designed to meet less stringent Mexican emissions standards. After litigation by U.S.-based community groups and government agencies and threatened congressional action by a California federal legislator, the plant agreed to upgrade its controls to meet U.S. air emission standards.

Summary of Features

The most important features of the successful Sempra and InterGen projects are as follows:

- TDM was the first power plant sited in Mexico solely for supplying electricity to the United States.
- Mexicali had affordable idle land.
- Affordable water from the Mexicali wastewater treatment lagoons was available.
- The GDN was on-line to supply natural gas to the plants.
- Mexico's permitting time frame was quicker than in California 5 vs. 22 months.
- A U.S. Presidential permit for cross-border electricity transmission was obtainable.
- CRE regulations allowed private entities to participate in the generation of electrical energy and allowed projects that intended to primarily utilize natural gas the option of contracting for the fuel supply with a private company.
- TDM facility was designed with pollution control technologies consistent with U.S. regulatory requirements at the time.
- LRPC agreed to upgrade its controls to meet U.S. air emission standards after legal challenges and political pressure.
- The legal challenges showed that the U.S. regulatory and judicial systems had a limited ability to affect air emission sources outside of U.S. territory.
- The Government Accountability Office (GAO) review of the projects determined that U.S. policy makers have limited options to ensure that projects located outside the U.S. do not adversely affect the health of U.S. residents.

Other Potential Opportunities

According to ICAPCD staff, several "major source" companies have submitted letters to that air district expressing interest in participating in emission reduction projects in Mexico if the

resulting offsets could be banked and used in Imperial County.⁵⁰ These major sources are as follows:

- Imperial Irrigation District (IID).
- U.S. Gypsum.
- Mesquite Landfill (now owned by the Los Angeles County Sanitation District).

Also, the results of several Energy Commission and related projects may be used to identify potential candidates for future emission reduction projects in Mexico. These are described below:

- San Diego Region Energy Office (SDREO) Border Energy Savings Program. This program identified companies located in Mexicali and Tijuana, mainly maquiladoras that as large energy users could benefit from participation in energy efficiency programs. Through a series of interviews and follow-up meetings conducted in 2006 under Energy Commission grant No. IEF-04-005, these facilities were found to be amenable to energy reduction projects:
 - MabaMex (a subsidiary of toymaker Mattel).
 - Rheem (fabricates water heaters).
 - Sanyo (assembles liquid crystal display and plasma televisions).
 - Fábrica de Papel San Francisco, S.A. (makes paper towels and bathroom tissue).
 - FEVISA (manufactures glass bottles for beer, soda, and juice).

Notes from interviews conducted by Energy Commission staff indicate a very strong motivation by these industries to lower peak energy use.

- Combined Heat and Power (CHP) Study. This is an on-going study that included a survey of a representative sample of from 800 industries in Mexicali and Tijuana to identify candidates for energy-efficiency improvements. This program, complementary to the SDREO energy efficiency program described above, focused on CHP potential in the Baja California Region. Approximately 30 plants in Mexicali and Tijuana were surveyed, and information was collected pertaining to number of employees, annual kilowatt (kW) hours of electricity used, type and amount of fuel(s) consumed, types of combustion and process device(s) (motors, air conditioning, lighting, refrigeration, process heat, electricity generation, boilers, heaters, furnaces, dryers, other), and the percentage of annual electricity use by each device. Also, information was collected regarding the plant's willingness to participate in energy efficiency or CHP programs.
- Tecate Brewery. Onsite Energy was involved in a project to install a 3.6 MW diesel generation plant at the Cervecería Cuauhtemoc Moctezuma plant (Tecate Brewery).⁵¹

⁵⁰ Brad Poiriez, Assistant Air Pollution Control Officer, ICAPCD, telephone conversation with author, October 15, 2007.

The motivation was that the energy was cheaper to generate on site than to purchase from the Mexican power agency, CFE. According to the Energy Commission, this diesel plant might be a candidate as an offset project.

- Ethanol Production. A boom in construction of ethanol production facilities is occurring in California. Table 10 provides a summary of ethanol production projects that are either under construction or proposed for Imperial County, based on Energy Commission data. No plants are under construction or on the books in San Diego County) (Argentine, 2008). These plants can generate a range of pollutants, depending upon the types of sources operating at the plants (natural gas combustion in boilers, fugitive emissions from storage tanks, back-up generators, and so forth), which may need to be offset, depending upon their magnitude.

⁵¹ Paul Blevins, Onsite Energy, e-mail message to Alan Argentine, Energy Commission. January 10, 2008.

Table 10: Summary of Ethanol Production in Imperial County – Plants Under Construction or Proposed

Organization Name	Location	Capacity MGPY	Start Year	Feedstock	By-Product(s)	Comments
Ethanol Production Facilities Under Construction						
Pacific Ethanol, Inc.	Calipatria	50	On hold	corn	distillers grain, animal feed	Construction suspended 11/30/07
Proposed Conventional (Sugar/Starch Feedstock) Ethanol Production Facilities						
Cilion, Inc.	Imperial County	110	2009	corn	distillers grain, animal feed	Production 1st quarter
Imperial Bioresources, LLC	Brawley	58		sugarcane, sugar beet, corn	electricity, animal feed	Planned modification of the Holly Sugar Co. plant for year round operation
Imperial Ethanol (subsidiary of U.S. Farms, Inc.)	Imperial County	50		sugarcane, corn		Feasibility study completed; several sites under evaluation
California Ethanol and Power, LLC	Imperial County	50		sugarcane	30 MW electricity	Preliminary engineering design - Washington Group International
Proposed Advanced Technology (Cellulosic Feedstock) Ethanol Production Facilities						
Imperial Valley Biorefining, Inc.	Imperial	30	2009	sugarcane (sugar and cellulose processing)	future by-products in planning	Swan Biomass biochemical technology
<p>Notes: MGPY = Million gallons per year of ethanol produced.</p> <p>Additional projects may be under development.</p> <p>Scheduled start-up year for proposed projects shown if furnished by project developer or public documents (otherwise blank).</p> <p>Production capacities for proposed projects should not be considered additive for various reasons (for example, some projects may compete for the same feedstock supplies, some listings may involve optional sites, etc.).</p> <p>Projects listed as "Proposed" may or may not become actual operating facilities.</p>						

Source: California Energy Commission

Potential Barriers to a Cross-Border Emissions Trading Program

This section discusses potential barriers to a CBETP, in terms of their legal, institutional, technical, and practical implementation implications.

Legal Barriers

Potential legal barriers to implementing a CBETP are described below as related to the U.S. federal, state and local, and Mexican federal laws and regulations, as well as international agreements.

U.S. Federal CAA Implications

The FCAA contains a number of provisions that would have to be amended before a CBETP could gain U.S. EPA approval. Without U.S. EPA approval, U.S. sources could not use credits generated in Mexico to meet mandatory FCAA permit requirements or use CBETP emissions reductions to satisfy their SIP obligations. The FCAA sections that would need amendment are listed below. They will be discussed in more detail when recommendations are provided later in this report.

Title 1, Part D requirements that require permits and offsets in nonattainment areas would need to be amended. These include Sections 172, 173, 182, and 189. Current provisions would not, for example, allow the U.S. EPA to recognize Mexican permit provisions as enforceable or to accept the validity of credits generated in Mexico. In addition, Section 176 may need to be amended to clarify the applicability of General Conformity requirements to U.S. federal agency actions affecting joint attainment strategies in international air basins.

Title 1, Part A and Part D, planning requirements, need to be amended if a CBETP is to be a component of a SIP strategy to attain ambient air quality standards on the U.S. side of the border. FCAA Sections 110, 172, 181, and 182 contain basic planning requirements, including attainment dates and other schedules, minimum plan provisions, and a process for establishing the boundaries of air quality planning or nonattainment areas. Section 115, which currently provides a limited opportunity to address cross-border pollution, could be used to make appropriate amendments.

Title 1, Part A, Section 113 provides for the enforcement of the FCAA requirements, including Title IV and Title V permit provisions, in federal court. This section also allows U.S. citizens to sue the U.S. EPA for its actions, or lack of action, in implementing the FCAA. It seems likely that amending Section 113 would be helpful to address cross-border enforcement issues and address the prospect of Mexican sources being implicated in U.S. citizen lawsuits.

Some U.S. EPA policies and regulatory interpretations would have to be amended to be consistent with the statutory changes listed above. As one example, policies that require emissions credits to be real, surplus, quantifiable, permanent, and enforceable would need to be applied to Mexican sources participating in the trading program.

As noted earlier in this report, Presidential Executive Orders have given the U.S. State Department the lead in working with Mexican authorities on cross-border projects. The State Department, in turn, has delegated certain decision-making responsibilities for facilities on the U.S. side of the border to other federal agencies such as the DOE. The Executive Order that established this process may need to be amended to facilitate a CBETP and clarify related National Environmental Policy Act (NEPA) responsibilities.⁵² Presidential permit guidance and the public review process would need to be updated. It is not clear whether NEPA would have to be amended.

State of California and Local Air District Implications

Under California law and the supporting regulations that have evolved over the years, emissions trading programs are integrated into the air quality planning process.⁵³ As noted elsewhere in this report, local and regional air districts have primary authority over stationary sources in California; therefore trading programs that involve stationary sources would be implemented by local and regional air districts pursuant to their rules and regulations. Each air district operates a source-based emissions trading program that meets federal and state new source review requirements.⁵⁴ In addition, the South Coast Air Quality Management District (SCAQMD) operates a version of a cap-and-trade program called the Regional Clean Air Incentives Market (RECLAIM). While these programs are subject to oversight by the ARB and, to the extent they implement FCAA requirements, the U.S. EPA, California air districts have the authority to exceed minimum state and federal requirements.⁵⁵ (Note that the ARB and California's local and regional air districts also implement a variety of regulations and programs that allow the creation and limited use of "emissions credits" to provide compliance options and serve other limited purposes.)

Along with changes to federal laws and regulations, corresponding changes to laws and regulations in California, both state and local, would be needed to implement a CBETP. The difficulty in making the necessary changes to California laws and local regulations, while formidable, have historically not been as difficult as securing changes to the FCAA. California law lays out a well-defined structure for emissions trading to occur within and between local jurisdictions within the state. Major changes to these laws will be needed to implement a CBETP. These changes will depend upon the type of program to be implemented (traditional NSR-type program, cap-and-trade program, baseline-and-trade, etc.).

California's air quality planning process is designed, as is the federal program, by establishing boundaries (air basins) where pollutants are for the most part contained, and documenting emission sources, meteorology, and air quality within those air basins. One of the likely goals of

⁵² See Executive Order 11423 of August 16, 1968, as amended by Executive Order 12847 of May 17, 1993 (58 Fed. Reg. 29511)

⁵³ See Chapter 10, Health & Safety Code Sections 40910 through 40930

⁵⁴ Health & Safety Code Section 40709.6 prescribes emissions reduction offset requirements and limitations in detail.

⁵⁵ Health & Safety Code Section 39002.

an emissions trading program would be to ensure that air quality within an air basin is not degraded or is improved as a result of the program. Therefore, any program to provide for cross-border emission trading would require a modification to Sections 39606 (a) (1) and (2) of the Health and Safety Code that provides for establishing air basin boundaries to, in some fashion, allow emissions reductions in Mexico to be recognized. Politically, this may prove to be one of the more difficult tasks. Modifications to Chapter 10, which deals with attainment plans, will also be required.

In addition, new provisions may be needed to ensure that any program implemented provides for proper enforcement mechanisms and ensures the permanence of any cross-border reductions. These will be very contentious issues.

While the California Health and Safety Code provides the legal basis for local air pollution control programs, changes to state law will need to be reflected in local regulations before a CBETP can be implemented. One issue will be whether the air districts' authority to apply more stringent requirements will be retained.

For NSR-type programs, criteria for offsets would need to be developed that reflect the unique emissions, meteorological, and air quality characteristics of the area involved. Appropriate offset ratios, and maybe inter-pollutant and inter-basin offset requirements and ratios, will need to be developed.

For cap-and-control, and market-based incentive type programs, the whole planning effort would need to be revisited at the local and state level. Attainment plans would need to be revised to incorporate areas of Mexico into the planning effort. A methodology for doing so would need to be developed.

Mitigation requirements under state law are part of the decision making process of the lead agency under the California Environmental Quality Act (CEQA). To meet their mitigation responsibilities, some lead agencies, including the Energy Commission, have gone beyond the provisions of California's emissions trading programs and required project proponents to obtain and use additional ERCs. Although CEQA mitigation operates outside of California's emissions trading programs, the discretion to require additional ERCs affects how trading programs operate as a practical matter. As a result, CEQA revisions may need to be considered.

California has adopted several initiatives to encourage the importation of cleaner out-of-state power. As one example, Resources Code Section 25741(b) states that for an out-of-state (or out-of-country) renewable energy facility to be eligible for credit, it cannot cause or contribute to any violation of a California environmental quality standard or requirement. A CBETP will need to consider and address such California policies.

Mexican Federal and State of Baja California Regulatory Implications

Development of a CBETP can take several forms, and the specific mix of agencies required to implement the program will depend on the program's final form. In one possible scenario, Mexico would first need to implement its own domestic trading program and would then need to coordinate it with a similar U.S. program. Another option would be to establish a new bi-

national authority to manage a number of specific basin-by-basin trading programs. In any case, the choice will depend on the best way to ensure that the system functions effectively and provides the United States regulated community with assurances of the certainty, transferability, and ultimately, the value of the resulting credits.

Mexican regulatory framework clearly places this responsibility on the federal government, allowing for implementation accords between the states and the federation. Although initial review suggests that a demonstration-type CBETP designed exclusively to generate ERCs in Baja California for use by California projects could be implemented within the current laws and regulations by the administering agencies, implementing an emissions trading scheme that can operate independently in each country as well as across the border will very likely require substantial regulatory and rule development in Mexico.

A strong regulatory framework supports both project-based and cap-and-trade programs in the U. S. and in California. At a minimum, Mexico would need to further develop and strengthen regulatory oversight of its sources as a precursor and foundation for a CBETP.

Creating a basic offset program poses some immediate challenges for Mexico. To start with, there are no mass-based limits on emissions of criteria pollutants, only emission rates and concentration limits. There is no planning process analogous to U.S. SIPs that integrates source air emission rates and ambient air quality standards. And, while the law and regulations identify critical zones where geography, meteorology or high levels of air pollution require more stringent air emissions standards, there are no rules on attainment or corresponding penalties for nonattainment in individual air basins.

Leaving aside for a moment the question of whether Mexican federal environmental law and air regulations as written already allow emissions trading (SCERP, 2006), a whole new set of rules would be useful in facilitating an effective implementation of an offset program. Opposition from the regulated community is very likely. Therefore, these new rules would be more successful against industry pressure at the rules committee level or subsequent litigation if they were firmly supported by clear language in the law and regulations. In addition, U.S.-based ERC buyers will be more apt to invest in these credits if they are clearly based on a strong statutory foundation.

Making changes to the environmental law and regulations when adding major new areas of environmental policy is also consistent with Mexico's traditional approach. A relevant example can be found in the case of the Pollution Release and Transfer Registry (PRTR), which is the counterpart to the U. S. Toxics Release Inventory (TRI). The legal basis for the public right-to-know was unarguably contained in the Mexican Constitution, as well as in language in the General (Environmental) Law. However, as the process unfolded within the working group, first with a voluntary technical standard, then an Official Mexican Standard, stakeholders ultimately opted for the certainty of statutory and regulatory language, which resulted in a reform to the General Law and promulgation of the PRTR Regulations.

Federal laws and regulations would need to be revised, and possibly new ones issued. Current ones that may require changes include:

- General Law of Ecological Balance and Environmental Protection (General Law).
- Air Pollution Regulations of the General Law.
- Environmental Impact Regulations of the General Law.
- Pollution Release and Transfer Registry Regulations of the General Law.

NOMs detailing the specific procedures for obtaining and trading the resulting offset credits would also need to be developed. To the extent that the new and modified regulations and rules change current air emission standards, some, if not all, of the following NOMs may also require updating:

- NOM-039-SEMARNAT-1993 – Emissions Standards for Sulfuric Acid Plants.
- NOM-040-SEMARNAT-2002 – Emissions Standards for Cement Plants.
- NOM-043-SEMARNAT-1993 – Emissions Standards for Fixed Sources of Particulate Matter.
- NOM-085-SEMARNAT-1994 – Emission Standards for Fixed Sources of Criteria Pollutants from Combustion.
- NOM-097-SEMARNAT-1995 – Emission Standards for Glass Manufacturing Plants.
- NOM-105-SEMARNAT-1996 – Emission Standards for Cellulose Plants.
- NOM-121-SEMARNAT-1997 – Emission Standards for VOCs in Vehicle Manufacturing Plants.

In Baja California, the “maquiladora” (light manufacturing) industry constitutes the largest number of individual air emission sources along the Mexican border. Mobile sources make up the largest volume of emissions. Industrial sources account for 4.6 percent of all area emissions of listed air contaminants, based on 1998 data⁵⁶. Both industrial and mobile sources are regulated by the state. Local governments are responsible for managing vehicle emission verification programs according to the law, but none have yet been implemented. Certain state environmental laws and corresponding regulations would need to be revised in order to include these sources into a CBETP, including the following:

- Environmental Protection Law for the State of Baja California.
- Air Pollution Regulation for the State of Baja California.
- Environmental Impact Regulation for the State of Baja California.

The Programa para Mejorar la Calidad del Aire (PROAIRE – Program to Improve Air Quality) Air Quality Improvement Plans (AQIP) for Mexicali and for the Tijuana-Rosarito area will need

⁵⁶ Air Quality Program for Rosarito-Tijuana 1999-2004. SEMARNAT.

to be revised if they are to play a constructive role in implementation of a CBETP. These 5-year, voluntary plans developed jointly by SEMARNAT, SPABC, and other federal, state, and local agencies provide a diagnosis of the current and projected air quality situation and propose mainly qualitative measures to be implemented by the various sectors, such as transportation, industry, business, and government to improve air quality in the particular air basin. Interestingly, although the Northern Border Area within 100 kilometers of the U.S.-Mexico border, including Mexicali and Tijuana has a critical zone designation under NOM-043-SEMARNAT-1993 due to high concentrations for total particulates, and Tijuana is so designated for criteria pollutants in NOM-085-SEMARNAT-1994 as well, neither AQIP makes mention of this designation in setting air quality strategies or improvement targets.

Progress reports on the performance of the 2000-2005 AQIPs issued by SEMARNAT show that in the case of Tijuana-Rosarito only 16 percent of the 25 action items were completed, while in Mexicali, 11 percent of 27 action items were achieved (SEMARNAT, 1999b; SEMARNAT, 2000). Almost half of the action items in each plan reported no progress after 5 years. Of particular note is that among the reasons reported for the slow progress was a lack of information from the air monitoring network, as well as a need for better coordination and follow through among the agencies involved. More importantly, the reports were not able to show verifiable improvements in air quality over the plans' five-year tenure. As they currently exist, AQIPs have substantial limitations as effective instruments to improve air quality. However, to the extent that these issues are successfully addressed in the next version of the AQIPs, a strengthened PROAIRE program with greater resources and authority could potentially function along the lines of a U.S.-type SIP.

International Agreement Implications

The two major environmental agreements between the U.S. and Mexico, the La Paz Agreement and North American Agreement on Environmental Cooperation are likely to require few, if any, modifications.

Institutional Barriers

Potential institutional participants in the development and implementation of a CBETP are described below as they relate to U.S. federal, California, Mexican federal, and Baja California governmental agencies; and private sector and nongovernmental organizations (NGOs). It is beyond the scope of this analysis to address comprehensively the policies, fiscal interests, institutional cultures, or potential positions of the parties discussed below. The level of support (or resistance) for a CBETP will vary significantly among these participants depending on a number of factors, including the goals and design of the program. The central "institutional barrier" is the difficulty of managing this large and diverse group and reconciling their interests to the extent possible while designing an effective CBETP.

U.S. Federal Agencies

As a minimum, a CBETP will require the extensive involvement of the U.S. EPA and the State Department. The U.S. EPA's primary role is to ensure that a trading program is designed and

implemented to meet FCAA requirements. The State Department would be expected to focus on whether the program was in the U.S. national interest and also ensure that the program operated without damaging the bilateral relationship with Mexico. Finally, because a number of boards and commissions have been created to coordinate a variety of border activities with Mexico, U.S. EPA and the State Department would likely play the role of coordinating and facilitating the input of numerous other federal agencies, including but not limited to the Department of the Interior, the DOE, and the Department of Transportation.

