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Developing a German and an International Emissions Trading System- Lessons from U.S. Experienced with the Acid Rain Program

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ARTICLES

DEVELOPING A GERMAN AND AN INTERNATIONAL EMISSIONS TRADING SYSTEM - LESSONS FROM U.S. EXPERIENCES WITH THE ACID RAIN PROGRAM

*Isabel Rauch**

INTRODUCTION

The German Federal Constitutional Court recently declared taxes on packaging material and fees for wastes as inconsistent with the German Constitution.¹ This not only demonstrates that economic incentives are highly relevant in the debate about environmental instruments in German law, but also opens up new opportunities for emissions trading mechanisms. Although the environmental taxation system and the emissions trading scheme both belong to the category of economic instruments that attempts to reduce environmental pollution using market forces, they differ considerably in their individual concepts. Under a taxation system, the tax (price) is set exogenously by the legislature and the

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1. BVerfGE 98,83; BVerfGE 98,106.

pollution level is determined endogenously by the industry.² Under an allowance trading system, the allowable pollution level is set exogenously by the regulator and the price for an allowance is determined endogenously by the market.³ Hence, in terms of environmental protection, a trading system is arguably more protective than a taxation scheme. In addition, an emissions trading program may provide a welcome alternative to current mechanisms and end the long-standing German debate over environmental taxes. Although the idea of introducing such a system into German law has been considered before, no actual attempts to realize this idea have been made. The reason for such inactivity has been the German government's fear of being burdened with an immense load of legislative and administrative work, as well as uncertainty about the eventual outcome. The latter concern may be addressed by an analysis of the effects of the emissions trading program under the United States Clean Air Act ("CAA").⁴

The idea of employing market mechanisms to combat air pollution was originally introduced thirty years ago by J.H. Dales.⁵ Since then, this proposal has become

2. See Michael C. Naughton, *Establishing Interstate Market for Emissions Trading of Ozone Precursors*, 3 N.Y.U. ENVTL. L.J. 195, 202-03 (1994).

3. See *id.* at 202.

4. Clean Air Act §§ 101-618, 42 U.S.C. §§ 7401-7671q (1994) (hereinafter CAA).

5. See JOHN HARKNESS DALES, *POLLUTION, PROPERTY AND PRICES* (1968). Since then trading has been supported by others. See generally Robert N. Stavins, *What Can We Learn from the Grand Policy Experiment? Lessons from SO₂ Allowance Trading*, 12 J. ECON. PERSP. 69, 70 (1998); Daniel J. Dudek *et al.*, *Environmental Policy for Eastern Europe: Technology-based Versus Market-based Approaches*, 17 COLUM. J. ENVTL. L. 1, 3-4 (1992) [hereinafter Dudek *et al.*, *Environmental Policy for Eastern Europe*]; Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN.

increasingly popular, even among environmentalists. Although a number of trading programs have been developed in several countries, the Acid Rain Program in the U.S.⁶ is still the most comprehensive and complex allowance market. It may therefore serve as the best model for future programs.

The Acid Rain Program ("Title IV") provides for an innovative market-based allowance trading system designed to reduce sulfur dioxide (SO₂) emissions, one of the primary precursors of acid rain. Under this system, fossil fuel-fired power plants, the principal emitters of SO₂, are allotted tradeable allowances⁷ based on their past fuel usage and statutory emission limitations. Each allowance entitles a facility to emit one ton of SO₂

L. REV. 1333 (1985); James T.B. Tripp & Daniel J. Dudek, *Institutional Guidelines for Designing Successful Transferable Rights Programs*, 6 YALE J. ON REG. 369, 391 (1989); Daniel J. Dudek & John Palmisano, *Emissions Trading: Why is this Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L. 217, 222 (1988); Chelsea H. Congdon et al., *Economic Incentives and Nonpoint Source Pollution - A Case Study of California's Grasslands Region*, 2 HASTINGS W.N.W. J. ENVTL. L. & POL'Y 185, 194 (1995); Horst Zimmermann & Bernd Hansjürgens, *Zertifikate im Instrumentvergleich aus ordnungspolitischer Sicht [Comparing Allowances with Other Instruments from a Command-and-Control Point of View]*, in UMWELTZERTIFIKATE - DER STEINIGE WEG ZUR MARKTWIRTSCHAFT [EMISSIONS TRADING - THE STONY PATH TO MARKET ECONOMY] 47, 59 (Holger Bonus ed., 1998) [hereinafter *Zimmermann & Hansjürgens, Comparing Allowances with Other Instruments*]; Joachim Weimann, *Wettbewerbspolitische Aspekte von Zertifikaten [Competition Policy Aspects of Allowances]*, in UMWELTZERTIFIKATE - DER STEINIGE WEG ZUR MARKTWIRTSCHAFT [EMISSIONS TRADING - THE STONY PATH TO MARKET ECONOMY] 61 (Holger Bonus ed., 1998); Richard Schmalensee et al., *An Interim Evaluation of Sulfur Dioxide Emissions Trading*, 12 J. ECON. PERSP. 53, 65 (1998).

