



# POWER PLANTS

## RECOMMENDATIONS

- **Airsheds:** Pursue airshed-based emissions caps that address power plants and other pollutant sources affecting the border. Build on airshed discussions initiated by local partnerships, the U.S.-Mexico Binational Commission (BNC) and the North American Commission for Environmental Cooperation (CEC).
- **Public involvement:** Increase public awareness of power plants' environmental and human health effects as well as their economic effects. Publicize emissions data, conduct trans-boundary environmental impact assessments, and move discussions forward to harmonize different emissions standards, involving the public at each step.
- **Alternatives:** Intensify focus on other solutions besides power plants to meet energy supply needs. Promote wind and solar options; support dry cooling and emission-reducing technologies where appropriate; increase energy efficiency and conservation; and consider market-based incentives, including emissions trading.

Events of the past several years such as the California energy "crisis," the White House Energy Plan, and the Enron scandal have increased national attention on energy supplies and power plants. And although, at least in the U.S., there seemed to be a slow-down during 2002 in the previous year's rush to build power plants, overall demand for power likely will continue to grow. Moreover, power plants are likely to play a significant role in meeting that demand. Therefore, the Good Neighbor Environmental Board believes that power-plant infrastructure should remain an issue that is closely tracked by border-region policy makers, particularly in light of the potential trans-boundary effects.

In its last report, its Fifth Report to the President and Congress, the Board examined how existing air-quality problems might be further exacerbated by elevated activity in the power sector and called for alternatives to such a scenario. For this report, the subject once again has been selected as a top issue for analysis.

As of autumn 2001, 13 new electricity-generating projects had been issued permits border-wide and 16 more were being planned to meet the region's anticipated needs. Cumulatively, these activities were projected to increase the region's generating capacity by more than 5,000 megawatts (MW) by 2003 and to almost double the current capacity from 14,000 to 26,000 MW by 2009, according to statistics from several U.S. and Mexican government sources.

These projections for the border region likely will be repeated on a larger scale throughout the interior of both countries, according to the CEC. In its June 2002 report

called “Environmental Challenges and Opportunities in the Evolving North American Electricity Market,” the Commission projects that electricity demand from 2000 to 2009 will increase by 21 percent in the United States and 66 percent in Mexico. The report goes on to say that as of August 2001, utilities, private developers, and energy planners were projecting that by 2007, approximately 2000 new electric generation units would be built across the three NAFTA countries, roughly a 50 percent increase over current installed capacity.

The implications of these projections are serious. While the need to meet energy demands to build and maintain a strong regional economy is widely acknowledged, so, too, is the need to protect the region’s environment and the health of its inhabitants. Power-plant fuels can introduce a number of potential problems. For example, coal-fired power plants produce numerous pollutants including sulfur dioxide (SO<sub>2</sub>), which leads to acid rain; nitrogen oxides (NO<sub>x</sub>), which can add soot and smog to the atmosphere; toxic mercury; and carbon dioxide (CO<sub>2</sub>), which contributes to global climate change. Oil-fired plants produce many of the same pollutants, though in somewhat smaller quantities. Energy from natural gas is considered to be relatively cleaner, with negligible emissions of SO<sub>2</sub> and very low NO<sub>x</sub> emissions. Burning natural gas, however, still produces CO<sub>2</sub> emissions, and natural gas itself, composed primarily of methane, can contribute to climate change if released to the atmosphere, according to the International Council on Local Environmental Initiatives (ICLEI).

Power plants in North America still are primary contributors of toxic releases, says the CEC in that same 2002 report, with the U.S. in the lead. In 1998, the U.S. emitted 12.3 million tons of SO<sub>2</sub> (Mexico emitted 1.6 million) and 5.8 million tons of NO<sub>x</sub> (Mexico emitted 0.2 million). The U.S. electricity sector is responsible for 25 percent of all NO<sub>x</sub> emissions in the nation, 70 percent of SO<sub>2</sub> emissions, 25 percent of mercury emissions, and 35 percent of CO<sub>2</sub> emissions.