The U.S. EPA's traditional way of operating can pose additional practical problems. The U.S. EPA's decentralized structure often means that a number of U.S. EPA organizational units, each having specific responsibilities, provide semi-autonomous input to air quality and other environmental issues. Some coordinating body within the U.S. EPA might need to bring together the input of U.S. EPA organizational units.

Assuming the CBETP will require amendment of the FCAA, the U.S. Congress will have a critical role to play. Historically, it has been very difficult to amend the FCAA. The broad impact and technical complexities involved have created substantial political controversy each time it has been opened for amendment. Successful amendments have occurred, but they have been narrow in scope and relatively surgical.

California State and Local Agencies

The development of a CBETP will be of interest to many state and local agencies. At the state-level, the California Environmental Protection Agency (Cal EPA), and the ARB within it, will certainly have a major role to play. The ARB has been actively involved in cross-border studies and program development in these areas. Because the Energy Commission has closely related program interests and has taken the initiative to pursue a CBETP, it will likely want to continue to play a role. The California Public Utilities Commission (CPUC) and Resources Agency, while not directly involved in air pollution, have related responsibilities and should be contacted to determine their respective interest in such a program. If major international policy issues need to be resolved at the federal level, the Governor's office will likely want to play a key role. Again, assuming a CBETP will require changes to state law, the California legislature will play a significant role in the development of such a program. At the local level, the ICAPCD and SDAPCD will be affected by a CBETP and would want direct involvement in the decision making process. To a lesser extent, local Councils of Government may also have an interest.

Mexican Federal and State of Baja Agencies

The number of Mexican agencies that will be involved in developing and implementing a CBETP will depend on the program's final scope and configuration. As an issue of federal jurisdiction, Mexico may prefer to develop a cross-border trading program that would apply across the entire length of the border, rather than in only one state. Based on the experience of the Sempra and InterGen power exporting facilities, the following agencies would likely play some type of role in development of such a program:

- Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT – Secretariat of Environment and Natural Resources).

- Secretaría de Relaciones Exteriores (SRE – Secretariat of Foreign Relations).
- Secretaría de Economía (SE – Secretariat of Economy [Commerce]).
- Secretaría de Energía (SENER – Secretariat of Energy).
- Secretaría de Hacienda y Crédito Público (SHCP – Secretariat of Revenue and Public Credit).
- Procuraduría Federal de Protección al Ambiente (PROFEPA – Federal Attorney for Environmental Protection).
- Comisión Reguladora de Energía (CRE – Energy Regulatory Commission).
- Comisión Federal de Electricidad (CFE– Federal Electrical Commission).
- Petróleos Mexicanos (PEMEX – the Mexican national oil company).

In addition, the corresponding commissions of the Senate and Chamber of Deputies would actively participate in the legislative process. The State of Baja California would play a supporting role to SEMARNAT in the developmental phase of the program.

During the implementation stage, the SPABC would need to enter into a coordination agreement with SEMARNAT to administer the program in the state. In keeping with existing permitting and enforcement models, sources under federal jurisdiction located in the state, such as power plants, chemical facilities, pulp and paper plants, cement plants, and gas pipeline terminals, would continue to be administered by the state office of SEMARNAT, unless they become part of the coordination agreement.

The PROAIRE plans have no regulatory enforcement provisions and, as described above, have performed rather poorly to date as mechanisms for improving air quality. The PROAIRE model includes multi-agency technical and steering committees, as well as working groups with stakeholder representation. However, there are no formal public air quality boards with project review and approval powers.

The formal project approval process through federal or state Environmental Impact Manifests (EIMs) considers complying with existing air emission standards an acceptable mitigation measure for air pollution sources. Given the relatively lenient fixed-source air emission standards, which are limited to criteria pollutants and total particulates, most projects pass review and are approved without the need for air pollution control devices. As a result, regulators have little discretion in managing the make-up and mass emission profiles of facilities in their jurisdictional areas.

The concept of emissions trading is looked upon favorably among Mexican federal and state regulators contacted, especially when separating the credit component from the offset requirements. One scenario that would make the CBETP more agreeable in Mexico would involve implementing the credit portion of the program allowing the opportunity to bank offsets, but not requiring them for domestic projects. This idea will be analyzed in more detail later in this report.

Coordination Among U.S. and Mexican Agencies

The format for the bi-national negotiations would proceed on the basis of communication between counterpart agencies in each country. SRE would likely play the lead in the international aspects of the negotiations. SEMARNAT would play the coordinating role in the technical and administrative aspects of the cross-border trading program with major involvement from SENER, CRE, CFE, and PROFEPA. The SE, SHCP, and PEMEX may need to be involved in specific program areas under their purview.

While the State of Baja California would play a minor role in the international negotiations, it would be an active participant internally in the development of the administrative program elements to ensure that it will have sufficient resources to manage the program effectively in its jurisdiction. To that extent, SPABC as the lead state agency will need to coordinate with Cal-EPA and the ARB regarding technical issues. In practice, SPABC has established direct lines of communication with the U.S. EPA's Region 9 and Border Liaison offices as well, and the California agencies routinely meet with SEMARNAT on matters concerning the border area. This communication will be facilitated through the Border 2012 media-specific working group process, which has become the major, on-going venue for multi-level, inter-agency communication on environmental matters between the two countries.

Private Sector and Nongovernmental Organizations

A CBETP is more than an opportunity to achieve air quality and public health benefits. It could affect energy infrastructure, energy security, energy conservation goals, global warming gas emissions, economic development goals, and the use of basic resources such as land and water. For these reasons, a wide variety of private sector or NGOs and advocates will likely want the opportunity to influence the development, design and implementation of a CBETP. The challenge is to create a process that provides these groups with meaningful access to key decisions.

Several of these organizations known to be active in the CA-BC border region, with their locations and websites (if available) are as follows:

- Environmental Health Coalition (<http://www.environmentalhealth.org/>), San Diego-Tijuana.
- Border Power Plant Working Group (<http://www.borderpowerplants.org/>), San Diego-Tijuana.
- Proyecto Fronterizo de Educación Ambiental (<http://www.proyectofronterizo.org.mx/main/index.php>), Tijuana.
- Comité Cívico de Divulgación Ecológica, Mexicali.
- Ratepayers for Affordable Clean Energy (<http://ingwatch.com/race/about.thm>), San Diego.
- Good Neighbor Environmental Board (<http://www.epa.gov/ocem/gneb/index.html>).
- Southwest Consortium for Environmental Research and Policy (SCERP) (<http://www.scerp.org/>).

Technical Implications

The technical demands of a CBETP partially depend upon the type(s) of trading scheme(s) used. For example, a project-based program has less onerous technical demands than a cap-and-trade program that is part of a strategy to improve air quality to acceptable levels.

Technical demands begin with the need for a current and accurate inventory of sources, emissions, and pollutants that will participate in the program. For individual stationary sources, this requires detailed data on equipment, processes, fuels, operations and control equipment. A project-based program could begin by collecting this information on a case-by-case basis. For a cap-and-trade program to operate effectively, the level of detail and accuracy needs to be consistent across the trading region, as do the methods and protocols used to calculate emissions.

Accurate and detailed technical knowledge of air quality conditions in both countries is needed to apply sophisticated analytical tools, such as regional air quality models, that are used in the U.S. to design regional pollutant control strategies and cap-and-trade programs. The most important technical inputs are a complete and detailed ambient air quality database, meteorological measurements on the surface and aloft, a comprehensive regional emissions inventory, and sufficient knowledge of regional atmospheric chemistry to understand the transport and fate of various precursors. This information is generally less important for project-based programs because they rely largely on accurate emissions information. However, any program that allows inter-pollutant or interprecursor trading needs to have a strong understanding of regional atmospheric chemistry.

There must also be mechanisms in place to track and update source activities and emissions on an ongoing basis. Also, a trading program requires a means of holding participants accountable and ensuring that they comply with trading agreements. In the United States, air permit programs provide the mechanism for meeting these technical needs, and it is difficult to envision a CBETP, whether it is cap and trade or project based, that would not be based on a uniform, cross-border permit program.

Currently, there is an imbalance in available data and information between the United States and Mexico.⁵⁷ (Several examples of this imbalance are described below as related to emissions data for criteria and toxic air pollutants). In the meantime, technical uncertainty will exist about the potential effectiveness of any CBETP. Several of these technical areas of uncertainty are discussed in more detail below.

Physical Boundaries

It is always a challenge to establish the appropriate physical boundaries to an emissions trading area. The type of trading program and its relationship to air quality planning are important considerations. Cap-and-trade area boundaries are often larger than air quality planning regions. In the United States, the Acid Rain Program (ARP) and the Clean Air Interstate Rule

⁵⁷ "Improving Transborder Air Quality with Binational Emissions Reduction Credit Trading", SCERP Monograph Series 10, 2004, page 53.

(CAIR) cover many states and scores of air quality planning areas, in part because they are intended to address the impact of the long-range transport of pollutants. Project-level trading programs like NSR however, which are designed to support regional air quality strategies, are more careful when drawing trading area boundaries. Because the purpose of the program is to ensure that the impact of a new or expanding source on regional air quality is offset, borders are drawn to ensure that offsetting reductions occur “upwind” where they will have an impact on the same downwind area as the new or expanding source. While a good technical understanding of regional air quality is important, trading area boundaries are often drawn in consideration of additional nontechnical factors such as political jurisdictions, land use, or economic planning.

Another factor governing the technical implications of a CBETP, especially where the goal is air quality improvement, is which pollutants are being addressed. Ozone is a secondary pollutant, and both PM₁₀ and PM_{2.5} have important secondary pollutant components in most areas. The relationship between secondary pollutants and the precursor pollutants that react in the atmosphere to form them is very complex. To improve air quality reliably, it is essential to understand the relationship among precursor pollutants—in particular which precursor reductions are most effective in improving air quality. Each region/pollutant combination is different. The better regional air quality problems are understood, the easier it is to design a CBETP that will reliably improve air quality by encouraging the most effective precursor and inter-precursor trades.

Air Quality Data in the CA-BC Border Region

The federal air pollution control program as outlined in the FCAA and the California state program as outlined in California law are based on preparing plans to attain ambient air quality standards. Any trading program contained in those plans must be an integral part of that plan, and operate so as to promote reasonable further progress toward attainment of the ambient standards.

Therefore, one of the first things to be determined in developing a CBETP is if there is enough information available to develop a comprehensive program. To develop an implementation plan and a comprehensive trading program requires information on the existing air quality, meteorology, emission inventories, and atmospheric chemistry of the specific cross-border area. Much work has been done in these areas, but more work is needed.

There have been concerted efforts to examine the existing air quality in the border regions. On the U.S. side, monitoring networks have been operating for years as part of efforts to develop SIPs, and their data are publicly available.⁵⁸ Since 1995, the ARB has managed the California-Mexico Air Monitoring Network with funding from the U.S. EPA.⁵⁹ Effective April 1, 2007, the monitoring network was transferred to the control of SPABC. The network consists of 13 monitoring stations. These stations can provide critical information needed to develop plans and trading programs. Figure 1 shows the air quality monitoring network currently operating

⁵⁸ <http://www.arb.ca.gov/adam/welcome.html>

⁵⁹ Border 2012: U.S.-Mexico Environmental Program, Regional Workgroup Newsletter Fall 2007 pg 9

in the CA-BC border region. The figure shows the locations of the monitors, and the accompanying table lists the pollutants measured at each location. Real-time monitoring data are available on line from SPABC.⁶⁰

There has been a number of air quality studies in the CA-BC border region that could provide valuable data for developing a CBETP. A compendium of these studies was prepared by in 2004 by the Mexicali-Imperial Valley Air Quality Modeling and Monitoring Program for Latin American Scholarship Program of American Universities: Academic and Professional Programs for the Americas.⁶¹

Also, an analysis of the atmospheric chemistry in the border region is necessary to establishing a CBETP.⁶² Atmospheric chemistry is a concern in establishing an emissions trading program for inter-pollutant or interprecursor trading.⁶³ Specifically with regard to air quality research in the CA-BC border region, the 2004 document noted these most recent and relevant studies, among others:

- “Air Quality in the CA-BC Border Region” (SCERP, 2003). This document includes a summary of 1997 summer daily NO_x and Ozone (O₃) cycles (hour of day) in Tijuana, and 1997 winter daily NO_x and O₃ cycles and 1997 monthly TSP concentrations in Tijuana and Mexicali.
- “Imperial Valley/Mexicali Cross Border PM₁₀ Transport Study” (Chow and Watson, 1995). This study resulted in a database on PM₁₀ concentrations used to estimate spatial and temporal distributions of PM₁₀ concentration in the Imperial and Mexicali Valleys; to apportion PM₁₀ concentrations to source emissions; and to estimate cross-border transport of PM₁₀.

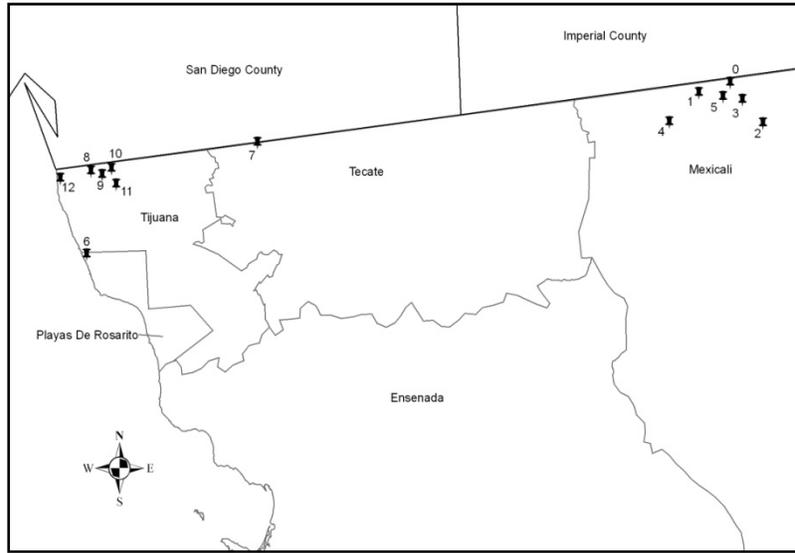
⁶⁰ SPABC Website: <http://aire.bajacalifornia.gob.mx/>

⁶¹ http://www.laspau.harvard.edu/aire_frontera/mexicali_catalogue_report_draft_final.pdf.

⁶² Personal communication between John DaMasa, ARB and Ray Menebroker, Sierra Nevada Air Quality Group, LLC, October 17, 2007

⁶³ EPA Interpollutant Trading Workgroup: Preliminary Assessment of Methods for Determining Interpollutant Offsets. Website <http://iptsb.home.mindspring.com/> accessed October 16th 2007

Figure 1: CA-BC Air Monitoring Network



ID	Site	O ₃	NO _x	CO	SO ₂	Met	TSP	PM ₁₀	VOC
0	Campestre	•	•	•		•		•	
1	Cobach	•	•	•		•		•	
2	Conalep							•	
3	ITM	•	•	•		•		•	
4	Progreso							•	
5	UABC	•	•	•	•	•		•	•
6	Rosarito	•	•	•	•	•		•	•
7	Tecate	•	•	•		•		•	
8	Centro							•	
9	Colef						•	•	
10	ITT	•	•	•		•		•	
11	La Mesa	•	•	•	•	•		•	
12	Playas	•	•	•		•		•	

O₃ = ozone; NO_x = nitrogen oxides; CO = carbon monoxide, SO₂ = sulfur dioxide; Met = meteorological; TSP = total suspended particulate; PM₁₀ = particulate matter ≤ 10 micrometers in aerodynamic diameter; VOC = volatile organic compounds.

Source: Amador, Fernando, California Air Resources Board, October 30, 2007

Emissions Data for the CA-BC Border Region

To understand the sources and magnitude of air pollutant of emissions on both sides of the border, and evaluate the relative quality of the emissions estimates, emissions inventory data were compiled for Imperial County, San Diego County, and Baja California. The relative quantity and quality of these emissions estimates are discussed below.

Emissions Summary. California emissions inventories are an almost continuous work in progress, with various areas of the inventory being improved periodically. County-level inventories are maintained and updated annually based on the latest available data and methodologies. Also, emissions can be back cast and forecast for use in air quality modeling and developing air quality plans. By contrast, the most current emissions inventory currently available for Baja California is 1999.⁶⁴ Furthermore, no tools currently exist to back cast/forecast these emissions, although a project is underway and being sponsored by the Instituto Nacional de Ecología (INE) to forecast the national Mexican inventory from 1999 to years 2008, 2012, and 2030. Also, while California's inventory is developed with various levels of temporal resolution (for example, pounds per day), the current Mexican inventories are only available in tons per year.

Because emissions for the northernmost Baja California municipalities (in effect, Tijuana, Tecate, Rosarito, and Mexicali) comprise the vast majority of emissions for the entire state, the state-level emissions were summarized. A project sponsored by U.S. EPA and the Western Governors' Association is underway to improve and update the Mexicali emissions inventory to the year 2005.⁶⁵ Also, plans are underway to update the Tijuana, Tecate, Rosarito emissions inventory. This Mexicali update will include emissions from the LRPC and TDM power plants (operational in 2003), as well as other stationary sources that have come on line since 1999 and changes to many of the area-wide sources driven by the changing population in the region. It is anticipated that the 2005 updated Mexicali emissions inventory will be available in the near future; therefore, the California county-level inventories for 2005 are shown in figure 2, instead of 2006, in order to be comparable to the (future) Mexicali inventory.⁶⁶

In addition to covering different years, (1999 and 2005), several other differences should be pointed out before making comparisons between these inventories:

- The 1999 Baja California inventory excluded some categories of emissions that are included in the California inventory. It does not include PM₁₀ emissions from wind erosion and paved and unpaved road dust. These were excluded from the inventory due to the uncertainty in the activity data used in the estimation methodology. Although these fugitive dust categories are significant contributors to the overall PM₁₀ inventories in San Diego and Imperial Counties, they were removed from those inventories in this report to allow comparison with the Baja California inventory.

⁶⁴ "Mexico National Emissions Inventory, 1999, Final." Prepared for the Secretariat of the Environment and Natural Resources and the National Institute of Ecology of Mexico, by ERG and TransEngineering, with Sponsorship of the U.S. EPA, Western Governor's Association, and the North American Commission for Environmental Cooperation. October 11, 2006. Available at: <http://www.epa.gov/ttn/chief/net/mexico.html>

⁶⁵ Personal communication between Emanuelle Rapticavoli, U.S. EPA Region 9, and Paula Fields, ERG. October 17, 2007.