6. Title IV of the CAA is called the "Acid Rain Program."

7. While the CAA talks of "allowances," this Article uses the terms "allowance," "credit" or "permit" as synonyms.

during or after the year specified in the allowance serial number. At the end of any given year, the number of allowances a facility holds must equal or exceed total emissions at that unit; otherwise, stringent penalties will be applied.⁸ The ultimate goal of Title IV is to decrease annual emissions of SO₂ by ten million tons from 1980 emissions levels.⁹ In order to reach this goal, the CAA allows no more than 8.90 million tons of SO₂ to be emitted by the electric utility industry per year.¹⁰ A detailed analysis of this Program and its effects may provide important lessons for how a similar program may be introduced into the German law system.

The discussion of emissions trading is not restricted to the national level. International representatives at the Kyoto Conference in 1997¹¹ adopted the basic idea of tradeable permits, while representatives at the Buenos Aires Conference in 1998¹² and the future Conferences of the Parties ("COPs")¹³ are left with the responsibility of arriving at the details. Future conferences may be more successful if doubts about the efficiency of trading systems are resolved. Some critics have questioned whether a trading system is a progressive means of fighting air pollution or just an attractive-sounding notion behind which polluting companies can hide their discharges by acquiring "indulgences."¹⁴ Again, experience with the U.S. emissions trading program may be useful in predicting the effectiveness of an international trading model and how it would have to be structured in

8. See CAA §411(a).

9. See CAA § 401(b).

10. See CAA § 403(a)(1).

11. The conference was held on December 8-11.

12. The conference was held on November 2-13.

13. The 1999 COP was held on October 25-November 5, 1999 in Bonn, Germany. The next COP will be held on November 13-24, 2000 at The Hague, Netherlands.

14. For a discussion of the criticisms of a trading system, see Part I.A.1.c.

order to be effective. However, few legal analyses have been undertaken on whether an emissions trading system complies with international customary law and international conventions.

The purpose of this Article is to analyze the legal and practical difficulties as well as shortcomings of the existing Acid Rain Program in the United States. The findings will help in evaluating whether and how similar programs may be set up in Germany, as well as on an international level, within the context of the international climate change conventions. Furthermore, this analysis proposes that an allowance trading system for either SO₂ or carbon dioxide (CO₂) should contain certain mechanisms in order to be effective. Part I provides a discussion of the U.S. Acid Rain Program with its theoretical and legal background and current problems. Part II examines whether it is legally feasible to introduce a similar program into the German legal system. This discussion does not only consider German law, but also European and international law. Part III discusses legal constraints of an international CO₂ allowance market and proposes some design features that support the program's effectiveness. Part IV draws conclusions for the introduction of a trading program in the real world by including interdisciplinary aspects in the discussion. Finally, this Article makes suggestions about long-term air pollution policy.

I. THE U.S. CLEAN AIR ACT TITLE IV (ACID RAIN PROGRAM)

This Part analyzes the Acid Rain Program under Title IV of the CAA by first reviewing the economic and historical background of the program, focusing on some of the problems with implementation of the program, and finally drawing conclusions for other trading programs. It is useful to review the background of pollution trading in the U.S. in order to understand the Acid Rain Program better, especially its difficulties. This Part concludes that the trading system established by Title IV,

despite several shortcomings, provides a substantial structure for an economically and environmentally effective mechanism to reduce air pollution. Based on the conclusions concerning the individual structural elements of the program, lessons for similar trading programs can be drawn.

A. *Background of the Acid Rain Program*

The following presentation of the background of the Acid Rain Program includes the general economic theory of emissions trading systems, the history of trading programs in U.S., and the legal framework of Title IV. A discussion of the strengths and weaknesses of economic incentives, especially emissions trading, compared with those of a regulatory approach demonstrates that neither program is clearly superior to the other.¹⁵

The Acid Rain Program builds upon prior experiences with trading mechanisms. The most important of the program's predecessors is the air emissions trading program established by the U.S. Environmental Protection Agency ("EPA") in 1974.. This program offered sources¹⁶ four alternatives for dealing with the credits acquired through emission reductions: offsetting, bubbling, netting and emissions banking.¹⁷ A brief look at other trading systems illustrates the popularity of the methods for dealing with emission credits.¹⁸ A description of how the Acid Rain Program is actually designed and embedded in the regulatory framework of the CAA is necessary in order to understand its current problems.

15. See discussion *infra* Part I.A.1.

16. Throughout this Article, "sources" refers to various industrial producers of pollution.

17. See discussion *infra* Part I.A.2.a.

18. See discussion *infra* Part I.A.2.b.

1. Theory of Emission Allowances as Economic Instruments

Under the traditional "command and control" regulatory approach predominantly used in environmental law, a government agency is responsible for overseeing pollution control.¹⁹ The government agency controls the level of pollution reduction through "various regulations, allocates control responsibility among the polluters, and establishes an enforcement mechanism to ensure that reductions are met."²⁰ Pollution reductions are generally achieved by two control methods: performance standards and technology-based standards.²¹ In the first case, the regulatory agency establishes a limit for a particular pollutant.²² In the latter, it specifies a certain technology for the control of a particular pollutant or the level of reduction to be achieved by that technology.²³ Economic incentive programs, on the other hand, provide an economic benefit for pollution reductions or an economic penalty for pollution.²⁴ These programs seek to overcome what some contend to be

19. See generally Matthew Polesetsky, *Will a Market in Air Pollution Clean the Nation's Dirtiest Air? A Study of the South Coast Air Quality Management District's Regional Clean Air Incentives Market*, 2 *ECOLOGY L.Q.* 359, 366 (1995).

