

CLEAN AIR MARKETS update

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MESSAGE FROM BRIAN MCLEAN

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Welcome to the first edition of the *Clean Air Markets Update*, a periodic report focused on the application of market mechanisms for environmental protection. The *Update* is produced by EPA's Clean Air Markets Division, which manages the U.S. sulfur dioxide (SO₂) trading program.

In these pages, we will explore the key elements involved in the design, implementation, and operation of market-based mechanisms, focusing on emissions trading. We will also look at how market mechanisms can be successfully applied to local and national environmental problems. The *Update* offers a governmental perspective on emissions trading that primarily targets a global audience of government officials. Members of the academic, business, and environmental communities may also find many of our articles of interest.

Each issue of the *Update* will contain features on various policy and technical aspects of market-based mechanisms—the kinds of issues that decision-makers will face when deciding whether and how to introduce market mechanisms as policy instruments. In each issue, the *Update* will track the progress of an evolving trading program. We will examine some of the challenges of designing and implementing a cap and trade program and how these issues can be resolved. Finally, the *Update* will contain the latest news on market mechanisms from around the world, including information on recent and upcoming events of potential interest to our readership. Periodically, we may also feature articles by guest authors from other governments, industry, non-governmental organizations, or academia.

The *Update* is available on the EPA Web site at <www.epa.gov/airmarkets/camupdate> or via regular postal mail upon request. We hope that you find the *Clean Air Markets Update* informative, and we invite you to submit comments, suggestions, news, and trading-related questions. We will try to address these submissions in subsequent issues of the *Update*, and we welcome the chance to open a dialogue with our readers. Please send feedback to Melanie Dean, editor, at <dean.melanie@epa.gov> or by calling 202 564-9189.

THE ENVIRONMENTAL CASE FOR EMISSIONS TRADING

—Melanie Dean, U.S. EPA

Since the U.S. sulfur dioxide (SO₂) trading program, more commonly known as the Acid Rain Program, began in 1995, the concept of emissions trading has played an increasingly important role in the development of air quality improvement programs in the United States and abroad. Interest in the SO₂ trading model can be traced in part to the dramatic cost savings associated with its implementation. However, cost savings are only part of the story—market-based mechanisms can also provide impressive environmental results. This article reviews the environmental case for emissions trading and describes four reasons why a well-designed cap and trade program can provide better environmental results than a conventional, command-and-control approach.

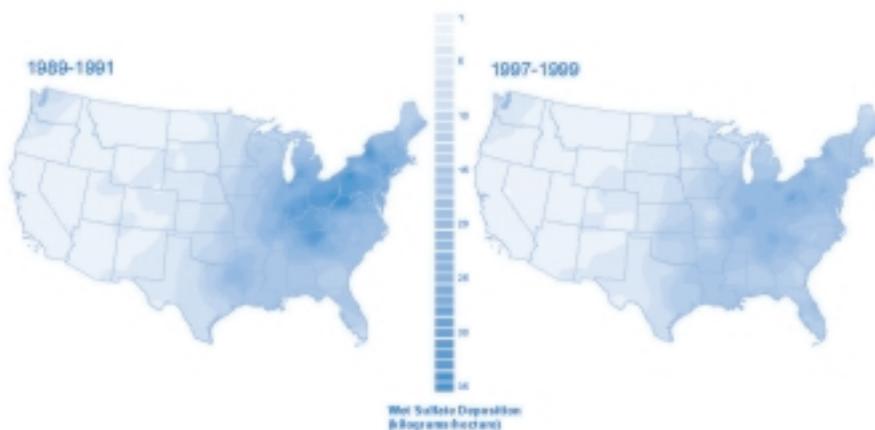
REASON #1: THE CAP PROVIDES ENVIRONMENTAL CERTAINTY

The most important advantage of using cap and trade—provided the environmental problem is suited to using this mechanism—is the creation of environmental certainty. A cap and trade program establishes the program goal (the cap) as an allowable quantity of total emissions needed to achieve a desired degree of environmental improvement. By cap-

ping emissions, allocating or auctioning allowances equal to the total emissions cap, and enforcing compliance by affected entities, the environmental integrity of the program is guaranteed. Even if industrial production or electricity generation grows at a faster rate than expected, emissions will not exceed the cap because the total number of allowances in the system remains unchanged.