These air pollutants, in turn, have been associated with a number of health problems (see also the *Human Health* section of this report). For instance, NO<sub>x</sub> contributes to the formation of ozone, which is linked to respiratory illness and asthma, particular in sensitive populations such as the elderly and children. And microscopic particles of soot have been associated with heart and lung disease. Findings from specific studies back up the concern: One long-term study on children’s health evaluates the effects of chronic air pollution exposures on the health of children living in Southern California. The findings indicate that besides the acute effects of air pollution on asthma incidents and respiratory illness, there is evidence of decreased lung development and increased probability of developing asthma in the first place.

Wildlife also can suffer from the presence of power plants. It has been estimated that 80 million birds die in the U.S. each year as a result of collision with electric transmission lines or

through electrocution, as the lines can interfere with natural migratory cues (“Power Trip,” Weisman, *Harper’s Magazine*, October 2000). And from a purely aesthetic and economic perspective, transmission lines can mar scenic “viewsheds,” affecting the economy of a region that relies on nature tourism. Finally, evidence indicates that air pollution from power plants and other sources in the U.S. and Mexico is partially responsible for decreasing visibility in the Grand Canyon and other national parks on the Colorado plateau, as well as in Big Bend National Park in Texas.

## POLICY ISSUES AND NEXT STEPS

Based on developments in the power-plant sector during 2002, the Good Neighbor Environmental Board has identified several key policy issues and next steps it advises be taken to address these issues:

### Issue 1

**COMPLEX LEGAL, INSTITUTIONAL AND ECONOMIC ARRANGEMENTS.** A variety of different state and federal entities in the U.S. are responsible for issuing permits for power plants, monitoring and regulating emissions from power plants, issuing permits for trans-boundary pipelines and transmission lines, and conducting the appropriate oversight and federal review processes such as National Environmental Policy Act (NEPA) review. Especially when trans-boundary impacts are the focus, the process for review and public input is not always clear or well-defined. Moreover, in the view of critics, all too often it seems that a power plant has gotten approval for construction on one side of the border before the public on the other side is even aware of the project.

The concerned public, in some cases, is beginning to take action. In 2002, for example, a binational non-governmental group called the Border Power Plant Working Group gained significant attention. It carried out a locally waged battle against two power plants being constructed in Baja California near the border in Mexicali and Rosarito by two energy companies, Sempra Energy and Intergen Corporation. The group, with the help of Wild Earth Advocates and Earth Justice, filed suit against the U.S. Department of Energy (DOE) relating to the plants, which are scheduled to export some, if not all, of their electricity to California.

This suit revolved around the issue of presidential permits, which are mandatory documents issued by DOE granting permission to construct and operate electric transmission lines that cross the U.S. international border. The U.S. Environmental Protection Agency (EPA) submitted comments

during the public comment period. It should be noted that U.S. air-quality standards in both Imperial and San Diego Counties are in non-attainment for both CO and ozone. In building their case, filers drew on past case law that interprets the NEPA to include major actions outside the U.S. that nevertheless may have effects within the country. Using this NEPA interpretation, they contended that the presidential permits for these two plants were issued without due consideration of the potential cumulative impacts that the two plants and transmission lines would have on the environment and on local air quality.

As of the end of 2002, this lawsuit was still pending. However, early in 2003, Intergen announced it would install selective catalytic reduction equipment on its entire Mexicali plant.

## Next Step

**INCREASE INFORMATION-SHARING AND TRANSPARENCY.** As increased energy production and cross-border energy trade is projected for the U.S.-Mexico border, governments should pursue a binational program using the best available science to establish officially recognized airsheds in the border region. Emissions caps should be set for these airsheds that reflect the variety of sources in the region, both from within the U.S. and also from Mexico.

Regardless of whether or not the NEPA can be applied within a cross-boundary context, the Board recommends that both the U.S. and Mexico consider potential trans-boundary environmental effects of proposed projects, and widely disseminate information to potentially affected border communities. In addition, the U.S. and Mexico should be encouraged to finalize negotiations on the Trans-boundary Environmental Impact Assessment (TEIA) agreement under the North American Agreement for Environmental Cooperation, which calls for notification of projects with trans-boundary environmental impacts.