20. Christopher S. Hooper, *Limiting the Use of Emissions Allowances: A Statutory Analysis of Title IV of the 1990 Amendments to the Clean Air Act*, 5 *N.Y.U. ENVTL. L.J.* 566, 569 (1996).

21. See Vincent Joseph Rafferty, Jr., *Uncle Sam Goes to Market: Federal Agency Disposal of Emission Reduction Credits Under the Federal Property Management Regulations*, 146 *MIL. L. REV.* 154, 168 (1994).

22. See *id.*

23. See *id.* at 168 & n.74.

24. See David M. Driesen, *Is Emissions Trading an Economic Incentive Program?: Replacing the Command and Control / Economic Incentive Dichotomy*, 55 *WASH. & LEE L. REV.* 289, 323 (1998).

weaknesses of traditional regulation by spurring innovation and providing continuous incentives.²⁵

Among all economic instruments, emissions trading is designed to trigger market forces leading to a more efficient allocation of resources than traditional regulatory alternatives, thereby making it possible to achieve the goal of reducing emissions at a lower cost. Sources that cannot achieve the targeted level of emissions can purchase allowances from a party whose reduction exceeds its mandated amount. Therefore, an incentive exists for each party to reduce pollution below the legally required level so that unused allowances may be sold.²⁶ While theoretically emissions trading has potential and actual strengths, it nonetheless carries weaknesses and risks. The differences that a system of environmental taxation would make to an emissions trading program will be woven into the following overview wherever they occur.

a. Strengths of an Emissions Trading System

An emissions trading market is expected to lead to a cost-effective allocation of emission reductions. Not only will sources benefit from decreased expenses by participating in emissions trading, but government agencies may also be able to spend less resources regulating these sources. This latter assumption, however, is under dispute.²⁷ Furthermore, a trading system may provide an incentive for development of innovative

25. See Wolfgang Köck, *Umweltrechtsentwicklung und Ökonomische Analyse* [Development of Environmental Law and Economic Analysis], NATUR UND RECHT 412 (1992) [hereinafter Köck, *Development of Environmental Law*], for an overview of the different economic instruments and their theoretical background.

26. See Robert W. McGee & Walter E. Block, *Pollution Trading Permits as a Form of Market Socialism and the Search for a Real Market Solution to Environmental Pollution*, 6 FORDHAM ENVTL. L.J. 51, 51-52 (1994).

27. See discussion *infra* Part I.A.1.a.(1).

technology to reduce emissions, which will ultimately benefit the environment. If the industrial sources recognize the benefits of a trading system, they will play a leading role on the trading stage. Finally, once a market for emissions trading is established, sources will refrain from engaging in litigation and exerting political pressure.

(1) Economic Efficiency

The greatest strength of a trading scheme is its assumed economic efficiency.²⁸ The theory under which emissions trading reduces costs is straightforward. The costs of controlling emissions varies among industrial plants. If emission credits are transferable, sources that can control their emissions most cheaply have an incentive to do so since they will be able to sell any excess credits and make an additional economic profit. Plants whose control costs are higher than the cost of an allowance will be interested in purchasing those excess credits, thereby providing a constant demand for credits. Whenever an allocation of control responsibility is not cost-effective, opportunities for trade exist. When all such opportunities have been fully exploited, the allocation is cost-effective.

Theoretically, a trading scheme will lead to a more efficient allocation of resources than would occur through government regulation. Not only will an emissions trading program make it possible for industry to reduce emissions at a lower cost, transaction costs involved in finding the best reduction technology also would be reduced.²⁹ These cost reductions can best be understood

28. The analysis in the following paragraph is based on a discussion found in THOMAS H. TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY 16 (1985).

29. See Dieter Cansier, *Umweltzertifikat* [Environmental Allowance], in 2 HANDBUCH DES UMWELTRECHTS 944 (Otto

by comparing the regulatory and the economic approaches.

Proponents of emissions credit trading system suggest that regulatory mechanisms are unnecessarily expensive because significant costs result from making centralized decisions on how to achieve pollution control over the activity of numerous facilities and industries.³⁰ A regulatory approach that imposes uniform requirements largely ignores the substantial differences in pollution abatement costs among facilities and is inefficient.³¹ This approach requires every source to institute certain pollution control technologies. Additionally, installation costs are not taken into account. Since differ-