by allowing the highest-emitting sources to purchase allowances, rather than reduce their own emissions. They argued that this would result in a failure to achieve reductions where most needed. To address this concern, separate health-based requirements under the U.S. Clean Air Act remain in place to ensure that ambient air quality requirements are met (through prohibiting sources to emit pollutants in excess of certain

ACTUAL IMPROVEMENTS IN ENVIRONMENTAL QUALITY AS A RESULT OF THE U.S. ACID RAIN PROGRAM



Economic growth is accommodated through the flexibility of emissions trading and through a constant incentive to employ improved emission reduction technologies.

Although the SO₂ cap under the Acid Rain Program provided certainty of significant national reductions, some stakeholders initially raised concerns that a market-based approach could have a negative impact on local air quality

levels, regardless of the amount of allowances they hold). These concerns have been further put to rest as implementation progresses, because the largest emissions reductions in the program to date have occurred in the heaviest-emitting regions. SO₂ emissions from electric power generators participating in the Acid Rain Program have already decreased by more than 6 million tons below 1980 levels, representing more

than half of the 2010 reduction goal. These reductions have contributed to decreases in ambient SO₂ concentrations as well as in wet and dry sulfate deposition levels.

REASON #2: LOWER COSTS CAN SUPPORT STRONGER ENVIRONMENTAL GOALS

Another important advantage of a cap and trade program is that the inclusion of the cost-minimizing trading feature may enable policymakers to pursue a more ambitious environmental goal than would otherwise be politically and/or economically feasible. Because trading allows companies to choose among compliance options, and thereby minimize costs, cap and trade programs may allow governments to pursue more ambitious environmental goals for a given expenditure. Prior to the introduction of the 10-million-ton reduction under the Acid Rain Program, most proposals sought only an 8-million-ton reduction using conventional approaches.

REASON #3: BANKING ENCOURAGES EARLY REDUCTIONS

The existence of a cap on emissions may also encourage sources to pursue additional and/or earlier reductions of emissions than would have otherwise occurred. This is a result of two primary drivers: first, the cap and associated allowance market creates a monetary value for reduced emissions, providing sources with a tangible incentive to decrease emissions. Second, a cap and trade program that

incorporates the flexibility of banking in its design gives sources an additional incentive to reduce emissions in excess of requirements. Banking allows sources to carry over unused allowances to use in a future compliance period when there may be more restrictive requirements. The ability to bank allowances in a cap and trade program can provide significant reductions early in the program—but practitioners must understand that banking can



also delay the achievement of an annual emission reduction target later in the program when banked allowances are used. Because banking does not delay achievement of cumulative reductions, this trade-off does not represent an environmental concern when addressing problems such as climate change or acid deposition, which result from an accumulation of emissions over time. However, when addressing a problem caused by short-term episodes of high emissions, such as regulating nitrogen oxides (NO_x) to mitigate ground-level ozone, analysis should be undertaken to weigh the possible effects of banking.

REASON #4: IMPROVED ACCOUNTABILITY

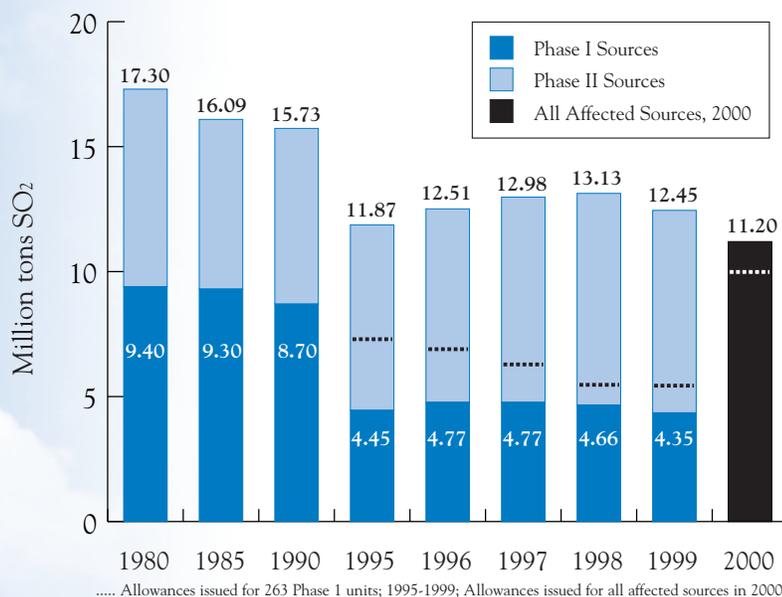
Cap and trade programs require the creation of compliance structures that are useful regardless of whether any trading occurs. Participating sources must fully account for each ton of emissions according to stringent protocols to ensure completeness, accuracy, and consistency. Accurate monitoring of all emissions and timely reporting are critical to the success of a cap and trade program because they ensure the fungibility of allowances and the integrity of the cap. Moreover, both Chile and Slovakia, which recently have experimented with cap and trade, found that these programs served as an incentive for more complete and accurate emissions