⁶⁶ <http://www.arb.ca.gov/app/emsinv/fcemssumcat2007.php>

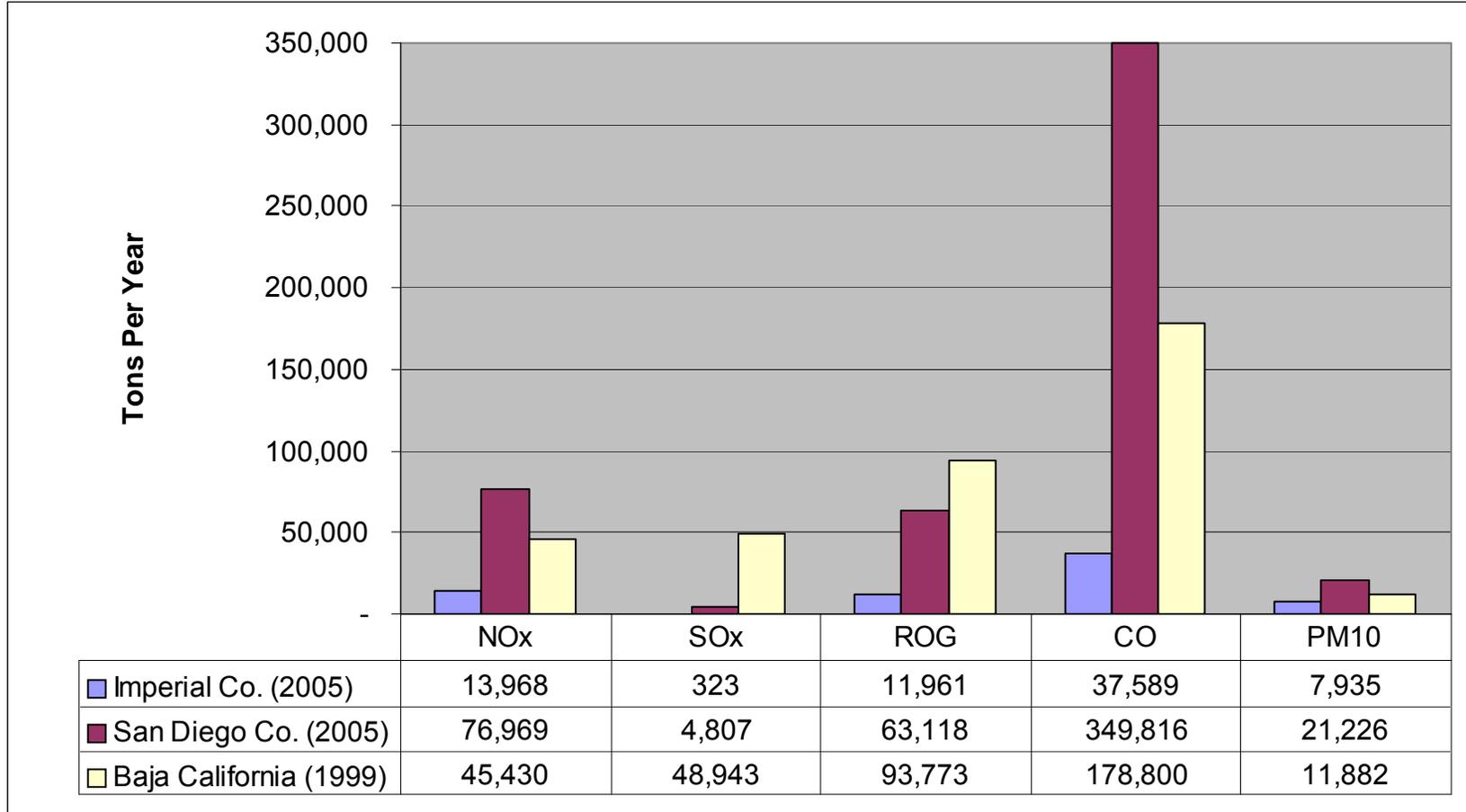
- The 1999 Baja California inventory for stationary sources is relatively inaccurate compared to the San Diego and Imperial County inventories. This is because some Baja California industrial source emissions were excluded due to confidentiality concerns or because they were not under either federal or state government jurisdiction. (Additional issues concerning industrial source emissions data from Baja California are discussed in detail below).
- Categorizations of area-wide sources are different between the California counties and Baja California. For example, the Baja California inventory includes vehicle emissions of NO_x, VOC, and CO at border crossings as a discrete source. This source is not estimated on the California side since border congestion emissions are not considered separately from other motor vehicle emissions in California. Vehicle congestion at border crossings generally occurs with greater frequency and duration on the Mexican side of the border.
- Categorization of nonroad mobile sources is different in the California county inventories than the Baja California inventory. For example, Baja California's nonroad inventory includes only aircraft, locomotive, commercial marine vessel, agricultural machinery, and construction equipment. The California county inventories include these types of categories, but in addition also include off-road recreational equipment and boats. (However, note that emissions from recreational equipment and boats in Baja California are likely accounted for under the more general "area sources" [fuel combustion, gasoline] category).

Figure 2 summarizes the total NO_x, SO_x, ROG, CO and PM₁₀ emissions inventories of stationary, area-wide, and mobile sources in San Diego County, Imperial County, and Baja California. Note that PM₁₀ emissions from wind erosion and paved and unpaved road dust are not included in this figure because they have not been estimated for Baja California; therefore a comparison with Imperial and San Diego County's PM₁₀ inventories (which include these sources) would be misleading. Figure 2 shows that NO_x and CO emissions in San Diego County are much greater than the emissions in Imperial County and Baja California. The SO_x and ROG (VOC) emissions in Baja California are much greater than those emitted in San Diego and Imperial Counties combined. Baja California's SO_x emissions come mainly from power plants (mostly from residual oil combustion at the Presidente Juárez power plant in 1999) and area source fuel combustion (commercial and industrial residual oil combustion in boilers, engines, and process heaters in 1999). Note that the Presidente Juárez plant has since converted to natural gas.

Characteristics of the California Point Source Emissions Data. The ICAPCD and SDAPCD estimate the emissions for the stationary sources within their jurisdictions.⁶⁷ These are reported to the ARB annually, and thus are continually updated.

⁶⁷ <http://www.arb.ca.gov/ei/stationarysources.htm>

**Figure 2: Summary of Selected Criteria Pollutant Emissions in the CA-BC Border Region*
(Imperial and San Diego Counties = TPY for 2005; Baja California = TPY in 1999)**



* In order to be consistent, the PM₁₀ totals on this figure do not include emissions from wind erosion and paved and unpaved road dust because these have not been estimated for Baja California.

Source: ARB Emission Inventory Summaries website; ERG, 2006

The SDAPCD reports emissions for sources emitting a minimum of 4 TPY. Sources that emit 20 TPY report annually; sources that emit 10 TPY report bi-annually; sources that emit from 4 to 10 TPY report every 4 years. Emissions reported by facilities are checked by SDAPCD based on fuel usage, size/capacity of equipment, etc., while looking for outlier data and checking calculations. Continuous emissions monitor (CEM) data and source test data are used when available. Material usage, fuel usage, and equipment size, etc. are used with emission factors and engineering judgment to calculate most other emissions. SDAPCD compiles emissions for approximately 1,600 sources, of which 150 to 200 are large sources.⁶⁸

Characteristics of Baja California Point Source Emissions Data. The stationary or point-source portion of the inventory is particularly important because a CBETP would almost surely focus on these sources. Information on air emissions sources from Mexican facility operations is derived from the Cédula de Operación Anual (COA – Annual Operating Permit) submitted by all facilities that have a Licencia Ambiental Única (LAU – Multimedia Environmental License). Federal sources submit the COA to SEMARNAT, while state sources in Baja California file it with the SPABC.

The COA contains data on all pollutant discharges, releases, and shipments forming the basis of the PRTR, Mexico's equivalent to the U.S. TRI. Recent PRTR results were published by the NACEC.⁶⁹ The COA includes an emissions inventory of particulate matter, criteria pollutants and VOCs emitted by permitted source. Although current Mexican standards on VOC emissions apply only to refinery oil-water separators and new vehicle coating operations, some state LAUs require sources to report controlled VOC emissions from other processes, such as paint booths. Emission estimates can be derived from source testing, emission factors, or material balance calculations.

The general data collected in the COA includes process information, a list of machinery and equipment, facility-wide fuel and energy use by type, and the annual amount of raw materials consumed.

For each fixed source, the form requires an identification number and location code, total annual operating hours, equipment capacity (horsepower or heat output), type of combustion equipment, annual fuel consumption, stack height and diameter, volumetric flow information, and temperature. Emission data are presented by pollutant type, maximum allowable rate, actual average emission rate in mass per unit volume or volumetric parts per million, estimating method (source test, emission factor or mass balance), and the type and efficiency rating of any installed pollution control device.

The annual facility emissions are aggregated by contaminant indicating the contribution of each source to the total mass emitted. These include SO_x, NO_x, TSP, CO, CO₂, PM₁₀, total

⁶⁸ Telephone conversation with Archie Delacruz, Senior Engineer, SDAPCD, and Ray Menebroker, Sierra Nevada Air Quality Group. November 2, 2007.

⁶⁹ "Taking Stock, 2004 North American Pollutant Releases and Transfers." Commission for Environmental Cooperation. September, 2007. Web site: <http://www.cec.org>

hydrocarbons, and VOC. These totals form the basis of the PRTR reports issued by SEMARNAT for each state.

Air pollution control equipment is not widely used in Baja California. This is in part because Mexican air emission standards only regulate emission rates and do not set limits on the total mass of pollutants that can be released. Criteria pollutant limits for diesel- and gas-fueled equipment allow virtually any well-maintained source to meet the permissible limits without the need for sophisticated control devices. Most industrial TSP and PM₁₀ sources can meet the maximum permissible limits by installing simple cyclone dust collectors or bag houses, respectively.

COA data quality is difficult to assess. Notwithstanding the existence of test method NOMs for combustion and particulate emissions, and emission factor references, there is substantial variability in application of testing methods, instrumentation, and the level of expertise of source testing practitioners. In addition, regulatory agencies do not have the technical resources and capabilities to evaluate facility-derived mass balance data or to verify the accuracy of the information received.

Another factor is the completeness of the collected data by federal regulators. Sources only need to report emissions for purposes of the PRTR if they meet specific threshold quantities of listed substances. A majority of border industrial facilities are under state jurisdiction and do not emit listed substances in sufficient amounts to require reporting. At the same time, they may emit other chemicals, in particular VOCs, which are not on the PRTR list.

In its present format, data collected in the COA are not intended to support an emissions trading program. Information on historical operating hours, control equipment description and efficiency, and load factors is not provided in the level of detail needed to meet the reporting requirements of real, surplus, verifiable, and permanent emission reductions.

Implementation Barriers

There are many practical challenges to establishing a CBETP. Some are posed here as questions:

- Where will the political/policy leadership come from to marshal the government resources needed to make it happen? All levels of government are involved on both sides of the border and interest in a CBETP extends well beyond California and Baja California to other border states. Congressional action would be required to amend the FCAA, and Mexican laws and regulatory practices will have to be changed. Who will lead and serve to coordinate the efforts of these disparate entities?
- How will a CBETP be designed and who will do it? As noted elsewhere, there are a number of trading program options, depending on the air quality goals being served. Given the government and nongovernmental interests involved, how will practical decisions be reached?
- Who would administer a CBETP? There is already an array of agencies with a direct hand in air quality regulation along both sides of the border. Does a new international

entity have to be created, or can existing regulatory bodies operate a new program in a decentralized manner?

- Can different regulatory cultures be reconciled? The United States and California operate a more comprehensive regulatory regime and stricter air quality enforcement program than their Mexican counterparts. Can the parties reach a consensus on the permitting, reporting, and enforcement structures needed to operate an effective CBETP?
- How broad will the program be? Limiting it to California and Baja California, even with SEMARNAT's involvement, will simplify the task of dovetailing the regulations, offset criteria, and administrative procedures, compared to a federal program on the Mexican side that would apply to all U.S.-Mexico border states.
- Is the current Mexican air emissions reporting and regulatory enforcement system capable of supporting an effective cross-border program? The regulatory system will need to undergo substantial changes in order to serve as the foundation for a domestic and cross-border emissions trading market. What additional burdens will these changes present to the regulated communities and government agencies on both sides of the border? Will the regulatory agency validating the credits be able to develop and implement a transparent and streamlined bureaucratic process with a manageable reporting mechanism?
- What technical data must be collected and what regulatory changes are necessary as a prerequisite to implementing a CBETP? In what sequence do these changes need to occur? How long will it take to make these changes and how should they be funded?
- How will Mexican and U.S. regulators react to giving up some of their jurisdictional autonomy and authority to another agency with a different regulatory philosophy, administrative structure, language, and legal system?
- How will the Mexican industrial sector perceive the benefits and costs of such a program? At a fundamental level, the environmental benefits need to be clearly explained, well understood, and broadly accepted by all involved parties including the community. Beyond these issues, will economic incentives and regulatory prerequisites be needed to encourage participation in the program?
- What criteria will the Mexican business sector use to evaluate the program? When considering other voluntary compliance programs, such as the Clean Industry Audit Certificate, the private sector has consistently called for clear rules and reporting procedures, affordable costs, and flexible entry and exit strategies.
- Will the credit seller and offset buyer interact directly in such a program? Transactional models such as the El Paso brick kilns retrofit or the Otay Mesa garbage truck conversion involved having an offset buyer pay for the equipment and installation cost of the emissions reduction technology and then purchasing the credits at a mutually agreeable price. Will the U.S. credit buyer agree to make an initial investment in technology in Mexico?

- How will regulatory risk affect the trading program? This risk encompasses the possibility that the Mexican credit-issuing regulatory agency will change its policies on the credits after the U.S. project is built, thus invalidating or reducing the value of the offset in the eyes of the U.S. regulators. Will the buyer have legal recourse under U.S. statute or regulations to make the U.S. regulatory entity honor the original credits? Will discounting Mexican offset prices to compensate for this risk have negative or positive consequences to the program's overall viability?
- Will the existing U.S. credit trading firms be able to incorporate Mexican emission credits into their portfolios? How will these credits affect the existing California offset market? Will it produce stability or speculation?
- Will the program need to be financially self-supporting to allow the Mexican state and federal regulatory agencies to develop the technical expertise and administrative capability to effectively manage the program? Will the program create a dependence on the regulated community?
- What are the environmental justice implications of a CBETP? Any emissions trading program, whether project based or cap and trade, inherently results in either maintaining or increasing emissions in some location, while reducing emissions somewhere else.

Comparing Barriers by Program Type

Table 11 compares the effect of selected barriers on a project-based trading program versus a cap-and-trade program in the United States and Mexico. For purposes of comparison it is assumed that a project-based program would be in place on both sides of the border, would operate in a manner that is similar to a U.S. NSR program, and its primary goal would be to prevent new/expanding sources from degrading air quality. In table 11, the cap-trade-program is assumed to apply on both sides of the border, would apply to a diverse group of stationary sources, would operate similar to the South Coast RECLAIM program, and would serve the goal of improving regional air quality. The NSR and RECLAIM programs are described in more detail later in this report, as are other trading program alternatives.

Table 11: Cross-Border Emissions Trading: Selected Potential Barriers to Project-Based and Cap-and-Trade Programs

Potential Barriers	Project-Based	Cap-and-Trade
Amend U.S. Laws, Regulations, and Policies		
Amend Federal Clean Air Act (FCAA) requirements to include new source review program as part of State Implementation Plan (SIP)	Amendments required to parts of Sections 172, 173, 176, 182, and 189.	Amendments required to parts of Sections 172, 173, 176, 182, and 189.
Amend FCAA various permit program requirements throughout the law	As a minimum, amend to allow offsets to be obtained in Mexico.	As a minimum amend to allow offsets to be obtained in Mexico.
Amend FCAA planning requirements in Section 110, 181, etc.	Could be avoided, depending on program specifics.	Required if California districts are to take credit for emissions reductions in Mexico.
Amend FCAA enforcement jurisdiction	Amend Section 113 to address the issue of sources meeting FCAA requirements via actions inside Mexico.	Amend Section 113 to address the issue of sources meeting FCAA requirements via actions inside Mexico.
Amend FCAA international airshed planning	Could be avoided, depending on program specifics.	Amend Section 115 to authorize/recognize a CBETP.
Amend U.S. EPA regulations & policies	Amend surplus requirement and review other offset eligibility criteria.	Amend offset eligibility criteria, plus permit and enforcement requirements.
Presidential permit guidelines	Modify to address a CBETP.	Modify to address a CBETP.
Amend Mexican Laws, Regulations, and Policies		
Amend Federal General Law	The General Law states that cross border issues are under federal purview (Art. 5) and allows SEMARNAT to promote emissions trading (Art. 111), and to enter into agreements with the states to regulate federal sources (Article 11). Under one scenario, SEMARNAT could theoretically simply enter into such an agreement with Secretaría de Protección al Ambiente de Baja California (SPABC) to manage a CBETP - similar to the agreement turning over the air monitoring network to SPABC - without changing any part of the Law. However, a more likely scenario involves adding language authorizing an offset program and a CBETP in Title Four, Chapter II, and the Air section of the Law.	The same issues apply to a cap-and-trade program.

Potential Barriers	Project-Based	Cap-and-Trade
Amend General Law Air Regulations	The General Law would not require a change under the first scenario. However, if the General Law was amended to authorize an offset program and a CBETP, similar changes would be required in Chapter I (General Provisions), Chapter II (Fixed Sources), and Chapter V (Fines and Penalties).	The same issues apply to a cap-and-trade program.
Amend Environmental Impact Regulations	This regulation will need substantial changes to work in an emission reduction credit (ERC) environment. The EIS evaluation process in Chapter III will need a new section specifying the type of EIS that would require offsets, particularly for projects that intend to generate credits for use in the U.S.; Chapter VI, Public Participation would need to be revised if public air boards will have a formal role in project approval, Chapters VIII (Insurance and Warranties) and IX (Inspections and Fines) will need to incorporate criteria to ensure U.S. ERC buyers and regulators have appropriate protection.	The same issues apply to a cap-and-trade program.
Add new Official Mexican Standards (NOM) for Emissions Trading	<p>Substantial new rule-making is needed in any scenario:</p> <p>An offsets New Source Review (NSR)-type rule.</p> <p>A federal CBETP standard describing the workings of the program would make for clear and transparent ground rules.</p> <p>3) A NOM for EIS evaluation criteria for projects seeking CBETP offsets and credits.</p>	The same issues apply to a cap-and-trade program. The CBETP NOM would be the key regulatory instrument.

Potential Barriers	Project-Based	Cap-and-Trade
Amend Environmental Protection Law and Regulation for the State of Baja California	<p>Article 8 of the state law would need to be amended to allow an offset program for state sources and a CBETP, provided such an agreement would be negotiated with SEMARNAT. Adding a new section may be preferable.</p> <p>Other sections may need to be amended to be compatible with corresponding changes to federal law and regulations.</p>	The same issues apply to a cap-and-trade program.
Amend California Law, State, and Air District Regulations		
Planning Area Boundaries	Could be avoided, depending on program specifics.	Amend H&S Code Section 39606 if California districts are to take credit for emissions reductions in Mexico.
District authority to be more stringent than state requirements	Section 41508 may need to be restricted to achieve consistent cross-border requirements.	Section 41508 may need to be restricted to achieve consistent cross-border requirements.
Requirements for offsets credits generated outside an air district	Section 40709 criteria would need to be changed to allow offsetting reductions generated in Mexico.	Section 40709 criteria would need to be changed to allow offsetting reductions generated in Mexico.
Requirements to adopt and update plans to attain state ambient standards	Could be avoided, depending on program specifics	Chapter 10 requirements would have to be amended if California districts are to take credit for emissions reductions in Mexico.
Planning area designations and associated new source program performance requirements	Sections 40918-40920 would have to be amended if offsetting reductions in Mexico could be credited to performance goals.	Sections 40918-40920 would have to be amended if offsetting reductions in Mexico could be credited to performance goals.
Enforcement & penalties for violation of any rule, regulation, permit, or other order of the California Air Resources Board (ARB) or air district	Section 42400 et seq. may need to be modified to address the issue of sources meeting requirements via actions inside Mexico.	Section 42400 et seq. may need to be modified to address the issue of sources meeting requirements via actions inside Mexico.
CEQA duty to impose additional or more stringent requirements if needed to mitigate impacts	Local government and Energy Commission authority may need to be restricted to achieve consistent cross-border requirements.	Local government and Energy Commission authority may need to be restricted to achieve consistent cross-border requirements.

Potential Barriers	Project-Based	Cap-and-Trade
Air Pollution Control District (APCD) new source review requirements	Imperial Rule 207 and San Diego Rule 20.3 will need to be modified to allow emissions reductions from Mexico to meet offset requirements.	Imperial Rule 207 and San Diego Rule 20.3 will need to be modified to allow emissions reductions from Mexico to meet offset requirements.
Technical Information Needed to Implement CBETP		
Information on air quality formation and transport on both sides of the border	Additional studies needed to establish ratios if program allows inter-pollutant or interprecursor trading.	Information, particularly on Mexican side or border, will need to be upgraded to provide a reliable technical basis to design a cap-and-trade program.
Emissions inventory	Systematic improvement would be beneficial but as a minimum information on Mexican sources must be improved on a case-by-case basis.	Information on Mexican sources would have to be upgraded systematically before a program is implemented.
Air pollution permit program infrastructure and associated recordkeeping and reporting requirements	As a minimum, each source involved in a trade would need to be issued a permit with appropriate requirements to allow tracking and enforcement.	A comprehensive permit program would have to be established with appropriate requirements before a program is implemented.