Kimminich ed., 1988) [hereinafter Cansier, *Environmental Allowance*]; Alfred Endres, *Umweltzertifikate - Die marktwirtschaftliche Lösung?* [*Environmental Allowances - The Solution of the Market?*], in *ÖKOLOGIE, ÖKONOMIE UND JURISPRUDENZ* [ECOLOGY, ECONOMY, AND JURISPRUDENCE] 57, 58 (Edgar Michael Wenz et al. eds., 1987) [hereinafter Endres, *Solution of the Market*]; John J. Fialka, *EPA Plans Emissions-Trading Program to Reduce Nitrogen-Oxide Pollution*, WALL ST. J., Apr. 30, 1998, at B11; JOHANNES HEISTER & PETER MICHAELIS, *UMWELTPOLITIK MIT HANDELBAREN EMISSIONSRECHTEN, MÖGLICHKEITEN ZUR VERRINGERUNG DER KOHLENDIOXID- UND STICKOXIDEMISSIONEN* [ENVIRONMENTAL POLICY WITH TRADEABLE EMISSION CREDITS, POSSIBILITIES FOR THE REDUCTION OF CARBON DIOXIDE AND NITROGEN OXIDE EMISSIONS] 6 (1991) [hereinafter HEISTER & MICHAELIS, *ENVIRONMENTAL POLICY*]; Tom Jones & Jan Corfee-Morlot, *Climate Change: Designing a Tradeable Permit System*, in *CLIMATE CHANGE: DESIGNING A TRADEABLE PERMIT SYSTEM* 17, 17 (Tom Jones & Jan Corfee-Morlot eds., 1992); Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy for Slowing Global Warming*, 22 ENVTL. L. 623, 629 (1992); Stavins, *supra* note 5, at 78. *But see* Jeanne M. Dennis, *Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Act Amendments of 1990*, 40 UCLA L. REV. 1101, 1137 (1993).

30. See Polesetsky, *supra* note 19, at 366.

31. See *id.*

ent sources using different kinds of pollution control technologies require different kinds of adjustments, the costs of reducing a fixed amount of a pollutant may vary among sources.³² By mandating certain pollution control technologies, command and control regulation may result in firms having to spend more money than they might otherwise have spent on other technology that is equally-efficient and is more suitable for their needs.³³

A market-based trading system, on the other hand, would target only those sources that could reduce costs most effectively, perhaps saving billions of dollars.³⁴ This system could provide a low-cost solution through the sale of allowances. The market approach theory allocates reduction measures to the source that can do it most efficiently. By reducing marginal costs, a market price for reducing units of pollution is created.³⁵ Furthermore, the cost of pollution reduction will not exceed the market price of a trading credit because of the interaction between supply and demand.³⁶ The interaction between demand and supply will remain constant as every source has an incentive to reduce emissions up to the market price of a trading credit in order to sell the credit for a profit on the market.³⁷ Sources which reduce pollution below their allocated level may sell their surplus permits to other sources and thereby provide a sufficient supply of allowances. Other sources could save money by buying credits on the market instead of installing emission-reducing technology, thereby creating a demand for credits.

Theoretically, market-based policies should yield lower costs and greater efficiency than regulations. Whether

32. See Polesetsky, *supra* note 19, at 369.

33. See *id.*; Hooper, *supra* note 20, at 569.

34. See TIETENBERG, *supra* note 28, at 16; Polesetsky, *supra* note 19, at 366.

35. See Polesetsky, *supra* note 19, at 369-70.

36. See *id.* at 370.

37. See *id.*

this theory actually proves true and works successfully for all kinds of industrial sources and different control technologies is another question. For smaller sources, which generally have relatively higher transaction costs than larger sources, this mechanism may not work. When a source searches for a trading partner, it incurs transaction costs, which are fixed amounts. For example, a small source capable of trading 100 allowances has to spend the same amount as a large source looking to trade 1,000. Therefore, market-based policies may not necessarily yield lower costs and greater efficiency than regulation.

The question of whether an emissions trading system causes additional governmental administrative expenses or reduces them remains unresolved. Some observers believe that emissions trading would actually increase administrative costs, because not only will monitoring and control be kept at the same level, but allocation and transfer of permits, general information services, and the control of the competitive market will require more personnel and money.³⁸ In that event, the trading approach would not outweigh the regulatory system in economic efficiency.³⁹ The majority of commentators, however, assume that administrative procedures would be lessened and simplified and administrative costs

38. See e.g., Alexander Blankenagel, *Umweltzertifikate - Die rechtliche Problematik* [Environmental Credits - Legal Problems], in *ÖKOLOGIE, ÖKONOMIE UND JURISPRUDENZ* [ECOLOGY, ECONOMY, AND JURISPRUDENCE] 71, 77 (Edgar Michael Wenz et al. eds., 1987) [hereinafter Blankenagel, *Environmental Credits*]; Gerhard Feldhaus, *Marktwirtschaft und Luftreinhaltung* [Market Economy and Air Pollution Control], *DEUTSCHES VERWALTUNGSBLATT* 552, 554 (1984) [hereinafter Feldhaus, *Market Economy and Air Pollution Control*]; *Development of Environmental Law*, supra note 25, at 415.

39. See *Development of Environmental Law*, supra note 25, at 415.

within a regulatory system would decrease.⁴⁰ The process of determining pollution control requirements within a regulatory system requires substantial administrative costs, as regulators must collect and analyze information about control technologies for all kinds of polluters. This research includes determining which control technologies actually function properly and whether it is economically feasible to impose them on the industries.⁴¹ The process is long and may easily delay the attainment of statutory objectives, which again is ecologically undesirable. Therefore, a tradeable permit market should shift some of the burden of emissions control from government agencies to industry.