inventories. This mirrors the U.S. experience, where placing a value on emissions led sources to improve reporting of the fuel and emissions data upon which allowance allocations were based. All of the reported information on emissions—and the trading of allowances—can be made available to the public on the Internet. This transparency provides the necessary confidence in the efficacy of the market tool and the necessary accountability of each source for each ton of emissions.

For further information, please contact Melanie Dean at <dean.melanie@epa.gov> or 202 564-9189.

UPDATE ON U.S. EMISSIONS TRADING PROGRAMS

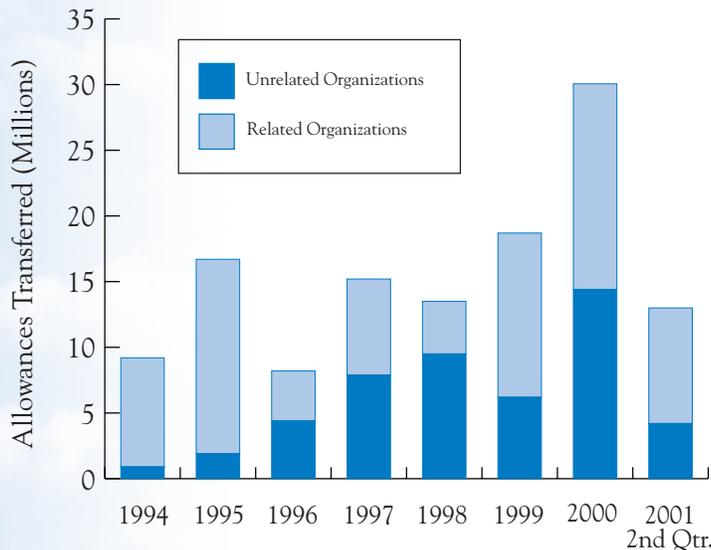
EMISSIONS FROM SOURCES PARTICIPATING IN THE ACID RAIN PROGRAM



Implementation of the U.S. Acid Rain Program began in 1995 to reduce annual SO₂ emissions from power generation by 50 percent nationally through a cap and trade program.

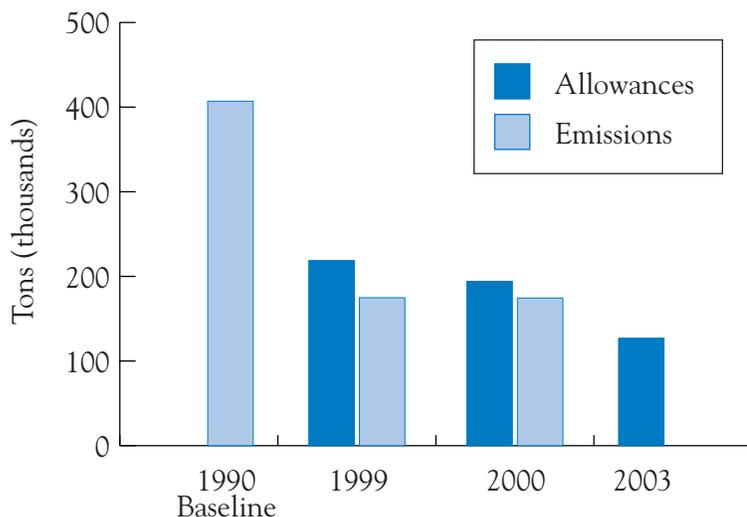
- In 2000, the 2,262 units covered by Phase II of the Acid Rain Program emitted 11.2 million tons of SO₂, or 10 percent less than 1999 levels and 35 percent below 1980 levels.
- Emissions in 2000 were above the allowances issued. This was both expected and allowed due to the substantial banking of early reductions achieved through 1999. Please refer to reason #3 on page 3 for a discussion of the role of banking in a cap and trade program.