Institutional Issues		
Convincing the regulated community on both sides of the border that the program is fair, reliable, cost-effective, and mutually beneficial	Not a major factor since issues can be worked out on a case-by-case basis.	Will be a major factor in developing political support for a cap-and-trade program on both sides of the border.
Managing the policies and agendas of numerous public agencies at all levels of government on both sides of the border	A factor, but the needed coordination is mainly among local, state and federal air pollution control authorities.	Probably a major factor because cap-and-trade programs affect more agencies.
Making a fundamental change in the way air emission sources in Mexico are regulated by adding mass emission limits, offset requirements, and stronger regulatory oversight	A major factor that can be managed in a format that allows for limited scope, demonstration projects, and voluntary participation.	Will be a major factor in developing political support for a cap-and-trade program on both sides of the border.

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Conclusions

Potential benefits of, and barriers to, a CBETP, have been described, although the actual benefits realized and the barriers encountered depend heavily on the goals set for the program as well as how it is designed and implemented. A cap-and-trade program that is designed to improve air quality on both sides of the border but also has provisions to facilitate the construction of new sources has more potential benefits than a project-based program. For example, an ambitious cap-and-trade program might yield the following benefits:

- Produce significant public health benefits by reducing exposure to ozone and particulate matter on both sides of the border.
- Reduce the overall cost of air quality controls in the CA-BC area.
- Make it easier to site industrial facilities and energy infrastructure in the CA-BC area.
- Establish a precedent for cross-border trading in other parts of the country.
- Increase U.S. investment in modernizing and reducing emissions at Mexican industrial facilities.
- Enhance air pollution control programs, particularly in Mexico.

A project-based program that is designed to facilitate the siting of new sources without degrading air quality would have fewer benefits but would still be important. For example, the main potential benefits of a cross-border NSR program would be:

- Make it easier to site energy-related infrastructure in the CA-BC area, particularly on the U.S. side.
- Encourage the enhancement of air quality programs in Mexico.
- To a lesser extent than cap and trade, establish a precedent for cross-border trading in other areas.

However, there are also legal, institutional, technical and practical barriers to a CBETP. Many of the same barriers exist for a project-based CBETP as for a cap-and-trade program, but the cap-and-trade barriers tend to be higher. Most barriers exist in both the United States and Mexico, and among them are the following:

- Federal, state, and local laws and regulations will have to be amended in both countries.
- Numerous government agencies at all levels of government in both countries will need to be involved.
- The views of private sector interests, including industry groups and NGOs, need to be accommodated.
- Some air quality information will need to be upgraded to provide a reliable technical basis to design a CBETP, including information on the emissions and operation of

industrial sources in Mexico. Better technical information is a more pressing need for a cap-and-trade program.

- Political leadership will have to emerge in both countries to garner the resources needed and facilitate effective decisions on CBETP design and implementation.

Certain factors emerge as particularly significant, including the following:

- Creating a basic offset program poses some immediate challenges for Mexico. Air pollution regulatory infrastructure is not as developed in Baja California as in California. For example, there are no mass-based limits on emissions of criteria pollutants, only emission rates and concentration limits. In addition, there is no planning process analogous to U.S. SIPs that integrates source air emission rates and ambient air quality standards. Also, there are no rules on attainment or corresponding penalties for nonattainment in individual air basins.
- Mexico has no experience operating a cap-and-trade program. The development of a more robust emissions reporting system in Baja California is needed. Reliable data on emissions from the sources that are included in the program is essential to meeting U.S. policy and legal criteria for a CBETP and for evaluating the actual potential of emissions reductions from these sources.
- The recent record of emissions trading in the border region provides a mixed picture. Some of the electrical generating facilities sited in California since 2001 obtained offsets, while others were exempt.
- There is no complete precedent for cross-border trading. The EPE brick kiln replacement project provides an interesting demonstration, but it bypassed the FCAA and therefore does not provide a legal precedent for a broader CBETP.
- Some project proponents have been challenged by the limited availability of emissions reduction credits in San Diego and Imperial Counties, but there are also other factors that affect the decision of where to locate new power plants and other facilities.
- The TDM and LRPC plants established several precedents for border region projects, including a Presidential permit for the transmission lines that connected the plants to the U.S. market. However, a GAO review of the projects determined that U.S. policy makers have limited options under current law to ensure that projects located outside the U.S. do not adversely affect the health of U.S. residents.
- Better quality information on the atmospheric fate and transport of ozone and particulate precursors is needed. This information is needed to deal with key CBETP design issues such as inter-pollutant and interprecursor trading and to increase public confidence that a CBETP will actually meet air quality goals.
- Establishing the scope and policy goals of a CBETP will facilitate implementation. Support might increase if the program is envisioned to enhance a variety of goals, including air quality improvement, improving energy infrastructure, and enhancing job

creation and economic development in both countries. On the other hand, a less ambitious program might be easier to implement.

- Limiting the program to California and Baja California would decrease the impact of some barriers.
- Convincing the regulated community and other interested stakeholders on both sides of the border that the program is fair, reliable, cost-effective, and mutually beneficial is crucial to success.
- Establishing a viable and stable banking and/or credit market that is both transparent and reliable is essential.

Given the state of air quality regulations in the CA-BC region, the opportunity to create a vital and effective CBETP depends initially on the demand for it on the U.S. side of the border and the potential supply of credits in Mexico. Credits for some pollutants are difficult to come by in California and there appear to be numerous industrial facilities in Mexico that could reduce their emissions to generate credits. A demand for credits can also emerge in Baja California if future air quality requirements mandate overall emissions reductions from Mexican sources, but the interest in establishing a program at this time is greatest among those who wish to build projects in California and are frustrated by the difficulty of obtaining offset credits.

The information in this report shows why it is difficult to assess objectively the current level of demand for a CBETP in California. There have been no cross-border trades and therefore no real-world test of the concept. In recent years, some California power projects have had difficulty assembling sufficient credits; though five peaking plants and a base load plant have ultimately been approved. Deposits in air district emissions reduction credit banks are relatively small and the actual availability of deposited credits is hard to assess. There is anecdotal information that some projects have been delayed or shelved, particularly in Imperial County, because of the inability to acquire credits. Two major power plants have been sited in Mexico with most of their electricity generation dedicated to serving the U.S. market. While the ability to acquire emissions reduction credits in the United States may have been one factor in the decision to locate these facilities in Mexico, there are other reasons as well.

It is even more difficult to quantify the potential supply of credits. As has been noted, the design and implementation of a CBETP will significantly influence the willingness of sources to reduce emissions beyond minimum requirements in order to generate marketable credits. Mexican regulatory requirements are generally less stringent than requirements in California so there would appear to be opportunities to modernize or control these sources to generate credits. On the other hand, there is not sufficient information available about existing sources in Baja California to quantify their ability to reduce emissions.

From available information, it can only be concluded that there is interest in cross-border trading on the California side of the border, which is motivated in part by the difficulty of obtaining sufficient credits to meet NSR offset requirements. There appears to be a significant potential for sources in Baja California to generate credits, but more information is needed to objectively assess that potential. The design and implementation of a CBETP will help to determine both demand and supply.

CHAPTER 4:

Evaluation of the Requirements Necessary to Implement Cross-Border Emissions Trading

This chapter identifies and describes the various cross-border emission trading schemes, and assesses their feasibility for implementation in the California-Baja California (CA-BC) border region.

Objectives

The objectives of this chapter (Subtask 4.3) are to summarize existing and proposed trading programs, analyze the ability of various types of trading programs to improve air quality, discuss the design and implementation of cap-and-trade programs, and draw some conclusions concerning the elements of an optimal cross-border emissions trading program (CBETP) for the CA-BC border region.

Method

To begin this subtask, the following references were reviewed in detail:

- *The U.S.-Mexican Border Environment: Improving Transboundary Air Quality with Bi-national Emission Reduction Credit Trading.*⁷⁰
- The U.S.-Mexico Border 2012 Framework.⁷¹
- Various air quality reports and data presented by the SCERP.⁷²
- The website developed by the ARB and the SPABC related to air quality data along the border (SPABC website).

Other resources, noted throughout this chapter, were reviewed and summarized as they helped characterize the range of existing emission trading schemes and their characteristics.

The direction established by the Energy Commission for this project stipulated the specific attributes and limitations to be examined, including monitoring requirements, enforcement, harmonization of air quality standards, cost effectiveness, and functional operation. Also, the Energy Commission directed the project team to specifically examine cap-and-trade, baseline-

⁷⁰ "Improving Transboundary Air Quality with a Binational Emissions Reduction Trading Program", SCERP Monograph Series, No. 10

⁷¹ <http://www.epa.gov/usmexicoborder/intro.htm>

⁷² <http://scerp.org/new/>

and-trade, and project-specific mitigation types of emission trading schemes. To the extent that data were available and resources were reliable, these attributes and types of trading schemes were examined.

This chapter is organized around the various types of existing trading programs and their attributes. Then, a general analysis provides a description of the basic structure of trading programs focusing on design and implementation, which leads to initial conclusions about the specific issues and attributes associated with a potential CBETP.

There are several ways to categorize emissions trading programs. For example, SCERP considered two types in its analysis: cap and trade and baseline and trade.⁷³ Also, the U.S. EPA lists three types of programs in its 2007 fact sheet: cap-and-trade, project-based credit or offset, and rate-based credit or averaging.⁷⁴ The baseline-and-trade program as described by SCERP and the U.S. EPA's project-based offset program are essentially the same approach. Under this approach, individual sources are required, under specified circumstances, to obtain offset credits that have been generated by other sources. The credits are stated as mass emissions per some unit of time, for example tons per year or pounds per calendar quarter. The New Source Review (NSR) programs that are required by the Federal Clean Air Act (FCAA) and the California Clean Air Act, which are operating in Imperial and San Diego Counties, are both project-based trading programs. NSR programs prevent emissions increases from new and expanding sources from slowing progress toward attaining ambient air quality standards.

A rate-based program can be understood as a trading program that provides a compliance option for sources or groups of sources that are subject to a declining emissions rate performance standard. The source can match its required emissions rate, create credits by reducing emissions below the required rate, or emit above the required rate and purchase credits generated by another source. The rate-based program concept has been used as a compliance option in some on-road motor vehicle and off-road mobile source control regulations in California and has been applied to stationary sources in Texas. The El Paso Electric brick kiln replacement project is an example of a stationary source in the United States. using a cross-border trade as an alternative means of complying with a state emissions reduction requirement. The source reduced emissions in Mexico rather than at the facility itself. The El Paso approach of using Mexican emission reductions as a compliance option for existing sources would likely be viewed skeptically in California for the following reasons:

- California has a strong regulatory tradition of emphasizing on-site emissions reductions from stationary sources through the installation of advanced control technology. The Regional Clean Air Incentives Market (RECLAIM) program is an exception, and other air districts in the state have not replicated it.

⁷³ "Improving Transboundary Air Quality with a Binational Emissions Reduction Trading Program", SCERP Monograph Series, No. 10, p.102.

⁷⁴ "Types of Trading", EPA Fact Sheet, on their website at <http://www.epa.gov/airmarkets/cap-trade/docs/tradingtypes.pdf>, accessed November 9, 2007.

- State law generally requires existing sources to install the best available retrofit control technology (BARCT) and new or expanding sources to install BACT.
- On-site emissions reductions have both local and regional air quality benefits. Reducing emissions in Mexico rather than on site in California would provide local benefits in Mexico rather than in California.
- A trading program for existing sources would not address the problems, discussed elsewhere in this report, that are associated with siting new or expanding energy facilities and other sources.

For these reasons unique to the CA-BC border region, this report will focus on cap-and-trade programs and project-based programs directed at new or expanding sources.

Cap-and-trade programs operate in situations where a regional emissions reduction goal or cap has been established for a defined group of sources. The cap is typically established for a baseline period and then declines over time. Individual sources that are in the covered source group are allocated emissions allowances that collectively are consistent with the regional cap. As the regional cap declines, each source's allocation declines proportionally. Sources may choose among several options to comply, depending on what they perceive as in their operational and economic interest. Sources may match emissions to their allowances, reduce emissions to below their allowances and sell the surplus, or emit more than their allowances by purchasing allowances from other sources. There is a number of cap-and-trade programs operating in the United States.

As noted elsewhere, this report assumes that the goal of a CBETP would be to improve regional air quality by reducing overall emissions in the CA-BC border region. Although cap-and-trade programs are designed to reduce regional emissions, project-based programs have other benefits, such as facilitating construction of new facilities without damaging air quality. Therefore, both types of programs are examined in this analysis.

Overview of Existing Emission Trading Programs

This section provides a brief overview of some of the emissions trading programs operating in California, in other parts of the United States, and internationally. The purpose is to introduce some of the main features and attributes of real-world trading programs before discussing those attributes individually and in more detail. All but one of the programs discussed in this section, NSR, are cap-and-trade programs. Cap-and-trade programs are emphasized because they are more numerous in the United States. In addition, cap-and-trade programs have many attributes that support the assumed long-term goal of a CBETP between California and Mexico to achieve regional air quality improvement. Project-based trading programs like NSR can have a number of benefits but are not designed to achieve overall regional emissions reductions. However, as will be discussed, cap-and-trade programs have no particular advantage in addressing emissions from new or expanding facilities. The ability to construct new facilities is an issue of concern in the CA-BC region, particularly on the U.S. side of the border. Therefore, the

overview begins with a discussion of NSR, a trading program specifically designed to address new and expanding facilities. Later, the issue of accommodating new facilities in the context of a cap-and-trade program is discussed.

New Source Review

The United States Congress established the NSR permitting program as part of the 1977 FCAA Amendments. NSR is a preconstruction permitting program that serves two important purposes.

- First, it ensures that air quality is not significantly degraded from the addition of new and modified factories, industrial boilers, and power plants. In areas with unhealthy air, NSR ensures that new emissions do not slow progress toward cleaner air. In areas with clean air, especially pristine areas like national parks, NSR ensures that new emissions do not significantly worsen air quality.
- Second, the NSR program ensures that any large new or modified industrial source located in their neighborhoods will be as clean as possible and that advances in pollution control occur concurrently with industrial expansion.

NSR permits are legal documents that facility owners/operators must abide by. The permit specifies what construction is allowed, what emission limits must be met, and often how the emissions source must be operated.⁷⁵

The NSR program has been referred to in various terms such as command and control, baseline and trade, and project-based offset. All areas that are nonattainment for a given criteria pollutant must operate a NSR or equivalent program for that pollutant and its precursors. All areas in California, which include the CA-BC border region counties of San Diego and Imperial, have adopted the U.S. EPA-approved NSR program.

California NSR Program

As discussed above, there are two basic provisions of an NSR program. The first provision is that all new and modified stationary sources above specified thresholds must install the best technology that results in the lowest achievable emission rate (LAER). In most California air district rules, the term BART is used in place of the federal term LAER. The second provision is that all emissions above specified levels must be fully mitigated (offset) by reductions in emissions from existing sources sufficient to demonstrate that a net air quality benefit results. The basic legal requirements for an NSR program in California are described in detail in the Subtask 4.1 report.

⁷⁵ U.S. EPA's NSR website at EPA's NSR website at <http://www.epa.gov/nsr/>

The critical attributes of a good NSR program include that it forces the installation of new innovative technologies, and secondly, that it ensures that increases in emissions from new and existing sources are fully mitigated by real reductions in emissions.

A successful NSR rule needs to require or otherwise encourage the use of new and innovative technologies. Historically in California, the difficulty in obtaining offsets has encouraged stationary sources to install state-of-the-art technologies with low emissions to minimize the need for offsets. This attribute of California's NSR program has been one of its major strengths.

The most important attribute of offsets is that emission reduction credits (ERCs) are available and represent true reductions in emissions to the atmosphere. The criteria that ERCs must be real, quantifiable, surplus, permanent, and enforceable are designed to ensure this. Historically in California, some ERCs have been created and banked without fully meeting these criteria. When this is done, project proponents are forced to spend time and money to verify that banked ERCs not only are acceptable to the air district that granted them, but also are acceptable to the ARB and the U.S. EPA. There have been several instances where project proponents have purchased ERCs assuming that they were legitimate, only to have the U.S. EPA challenge their validity and threaten enforcement action. This has created some uncertainty in the offset program and has been a problem for project proponents.

In addition to meeting the "real, quantifiable, surplus, permanent, and enforceable" criteria, offsets also must be available and at a reasonable cost. This is where much of the criticism of the existing program has been focused. Over the years, project proponents have claimed that offsets were difficult to find, and when they were available, project proponents and credit sellers had little experience in the market. Regulators have tried to address these issues by requiring the establishment of district-operated ERC "banks," the annual reporting of offset transactions, and the cost of offsets for those transactions. While banks have been created and ERCs are deposited in these banks, the amount of ERCs in many banks can be limited and of uncertain value. Also, the ERC owner has the option of holding them and using them at a later date, instead of selling them. A desired attribute of any trading system is that it treats new sources equitably with existing sources. Under the current NSR program, existing stationary source owners with emissions that can be reduced to create ERCs have a distinct advantage over project proponents trying to secure ERCs for a new stationary source.

Another attribute of any banking system must be assurance that ERCs placed in the bank are real, permanent, will not be discounted in any way upon use, or confiscated to be applied toward an area's demonstration of attainment of ambient air quality standards.

Federal NSR Program

Nationally, there has been concern about whether NSR is working as the U.S. Congress intended. That is, does it have the attributes described above? In 1992, the U.S. EPA established a committee to simplify and streamline the NSR regulations. The U.S. EPA formed a subcommittee of its existing Clean Air Act Advisory Committee, composed of representatives of states, environmental groups, and industries. For several years, the task force members discussed possible changes in the federal NSR regulations. In 1996, the U.S. EPA published in

the Federal Register (FR) a package of proposed changes to the NSR rules (61 FR 38250) that came from the committee's work. These proposed changes however, were never finalized.

It was not until 2001, that a new effort headed by Vice President Cheney and the National Energy Policy Group resulted in a report that recommended that legislation be introduced to cap emissions of NO_x and SO₂ at power plants. The report also recommended that the U.S. EPA, in conjunction with the DOE and other federal agencies, examine its NSR regulations and report on the impact of NSR on investment in new utility and refinery generation, energy efficiency, and environmental protection. Subsequently, the U.S. EPA promulgated changes to the NSR regulations in December 2002. The changes that were made had their greatest impact on how modifications to existing sources would be addressed. The proposed changes were not well received by environmental groups and state and local air agencies and have been challenged by some states and environmental groups before the U.S. Court of Appeals, District of Columbia Circuit.

Of more interest, however, is that the U.S. Congress commissioned the National Academy of Public Administration (NAPA) to conduct an independent management evaluation of the NSR program.⁷⁶ The evaluation report recommends that the U.S. Congress maintain the existing program for new sources of air pollution but also recommends a national or regional multi-pollutant cap-and-trade system for all fossil fuel-fired power plants, industrial boilers, and similar facilities. This report gives specific examples of where NSR as applied to existing sources has been deficient in protecting air quality. It is of specific interest as it relates to this analysis for the CA-BC region because it provides an example of approaching the U.S. Congress with the idea of a cap-and-trade program for NSR.

Acid Rain Program

The Acid Rain Program (ARP) is a national program enacted in 1990 that is designed to reduce acid rain and dry acid deposition in the eastern United States and Canada. The ARP is required by Title IV of the FCAA, which mandates a cap-and-trade program to reduce SO₂, the primary acid rain precursor in the eastern U.S. and Canada. Because the ARP reflects a U.S. congressional compromise between coal-producing states, particularly Midwestern states with high-sulfur coal and western states with low-sulfur coal, the statutory language is extremely detailed. The goal is a 10-million-ton SO₂ emissions reduction by 2000 in the "lower 48 states" compared to 1980 emissions levels. The SO₂ emissions come primarily from power plants or EGUs, particularly high-sulfur-coal-burning power plants in the Midwestern and eastern U.S. EGUs with capacities greater than 25 MW are included in the program. The ARP also requires NO_x emissions reductions, but NO_x is regulated by more traditional rate-based performance standards rather than a trading program.

⁷⁶ A Breath of Fresh Air- Reviving the New Source Review Program
<http://71.4.192.38/NAPA/NAPAPubs.nsf/17bc036fe939efd685256951004e37f4?OpenView>

The ARP has often been described as a success, particularly in terms of reducing control costs. The U.S. EPA began implementing the cap-and-trade program in 1995. In the early stages of the program, the GAO reported emissions reductions were occurring more rapidly than required, and substantial cost savings were being realized compared to traditional command and control programs. The program's benefit-to-cost ratio was estimated at 40:1.⁷⁷ In addition to acid rain benefits, the U.S. EPA also cites ozone- and particulate-reduction benefits from the SO₂ and NO_x reductions made under the program. However, the ARP has not yet achieved the statutory SO₂ emissions reduction goal. The U.S. EPA's 2006 progress report indicated that SO₂ emissions had been reduced by 7.8 million tons as compared to 1980 levels.⁷⁸ This reduction conforms to the ARP's declining cap but remains less than the 10-million-ton reduction required by the law.