An emissions trading system is especially advantageous in comparison with a system of environmental taxation. In a tax system, the regulator must know the external costs of pollution, for each pollutant at each source. Those costs are generally difficult, if not impossible, for the regulator to determine. After an initial estimate, they must incorporate changes in the impact of the source's pollution, economic activity, and inflation.⁴² In contrast, an allowance trading system is capable of determining the shadow price and is therefore preferable.⁴³ However, a tax system may still be attractive as taxes may be more easily administered than permits, and therefore may out-perform permits in ease of implementation.⁴⁴

40. See, e.g., Cansier, *Environmental Allowance*, *supra* note 29, at 944.

41. See Polesetsky, *supra* note 19, at 367.

42. See Naughton, *supra* note 2, at 201-02.

43. See Wolfgang Gick, *Zertifikate - ein geeigneter Weg in der Umweltpolitik* [Allowances - An Appropriate Path in Environmental Policy], 4 AKTUELLE ANALYSEN 7 (1996) [hereinafter Gick, *Allowances*]. The shadow price is the monetary cost of the environmental harm a source causes.

44. See Tom Jones & Jan Corfee-Morlot, *supra* note 29, at 18.

(2) Innovative Efficiency

Another direct effect of an emissions trading program is an increase in innovative efficiency.⁴⁵ However, viable pollution control techniques may not be detected in a centralized decision-making system because regulating agencies, which must choose the technical solutions mandated by their legislatures, generally do not have the best information on the feasibility of pollution control technologies and the cost of potential solutions.⁴⁶ Plant managers and their engineers are in a much better position to discover appropriate pollution control technologies.⁴⁷ If plant owners do not have incentive to develop new technology, they may refrain from doing so, fearing that the legislature may raise the mandatory technological requirements and enact more stringent standards. Thus, the firm's operating costs will rise.⁴⁸ An allowance trading system avoids this possibility. As the right to pollute in such systems must be paid for, sources have incentive to develop new pollution-reducing technology. Rather than buying additional credits, they will innovate.⁴⁹ The impetus to develop

45. See Endres, *Solution of the Market*, *supra* note 29, at 59; Perry S. Goldschein, *Going Mobile: Emissions Trading Gets a Boost from Mobile Source Reduction Credits*, 13 UCLA J. ENVTL. L. & POL'Y 225, 232 (1994/95); Marchant, *supra* note 29, at 630; Dudek *et al.*, *Environmental Policy for Eastern Europe*, *supra* note 5, at 9.

46. See Polesetsky, *supra* note 19, at 366-67.

47. See Holger Bonus & Michael Häder, *Zertifikate und Neue Institutionenökonomik [Allowances and New Institutions Economy]*, in *UMWELTZERTIFIKATE - DER STEINIGE WEG ZUR MARKTWIRTSCHAFT [EMISSIONS TRADING - THE STONY PATH TO MARKET ECONOMY]*, *supra* note 5, at 32, 39; Polesetsky, *supra* note 19, at 367, 369.

48. See Polesetsky, *supra* note 19, at 367.

49. See Cansier, *Environmental Allowance*, *supra* note 29, at 944. Concerning the spread of best available control technology, Kloepfer points out the potential of a market fail-

new technology may even create competition among fuel producers and equipment manufacturers to develop cleaner products.⁵⁰

(3) Environmental Effectiveness

The purpose of using an emissions trading program is to achieve environmental goals effectively. The presumption is that a tradeable permit system is much more successful in controlling air pollution than regulation. In theory, prescribed emission standards will be met since only holders of emission credits may emit the regulated pollutant, and will do so only up to the amount permitted under the allowances held.⁵¹ However, a tradeable permit system may be less reliable than regulation since the actual response of the marketplace cannot be predicted with absolute certainty. Furthermore, it is unclear whether tradeable permits are more effective than environmental taxation. The most obvious difference between a tax and a tradeable permit system lies in their structure. Under a permit trading system, the allowable pollution level is set externally by the regulator and the price for an allowance is determined internally by the market. Alternatively, under a tax system, the tax is set externally by the legislature and the pollution level is determined internally by industry.⁵² Accordingly, the given standard of emis-

ure. MICHAEL KLOEPFER, *UMWELTRECHT* [ENVIRONMENTAL LAW] § 5-304 (1998) [hereinafter KLOEPFER, ENVIRONMENTAL LAW].

50. See Center for Clean Air Policy, *Air Quality Publications, Greenhouse Emissions Trading: Improved Compliance at Reduced Cost* at 1 (visited April 13, 2000) <<http://ccap.org>> [hereinafter Center for Clean Air Policy].

51. See, e.g., Cansier, *Environmental Allowance*, *supra* note 29, at 944; Endres, *Solution of the Market*, *supra* note 29, at 59.

52. See Naughton, *supra* note 2, at 202-03; Zimmermann & Hansjürgens, *Comparing Allowances with Other Instruments*, *supra* note 5, at 50; James E. Krier, *Marketable Pollution Allowances*, 25 U. TOL. L. REV. 449, 453 (1994).

sions cannot be exceeded in a tradeable permit system. The trading mechanism, therefore, offers certainty and is environmentally preferable to a tax system.

(4) Avoiding Litigation and Political Pressure

Since regulation may increase costs for industries, those industries may try to mitigate these burdens by exerting political pressure or engaging in litigation.⁵³ In contrast, litigation is not as prevalent in a market system. The regulatory agency no longer mandates the installation of certain control technologies. Furthermore, political pressure on the legislative bodies by the industry should largely disappear as the legislature will leave it to the polluters to make further reductions if they find that doing so is worthwhile instead of imposing more stringent standards. Thus, economic instruments such as emissions trading lessen industries' need to exert political pressure on the governmental agencies and relieve courts from litigation.

b. Weaknesses and Risks

Although there are many advantages to a trading scheme, there may also exist in such a scheme several weaknesses and potential risks. Some of these weaknesses and risks include pollution hot spots, monitoring, and distributional problems, all of which create environmental, economic and technical difficulties. Even though, at first glance, the advantages seem numerous, one must not overlook the substantial uncertainty a market always entails. Demand and supply can rarely be accurately predicted. The following section discusses some of the weaknesses and risks inherent in a trading scheme.