SO₂ ALLOWANCES TRANSFERRED IN THE ACID RAIN PROGRAM



- Since 1994, more than 121 million SO₂ allowances have been transferred.
- Approximately 41 percent of all SO₂ allowances have been traded between different companies.

ALLOWANCES AND EMISSIONS FROM SOURCES PARTICIPATING IN THE OZONE TRANSPORT COMMISSION NO_x BUDGET PROGRAM



Implementation of the Ozone Transport Commission NO_x Budget Program began in 1999 in nine northeastern U.S. states to reduce NO_x emissions region-wide during summer months, when smog forms. It is a cap and trade program modeled after the Acid Rain Program.

- In 2000, more than 900 stationary combustion units in 9 states reduced NO_x emissions by 11 percent below compliance requirements.
- For additional information on the U.S. SO₂ and NO_x trading programs, please see <www.epa.gov/airmarkets/progsregs/index.html>. For compliance reports for these programs, please see <www.epa.gov/airmarkets/cmprpt/index.html>.

Glossary of Trading-Related Terms

ALLOWANCE: an authorization to emit a specific quantity of a pollutant (e.g., 1 ton) under a cap and trade program.

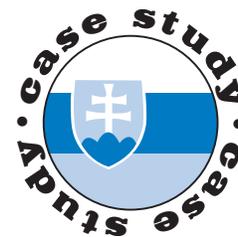
BANKING: the ability of sources to carry over unused allowances and/or offsets for use in a later compliance period.

CAP AND TRADE: programs that establish aggregate emissions caps and allow sources to trade their authorized emissions as a commodity. Emitting facilities covered by the program can tailor their compliance strategies to reflect their own least-cost approaches and adjust to changes in technology or market conditions by buying or selling allowances as needed in a private market.

FUNGIBILITY: the interchangeability of allowances, credits, and/or offsets, assuming that each unit represents a consistently measured and standardized quantity of emissions.

SOURCE: any plant or facility that produces emissions.

DEVELOPING AN EMISSIONS TRADING PROGRAM IN SLOVAKIA: A CASE STUDY



—Mary Shellabarger, U.S. EPA and Gabriela Fischerova, Slovakian Ministry of Environment

Slovakia has established a national cap and trade program for sulfur dioxide (SO₂) emissions. The sources affected by this program have received their allocations, and compliance begins in 2002. This article briefly describes the Slovakian program. Subsequent issues of the *Update* will provide further insight into the issues encountered during development and lessons learned for future program design.

LEGAL AUTHORITY

In 1998, the government of Slovakia passed a law allowing the use of emissions trading for air pollution control. This law gives authority to the Ministry of Environment to establish a cap and trade program for large and medium sources for a variety of pollutants. This is done by issuing an emissions quota for a specific pollutant to each of its 79 administrative districts. Consequently, each district is required to set quotas for individual sources. In this stage, only large sources—more than 50 MW thermal input—are in the program. The sources may trade the quotas or portions thereof. The law requires

that the district quotas be established at least 18 months prior to the start of the program. The districts must then issue the source quotas at least 9 months prior to the start of the program.

ESTABLISHMENT OF THE SO₂ PROGRAM

As a signatory of the Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone, Slovakia committed to

3 years of the program, 2002-2004. The Ministry began the program by issuing quotas in the initial year that total more than the current emissions for the affected sources. This cap on large sources decreases for the 2 subsequent years, with the intention that the cap will continue to decrease until 2010, when the emissions goal is achieved. More information on the development of the Slovakian trading program will be included in the



reduce its SO₂ emissions to 110 thousand tons by 2010. To guarantee that this commitment is met, the Ministry established a cap and trade program that will capture about 80 percent of the national SO₂ emissions. District quotas were announced for the first

next issue. For additional information in the meantime, please contact Stephanie Benkovic at <benkovic.stephanie@epa.gov> or 202 564-9142, or Gabriela Fischerova at <fischerova.gabriela@enviro.gov.sk>.