NO_x Budget Trading Program

A cap-and-trade program for NO_x emissions was first established in the Eastern United States as an initiative of the Northeastern states. It was designed to address the long-range transport of ozone and its precursors during the summer months from some southern and midwestern states, through the Mid-Atlantic states, and on to the Northeast. The trading program began in 1999 as the Northeast Transport Commission NO_x Budget Trading Program (NBTP). The trading program continued in 2003, with modest modifications, under a different legal structure as the "NO_x SIP Call" or NBPT. The trading program addressed NO_x emissions between May and June in all or parts of 21 states. EGUs rated greater than 15 MW and large industrial boilers rated at greater than 250 million British Thermal Units per hour (MMBtu/hour) heat input are included in the program. The program is separate and distinct from the ARP, even though both programs require NO_x reductions.

The U.S. EPA and the states have distinct roles. The U.S. EPA determined the overall regional NO_x emissions cap, allocated allowances to the states, oversees enforcement, and serves as the program's accountant. The U.S. EPA developed the NO_x Allowance Management System (NAMS) as a central registry for allowances, transactions and the annual reconciliation of source allocations. The U.S. EPA also developed a system to track emissions. The states administer the program and allocate allowances to individual sources within their jurisdictions. Program requirements are consistent among states despite decentralized administration. Consistency exists because the states and other stakeholders had developed a model rule early in the program and each state adopted that rule or its equivalent and used it to administer the program.

An interesting component of the program is a feature called flow control. As with the ARP, sources can bank unused allocations for future use. If the bank becomes too large and many

⁷⁷ "Overview and Issues on Emissions Allowance Trading Programs", Statement of Peter F. Guerrero, Director, Environmental Protection Issues, Resources, Community, and Economic Development Division GAO/T-RCED-97-183, July 9, 1997.

⁷⁸ U.S. EPA's 2006 Progress Report, U.S. EPA website at <http://www.epa.gov/airmarkets/progress/arp06.html> accessed November 16, 2007.

sources decide to use banked allocations during a given ozone season, actual emissions could increase significantly. To reduce this potential, banked allocations are essentially discounted, such that rather than an allocation equaling 1 ton of actual emissions, it might equal 1/2 ton. The ratio is adjusted depending upon the size of the bank.

The U.S. EPA's 2006 progress report indicated that NO_x emissions from the sources subject to the program had been reduced by 74 percent since 1990, though not all reductions are directly due to the NBTP. The U.S. EPA also reported a 99.7 percent compliance rate and substantial ozone reduction benefits.⁷⁹

Clean Air Interstate Rule

The U.S. EPA adopted the CAIR in 2005 to implement cap-and-trade programs on a broader scale and to replace a scheduled round of additional command-and-control regulations on EGUs. The program addresses SO₂ and NO_x emissions in 28 states and the District of Columbia. The air quality goals are to reduce ozone and particulate matter in affected states, both of which are affected by the interstate transport of precursor gases. CAIR essentially extends the ARP and, beginning in 2008, replaces the NBTP. The U.S. EPA and the states will play the same basic roles as they do in the NBTP.

The U.S. EPA forecasts regional SO₂ reductions of 70 percent and NO_x reductions of 60 percent, between 2003 and 2015 and a benefits-to-cost ratio of 25:1. The CAIR applies to EGUs only, although states are given the option of creating their own mix of sources as long as their trading program achieves their state SO₂ and NO_x caps.

Mercury Rule

In 2005, the U.S. EPA also adopted a cap-and-trade program to control mercury emissions from coal-fired EGUs. The rule is intended to produce a 70-percent reduction in mercury emissions from coal-fired power plants by 2018. As with CAIR, it replaces a scheduled command and control rule.

The mercury cap-and-trade program is very controversial and faces numerous legal challenges from environmental advocates and many states. Critics argue that substantially greater reductions could be achieved, and that toxic pollutants like mercury should not be regulated by a trading program because it would allow power plants generating mercury "hot spots" to buy allocations instead of reducing emissions on-site.⁸⁰ The U.S. EPA argues that mercury is actually

⁷⁹ NO_x Budget Program 2006 Budget Report, EPA website at <http://www.epa.gov/airmarkets/progress/nbp06.html>, accessed November 16, 2007.

⁸⁰ Sierra Club Press Release, May 2005, accessed at Common Dreams website, <http://www.commondreams.org/news2005/0517-11.htm>, November 16, 2007

a worldwide pollution problem and that greater levels of control in the U.S. would provide few benefits.⁸¹

Regional Clean Air Incentives Market

The RECLAIM is California's first cap-and-trade program. The SCAQMD developed the program in the early 1990s as an alternative to the command-and-control approach then being used to reduce NO_x and SO₂ emissions in California's most polluted air basin. Because of the severity of the air quality problem, the SCAQMD was in the process of adopting category-specific regulations on virtually all combustion sources in the District. RECLAIM was seen as a more cost-efficient alternative that would use market mechanisms to bring about the same level of reduction at lower overall cost. When it began operating in 1994, RECLAIM effectively replaced a number of existing regulations. The program was designed to reduce NO_x emissions from affected facilities by 70 percent and SO₂ emissions by 60 percent, by 2003.⁸²

RECLAIM applies to a diverse universe of sources, basically any facility that emits 4 tons or more of NO_x or SO₂. The SCAQMD issued initial allocations based on each facility's emissions history over a five-year period before the start of the program. Allocations are called RECLAIM trading credits (RTCs) and are issued in units of pounds of NO_x and SO₂ per calendar quarter. For technical reasons, namely the typical movement of ozone precursors during high ozone episodes from coastal to inland areas, the program was set up with two trading zones. Sources in the Inland Zone can purchase and use RTCs from anywhere in the air basin, while sources in the Coastal Zone can only use RTCs generated in the Coastal Zone.

The trading market has had a tempestuous history. Owing to compromises made during a contentious allocation process, initial allocations exceeded actual emissions on a basin-wide basis. As a result, most sources had ample allocations and RTCs were inexpensive and readily available between 1994 and 1999. In 2000, events surrounding the California energy crisis caused electrical generators to increase their use of older, higher emitting units in the Los Angeles area. This increase in emissions, in combination with other factors, caused the demand for and the price of RTCs to increase substantially. The price of RTCs in 2000 for NO_x increased tenfold in a year and, for the first time, actual basin-wide emissions began to exceed allocations.⁸³ Some sources could not find credits and others could not afford them. In the ensuing crisis, the SCAQMD made modifications to the program, the most significant of which was to separate electrical generators from the RTC market and place them back in a hybrid command-and-control program. This mid-course adjustment was successful, and the RTC

⁸¹ Mercury Emissions – A Global Problem, EPA website

<http://www.epa.gov/oar/mercuryrule/basic.htm#global> , accessed November 16, 2007

⁸² SCAQMD website, <http://www.aqmd.gov/reclaim/reclaim.html> accessed on November 28, 2007.

⁸³ "Ex Post Evaluation of the RECLAIM Emissions Trading Program for the Los Angeles Air Basin", David Harrison, Jr., Ph.D, Senior Vice-President National Economic Research Associates, Inc. National Economic Research Associates, January 2003, p. 14.

market settled back to a more normal pattern. Adequate RTCs have been available since 2002 and prices have stabilized.⁸⁴

Between 1994 and 2007, NO_x emissions from RECLAIM sources have decreased 62 percent and SO₂ emissions have decreased by 50 percent. In 2005, the SCAQMD set a new or recalibrated emissions cap for 2011 that is designed to take advantage of emerging control technologies and reduce emissions by an additional 20 percent. Except for the period of the energy crisis, the reported compliance rate has been in the 96- to 98-percent range.⁸⁵

Texas Cap-and-Trade Program

Texas has made extensive use of cap-and-trade-type emissions trading programs as part of its effort to attain and maintain the National Ambient Air Quality Standard (NAAQS). Beginning in 1993, Texas adopted several programs that apply to specific sources and areas of the state. As one example, the TCEQ adopted the Mass Emissions Cap-and-Trade program on December 6, 2000.⁸⁶ This program was mandatory for stationary facilities in the Houston/Galveston nonattainment area located at sites with a collective design capacity of 10 tons per year or more and subject to the NO_x SIP. The program set a cap on NO_x emissions beginning January 1, 2002, with a final reduction to the cap occurring in 2007. Facilities are required to meet NO_x allowances on an annual basis. The rules, which have been approved by the U.S. EPA, were to reduce overall industrial NO_x emissions by approximately 90 percent.⁸⁷ While these programs operate only in the United States, Texas' programs and experience could prove very useful in designing an effective CBETP.

Carbon Markets

With increased emphasis on global climate change and the GHG emissions affecting it, namely CO₂, CH₄, N₂O, PFCs, HFCs, and SF₆, several types of trading programs and/or carbon markets are taking form to respond to the need to reduce GHGs through market-based mechanisms. There are two general types of trading schemes for quantifying and trading GHGs in the form of CO₂ equivalents (CO₂e) compliance markets and voluntary markets. The GHG trading programs described below are largely voluntary, although several have or will contain compliance requirements.

⁸⁴ "Over a Dozen Years of RECLAIM Implementation: Key Lessons Learned in California's First Air Pollution Cap-and-Trade Program", Chapter 4, Market Issues, SCAQMD June 2007.

⁸⁵ "Over a Dozen Years of RECLAIM Implementation: Key Lessons Learned in California's First Air Pollution Cap-and-Trade Program" as cited, Executive Summary.

⁸⁶ TCEQ website, http://www.tceq.state.tx.us/permitting/air/nav/air_banking.html accessed on November 28, 2007.

⁸⁷ "Approval and Promulgation of Air Quality Implementation Plans; Texas; Emissions Banking and Trading Revisions for the Mass Emissions Cap and Trade Program for the Houston/Galveston/Brazoria Ozone Nonattainment Area", Federal Register: October 5, 2005 (Volume 70, Number 192).

European Union Emissions Trading Scheme

The European Union (EU) has taken serious steps to address its GHG emissions since the early 1990s. In March 2000, the European Climate Change Programme (ECCP) was launched, and its cornerstone is the EU Emissions Trading Scheme (ETS). The EU ETS, administered by the European Commission, is the largest multi-country, multi-sector GHG emissions trading scheme in the world.⁸⁸ The EU ETS covers 11,500 energy-intensive facilities across the EU, including power plants, oil refineries, coke ovens, iron and steel plants, and factories making cement, glass, lime, brick, ceramics, and pulp and paper.

The Kyoto requirements/protocols pertaining to registries and verification of credits apply to the scheme. To date, only 9 of the 24 member states (countries) have implemented registries. The member states must submit annual reports, which are compiled into an overall report that discusses how each state is implementing the EU ETS.⁸⁹ Each member state issues trading “permits,” with compliance requirements to its eligible facilities.

National Allocation Plans (NAPs) determine the total quantity of CO₂ emissions that member states grant to companies. These can be sold or bought by the companies themselves. Each Member State determines the amount of allowances to allocate during a trading period. The first trading period was from 2005-2007, the second is from 2008-2012, and the third will begin in 2013. Member states will limit CO₂ emission from industry through allocations, thereby creating a scarcity, so that a functioning market can develop later and overall emissions will be reduced. To date, there has been some confusion with regard to allocation of credits due to inconsistent definitions of emission units among the EU member states.

U.S. Greenhouse Gas Registries and Trading Mechanisms

Although there is currently no national U.S. GHG registry, one is in the development stages and is referred to as “The Climate Registry”.⁹⁰ The Climate Registry participants include the California Climate Action Registry⁹¹ and the Eastern Climate Registry⁹², as well as most U.S. states, the Mexican state of Sonora, and the Canadian provinces of British Columbia and Manitoba.

These registries have strict requirements, or protocols, that must be followed when estimating emissions and registering them. For example, a qualified third party verifier or certifier must review a company’s GHG inventory according to a certification protocol before the registry will accept it. These protocols generally follow IPCC guidelines.⁹³ Also, specific protocols apply for

⁸⁸ <http://ec.europa.eu/environment/climat/emission.htm>

⁸⁹ “Application of the emissions trading directive by EU member states.” EEA Technical Report No. 2/2006, Copenhagen, 2006. Downloaded from:<http://http://ec.europa.eu/environment/climat/emission.htm>

⁹⁰ <http://www.theclimateregistry.org/>

⁹¹ <http://www.climateregistry.org/Default.aspx?refreshed=true>

⁹² <http://www.easternclimateregistry.org/>

⁹³ <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm>

verifying emission offset projects, if the emissions from those projects will be sold under a GHG trading mechanism and may be dependent upon the specific trading mechanism.

With voluntary GHG emissions trading, emission reduction projects must be proven to be additional and not in response to a compliance requirement. For example, landfill gas collection and control must not be in response to NSPS or NESHAP requirements for the emission reductions to be considered additional and marketable. Currently in the United States, GHG reductions and trading is strictly voluntary.

Two types of trading mechanisms exist: trading on established markets (for example, Chicago Climate Exchange [CCX]), or bilateral trading outside of established markets. Two programs under development in the U.S. may implement cap-and-trade programs for GHGs that are supported by regulations and compliance requirements: California's AB 32, and the Regional Greenhouse Gas Initiative (RGGI). These are described below.

California AB 32 Cap-and-Trade Provisions

AB 32, or the California Global Warming Solutions Act of 2006, gives the ARB responsibility for adopting measures to achieve the GHG emission reduction target (achieve 1990 levels by 2020), and allows for the use of market-based mechanisms. Regulations to achieve the 2020 target must be adopted by 2011 and enforced by 2012.⁹⁴ Therefore, any market-based program would become operational by 2012. The governor-appointed MAC focused on the design elements of a cap-and-trade program for California and reported its final recommendations in a final report.⁹⁷

A current draft regulation for implementing mandatory reporting of CO₂, CH₄, and N₂O under AB 32 focuses on industrial sectors that emit more than 25,000 metric tons of CO₂e annually, including EGUs and cogeneration facilities (also includes emissions of HFCs and SF₆), and other industries emitting greater than 25,000 metric tons of CO₂e annually, including cement plants, petroleum refineries, hydrogen plants, and combustion from oil and gas production and general stationary combustion sources. It is reasonable to assume that these sources would eventually be subject to any cap-and-trade program implemented under AB 32.⁹⁷

The ARB has the authority to implement, monitor and enforce a cap-and-trade program in California, although currently no regulation provides these requirements.

Northeast Regional Greenhouse Gas Initiative

The RGGI is a multi-state regional initiative to design and implement a cap-and-trade program in the seven northeast states of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont. A regional cap-and-trade program will assist these states in meeting their various GHG emission reduction targets. RGGI-specific goals will be to achieve a 10-percent reduction by 2019.⁹⁵

RGGI's program will require mandatory participation by EGUs with a capacity of at least 25 MW and that burn more than 50 percent fossil fuel. Some exemptions may apply, such as EGUs

⁹⁴ http://www.climatechange.ca.gov/policies?market_advisory.html

⁹⁵ <http://www.rggi.org/index.htm>

that burn biomass as a primary fuel or sources that sell less than 10 percent of the electricity they generate to the grid. Emission allowances will be distributed by each state agency and, initially, sources may use offsets to cover up to 3.3 percent of their emission allowance.

Eligible offsets can be issued to verified reduction projects located anywhere in the United States, for projects such as natural gas, heating oil, and propane energy efficiency, and landfill gas capture and combustion, among others.

A unique feature of RGGI's offset provisions will be its "standards approach," whereby standards are set for specific types of offset categories, and project applications are assessed against that standard. This eliminates the need to evaluate projects one at a time and making judgments regarding baseline emissions, whether reductions are additional, real, etc., and benefits administering governments and offset providers by reducing administrative burden and making project approvals more predictable.⁹⁶

Summary of Attributes

Table 12 summarizes the design features of the various trading programs discussed above. Most of the cap-and-trade programs impose a mandatory, declining cap on emissions of one or more pollutants from a specified universe of sources. In most cases, the decline in emissions over time is large enough to improve regional air quality, even over large multi-state areas of the U.S. Most of the states subject to the NBTP, for example, have seen a decline in ozone levels since the program has been operating, progress that the U.S. EPA attributes in part to the emissions reductions from the NO_x trading program.⁹⁷

While the experience of the U.S. EPA-operated acid rain and ozone precursor trading programs shows that cap-and-trade programs can improve regional air quality, their design cannot be directly replicated in the CA-BC region. The U.S. EPA programs rely heavily on controlling emissions from large, high-emitting EGUs, a source category that various studies had shown to be major contributor to the air quality problems the U.S. EPA programs were designed to address. The situation in the CA-BC region is different. Electrical generating units are responsible for a relatively small share of the emissions inventory, and some of the largest EGUs are already well controlled. A cap-and-trade program in the CA-BC region may need to be designed more like RECLAIM and address a much more diverse universe of sources in order to affect enough emissions to reduce ozone and particulate levels.

⁹⁶ "Market Mechanisms for Greenhouse Gas Emission Reductions: Lessons for California." Working draft 8.1.06. <http://pewclimate.org>

⁹⁷ The U.S. EPA reports the following progress: "In 2004, EPA designated 104 areas in the East as 8-hour ozone standard nonattainment areas. In 2006, four out of five of the original nonattainment areas now meet the ozone standard. The vast majority of the remaining areas also came closer to attainment. The NBTP is the most significant contributor among several U.S. EPA programs leading to improvements in ozone." U.S. EPA Air Markets Website: <http://www.epa.gov/airmarkets/progress/nbp06.html> (Accessed on November 29, 2007).

None of the mandatory U.S. cap-and-trade programs described above were designed to replace NSR. New sources located in nonattainment areas and large enough to trigger offset requirements still must obtain ERCs in accordance with federal, state, and local requirements. When ERCs are difficult to attain, as they are in some cases on the California side of the border, an U.S. EPA-style CBETP would not by itself make it easier to site new facilities. Therefore, the treatment of new sources remains an important design consideration of a CBETP.

A CBETP could begin on a limited or pilot scale by allowing new or expanding sources in California to access ERCs created in Mexico. In subsequent phases, the CBETP could be expanded to create a project-based, NSR-type program on the Mexican side of the border, and later a cap-and-trade program that would operate alongside NSR. One of the main attributes of a phased approach is to allow Mexican authorities and sources to become familiar with the fundamentals of emissions trading and develop the regulatory infrastructure needed to implement a CBETP successfully. For example, California has developed rigorous standards for the creation and use of ERCs, and it is unlikely that those standards will be relaxed for a CBETP. A pilot program could allow project proponents and U.S. and Mexican regulators an opportunity to learn to apply those standards on a small scale. If successful, the pilot program would increase confidence in an expanded trading program. The phased approach is also consistent with the historical development of emissions trading programs in the U.S. NSR programs have been operating in the U.S. for several decades and the lessons learned contributed to the design of broader cap-and-trade programs.

Table 12: Summary of Attributes of Existing Emission Trading Programs

Program	Air Quality Goals	Physical Boundaries	Sources Included	Allocation Method	Organization Approach	Comments
New Source Review (NSR)	Ensure that emission increases from new and modified sources do not result in increases of ambient levels of pollutants.	Same impact area	All new and modified sources above various specified emission levels.	N/A. Project-based trading program.	Administered by local air districts using local regulations based on state and federal requirements.	Mandatory for sources exceeding specified emissions thresholds.
Acid Rain Program (ARP)	Reduce sulfur dioxide (SO ₂) by 10 million tons by 2000.	Continental U.S.	Electric Generating Units (EGUs) > 25 megawatts (MW).	Auctions and private market.	Administered by the U.S. EPA.	Mandatory for affected sources. NO _x reduced using rate-based performance standards with averaging.
NO _x Budget Trading Program (NBTP) (NO _x State Implementation Plan [SIP] Call)	Reduce ozone transport in Eastern U.S. Cuts ozone season NO _x emissions by ~70%.	All or part of 21 states east of the Mississippi River.	EGUs >15 MW and boilers >250 MMBtu/hr.	U.S. EPA sets state caps; states allocate to sources within their jurisdictions.	U.S. EPA serves as accountant and overseer. States operate program using local regulations based on federal requirements.	Mandatory for affect sources. U.S. EPA's NO _x Allowance Management System (NAMS) is central registry. State regulations incorporated in SIPs.
Clean Air Interstate Rule (CAIR)	Reduce ozone and particulate matter (PM) by reducing NO _x emissions by 60% and SO ₂ emissions by 70% between 2003 and 2015.	All or part of 28 states, mostly east of the Mississippi River.	EGUs only, but with state option to add other types of sources.	U.S. EPA sets state caps; states allocate to sources within their jurisdictions.	U.S. EPA serves as accountant and overseer. States operate program using local regulations based on federal requirements.	Mandatory program. Effectively extends ARP and replaces NBPT. State regulations incorporated in SIPs.