53. See Polesetsky, *supra* note 19, at 367.

(1) Environmental Risks of Marketable Credits

No trading program will ever be capable of completely eliminating harmful emissions.⁵⁴ Although this seems to be a severe weakness of the program, it is doubtful whether any other program could provide for a complete avoidance of emissions. Much more serious is the fact that, without any regional restriction, a trading market has the potential to cause local pollution hot spots. If emission reductions do not occur at the sources most responsible for contaminating sensitive ecosystems, those regions will be highly polluted.⁵⁵ Another environmental risk of marketable credits is that the trading system relies heavily on the assumption that pollution discharges can be accurately monitored. Critics assert that current technologies and systems of governmental administration have not yet been able to adequately deal with the monitoring problem.⁵⁶

(2) Uncertainty about Economic Effects

While a tax is fixed and certain, prices of emission allowances can only be estimated.⁵⁷ Thus, the potential economic effects of a credit system are much more difficult to assess than those of a tax system. This may be irrelevant since there is no need for the government to determine the price of the credits. Nevertheless, uncertainty about the potential economic effects causes a far more serious problem for the market, because it causes potential participants to refrain from actively participating in it. The risk of unprofitable transactions will keep sources from experimenting in the market.

54. See Gick, *Allowances*, *supra* note 43, at 39.

55. See Cansier, *Environmental Allowance*, *supra* note 29, at 945. Krier, *supra* note 52, at 453.

56. See *Development of Environmental Law*, *supra* note 25, at 415; Polesetsky, *supra* note 19, at 371 n. 93.

57. See HEISTER & MICHAELIS, *ENVIRONMENTAL POLICY*, *supra* note 29, at 7.

Uncertainty about the price of the credits might even lead to hesitation regarding future investments.⁵⁸ Therefore, it is unclear whether a trading mechanism will lead to an increase in innovations.

(3) Technical Difficulties

Several technical difficulties will arise when the initial allocation and subsequent devaluation of the allowances occurs. Problems may arise when credits are initially allocated by the government. A possible solution for potential problems is to allocate the pollution credits to sources based on their former permits (i.e., according to the amount of pollutants that they were allowed to release under their former permits).⁵⁹ As sources rarely emit at the maximum level allowed, a tremendous amount of pollution allowances may be created that do not reflect true emission reductions.⁶⁰ This allocation method would cause a second problem as permit holders would associate a right to pollute a certain amount with their permits. This use frustrates the purpose behind permits. A permit is granted with the expectation that its holder does not harm the environment.⁶¹ Another method of allocating credits is based upon the actual emissions of the utilities during a certain period of time. However, this method would result in an unjustified preferential treatment of those sources which did not employ any pollution reduction methods during that time period.⁶²

After determining the conditions of initial allocation of credits, the government must also design a method for

58. See Gick, *Allowances*, *supra* note 43, at 10.

59. Most plants are required to have a permit in order to be allowed to operate their facilities.

60. See Feldhaus, *Market Economy and Air Pollution Control*, *supra* note 38, at 554.

61. See *id.*

62. See *id.*

devaluing them over the course of time. If not, the final goal of all environmental policy (to create air conditions as clean and healthy as possible) cannot be attained. However, finding an appropriate devaluation method may prove to be a problem. In order to reduce the right amount at the right time, a great deal of technical and scientific data is needed far in advance in order to make a sufficiently safe prognosis.⁶³ This will cause costs for the agencies and possibly even compensate for the cost savings achieved through the new approach.

c. Overall Assessment

Whether economic incentives are, on the whole, more efficient compared with regulatory approaches, and more specifically, whether tradeable permits are preferential to environmental taxes, is highly controversial. Some commentators are generally against economic incentives.⁶⁴ They doubt that the expected economic mechanism really works efficiently. An incentive to continuously reduce emissions would require a continuously increasing demand for allowances. An increasing demand for allowances, on the other hand, would not occur without an increase in environmental pollution through economic growth.⁶⁵ Sources would not start selling their credits just because credit prices are rising. As there is always the possibility that other credit-holders hoard their credits, sources might want to be careful and keep their own credits should they need them later on. All these potential imponderables would make the market more unpredictable.⁶⁶ Another poten-

63. *See id.*

64. *See infra* notes 65-68.

65. *See* ECKARD REHBINDER, POLITISCHE UND RECHTLICHE PROBLEME DES VERURSACHERPRINZIPS [POLITICAL AND LEGAL PROBLEMS OF THE CAUSATION PRINCIPLE] 135 (1973) [hereinafter CAUSATION PRINCIPLE].