One example of an existing agreement that might serve as a model is Annex III of the La Paz Agreement, which deals with notification about the shipment of trans-boundary hazardous materials. A similar notification process might be instituted for new and expanded power plants. The increased transparency in the environmental review process, in turn, would generate greater confidence among companies and investors hoping to capitalize on an expanding electricity sector.

## Issue 2

### INSUFFICIENT FOCUS ON ALTERNATIVE SOLUTIONS.

The Energy Plan introduced by the administration in 2002 tends to be heavy on supply-side solutions and light on conservation. In addition, the plan relies heavily on new generation capacity using traditional fuels rather than using alternative sources of energy.

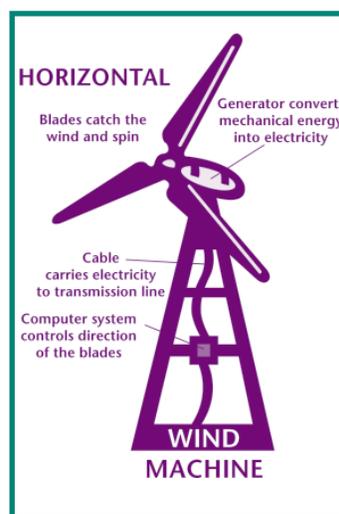
Fortunately, some progress in harnessing alternatives is being made on a state level. For instance, all four U.S. border states have taken steps to promote renewable energy development. They have put into place minimum renewable energy standards, so-called “renewable portfolio standards,” that have a goal of a certain percentage of electricity to be obtained from renewable sources. Each state also has developed and implemented energy efficiency and conservation programs, such as Senate Bill 7, 76<sup>th</sup> Texas Legislature. In addition, the state of California passed a new law (SB1078) in 2002 that requires electricity vendors to increase solar, wind, and other renewable sources to 20 percent of all electricity sold by 2017, with at least 1 percent increase each year until then.

These efficiency and conservation measures are being introduced not a moment too soon. The CEC’s June 2002 report (see above) includes a table summarizing national emission totals for new electric utility generation. Even the “low boundary” projections (i.e. those incorporating only a small percentage of the total plants projected, or those already in “advanced stages of development”) show that by 2007, CO<sub>2</sub> emissions for Mexico will increase by 29 percent, and in the U.S. by 14 percent from base year 1999 levels.

## Next Step

### HIGHLIGHT PROVEN ALTERNATIVES, EXPLORE OTHERS.

Energy policy experts and scientists studying global climate change have recommended a range of what are called market-based incentives to encourage development of renewable electricity. Candid discussion of existing and potential alternative options, highlighting their advantages and exploring potential barriers, would provide the momentum to institute what works and to find solutions to barriers. For example, in Austin, Texas, if a customer signs up for the Green Power option, which entails receiving a portion of your electricity from alternative energy sources such as wind and solar power, you can



Candid discussion of existing and potential alternative energy options such as solar and wind power would provide the momentum to institute what works in the border region and to find solutions to barriers. *Graphic courtesy of Department of Energy website.*

lock in your electricity rates even if natural-gas prices, for example, were to rise.

The media is doing its part to disseminate information on alternatives. In a five-part series on renewable electricity in spring 2002, the Dallas Morning News discussed wind and solar power and the status of these renewables in the current electricity market. According to the program, wind power appeared to be gaining a foothold in the marketplace; Texas developed 900 megawatts of new wind power during the 1990s. Also in Texas, consumers have been able to choose wind power as part of their energy source since the advent of restructuring in 2001. Wind farms have been established in West Texas, providing another source of income to landowners in that region.

Solar power also is making some gains. For instance, California has had a Renewable Energy Resources Program since 1995, giving partial rebates to help defray the costs of solar or photovoltaic energy collectors installation. There is a special program for schools and affordable-housing developments. San Diego County is showing the way with several solar projects: in Del Mar at the fairgrounds, 7000 solar panels have been installed at the horse barns; the U.S. Navy has a 750 kilowatts (kW) solar energy system lighting up 935 homes in Coronado; and the municipal building in San Diego incorporates solar-powered electricity.