Program	Air Quality Goals	Physical Boundaries	Sources Included	Allocation Method	Organization Approach	Comments
Mercury Rule	Reduce mercury emissions from coal-fired power plants by ~70% by 2018.	Continental U.S.	Coal-fired EGUs	U.S. EPA sets state caps; states allocate to sources within their jurisdictions.	U.S. EPA serves as accountant and overseer. States operate program using local regulations based on federal requirements.	Mandatory program; faces numerous legal challenges from environmental advocates and many states. Uses (U.S.) Federal Clean Air Act (FCAA) Section 111.
Regional Clean Air Incentives Market (RECLAIM)	Reduce ozone and PM by reducing NO _x by 70% and SO ₂ by 60% by 2003. Recently added reduced cap for another 20% reduction by 2011.	South Coast AQMD	Diverse universe of sources – any source emitting >4 tons per year.	South Coast Air Quality Management District (SCAQMD) issues allocation to sources.	SCAQMD operates entire program, including allocation registry.	Replaced a number of command and control regulations. Includes two trading zones. Problems during 2000 energy crisis triggered mid-course adjustments.
Texas Cap-and-Trade	Reduce ozone precursors in various areas.	Various areas in Texas	Stationary sources, but size varies by program.	Texas Commission on Environmental Quality (TCEQ).	TCEQ administers programs using state regulations; some based on statutory requirements.	Texas has operated programs since 2002; part of ozone SIP.
European Union (EU)	Reduce greenhouse gas (GHG) emissions according to goals set forth for 24 European Member States in the Kyoto Protocol.	24 European Member States	Diverse universe covering “energy intensive” sources such as power plants, oil refineries, cement plants, pulp and paper, etc.	National Allocation Plans (NAPs) filed by the Member States.	The European Commission administers the program. The Member States submit annual NAPs.	Early implementation hindered by inconsistent definitions. Trading is not regulated, and can take place between sources, or via a bank, broker or other market intermediary.

Program	Air Quality Goals	Physical Boundaries	Sources Included	Allocation Method	Organization Approach	Comments
California Assembly Bill (AB 32) (trading program not yet promulgated)	Reduce GHG emissions to 1990 levels by 2020.	State of California	Not yet specified, although mandatory reporting of emissions will focus on EGUs and industries emitting >25,000 metric tons carbon dioxide (CO ₂)e annually.	To be determined. ARB may eventually have authority.	To be determined. ARB most likely would operate entire program.	Market Advisory Committee (MAC) report makes specific recommendations for a mandatory cap-and-trade program and allowing offsets both within and outside of state borders.
Regional Greenhouse Gas Initiative (RGGI) (under development)	Reduce GHG emissions by 10% by 2019.	States of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont	EGUs with capacity of at least 25 MW and burn 50% fossil fuel; some exemptions.	By state agencies.	RGGI administers with authority from States.	Unique offset program uses standard-setting approach for categories of offset, instead of project-based verification.

Source: Fields, Paula; Sylte, William; Menebroker, Ray; Medina, Enrique

Emission Trading Program Design Attributes

The goals of a trading program significantly affect how it is designed. The goal of improving air quality on both sides of the border leads to a cap-and-trade program with more complex attributes. If the goal were more limited (to prevent new or expanding sources from degrading air quality or to facilitate the expansion of electrical infrastructure), a cap-and-trade program would not be necessary. Instead the program could be a simpler project-based design that looks like a cross-border version of the U.S. NSR.

This section describes the basic attributes, or components, of an emission trading program and what needs to be known and considered in making choices about these components. These components include the following:

- Air quality goals.
- Physical boundaries.
- Universe of sources.
- Allocation options.
- Organization approaches.

Although these attributes are important, they do not need to be identical throughout the trading region as long as the overall design of the program ensures that they function together effectively. For example, air quality goals could be customized within various zones within a trading region to address such issues as pollutant hot spots or environmental justice. Although it would pose special implementation challenges to do so, a cap could decline faster or by a greater percentage on one side of the border than the other. Similarly a project-based program could be phased so that its requirements were initially different on one side of the border. This flexibility may be attractive in a CBETP. There are limits, however, and any variability that results in uncertainty as to the market value of an allocation credit or emissions reduction credit could undermine the effectiveness of either a project-based or a cap-and-trade program.

Defining Air Quality Goals

Trading program designers must consider both what type of air quality goals to set and how challenging or stringent those goals should be. Both decisions are important.

Most cap-and-trade programs have air quality goals that are easily understood and are challenging but attainable. In addition, it is important that the goals are quantifiable so that progress can be monitored and reported on. The primary goals of U.S. cap-and-trade programs have been pollutant-specific emissions reductions, usually expressed in terms of tons per year or some other time period to be carried out according to a specified schedule. Reduction goals are usually established with reference to a base year, but may be expressed as tons of reduction

or as a percentage of base year emissions. Emissions reduction goals are straightforward and, in a well-run trading program, can be easily enforced, tracked, and reported on.

“Downstream” goals, such as attaining ambient air quality standards and reducing adverse health effects, are also compelling because they reflect the fundamental purpose of air quality improvement programs. Although such goals appear straightforward and quantifiable, it can be very difficult to reliably track and report progress on them. The most fundamental problem is that relationships between emissions and ambient pollutant levels and between pollutant levels and health effects are often complex, nonlinear, and inadequately understood. This is particularly true for secondary pollutants like ozone and particulate matter, both of which are of concern along the CA-BC border. Independent variables can mask the true impact of a trading program or any other emissions reduction strategy. For example, the frequency of adverse meteorological conditions varies substantially from year to year, greatly affecting the frequency and magnitude of high pollutant concentrations (the “improvement” shown between 2 years due to the effectiveness of the trading program or more favorable meteorological conditions). While it is technically possible to establish statistical air quality indicators that can track progress more reliably by filtering out the impact of meteorology and other variables, such indicators are often too complex to be easily understood.

Health effects goals have similar limitations. Many adverse health effects associated with exposure to air pollution, such as asthma, cancer risk, and various symptoms of cardio-pulmonary problems, have other causes in addition to air pollution (if the number of children’s asthma cases fails to decrease as expected, is it a failure of the trading program or because the impact of other factors has grown?). Nevertheless, downstream goals can be compelling from a public policy perspective and are useful if their limitations are understood and they are used in conjunction with emissions reduction goals.

The stringency of the goal is also important in establishing a viable trading program. An emissions cap must be challenging enough to improve air quality, but attainable within the scheduled time period at a cost that affected sources can absorb. A cap that is too stringent can create a seller’s market with too many buyers chasing too few credits. If the cap is too lenient, it will do less for air quality and can create a glut of cheap and easy credits—a situation that provides little incentive to invest in emissions control.

It is particularly challenging to find the right balance for an emissions cap that adjusts downward over time. An initial cap that is too lenient can lull sources into poor planning. If they defer the harder decisions, such as investing in control technology in anticipation of their future growth or a declining cap, they can find themselves in difficulty when circumstances change and easy credits are no longer available. If credits become scarce or unavailable, or prices suddenly escalate, affected sources will seek legal or political relief. If relief is not provided, sources may have to curtail operations or relocate. If relief is provided, the stability and predictability of the trading program can be adversely affected. The RECLAIM program encountered many of these problems in the first 5 to 6 years of operation. It would be important to review the RECLAIM experience carefully in designing a CBETP.

The project-based NSR program that has operated in the United States for several decades has had the goal of limiting the increase in emissions generated from new and expanding stationary sources. The FCAA has several ways of adjusting the stringency of the program based on the severity of the air quality problem. For example, the program applies the emissions offset requirement based on the source's "size," expressed as its potential to emit a nonattainment pollutant in tons per year. In areas with more severe air quality problems, the offset requirement applies to smaller sources than in less polluted areas. The offset ratio, the tons of emissions reduction per ton of emissions increase, can also be adjusted. For example, a ratio of 1.5 to 1 may mean the goal is a small net air quality benefit because each time the requirement is triggered the reduction exceeds the increase.⁹⁸

California law has similar goals but applies them differently. California sets programmatic rather than individual source goals. California requires "no net increase" in emissions from new and expanding sources larger than a specified cutoff, stated in tons per year, but leaves the means of achieving the no-net-increase goal to local air districts. This gives air districts the flexibility to have different requirements for different types or sizes of sources as long as they meet the overall goal.

Establishing Physical Boundaries

To ensure air quality improvement in the target region, the trading area ideally should, for any given universe of sources, include all of the source area that contributes to high pollutant concentrations. This requires a reasonably accurate technical understanding of the movement of pollutants within the trading area, the atmospheric fate of pollutants emitted in the trading area, adverse meteorological conditions, and the role of long-range transport from other areas. This knowledge is particularly important for trading programs that are designed to address secondary pollutants such as ozone and particulate matter.

There is a variety of ways that precursors can react with one another to produce high levels of ozone or particulate matter. Ozone formation, for example, is often more sensitive to changes in one precursor than another. A trading program that reduces the wrong precursor may look successful in terms of emissions reductions while doing little to reduce high ozone concentrations. Conditions vary from area to area, so regional-scale air quality models can be a valuable tool in understanding secondary pollutant formation and in defining boundaries, providing that input data are sufficiently complete and accurate. Where pollutant formation is well understood, trading areas can be designed to be more sophisticated and flexible. Such programs may allow interprecursor trading where it is advantageous, develop trading ratios among pollutants that ensure greater air quality improvement, and even designate zones within the trading area where some types of trades are allowed and others are not. Better knowledge is

⁹⁸ Offset ratios are imposed for a variety of reasons. Some air districts require a higher offset ratio in situations where the source providing the credits is beyond a certain distance from the new source. In other cases, offset ratios are imposed to reflect technical issues, such as when the net benefits of offsetting an increase in one ozone precursor with reductions in another is uncertain.

also helpful in addressing concerns for environmental justice and efforts to ensure that air quality improves relatively uniformly throughout the trading region. In areas where pollutant formation is not well-understood, the probability of ineffective trades is greater, and trading programs tend to be kept simple and less flexible in response.

There are also some non-technical considerations that can affect boundaries. One consideration is preventing “leakage,” a situation more likely in smaller trading areas where economic activity is displaced because sources relocate or choose to expand outside the trading region to avoid the emissions reduction requirements of the trading program. In general, the larger the trading region, the less likely economic expansion will leak outside of the area.

Another consideration is the jurisdictional boundaries of participating agencies. Many agencies do not like to divide their jurisdictions, particularly if they operate related air quality programs throughout their jurisdiction. There are areas in both San Diego and Imperial Counties that are not likely to influence, or to be influenced by, sources in Mexico. However, if these areas are not incorporated into a CBETP, then the two air districts might need to administer different regulatory regimes within their jurisdictions.

As noted elsewhere, federal and state laws and local regulations govern where emissions offsets can be obtained for the NSR program.

Identifying Universe of Sources

The selection of participating sources is an extremely important factor in the success of cap-and-trade programs. The most fundamental attribute is the air quality impact of affected sources. A trading program can only improve regional air quality if it applies to a universe of sources that collectively make a substantial contribution to the air quality problem the trading program is designed to address. Unlike in the eastern United States, EGUs in the CA-BC border region comprise a small share of regional emissions for most problem pollutants; therefore, the universe of sources subject to a CBETP must be more diverse than the U.S. EPA’s CAIR program.

A second attribute is the technical feasibility of reducing emissions from the universe of sources selected. A cap-and-trade program cannot operate as intended unless most sources subject to the cap have the practical ability to install controls. Sources that already have installed advanced control technology might have no choice but to buy allowances. Some sources in the CA-BC region are well controlled, particularly on the U.S. side of border.

A third attribute is an appropriate distribution of economic and operational circumstances within the universe of sources. A cap-and-trade program functions most cost-effectively when there is a balance between sources that choose technical control options and sources that choose to buy credits. The simplest way to approach the issue of balance is to designate a universe of sources that contains a large number of individual sources in a variety of circumstances. But the simple approach can create implementation problems if one subcategory of sources is in the

position to disproportionately influence the credit market, as for example, electrical generators did under the RECLAIM program in 2000.

The level of knowledge about source emissions and operations should be reasonably consistent for all sources subject to the trading program. The more diverse the universe of sources, the more difficult it can be to obtain complete and consistent information. Sources that are subject to strong air permit programs are good candidates for inclusion because their emissions, processes, equipment, and level of control are usually well known. Permit conditions are a readily available means of enforcing requirements, including emissions monitoring and reporting. If nonpermitted sources are included or allowed to opt in voluntarily, the program must require them to provide comparable information.

The universe of sources can be defined by source category, total emissions, installed equipment, fuel burned, throughput, or rate-based considerations like emissions per unit of heat input.

There is less concern with these issues for a project-based NSR program. The main considerations are what size of new or expanding source should be subject to offset requirements and what pollutants should be covered.

Issuing Source Allocations

Source allocation is a design issue unique to cap-and-trade programs. A project-based program does not issue emissions allocations. For cap-and-trade programs, there are at least two steps involved in issuing allocations. The first step is establishing a baseline, and the second step is distributing allocations.

A regional baseline or initial cap must be established that is based as closely as possible on the cumulative, actual emissions of the universe of sources subject to the cap. This baseline can be divided geographically by jurisdiction of “zone” as the U.S. EPA has done in allocating regional emissions by state for several of its cap-and-trade programs. In the case of a CBETP, the regional baseline could be subdivided into initial allocation for California and Baja California. The regional or subregional allocation must be distributed to the universe of sources subject to the trading program.

Typically, the initial cap is based on a state-of-the-art emissions inventory that applies consistent methodologies to quantify actual emissions from each of the sources subject to the cap during a base year or multi-year baseline period. Collectively, these emissions define the initial regional cap. The estimate of individual source emissions provides an excellent basis for distributing the initial allocation to individual sources.

It is important that actual emissions, rather than potential emissions, be used in the initial allocation. Many sources, even those currently subject to stringent permit programs, would enter the cap-and-trade program with both the physical capacity and the legal right to increase their emissions. Because these are potential emissions that exist only on paper, including them in the cap, allocating them to sources, and reducing them over time will produce no real-world air quality benefit.

The three options for distributing emission allowances are:

- Free allocation to individual sources by the governing body.
- Selling the allowances to sources by some form of auction.
- A hybrid approach in which some allowances are freely allocated and the remaining are auctioned.

Allocations are typically made in units of tons per year, tons per quarter or other period, such as the 5- to 7-month “ozone season” typical in most areas of the United States.

The governing body can find it very challenging to issue initial allocations to individual sources in a fair and effective manner. If the base year or baseline period is in some way atypical, it can create problems, particularly during the early stages of the program. For example, allocations based on actual emissions during a period of economic downturn may be restrictive and result in an extremely high demand for credits as soon as typical economic conditions return. Even where overall economic conditions are typical, individual sources may have base year emissions that are unrepresentative of their normal operations. It may be appropriate to allow sources to appeal their initial allocation if some easily documented situation, such as a major equipment retrofit, artificially reduced their baseline emissions. Some sources will have lower baseline emissions than their competitors because they invested in advanced control technology that their competitors have not. These sources will argue that they will be disadvantaged if the allocation formula does not credit them for their investment.

In addition to the options for allocation described above, there are many special issues that can affect the way emissions credits are allocated. Among them include the following:

- How to incorporate seasonal sources whose emissions profiles do not match the time period for which allocations are issued.
- How to distribute the allocations of sources that shut down or relocate.
- Whether to allow sources outside trading system universe to opt in.
- Whether to create a reserve of allocation credits that can be banked and used to smooth market fluctuations or provide allocations for expanding public services.
- How to deal with sources that were for some reason overlooked when the initial allocation was made.
- How to deal with new and expanding sources.

The last issue is particularly relevant in the CA-BC border region that has experienced rapid growth. Above it was noted that some project proponents have reported difficulty acquiring banked ERCs. Industrial growth has been uneven in the CA-BC region, with relatively slow growth in some areas of the U.S. side and more rapid growth in Mexico. A number of design issues emerge from these conditions. Should new sources be required to fully mitigate their impact by buying allocations that are part of the existing allocation pool? Should they be issued

new allocations? Can they create new allocation credits from sources outside the pool? Should they be subject to the same reductions over time as existing sources, even though they may use advanced control technology when they are built and therefore have lower starting emission rates than existing sources?

Developing Organizational Structure

Organizational structure is an important issue for any type of trading program. Project-based NSR programs are typically administered by a central agency that imposes consistent requirements on all trades. Where inter-jurisdictional trading is allowed, it is important that the jurisdictions work together to impose consistent requirements.

Cap-and-trade programs have used a variety of organizational structures, from the highly centralized structure of the RECLAIM program to the relatively decentralized organization of the Northeast Transport Commission's NBTP. What these organizational approaches have in common are the administrative functions they perform. Most administrative attributes are discussed in Chapter 4 of this report, but one is worth highlighting because it also affects how a cap-and-trade program is organized. It is extremely important that the program's organizational structure be capable of imposing consistent emissions monitoring, record keeping, and reporting requirements on all affected sources, as well as carrying out transparent and consistent enforcement practices.

If administration of a CBETP in the CA-BC region is consistent with regard to monitoring, record-keeping, reporting, and enforcement, then the administering organization could be either a new international governing body or a bi-national structure consisting of existing agencies. An international body capable of imposing and enforcing a single set of program requirements on both sides of the border could be administratively efficient but difficult to establish. Establishing a new international organization would require a new treaty or an amendment to existing treaties between the United States and Mexico. An international organization would likely raise issues of sovereignty on both sides of the border.

The alternative is a tightly coordinated program that would be administered by existing agencies in California and Mexico. A bi-national structure would be more complex and difficult to coordinate, but would likely mitigate sovereignty concerns. The key to making it work would be a detailed agreement between the United States and Mexico to ensure that essentially the same program requirements are administered and enforced on both sides of the border. In addition to the list of monitoring and enforcement features listed above, the agreement would need to establish a single trading system and ensure that rules governing the issuance and handling of allocations were implemented consistently.

Oversight is also an important organizational consideration. It is useful to have a capable overseer to conduct periodic program audits, identify problems, recommend solutions, and facilitate the resolution of disputes. A single international body, existing state or national oversight agencies, or even a nongovernmental organization could perform this function.

The final organizational issue is the ability to coordinate a cap-and-trade program, where necessary, with other air program requirements. In California, this includes the planning and other requirements of both the FCAA and California Clean Air Act. In the absence of good coordination, conflicting or duplicative requirements could be imposed that would undercut the effectiveness of the cap-and-trade program. This function would appear to be easier to perform with a bi-national structure than the other options.

Emission Trading Program Implementation Attributes

As previously noted, the design of a trading program can vary significantly by type, and effective cap-and-trade programs have certain common design attributes. Also, effective cap-and-trade programs share some common administrative characteristics and attributes that are somewhat different than other trading programs. In general, cap-and-trade programs are relatively more complex and, therefore, more challenging to administer effectively than project-based programs like NSR.

This section describes the basic operational features of an emission trading program and what attributes have been shown to be important and effective. These attributes are as follows:

- Trading market.
- Monitoring, reporting, and verification.
- Enforcement and penalties.

As noted above, the design of a trading program can vary significantly depending on program goals. That is less true for the administration of trading programs, where the core administrative attributes of an effective program are similar regardless if the program is project-based, rate-based, or cap-and-trade.

Trading Market

Project-based NSR programs do not operate with commodity-style trading markets. In California purchasers and sellers deal directly with each other and negotiate the credit price on a case-by-case basis. Local air districts recognize credits only after they are reviewed, certified as meeting regulatory criteria, and deposited in a mandatory emissions “bank.” Anyone can own banked credits. Owners can hold their credits indefinitely or sell them. Once credits are applied to offset an emissions increase, they are retired permanently.