66. *See id.*

tial problem with a trading system for air pollutants would be the numerous sources that must be controlled. Henceforth, the real problems of emissions trading may not be theoretical, but logistical. Enforceable targets and a limited number of players are required. Measurement and monitoring systems have to be effective. Also, the legislature must resist complaints about difficulties of reducing emissions and not hand out more pollution rights.⁶⁷ In sum, an instrument like pollution allowances might appear to be simple on first sight, but may not be effective in light of the numerous uncertainties of an air pollution market.⁶⁸

Other observers believe that pollution allowances do not offer overwhelming advantages compared to taxes or regulatory instruments.⁶⁹ These critics consider economic incentives more desirable because of their peculiarity in requiring more responsibility on the part of industry.⁷⁰ Under a regulatory approach, source operators remained rather passive about pollution control measures. They would follow the statutory standards whenever required to, but did not take the initiative to establish environmental policy by themselves. A trading scheme, on the other hand, will force the source owners to develop their own management policies. They will have to decide whether they prefer to employ reduction technology or buy additional credits. This responsibility is considered worthwhile when making the choice between a regulatory and an economic incentive approach.

A third group of commentators is in strong support of economic incentives,⁷¹ including the U.S. Environmental Protection Agency ("EPA"). The EPA has stated in its final rule for the Title V Operating Permit Program that it

67. See *Money to Burn?*, THE ECONOMIST, Dec. 6, 1997, at 86.

68. See CAUSATION PRINCIPLE, *supra* note 65, at 135.

69. See Gick, *Allowances*, *supra* note 43, at 39-40.

70. See *id.*

71. See authorities cited *supra* note 5.

is committed to using market-based principles to achieve the greatest level of environmental protection at the least cost.⁷² The EPA's commitment to market-based programs is also apparent in its proposed rule on Economic Incentive Programs ("EIPs"), in which the Agency declares that flexible approaches allow for less costly control strategies and for the development and implementation of innovative emission reduction technology.⁷³ Similarly, in its Interim Guidance on the Generation of Mobile-Source Emission Reduction Credits ("MERCs"), the EPA indicated that it favors trading programs, "because they offer the greatest environmental benefit for a given level of cost to society (or conversely, the least costly method for achieving a given level of environmental benefit)."⁷⁴

2. Historical Development

The Acid Rain Program is not the first economic incentive program for pollution control in the U.S. A brief review of the development of market incentives for the reduction of air pollution under the Clean Air Act is useful as a background on the current Acid Rain Program.

a. Precursors of the Acid Rain Program

Prior to the enactment of the 1990 Amendments to the CAA, the EPA experimented with several approaches that used economic incentives to regulate air pollution and set out elements of an emissions trading program in the EPA's 1986 Emissions Trading Policy Statement

72. See Operating Permit Program, 57 Fed. Reg. 32,250, 32,251-52 (1992)(to be codified at 40 C.F.R. pt. 70).

73. See Economic Incentive Program Rules, 58 Fed. Reg. 11,110 (1993)(to be codified at 40 C.F.R. pt. 51).

74. Interim Guidance on the Generation of Mobile Source Emission Reduction Credits, 58 Fed. Reg. 11,134, 11,141 (1993).

("ETPS").⁷⁵ The ETPS outlined four market-based mechanisms: offsets, bubbles, netting and emissions banking.⁷⁶ These mechanisms are united by a common policy whereby an operator of an emitting source is permitted to create reductions of emissions at certain emission sources beyond the requirements applicable to the source, and to use these reductions to meet requirements applicable to other sources.⁷⁷ The "common currency" of all emissions trading activity is the Emission Reduction Credit ("ERC").⁷⁸ States can establish their own ERC programs including either stationary, area, or mobile sources and have discretion concerning the creation, banking, transfer, and use of ERCs.⁷⁹ While each method requires the creation of surplus emissions reductions below the baseline of one source and the compensatory use of emissions at another source,⁸⁰ they may be used in the following four ways.

(1) *Bubble Policy*: The bubble policy allows existing plants to increase emissions at one source beyond the emission limitations set forth in the applicable State Implementation Plan ("SIP") in exchange for compensating decreases of emissions at other sources within a plant.⁸¹ The bubble concept considers the several sources as one source ("bubble") and seeks to impose on the group of sources an emission limitation, which is equivalent to the aggregated emission limitations previously applicable to these single sources.⁸²

75. Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits, 51 Fed. Reg. 43,814 (1986) (final policy statement) [hereinafter ETPS].

76. *Id.* at 43,830-31

77. *See id.* at 43,831.

78. *See id.* at 43,814, 43,831.

79. *See id.*

80. *See id.* at 43,830.

81. *See* ETPS, 51 Fed. Reg. at 43,830.

82. *See id.*

(2) *Netting Policy*: Netting is when an existing source expanding or modernizing will not be subject to resource-intensive and time-consuming administrative procedures for new plants if the sources compensate for added emissions by reducing the pollution from existing emission sources in the same plant.⁸³

(3) *Offset Policy*: The offset policy allows new major stationary sources and modified existing sources to comply with ambient requirements in nonattainment areas if they secure sufficient surplus emission reductions from other sources that more than offsets their new or additional emissions.⁸⁴

(4) *Banking Policy*: Under the concept of emission reduction banking, a source that emits less than the emission standard may deposit as a credit some fraction of its excess emissions reductions in an emissions bank. Deposited credits are stored in a legally-protected manner for possible future expansion needs, used as a hedge against future reductions in permissible emissions, or sold to some other firm seeking additional emission permits.⁸⁵

The ETPS establishes common minimum legal requirements for creating, using, and banking of ERCs, which must be surplus, enforceable, permanent, and quantifiable.⁸⁶ Although the ETPS is still valid, it is now encompassed by broader rules promulgated by the EPA.⁸⁷ The new Economic Incentive Program ("EIP") is not limited to stationary sources, but also encompasses additional mobile and area sources.⁸⁸ The continued viability of these programs demonstrates that the EPA was highly interested in allowing firms greater flexibility over their compliance options for meeting the standards

83. *See id.*

84. *See id.*

85. *See id.* at 43,831.