The state of Arizona also continues to harness solar energy: in Tucson, the Electric Power Company has a 2.4 milliwatts (mW) solar array. And across the border, the Comisión Federal de Electricidad (CFE) is embarking on building a 25 mW solar-energy unit in San Luis Río Colorado, Sonora, Mexico.

### Issue 3

**NATIONAL PROGRAMS MAY FALL SHORT OF ADDRESSING BORDER-REGION SCENARIOS.** Two changes introduced this year, the Clear Skies Initiative and the rule change in the New Source Review (NSR) program under the Clean Air Act, seem on the surface to be designed to cut emissions nationwide from both power plants and other sources. The Good Neighbor Environmental Board is concerned that these programs may actually do very little and, in fact, may worsen border air quality in non-attainment areas.

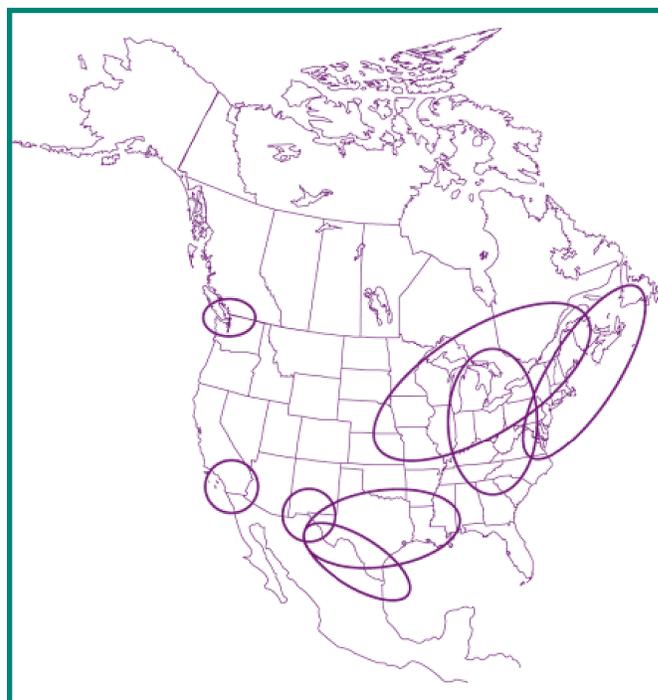
The Clear Skies Initiative was unveiled in February 2002. It proposed a “cap and trade” approach to emissions, under which pollution sources would be able to transfer authorized emission limits among themselves to achieve the required reductions at the lowest cost. The goal of this emissions trading program is to cut SO<sub>2</sub> emissions by 73 percent from current levels, NO<sub>x</sub> emissions by 67 percent, and mercury by 69 percent. Vigorous public debate on the plan has revolved around whether the Clear Skies Plan truly achieves emissions reductions, or whether the same or better success could be achieved through strict enforcement of existing Clean Air Act regulations. Concerns are that 1) the plan proposes emission reductions relative to the rate of growth in the

industry rather than reducing the total volume of emissions; 2) the program is voluntary; and 3) given the effectiveness of available emission-control technology, the emission-reduction targets are not aggressive enough.

The other national program announced during 2002 of concern to the Board is the NSR program within the Clean Air Act, which was unveiled by the EPA in November. Supporters of the revisions, due to take effect in March 2003, say they reflect how business has changed and will result in greater environmental benefit. Attorneys general in nine Northeastern states filed suit at the end of the year, claiming that the revisions will result in more acid rain, smog, asthma, and respiratory disease. California opposed the changes on the basis that they threatened the state’s more stringent state and local NSR rules by requiring EPA to find that state NSR programs were “equivalent” to the EPA rules.