Over the last decade, the demand for credits in California has fluctuated, with intense periods of trading in some years followed by years of relative quiet. The energy crisis and subsequent power plant building boom in 2000-2002 was a period of intense activity. Though ERC prices

are negotiated privately on a case-by-case basis, credit transactions must be reported.⁹⁹ The ARB publishes information on ERC transactions annually. Various statistics are presented, including average prices by pollutant and air district. Prices vary substantially by pollutant and air district and tend to be highest in air districts with a limited supply of banked ERCs.

Cap-and-trade programs operate like more traditional trading markets. A core attribute of an effective cap-and-trade program is a central registry for recording and tracking emissions allocations. In the United States, most registries are operated by a government entity, usually the agency that oversees the program. The U.S. EPA for example, serves as the accountant for the ARP by operating the program's Allowance Management System (AMS). Participation in the registry is mandatory for all allocation owners, and each owner has an account in the registry in which their allowances are recorded. For effective tracking, each allowance receives an individual serial number or other identifier. Allocation owners must report all their transactions to the registry, where they are posted as public information. Transparency is ensured if the information contained in the registry is available to the public. Among the information that can be made available are:

- Who owns allocations.
- Amount of credits each owner holds.
- Transactions between credit owners.
- Purchases made by auctions, if auctions are held.
- Transaction prices.
- Surrendered allocations (the transaction that occurs at the end of the reporting period in which sources turn in allocations equal to emissions).
- Allocations that are held or saved for future use.
- Allocations that are surrendered as penalties for non-compliance, if that is a design feature of the program.
- Allocation reserves, if the program is designed to have reserves.

Several other features of trading markets are worth noting. One is that cap-and-trade allocations are typically considered to be a commodity; that is, anyone can own them and can buy, sell, trade, or bank them for future use at their discretion. The AMS allows allocations for a given year (or other term of issue) to be banked for use in a future year but does not allow sources to "borrow" allocations from future years, except as a compliance penalty. Private sector brokers and consultants play a role in the process, advising clients on when to buy, sell, or bank allocations and actually handling transactions for a fee.

⁹⁹ Since 1993, California Health and Safety Code Sections 40709 and 40709.5 have required local air quality management districts/air pollution control districts to collect information about the cost of offset transactions from stationary source owners who purchase offsets as required by district NSR programs.

The startup of a new allocation market is a delicate time. Allocations are a new commodity, demand and supply are uncertain, and prices can be volatile until buyers and sellers settle on or “discover” the appropriate price. Some suggest that a new program begin with an auction of allocations that have been held in a reserve for that purpose so the market can discover the appropriate price.¹⁰⁰

In general, there are two types of trading markets compliance markets (for example, the U.S. EPA’s ARP and NBTP, etc.), and voluntary markets (CCX, private equity firms, etc.). Voluntary markets are currently where most GHG emissions are traded since most GHG trading programs are currently voluntary in nature; this may change in the future if mandatory GHG trading programs are established under AB 32 and RGGI. Voluntary markets are “buyer beware” markets since no regulations are in place to ensure the value of the credits with regard to surplus, real, etc. On the other hand, voluntary markets can motivate companies to reduce emissions and create a “green” image.

Monitoring, Reporting, and Verifying Emissions

As previously discussed, a framework of strong and consistent monitoring, record keeping, and reporting requirements is an important design feature of any type of emissions trading program but is particularly vital for a cap-and-trade program. For project-based programs, the air permits of sources that create ERCs are typically conditioned to verify the emissions reductions actions that produced the credits. If the credits are created by shutting down certain equipment or an entire facility, permits are surrendered. If installing emissions controls or modifying operations creates the credits, air permits are conditioned to require sources to keep records and report operating parameters that verify that emissions have been reduced permanently in the appropriate quantities. While these practices are routine in California, they would have to be developed and applied in Mexico.

Without current and accurate information on source emissions, cap-and-trade programs are less credible and less effective. However, effective implementation and administration of these requirements is an equally important attribute. Strong requirements are of little value if they are not carried out as intended.

Specific monitoring requirements depend on the sources and pollutants included in the trading program. For example, large combustion sources may use a continuous emissions monitoring (CEM) system to automatically measure and record stack emissions. Other sources may need to monitor emissions indirectly, using a network of surrogate parameters such as fuel use, temperature readings, and log records and then estimate rather than measure emissions manually. It is important for the implementing agency to ensure consistency by providing detailed guidance on how each source or process is to be monitored and to require those

¹⁰⁰ *Greenhouse Gas Emissions Trading in U.S. States: Observations and Lessons from the OTC NO_x Budget Program*, Andrew Aulisi, Alexander E. Farrell, Jonathan Pershing, and Stacy Vandever, World Resources Institute, 2005.

methods to be used consistently by all sources subject to the trading program. CEM systems and other high-technology measurement instruments should be subject to regular quality assurance tests, using standard methodologies to verify that they are well calibrated and operating properly.

Reporting procedures should also be specified and applied uniformly across the universe of sources included in the program. Reports should be submitted frequently enough to allow the source submitting them to see problems as they develop and avoid year-end surprises. Reporting formats should be electronic where possible and standardized to allow the implementing agency to review them as quickly and easily as possible.

The final attribute is an effective program that allows the implementing agency to independently verify monitoring data and reported information. Some of the techniques are source training and education, automatic notification of monitoring equipment breakdowns, on-site inspections, and various audit tools, including confidential software programs that scan for anomalies in reports. Sources should have strong incentives to implement complete and accurate data collection and reporting. One technique for creating incentives is to establish a system of automatic consequences for monitoring and reporting problems. For example, missing data might be required to automatically be replaced by a default methodology that typically overestimates emissions.¹⁰¹ Because sources are required to do their own testing and reporting, it is important to hold a responsible official accountable for the accuracy of reports. Signing statements, which declare under penalty of perjury that the report is accurate, provide a powerful incentive for source managers to deliver accurate information.

The more consistently, completely, and accurately emissions are reported, the less likely noncompliance problems will emerge. This result is somewhat easier to achieve if the entire cap-and-trade program is administered by a single agency. However, U.S. experience has shown that a decentralized organizational structure, such as the bi-national structure discussed above, can approach, if not match, the consistency inherent with single agency administration if they use the same overall monitoring, reporting, and verification procedures and coordinate closely on matters of interpretation.

Enforcement and Penalties

Consistent enforcement policies and practices are important to level the playing field for all sources involved in either a project-based or cap-and-trade program. Nevertheless, real-world enforcement policies reflect institutional values, personal philosophy, and the broader culture. Where enforcement discretion exists, the consequences of noncompliance will differ from

¹⁰¹ “Fundamentals of Successful Monitoring, Reporting, and Verification under a Cap-and-Trade Program”, John Schakenbach, Robert Vollaro, and Reynaldo Forte, U.S. Environmental Protection Agency, Office of Atmospheric Programs, *Journal of the Air & Waste Management Association* 1581, Volume 56, November 2006, p.1581.

agency to agency and situation to situation. These differences can be amplified for a CBETP where two national cultures are involved.

One approach to promote the attribute of consistent enforcement is to limit discretion and build uniform and automatic compliance penalties and fees into the trading program. The U.S. EPA's ARP contains a number of such provisions. Excess emissions, meaning emissions greater than the quantity of allocations owned by a source, are subject to an automatic, preset fine per ton of excess emissions. The penalty structure is set so that fines cost more per ton than allocations and are adjusted periodically for inflation. In addition, sources must offset excess emissions by surrendering an equal number of allocations from their next year.¹⁰²

The trading program enforcement provisions do not generally make up for the air quality damage caused by excess emissions. They are most effective when they successfully convince sources to fully comply and thereby prevent damage from occurring. Moreover, at least some experience suggests that a preventive approach results in better compliance rates. A previously cited report by the U.S. EPA authors reached the following conclusions:

“A key lesson to be learned from the ARP and NBTP is that working with the regulated sources in a preventive and collaborative manner, rather than using a ‘command and control’ approach to program implementation, achieves a better compliance rate (most problems are resolved at an early stage), saves resources in the long term, and makes day-to-day relationships much more productive.”¹⁰³

Conclusions

To understand the attributes, limitations, characteristics, and operation of an optimal CBETP, this report summarized existing and proposed programs and discussed the design and implementation elements of project-based and cap-and-trade programs. Much of the focus is on cap-and-trade because only a cap-and-trade program would be capable of achieving the assumed purpose of a CBETP—to achieve improvement in regional air quality on both sides of the border. However, project-based emissions trading also has a role to play in a CBETP. While expanding NSR, a project-based trading program, into Mexico would not in itself bring about significant regional air quality improvements, NSR would provide a means of dealing with air quality impacts from expansion of industrial and infrastructure facilities. Since the ability to site new infrastructure facilities is of particular concern on the U.S. side of the CA-BC region, an optimal CBETP must deal effectively with new sources. To do so, the CBETP would need to

¹⁰² “Fundamentals of Successful Monitoring, Reporting, and Verification under a Cap-and-Trade Program”, as cited, p.1578. Some enforcement provisions are statutory in Title IV of the FCAA.

¹⁰³ “Fundamentals of Successful Monitoring, Reporting, and Verification under a Cap-and-Trade Program”, as cited, pp. 1579-80.

allow new sources to be sited in a predictable regulatory environment while ensuring their air quality impact is mitigated.

In addition to dealing with new sources, the summaries and discussion provided above point to some preliminary conclusions about the design and implementation of an optimal CBETP, as follows:

- A CBETP could begin on a limited or pilot scale by allowing a limited number of new or expanding sources in California to access ERCs created in Mexico.
- In subsequent phases, the CBETP could be expanded to create a project-based, NSR-type program on the Mexican side of the border and, later, a cap-and-trade program that would operate alongside the NSR.
- More complete and accurate information on stationary source emissions in Mexico is needed to establish reliable emissions reduction goals for a CBETP and to issue allocations to individual sources.
- The universe of sources included in a cap-and-trade program will need to be more diverse than the U.S. ARP or NBTP, which focus on EGUs.
- Mandatory participation would probably be required for the universe of sources subject to the regional emissions cap or caps.
- More information on cross-border pollutant movement may be needed to set the physical boundaries of the trading area.
- More region-specific information on the relationship among ozone and fine particulate precursors will be needed to determine whether inter-precursor trading should be allowed or at what ratios it should occur.
- One of the key issues in designing a CBETP is to decide whether it would be administered by a centralized, international organization or a decentralized structure that uses existing institutions.
- If a decentralized organizational structure is selected, the second issue is how to ensure that the CBETP will have the consistent monitoring, record keeping, reporting, and compliance requirements that are so important to an effective program.

These and other issues are discussed in the next chapter in the context of recommendations.

CHAPTER 5: Recommendations and Possible Approach

This chapter presents recommendations for a possible approach to implementing a cross-border emissions trading program (CBETP) in the California-Baja California border region.

Objectives

The objective of this chapter (Subtask 4.4) is to recommend circumstances, conditions, and actions and changes needed to implement a California/Mexico emissions credit-trading scheme. The objective is addressed by recommending an approach and suggesting a series of actions rather than providing a program blueprint.

Method

The KEMA team approached the overall project with few preconceptions about the efficacy of a CBETP. The team's conclusions are based on the information and analysis developed under previous subtasks. The result is a set of conclusions about the feasibility of successfully establishing an effective CBETP, a recommended approach, and an example of how the approach could be implemented. The bias is to be as practical as possible in laying out a course of action that appears to have the greatest chance of producing a viable CBETP given the difficulty of doing so.

Recommended Approach to Implementing a Cross-Border Emissions Trading Program

The focus of this entire report is on a CBETP that would deal with traditional or "criteria" air pollutants. Some may suggest that an international trading system for greenhouse gases (GHGs) might emerge in the next few years that would allow trading between the United States and Mexico and pave the way for a CBETP for traditional pollutants. While a GHG trading program may emerge, and there are likely to be synergies between it and a CBETP for traditional pollutants, it is too early to merge the efforts. First, there are significant differences in the technical aspects of the two environmental problems that have to be reflected in the details of the respective trading programs. Second, traditional air pollution control programs and the emissions trading programs that have been developed to support them are several decades more mature than comparable GHG efforts. Nevertheless, climate change programs are emerging rapidly. For example the Western Climate Initiative is developing a cap-and-trade program for GHGs that will include California, a number of other Western states, and at least four Canadian provinces, but to date Mexican states are not partners in the effort. It is useful to

monitor the development of GHG trading programs and look for opportunities to merge development efforts, but for now it is prudent to pursue a CBETP that addresses traditional pollutants.

Key Benefits and Barriers

A practical approach to a CBETP requires recognition that while the potential benefits can be significant, the barriers are both real and formidable. The most significant potential benefits are a reduction in ambient pollutant concentrations in the CA-BC border region, with a commensurate reduction in public exposure to harmful levels of air pollutants, and enhancement of the opportunity to locate energy generation infrastructure and other facilities in the border region with less environmental impact. It is difficult to build large infrastructure facilities in the border region, particularly on the California side of the border. As will be discussed later, it is feasible to make substantial reductions in emissions from existing stationary sources in Mexico. Given the current situation, an effective CBETP has the “win-win” potential of achieving regional emissions reductions while facilitating needed energy generation infrastructure.

Unfortunately, an effective CBETP cannot be established without making a number of difficult legal and technical changes. Some of the barriers to making such changes are particularly daunting. For example, there is a substantial disparity between the air regulatory infrastructure in California and Baja California, and it must be narrowed considerably, if not closed, to implement an effective CBETP. A long-term effort and major investment of resources will be needed to close the gap.

Mexican interest in cross-border emissions trading is largely unknown. Mexico does not yet have the experience of operating emissions trading programs. Mexican officials and interested stakeholders have not yet been engaged about the benefits and barriers to emissions trading in the depth needed for them to understand what an effective CBETP might mean to them.

On the U.S. side of the border, it is extremely difficult politically to make the changes in law, regulations, and policy that are needed to implement an effective CBETP. In particular, there is reluctance to “open up” the Federal Clean Air Act (FCAA) for amendments. Local authorities and other stakeholders in the border counties can be expected to have reservations and concerns about whether a CBETP would reduce local prerogatives or impair existing air quality improvement efforts.

The situation described above creates a misalignment between the benefits, which are potential by nature and would occur some years in the future, and the barriers, which tend to be more tangible and immediate. To skeptics, a difficult and risky up-front investment in a CBETP would be required to produce an uncertain long-term payoff.

Conclusions and Recommended Approach

On balance, these benefits and barriers lead to the conclusion that current political and regulatory realities in both the United States and Mexico make it unlikely that a fully effective CBETP could be established at this time. The two major barriers discussed above, the political difficulty of opening up the FCAA and revising other laws and regulations and the time and effort needed to sufficiently reduce the disparity between air regulatory infrastructure in California and Baja-California, appear to preclude it.

The recommended alternative is to move forward deliberately with a phased approach that starts with a more limited program that defers and/or circumvents the most difficult barriers until such time as they can be tackled directly. A phased approach could begin with a pilot program that has limited air quality, legal, and institutional risks. The results of the pilot program would inform a go/no-go decision on phasing in a full CBETP. If the decision were made to move forward, a master implementation plan would be developed to guide the process. The master plan would provide a blueprint for full implementation of, for example, a project-based trading program modeled after the U.S. NSR program and/or a full, international cap-and-trade program.

Suggestions for a Phased Approach

One of the most important aspects of a phased approach is the opportunity to engage Mexican policy makers, give them the opportunity to learn about the potential benefits and difficulties of emissions trading, and ultimately provide the time required for Mexico to develop the regulatory infrastructure and institutional capacity needed for an effective program with California. Some of the broader advantages to be derived include:

- Promoting NAFTA's stated goal of "upward regulatory harmonization" between the two countries.
- Providing additional resources to accelerate the regulatory development process in Mexico.
- Giving California regulatory agencies practical experience in coordinating activities with their Baja California counterparts.
- Developing a framework for a future CBETP implementation plan.
- Testing the concept of a CBTEP before tackling the large barriers.

Some specific suggestions for implementing the phased approach are described next, with emphasis on describing a pilot program that would be the first phase of the effort.

A Pilot Program

Advantages of a Pilot Program—Some of the most difficult barriers to a CBETP could be lowered by implementing a small-scale pilot program that allows a few new or expanding industrial sources in the United States to offset their emissions increase with emissions reductions in Mexico. Such a program would introduce authorities and stakeholders in Mexico to the regulatory infrastructure requirements needed for a successful CBETP with California and allow them to gain experience on a smaller, more manageable scale than would be required by a broader program. A pilot program would utilize existing institutional arrangements without fundamentally changing the distribution of authority over air programs on either side of the border. On the U.S. side, local air districts could implement the program while state agencies like the Energy Commission and the ARB would provide oversight. A small-scale pilot program would give California and Baja California the opportunity to identify the practical obstacles to a larger scale program, develop strategies to overcome them, and increase the probability of a successful large-scale program. Existing forums for international cooperation, such as the Border 2012 program, could provide a mechanism for coordination. Finally, a pilot program would also provide an opportunity to reach out to other governmental stakeholders, like the Energy Commission, border cities, and the U.S. State Department, as well as to a host of nongovernmental interests, especially industry and environmental groups.

Basis and Parameters of Pilot Program—As noted elsewhere, the supply of banked emissions reduction credits is limited in the two California border air districts, particularly in Imperial County. As a result, a likely objective of a future CBETP is expanding the opportunity to site new and expanding stationary sources, including energy infrastructure facilities, in the border region. Therefore, NSR appears to be the appropriate air program niche for a CBETP pilot program between California and Mexico. It appears unlikely that there would be interest in the type of cross-border trading that was implemented in El Paso, Texas and Cd. Juárez, Chihuahua. In that case, cross-border trading provided an alternative method of complying with a state emissions reduction requirement.¹⁰⁴ (See Chapter 3 of this report for details.)

There appear to be both a demand for credits on the U.S. side and a supply of potential credits on the Mexican side. The potential demand for credits on the U.S. side of the border is discussed in Chapter 3 of this report. On the supply side, there is a number of opportunities to reduce emissions in Mexico. Some preliminary data obtained from the SPABC for the 2005 Mexicali Emissions Inventory update project show many industrial manufacturing facilities and food-processing operations emitting NO_x, SO₂, and particulate emissions from burning fuel oil or other higher-polluting fuels. Most sources do not have add-on air pollution controls. The

¹⁰⁴ Existing California stationary sources, particularly larger facilities, are generally well-controlled and are not facing major new emissions reduction requirements from air regulatory agencies. From a policy perspective, the air regulatory tradition on the California side of the border area is to reduce stationary source emissions on site as much as possible. The El Paso approach would forego on-site controls in favor of emissions reductions in Mexico. This would likely raise concerns about the local impacts of stationary sources and environmental justice.

potential demand among Mexican facilities for energy-efficiency improvements, which can also lower criteria pollutant emissions, is also a factor and was discussed in Chapter 3 of this report.

On the Mexican side of the border, federal regulatory changes may not be required for a limited-scope pilot program. However, SEMARNAT's involvement is essential for at least two reasons:

- To authorize SPABC to implement a cross border program with California agencies.
- To assign SPABC the administrative enforcement responsibility over federal stationary air emission sources in Baja California. These sources are the most likely to produce the levels of emission reductions that will make participation in the pilot program economically feasible for U.S. projects.

Institutionally, SPABC will need to strengthen its permit and enforcement departments to satisfy SEMARNAT's jurisdictional transfer requirements and to document the emission reductions in such a way that they meet the California air districts' criteria for issuing cross-border emission reduction credits to their local sources.

The potential parameters of a NSR-style pilot program could include the following:

- The option to use offsets from Mexico rather than domestic credits would be voluntary to project proponents. The program would be limited to the amount of time needed to test interest and have a small number of demonstrations.
- The program would only apply to new and expanding sources in the United States, although offsetting emissions reductions could come from Mexico. (There will be substantially more barriers to applying an offset program for new or expanding sources locating in Mexico at this time).
- The program could be implemented in Imperial County, San Diego County, or both, at local option. There is no technical justification for expanding the pilot program geographically outside the border counties because offsetting Mexican emissions reductions would mitigate only the air quality impact of new and expanding sources in those two counties.
- Laws would be amended to allow the pilot program to proceed in the two border counties. Earlier chapters of this report describe Health & Safety Code provisions that would have to be addressed. A limited California Environmental Quality Act (CEQA) exemption may also be needed to prevent CEQA lawsuits and deter other lead government agencies from imposing more stringent air mitigation requirements.
- Local air district NSR rules would need to be amended to allow the districts, within well-defined parameters, to credit emissions reductions in Mexico. Traditional emissions reduction credit criteria would continue to apply, although some may need to be interpreted differently for purposes of a pilot program. For example, because offsetting emissions reduction credits would be generated in Mexico, some means has to be developed to address the California "surplus" criterion and protect the integrity of State Implementation Plan (SIP) attainment demonstrations.