NEWS FROM AROUND THE WORLD



TRADING RELATED EVENTS

September 2001

UNCTAD/EARTH COUNCIL WORKSHOP TO PROMOTE THE EMERGING GREENHOUSE GAS (GHG) MARKET FOR ECONOMIES IN TRANSITION (EITs).

This workshop is a follow-up to a September 1999 workshop to explore trading-related issues, such as monitoring and reporting, and to identify ways to promote the GHG market in EITs. Contact: <Ricardo.Pronove@unctad.org>; Phone: (41-22) 917-2116; Fax: (41-22) 907-0044.

September 26-27, 2001

EPA NO_x BUDGET TRADING PROGRAM WORKSHOP in Alexandria, Virginia, USA. The workshop, which is free and open to the public, will address implementation of the NO_x trading program under the Clean Air

Act Section 126 Rule and the NO_x State Implementation Plan (SIP) Call. For more information, please see <www.epa.gov/airmarkets/fed/nox/index.html> or contact Gabrielle Stevens at <stevens.gabrielle@epa.gov>; Phone: 202 564-2681; Fax: 202 564-7372.

September 30 to October 2, 2001

THE EMISSIONS MARKETING ASSOCIATION (EMA) 5TH ANNUAL FALL MEETING AND INTERNATIONAL CONFERENCE

at the Hilton Oceanfront Resort in Hilton Head Island, South Carolina, USA. The conference will address policy and design aspects of emissions trading programs. Contact: Emissions Marketing Association, Phone: 414 276-3819; Fax: 414 276-3349; <www.emissions.org>.

October 14-18, 2001

SECOND INTERNATIONAL NITROGEN CONFERENCE

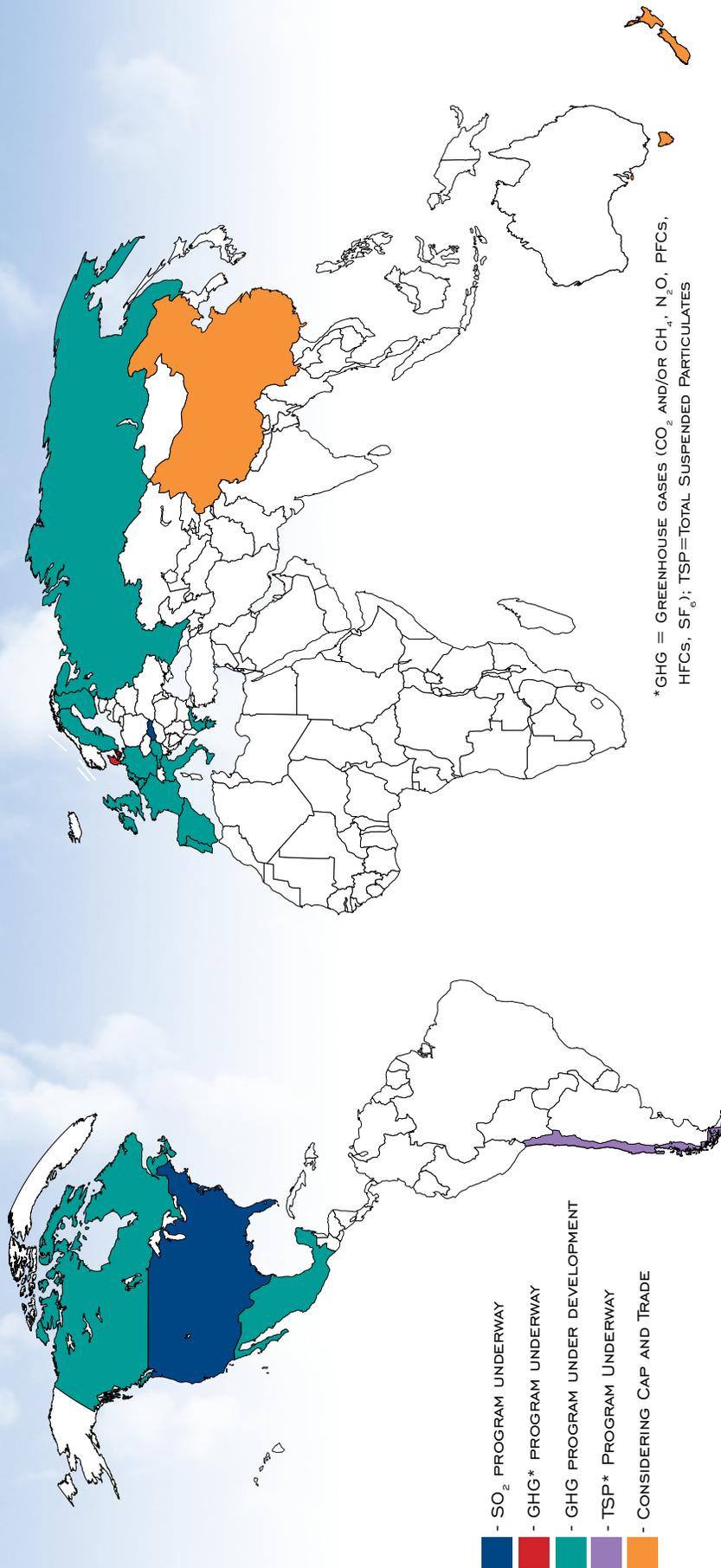
sponsored by U.S. government and industry organizations and the Dutch Ministry of Spatial Planning will be held in Potomac, MD, USA. Contact: Rhonda Kranz, Ecological Society of America, <rhonda@esa.org> or 202 833-8773.