### Next Step

**STRENGTHEN NATIONAL INITIATIVES, DEVELOP BINATIONAL AIRSHED APPROACH.** Strengthening, not weakening, national programs will benefit the border region and the nation as a whole; however, only when strong national programs are combined with a binational airshed approach along



Identification of shared cross-border airsheds like these could lead to binational agreement on acceptable levels of emissions for a particular airshed. Source: “Environmental Challenges and Opportunities of the Evolving North American Electricity Market,” Commission on Environmental Cooperation (CEC), June 2002, page 11. Paul Miller, 2001.

the border will real long-term success be achieved. Such a strategy, if adopted, could include cross-border consensus on the definition of a particular airshed, agreement on acceptable levels of emissions for that airshed, and a plan that includes enforcement actions for reaching these standards. The CEC report mentioned earlier (see above) includes a map that illustrates shared cross-border airsheds. Notably, a cross-border airshed approach is recommended in the section of the report entitled “Opportunities for Environmental Cooperation.”

Support for the airshed concept took another step forward at the annual BNC conference in Mexico City in November of 2002. A U.S.-Mexico Border Air Quality strategy was unveiled by the governments of Mexico and the United States that underscores “the importance of coordinated border airshed management.” Officials were directed to develop pilot trans-boundary projects and report back by April 1, 2003.

Without a comprehensive airshed-based air-quality plan, emissions trading may only result in shifting pollution sources. Once an overarching plan is in place, however, emissions trading regimes and other tools may be appropriate to consider. Under the right circumstances, they may offer flexibility and the potential to lower the cost of emission reductions. The CEC report includes a section on opportunities for cooperation that includes a discussion of innovative economic instruments, including trans-boundary emissions trading.

## Issue 4

**POWER-PLANT OPERATIONS MAY PUT STRESS ON WATER SUPPLIES.** Large volumes of water are consumed by power plants for cooling purposes. According to the California Energy Commission, a conventional 500 MW natural gas-fired combined cycle power plant using water for cooling consumes between 2,000 and 4,000 acre-feet of water per year, which is equivalent to the amount used by 4,000-8,000 homes (California Energy Commission, “Energy Facility Licensing Process: Water Supply Information,” Staff Paper/Draft, December 2000). Most of this water, up to 90 percent, is used in a closed loop wet-cooling system and emerges as steam and lukewarm water. The large majority of currently operating power plants in the border region are of this type.

Alternatives such as co-generation plants, simple cycle plants, and facilities that employ dry-cooling systems typically use less water during operation. But the quantity of water consumed and returned is only one of the environmental issues. Often, surface water used for cooling is returned to the source at a higher temperature. Aquatic habitats and species are highly sensitive to temperature changes; thus, power plant cooling water can significantly alter an aquatic environment over time. Finally, the brine stream generated as a by-product of water heating and other water treatment required for power plant processes will contain concentrated salts. This waste stream will degrade the quality of any water body into which it is discharged.

Recognizing that power-plant operations can put an extra demand on the quantity and quality of already depleted freshwater supplies, some U.S. states have adopted policies specifying preferred sources of water for power plants. California, for example, has had a policy since 1975 to minimize the use of freshwater for power plants. The policy instead states a preference for (1) inland power plants to use brackish water from natural sources of irrigation return and inland treated wastewater, and (2) for coastal power plants to use wastewater destined for discharge to the ocean. The non-governmental sector also is working to research and present alternative designs for power plants that may have fewer adverse effects on water supplies. For example, the Border Power Plants Working Group is promoting the use of dry-cooling technologies for power plants in arid regions.

## Next Step

**SUPPORT POWER-PLANT TECHNOLOGIES THAT REQUIRE LESS WATER.** To the extent possible, electric-utility operation should incorporate technologies such as air-cooled condensers that reduce water consumption and protect water quality at the discharge point. In some cases, such an approach would require amending state law to enable potential water-conservation benefits to be taken into consideration when issuing an air permit.

In addition, citizen pressure to stop diverting precious water supplies for power-plant operations can be an effective deterrent. For example, in November 2001, the Arizona Corporation Commission turned down a proposed electric generating plant in Western Arizona because of concern over how the plant would affect scarce water supplies. The proposed natural gas-burning plant would have produced 720 MW of electricity, but would have required pumping 4,000 acre-feet of groundwater each year for cooling. Residents who opposed the construction of the plant were concerned about drawing down the local aquifer and about affecting the riparian habitat of the Southwestern willow flycatcher, a migratory bird that is on the federal endangered-species list. Opponents of the project also stated that most of the power was to have been supplied to Nevada and California.