- In a limited pilot program there would be no need to implement an emissions offset program in Baja California or to amend Mexican federal environmental laws or air pollution and environmental impact regulations. The scope of the Mexican program would be limited to documenting emissions reductions in existing or expanding stationary sources and to enforce these reductions in a manner that would be consistent with the criteria used by California’s border air districts. The stationary sources would continue to apply for environmental impact authorization under the existing federal and state environmental impact regulations. However, a state standard describing the operational rules of the voluntary emissions reduction program and the requirements for documentation, reporting, enforcement, inspections and fines would be needed. It may also be necessary to amend the penalties established in the state environmental law and the air regulations to include violations of the voluntary emissions reduction agreements.
- A report should be prepared after the pilot program expires to evaluate its success.¹⁰⁵ The report would provide feedback on the pilot program, discuss lessons learned, and make recommendations for moving forward. This information would be central to the decision of whether to move to a broader CBETP. Assuming a decision is made to proceed, the report would be useful in developing a master implementation plan to phase in the CBETP.

Pilot Program Option 1—One option for a small-scale pilot CBETP is to limit the scope of the program to a specific and well-known source category, for example, new or expanding power plants. Air Resources Board comments noted that starting with a familiar, well-regulated source category like power plants would allow the program to take advantage of past technical and policy precedents. It would make it easier to agree on procedures for quantifying emission increases and decreases, select consistent emission factors and testing and monitoring requirements, and develop practical methods to ensure that offsetting emissions reductions are quantifiable, real, enforceable, and permanent. Finally, a pilot program that focused on power plants would facilitate energy infrastructure development on the California side of the border and directly address the shortage of banked offset credits in Imperial County.

Whatever the merits of this option, it would require exemptions from federal law, as well as state law and local air quality regulations. Most power plants have sufficient emissions to be defined as “major sources” under federal law and are therefore regulated by numerous provisions of the Clean Air Act. For this reason, this option would require at least a limited exemption from federal statutory and regulatory provisions. As noted above, while there is a reluctance to change air quality law at all levels of government, there is a particular reticence to make amendments to the federal Clean Air Act. It would reduce the height of the legal barriers

¹⁰⁵ Since this is a temporary pilot program rather than permanent program, the legislation authorizing it would likely contain an end date that sunsets the program. However, emissions trades made under the pilot program would continue to meet the regulatory criteria of being permanent and enforceable.

to a pilot program considerably if a program could be developed that, like the El Paso brick kiln trade, could be implemented without triggering federal Clean Air Act requirements.

Option 2

A second option is a pilot program that would be made available to new or expanding sources that have emissions increases large enough to require offsets under local air district rules but are too small an increase to make the facility a “major source” under federal law. The resulting window in which such a pilot program could operate does exist, though it is unfortunately rather small. There are a limited number of existing stationary sources in Imperial County with emissions levels within this window, including minerals processing, food processing, construction materials manufacturing, and electrical generation facilities.¹⁰⁶ If these sources wish to expand or if similar new sources are proposed, they would be the potential users of the program.

This option would also require some changes in state law and local regulations, but the adjustments could be relatively surgical. The premise of this approach is that it would necessitate no amendments to the FCAA or formal approval by the U.S. EPA. Nevertheless, the involvement of the U.S. EPA in an advisory role would still be beneficial to the long-term goal of expanding cross-border trading beyond the pilot stage.

Ensuring State Jurisdiction Over the Pilot Program—Once a local air district rule has been approved by the U.S. EPA and incorporated in a SIP, it becomes federally enforceable. Some California air district rules, particularly those with provisions that exceed federal requirements, are not submitted to the U.S. EPA. In other cases, rules are submitted but not acted on by the U.S. EPA. The NSR rules currently in the SIP for Imperial and San Diego Counties were federally approved on November 10, 1980, and April 14, 1981, respectively.¹⁰⁷ Both ICAPCD and SDAPCD subsequently revised their NSR rules, but these later revisions have not been incorporated into their SIPs. As a result, the rules in the SIP are different from the rules currently in place and enforced by the two local air districts. This situation appears to provide an opportunity for implementing a carefully structured pilot program under state law, since only those NSR provisions in the federally approved SIP are federally enforceable.

The U.S. EPA–approved SIP rule for Imperial County requires mitigation from all new stationary sources or modifications “...which are to result in a net increase in emissions of 250 or more pounds during any day (after the application of LAER) for any air pollutant for which there is a NAAQS (excluding CO) or any precursor of such contaminant.” The NSR rule that the district is currently enforcing, which has not been approved into the SIP, requires mitigation for sources emitting more than 137 pounds per day. Therefore, any new or modified source with a net emissions increase of more than 137 pounds per day but less than 250 pounds per day

¹⁰⁶ <http://www.arb.ca.gov/app/emsinv/facinfo/facinfo.php> accessed February 19, 2008.

¹⁰⁷ <http://www.yosemite.epa.gov/r9/r9sips.nsf/Casips?readform&count=100&state=California> accessed March 14, 2008.

would require mitigation by the district but not by the U.S. EPA under the SIP rule. This is the emissions increase window in which a pilot program would operate.

A similar analysis of SDAPCD rules shows that, in general, the window is between 50 and 100 tons per year (TPY) for new sources of NO_x and between 25 and 100 TPY for a modified source. The 1981 U.S. EPA-approved SIP rule requires mitigation of emissions exceeding 100 TPY, calculated using the source's maximum design capacity unless the source agrees to limitations on its emissions. The current district NSR rule requires mitigation for new sources exceeding 50 TPY for NO_x and VOC and for modified sources exceeding 25 TPY.

Operating a Pilot Program—Regardless of which pilot program option is implemented, the specific design and operational details of the pilot program would need to be determined by the appropriate air pollution control agencies in the CA-BC region. Some tentative operating principles are provided below to illustrate how such a program might operate.

On the U.S. side, a project proponent wishing to use the pilot program would submit a permit application to the local air district. The application would propose to use emissions reductions from one or more stationary sources in Mexico to generate the ERCs needed to meet the local air district's NSR offset requirements. The reductions in Mexico would have to meet regulatory criteria contained in an amended version of the air district's emissions banking rule. The reductions, for example, would have to be shown to be real, quantifiable, permanent, enforceable, and surplus. Some amendments to state law and air district regulations and policy would be necessary. For example, the emissions reductions would need to be considered surplus even though there is no bi-national attainment demonstration, and the sources that produce them are not included in the air district's emissions inventory. Amendments to the law and regulations would be narrowly drawn so they do not affect larger sources or apply to nonborder air districts. The amendments would apply for a defined term and sunset at the planned end of the pilot program. If the Mexican-generated credits are banked, their use should be conditioned so the credits can only be used by U.S. sources eligible for the pilot program.

On the Mexican side, the program would operate somewhat differently because of the absence of a comparable permitting and other regulatory infrastructure. For purposes of illustration, the scenario might unfold along these general lines:

- One or more existing Mexican stationary sources in Baja California would enter into a voluntary agreement with SPABC to reduce their emissions by installing air pollution controls or other suitable means.
- The SPABC would establish procedures to document the emission reductions and enforce their conditions. These conditions would need to be consistent with criteria used by California air districts to issue emission reduction credits, namely that they meet the real, quantifiable, permanent, enforceable, and surplus tests.
- The Mexican sources would assume on-going reporting obligations to SPABC through the existing Annual Operating Permit (COA).
- There would likely need to be fees levied by relevant Mexican agencies to pay for the management of the program.

The mechanism for paying for the Mexican source reductions would need to be established. One option is for the U.S. source buying the offsets to enter into a contract with the Mexican source to pay for installing air pollution control in exchange for the reduction. The U.S. source would then take the contract to the California air district to obtain the ERC. Another option is for a third party to buy the emission reductions from the Mexican sources, use them to obtain ERCs from the California air district across the border, and then sell them in an emissions trading market to a U.S. source needing offsets.

While a carefully designed pilot program should provide useful and practical information, there is no guarantee that it will succeed or lead to a broader CBETP. For example, many project proponents may find the prospects of successfully using the pilot program too uncertain to take a risk. In the case of the second option, the emissions increase windows are small, and few projects may emerge that fit within those windows. Nevertheless, the lessons learned from a pilot program would be highly useful to both California and Mexican authorities in reaching a public policy decision as to whether to proceed to additional phases of a CBETP.

If a decision is made to move forward, the potential benefits of the CBETP increase, the barriers become more significant, and greater resources and effort are needed. In this complex and difficult situation, a carefully drawn master implementation plan would be extremely useful.

Master Implementation Plan

A successful and complete master implementation plan would reflect bi-national consensus on goals, lay out the main steps in implementing them, and create a feedback process for evaluating success as the program moves forward. A complete and effective master implementation plan would likely address the following elements:

- Goals—An effective CBETP would foster a variety of goals. They may include air quality goals such as reducing regional emissions of ozone and particulates, development goals such as facilitating the development of energy infrastructure, or economic, institutional, or political goals.
- Participation—The plan would describe the institutional arrangements on both sides of the border and how they would work together to implement subsequent phases of the CBETP.
- Design—The plan would address general design issues like whether the CBETP would be a project-based program, a cap-and-trade program, or some combination of the two. Examples of other basic design parameters are the pollutants included, the geographic area in which trading will occur, the universe of sources that will be affected, whether the program is mandatory or voluntary, and whether it will be administered by a single international agency or a bi-national arrangement. Examples of more detailed issues are the nature of the trading market, monitoring recordkeeping and reporting, enforcement, verification, and penalties. Each of these program elements is described in more detail in Chapter 4 of this report.

- **Funding**—A key element of the plan would describe how administration of the CBETP will be funded.
- **Technical and Regulatory Infrastructure**—Preparing a sound technical and regulatory underpinning for a CBETP is crucial to success. The plan would contain an agreement with appropriate Mexican authorities to build appropriate regulatory infrastructure in Mexico over time to reduce or eliminate the air program disparity between the United States and Mexico.
- **Steps to Overcoming Barriers**—Regardless of the decisions made on other elements of the master implementation plan, there will be barriers to be removed. This will surely include amending laws and regulations and will likely involve additional technical studies and the development of new agreements among affected parties. The plan should assign responsibility and set a schedule for addressing these issues.
- **Planning and Implementation Schedule**—The plan would contain a number of difficult and time-consuming tasks that must be accomplished before a CBETP can become fully operational. An effective schedule should be sufficiently challenging to maintain forward momentum but realistic enough to acknowledge the difficult tasks ahead, such as amending the FCAA.
- **Metrics for Measuring the CBETP Effectiveness**—The ability to measure progress toward agreed-upon goals is a key element of any CBETP. Accordingly, the master plan should contain an advanced agreement on how that will be done.

Phasing In Remaining Elements of a Cross-Border Emissions Trading Program

Decisions concerning subsequent phases of a CBETP would be made during the development of the master implementation plan. The possible phases discussed below are speculative but consistent with some of the possible program goals discussed elsewhere in this report.

Phasing in a Project-Based Program Meeting New Source Review Requirements—As noted above, a CBETP would likely address the construction of new or expanding sources, particularly larger sources like major electrical generating facilities. Changes to U.S. federal law, California law, and local air district regulations and improvements to regulatory infrastructure on the Mexican side of the border are prerequisites to program implementation. It may be prudent to implement a project-based program first on the U.S. side. This would allow U.S. sources of any size to invest in and use Mexican credits. The program could then be expanded to Mexico later at their option. If the program were fully operational on both sides of the border it would mean that any affected source could create or use ERCs generated by any other source.

Phasing in a Cap-and-Trade Program with Project-Based Program Incorporated—As noted often in this report, significant air quality improvement in the CA-BC region can only be achieved by requiring existing sources to further reduce their emissions over time. Experience in the United States has shown that a well-designed and operated cap-and-trade-program can bring about such reduction cost-efficiently. As discussed in Chapter 4 of this report, a cap-and-

trade program requires consistent and effective administration throughout the cap-and-trade region.

Implementation Issues

The recommended phased approach to the creation of a CBETP appears to be the most practical way to move forward, yet a number of important issues remain. Solutions to these issues are in the realm of public policy and are therefore beyond the scope of this analysis. They are presented here as open questions to show that more decisions are necessary if a CBETP in the CA-BC border region is to move forward.

- Who will lead? – Some interested party or group of stakeholders must move the idea of cross-border emissions trading forward in the public policy arena.
- By what process will a decision be made whether to move forward? – A CBETP will affect a large number of government and nongovernmental stakeholders. Informal meetings, conferences, workshops, formal hearings, legislation, or some combination of the above could be used to seek input and reach a decision.
- How to engage Mexico? – In addition to government interactions, there is a wealth of informal and formal social, political, academic, and scientific networks operating on a wide range of issues in the California and Baja California border region. The engagement process across the border will be broad in scope and will not necessarily proceed along a straight and narrow technical definition of a CBETP. Various stakeholders will likely raise issues of environment, energy, health, land use, social justice, employment, and trade among others in the process. At the governmental level, there is a number of existing bi-national forums ideally poised to serve as vehicles for information exchange between sister agencies and to provide institutional capacity-building opportunities. The Border 2012 program is the most well-developed and broadly represented on environmental issues. California and Baja California academic institutions have a number of cooperative programs that can assist in developing the scientific and technical underpinnings for the cross-border transport of air pollutants as well as policy options for legislators and regulators on both sides of the border to evaluate in implementing an effective CBETP. There is also a number of nongovernmental community-based organizations, business groups, and trade organizations with long histories of practical experience in cross-border environmental affairs that will bring an important perspective to the discussion. In Mexico, an effective strategy should involve all three levels of government—federal, state, and local—and at the same time encourage a broad-based dialogue from the social, political, business, and academic sectors on the merits and challenges of a CBETP.
- How will additional information be collected? – It is likely that the outreach and decision-making process will generate additional questions and issues; it will therefore be necessary to conduct additional studies or inquiries. Funding and administration of these studies will be required.

Current political and regulatory realities in both the United States and Mexico make implementing a CBETP very difficult and time consuming. The political challenges in proposing changes in federal law, regulations, and policy as well as the substantial disparity between the air regulatory infrastructure in California and Baja California are two of the most important barriers. Overcoming these two obstacles is essential to realizing the goals of a robust CBETP, namely reducing ambient pollutant concentrations in the CA-BC area, reducing public exposure to harmful levels of air pollutants, and enhancing opportunities to locate energy and industrial infrastructure in the border region with less environmental impact. The KEMA team recommends a phased approach that starts with a more limited program—one that works within existing limitations—until such time as the main barriers can be tackled directly. But even the phased approach is challenging to implement and will require a strong, well-coordinated effort involving cooperation among numerous stakeholders on both sides of the border.

GLOSSARY

AB 32	Assembly Bill 32 – California Global Warming Solutions Act of 2006
AMS	Allowance Management System
APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
AQIA	Air Quality Impact Analysis
AQIP	Air Quality Improvement Plan
ARB	California Air Resources Board
ARP	Acid Rain Program
BACT	best available control technology
BARCT	best available retrofit control technology
BC	Baja California
BECC	Border Environment Cooperation Commission
CA-BC	California-Baja California
CAIR	Clean Air Interstate Rule
Cal EPA	California Environmental Protection Agency
CBETP	cross-border emissions trading program
CCR	California Code of Regulations
CCX	Chicago Climate Exchange
CEM	continuous emissions monitor
CEPA	California Environmental Policy Act
CEQA	California Environmental Quality Act
CESPM	Comisión Estatal de Servicios Públicos de Mexicali (Mexicali office of the State)
CFE	Comisión Federal de Electricidad (Federal Electrical Commission)
CHP	combined heat and power
CH ₄	methane
CNA	Comisión Nacional del Agua (National Water Commission)
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalents
COA	Cédula de Operación Anual (Annual Operating Permit)
COGs	Councils of Government
COP	Conference of Parties
CRE	Comisión Reguladora de Energía (Energy Regulatory Commission)

DOE	Department of Energy
ECCP	European Climate Change Programme
EGU	electric generating unit
EIM	U.S. Environmental Impact Manifest
EPE	El Paso Electric Company
ERC	emission reduction credit
ETS	Emission Trading Scheme (European Union)
EU	European Union
FCAA	Federal Clean Air Act
FERC	Federal Energy Regulatory Commission
FR	Federal Register
GAO	Government Accountability Office
GDN	Gasducto del Norte (Northern Gas Pipeline)
GHG	greenhouse gas
GWP	global warming potential
H&SC	Health & Safety Code
HFCs	hydrofluorocarbons
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
INE	Instituto Nacional de Ecología
IPCC	Intergovernmental Panel on Climate Change
JAC	Joint Advisory Committee
kW	kilowatt
lb/day	pounds per day
lb/MWh	pounds per megawatt hour
LAU	Licencia Ambiental Única (Multimedia Environmental License)
LAER	lowest achievable emission rate
LASPAU	Latin American Scholarship Program of American Universities
LRPC	La Rosita Power Complex
MAC	Market Advisory Committee
MMBTU	million British Thermal Units
MET	meteorological
MGPY	million gallons per year
MW	megawatt
N ₂ O	nitrous oxide
NAAEC	North American Agreement on Environmental Cooperation

NAAQS	National Ambient Air Quality Standard
NADbank	North American Development Bank
NACEC	North American Commission on Environmental Cooperation
NAFTA	North American Free Trade Agreement
NAMS	NO _x Allowance Management System
NAPA	National Academy of Public Administration
NAPS	National Allocation Plans
NBTP	NO _x Budget Trading Program
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGO	nongovernmental organization
NHPA	National Historic Preservation Act
NMHC	nonmethane hydrocarbons
NOMs	Normas Oficiales Mexicanas (official Mexican Standards)
NO _x	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
O ₃	ozone
Pb	lead
PEMEX	Petróleos Mexicanos (the Mexican national oil company)
PFCs	perfluorocarbons
PM	particulate matter
PM ₁₀	PM less than 10 μm in aerodynamic diameter
PM _{2.5}	PM less than 2.5 μm in aerodynamic diameter
ppm	parts per million by volume
PROAIRE	Programa para Mejorar la Calidad del Aire (Program to Improve Air Quality)
PROFEPA	Procuraduría Federal de Protección al Ambiente (Federal Attorney for Environmental Protection)
PRTR	Pollutant Releases and Transfers Registry
PSD	Prevention of Significant Deterioration
PUC	Public Utilities Commission
RECLAIM	Regional Clean Air Incentives Market
RGGI	Regional Greenhouse Gas Initiative
ROG	reactive organic gases
RTCs	RECLAIM trading credits

SCAQMD	South Coast Air Quality Management District
SCERP	Southwest Consortium for Environmental Research and Policy
SCR	selective catalytic reduction
SDAPCD	County of San Diego Air Pollution Control District
SDREO	San Diego Regional Energy Office
SE	Secretaría de Economía (Economy [Commerce] Secretariat)
SEDUE	Secretaría de Desarrollo Urbano y Ecología (Secretariat of Urban Development)
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales (Secretariat of Environment)
SENER	Secretaría de Energía (Secretariat of Energy)
SER	Secretaría de Relaciones Exteriores (Secretariat of Foreign Relations)
SF ₆	sulfur hexafluoride
SHCP	Secretaría de Hacienda y Crédito Público (Secretariat of Revenue and Public Credit)
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SO _x	sulfur oxides
SPABC	Secretaría de Protección al Ambient de Baja California (Secretary of Environmental Protection of Baja California)
SRE	Secretaría de Relaciones Exteriores (Secretariat of Foreign Relations)
TCEQ	Texas Commission on Environmental Quality
TDM	Termoeléctrica de Mexicali
TPY	tons per year
TRI	Toxics Release Inventory
TSP	total suspended particulate
UNFCCC	United Nations Framework Convention on Climate Change
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compounds
WGA	Western Governors' Association
µg/m ³	micrograms per cubic meter
µm	micrometer (micron)