Fall of 2001

EPA's Clean Air Markets Division will publish its **TOOLS OF THE TRADE: A GUIDE TO DESIGNING AND OPERATING A CAP AND TRADE PROGRAM.** Contact: Jennifer Macedonia at <macedonia.jennifer@epa.gov>; Phone: 202 564-9123.



DOMESTIC EMISSIONS TRADING PROGRAMS AROUND THE GLOBE



- A **EUROPEAN UNION** (EU)-wide GHG program is under development. See <<http://europa.eu.int/comm/environment/climat/eccp.htm>>.
- The **UNITED KINGDOM** is developing an emissions trading program that includes cap and trade, rate-based, and project-based trading for GHGs. See <www.defra.gov.uk/environment/climatechange/cm4913/index.htm>.
- **DENMARK** began a GHG emissions trading program in January 2001. See <www.ens.dk/uk/energy_reform/emissions_trading/index.htm>.
- In addition to having an SO₂ cap and trade program under way, **SLOVAKIA** also has a GHG cap and trade program under development.
- **CANADA** has pilot project-based offset programs in place for GHGs, SO₂, NO_x, and volatile organic compounds (VOCs) and is developing a cap and trade program in Ontario for SO₂ and NO_x. For further information on Canada's programs, see <www.nccp.ca/NCCP/whatsnew/index_e.html>. For Ontario, see <www.ene.gov.on.ca/envision/env_reg/er/documents/2001/ra01e0009.pdf>.
- **RUSSIA** and **MEXICO** have programs under development that involve internal company-level (PEMEX in Mexico, RAO-UES in Russia), rather than national-level, trading. For information on Mexico's programs, see <www.environmentaldefense.org/pubs/NewsReleases/2001/Jun/a_pemex.html>.
- **CHINA** has pilot offset programs in several cities and has just begun to develop a pilot SO₂ cap and trade program in Taiyuan, Shanxi Province.
- **CHILE** has launched a cap and trade project for total suspended particulates (TSP). See <<http://web.mit.edu/ceep/wwww/2000-005.pdf>>.
- In the **UNITED STATES**, cap and trade programs are under way nationally for SO₂, in the Northeast for NO_x, in southern California for SO₂ and NO_x, and in the Chicago area for volatile organic material (VOM). In addition, many states have offset or credit trading programs for NO_x and/or VOCs. For California's programs, see <www.aqmd.gov/reclaim/reclaim.html>. For Chicago, see <www.epa.state.il.us/air/erms/overview.html>.
- Because the Acid Rain Program applies only to the 48 contiguous United States, Alaska and Hawaii are not part of the program and therefore are not shaded.

This map shows the extent of emissions trading around the world. There may be additional trading programs for which information was not available at press time. Please send any updates on cap and trade programs to <camu@epa.gov>.