## PROJECTS AND PARTNERSHIPS

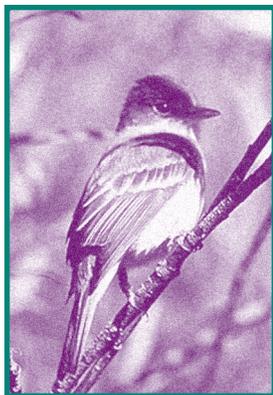
Communities along the border continue to work together to address cross-border air pollution caused by power plants and other sources. Previous Good Neighbor Environmental Board reports described initiatives such as the Joint Advisory Committee (JAC) for Improvement of Air Quality in the El Paso-Ciudad Juárez-Doña Ana County, New Mexico Air Basin. A similar effort, the Binational Air Quality Alliance (BAQA), is under way in the San Diego-Tijuana-Rosarito metropolitan

area, and nascent efforts are in evidence in the Mexicali-Imperial Valley.

Other developments to watch include efforts to incorporate economic incentives as a means of reducing air pollution. Through new legislative authority (Senate Bill 1561, 77<sup>th</sup> Legislature), the Texas Commission on Environmental Quality (TCEQ) approved an international emissions trading program in November 2002. Under its terms, the TCEQ allows the use of emissions reductions achieved outside the U.S. for the purposes of compliance with the Emissions Banking and Trading of Allowances program, a state cap and trade program for grandfathered electric generating facilities. Under this program, the El Paso Electric Company (EPE) was required to reduce its historical emissions of NO<sub>x</sub> by 50 percent beginning May 2003.

This same TCEQ emissions trading program also has an inter-pollutant component. Under its terms, emissions from a complex mix of pollutants (CO, NO<sub>x</sub>, PM, VOCs) emanating from open brick kilns in Ciudad Juárez, Chihuahua, Mexico are being reduced. According to the terms of the trade, EPE will convert 60 existing brick kilns to a newer, technologically appropriate kiln design. The emission reductions generated will then be substituted for the NO<sub>x</sub> allowances needed by EPE.

Reactions to the TCEQ project have been mixed: Although it has been lauded by the El Paso and Ciudad Juárez communities as an innovative method of improving air quality in



Residents who opposed the construction of a proposed electric generating plant in Western Arizona were concerned about affecting the riparian habitat of the Southwestern willow flycatcher, a migratory bird that is on the federal endangered species list. *Photo credit: US Fish & Wildlife Service website, Suzanne Landgridge, USGS.*

the binational airshed, the group Environmental Defense has criticized the project, saying it will not result in greater health benefits, nor will it bring overall improvement to air quality in the area.

On another front, new binational state-to-state partnerships on energy are forming within the Ten States coalition, a group that includes the four U.S. and six Mexican border states. A joint declaration was issued at the June 2002 binational Border Governors' meeting that called for the states to "work with federal officials on both sides of the border to ensure a steady supply of energy and to adhere to the principles of sustainable development and appropriate distribution." The governors decided to create an energy workgroup, and then directed the

existing environment workgroup to "promote the development of an environmental strategy for new electrical generation plants in the border region with the goal of protecting air quality, and, where possible, conserving water resources in the region." In response to these declarations, the Environmental Secretaries of the Ten States have approved an action plan that calls for the development of environmental guidelines for border power plants, and adoption of these guidelines at the 2003 Border Governors' meeting.

Binational energy policy work at the federal level took place under the Border XXI Program (1997-2002) and continues in the next phase of the program, called Border 2012 (2003- 2012). In April 2002, the Border XXI Air Workgroup convened a binational Energy Workshop in Mexicali, Baja California, in response to an earlier charge from the BNC to "examine ways of assuring that new energy projects in the border are consistent with applicable environmental regulatory structures and that they do not cause unacceptable impacts to border communities." The next step is to release a report on environmental issues related to energy plants in the border region. Border 2012 plans to continue addressing border energy issues during the coming year through its border-wide Air Policy Forum as well as through its regionally based workgroups.

And in June 2002, the CEC affirmed a decision to continue working on renewable energy as well as other initiatives to improve air quality in North America.