86. *See id.* at 43,831-32.

87. *See* Goldschein, *supra* note 45, at 229.

88. *See id.*

and goals of the CAA. This shift away from traditional regulatory instruments and the subsequent adoption of market-based programs laid the groundwork for Title IV.⁸⁹

b. Other Trading Systems

The Acid Rain Program is not the only emissions trading program that has been used in the environmental sector to achieve economically effective pollution abatement. An example is the transferable permit approach for lead in gasoline developed by the EPA, which led to an 89% reduction in airborne lead levels during the period from 1980-87.⁹⁰ Another example of an emissions trading program is a state program in California, called Regional Clean Air Incentives Market ("RECLAIM"), that seeks to abate nitrogen oxides (NO_x) in the greater Los Angeles area.⁹¹ Yet another example is the U.S. program that implements the Montreal Protocol of 1987 and 1990 update, both of which control

89. While the four instruments described above are called "emissions trading" mechanisms, this Article will refer to them by their proper names. In this Article, the term "emissions trading system" refers to the trading of pollution allowances as in the Acid Rain Program of Title IV.

90. See Dudek *et al.*, *Environmental Policy for Eastern Europe*, *supra* note 5, at 23.

91. For a detailed analysis of this program, see Pascal Bader & Fritz Rahmeyer, *Das RECLAIM-Programm handelbarer Umweltlizenzen - Konzeption und Erfahrungen* [The RECLAIM-Program for Tradeable Environmental Allowances - Concept and Experiences], ZEITSCHRIFT FÜR UMWELTPOLITIK UND UMWELTRECHT 43 (1996) [hereinafter Bader & Rahmeyer, *RECLAIM-Program*]; John P. Dwyer, *The Use of Market Incentives in Controlling Air Pollution: California's Marketable Permits Program*, 20 ECOLOGY L.Q. 103 (1993) [hereinafter Dwyer, *Market Incentives in California*]; Polesetsky, *supra* note 19, at 359. See also Alexander K. Wang, *Southern California's Quest for Clean Air: Is EPA's Dilemma Nearing an End?*, 24 ENVTL. L. 1137, 1151 (1994).

ozone-depleting chemicals and allow for the transfer of credits across national borders.⁹² Even if the other country does not have a transferable permit system under this program, producers and consumers of the controlled substances may buy and sell allowances to each other and across international borders.⁹³ The European Union ("EU") has also established a trading scheme for ozone-depleting chemicals.⁹⁴

Trading systems have also been developed to fight other forms of pollution besides air pollution. Allowance systems have been created to reduce water pollution in the Fox River, Wisconsin,⁹⁵ the Lake Dillon Reservoir, Colorado,⁹⁶ the Cherry Creek Basin, Colorado,⁹⁷ and the

92. Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, Misc. 1 (1988), Cmd. 283; 26 I.L.M. 1541 (1987) (entered into force Jan. 1, 1989); *Report of the Second Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer*, U.N. Environment Programme, U.N. Doc EP/OzL. Pro. 2/3 (1990).

93. The EPA regulations allowing producers, importers, and other interested parties to trade chlorofluorocarbon (CFC) allowances resulted in fast reductions at low costs. See Dudek *et al.*, *Environmental Policy for Eastern Europe*, *supra* note 5, at 32.

94. See Council Regulation 594/91 Substances that Deplete the Ozone Layer, *amended by* Council Regulation 3952/92 Substances that Deplete the Ozone Layer, and Council Regulation 3093/94 Substances that Deplete the Ozone Layer, 1994 O.J. (L 333) 1-20.

95. However, only one transaction has taken place because of strict framework conditions. See Gick, *Allowances*, *supra* note 43, at 14. The reasons for the failure of the program may include its implementation without explicit legal authority to use trading mechanisms and because pollution rights were not freely tradeable. See Tripp & Dudek, *supra* note 5, at 387-88. See Ann Powers, *Reducing Nitrogen Pollution on Long Island Sound: Is There a Place for Pollutant Trading?*, 23 COLUM. J. ENVTL. L. 137, 186-87 (1998), for a more detailed description.

96. See Powers, *supra* note 95, at 191-92, for a more detailed description.

Tar-Pamlico River Basin in North Carolina.⁹⁸ Individually transferable fishing quotas have been established in New Zealand, Canada, Iceland, and Australia.⁹⁹

3. Legal Framework for the Acid Rain Program

On November 15, 1990, Title IV of the Clean Air Act Amendments ("CAAA") was incorporated into the Clean Air Act after a long political debate.¹⁰⁰ Under the CAA, the EPA had previously established National Ambient Air Quality Standards ("NAAQSs"), which placed ceilings on the allowable levels of certain six pollutants in the air.¹⁰¹ Sulfur dioxide is one of the "criteria" pollutants for which NAAQS have been developed.¹⁰² Each state is required to meet the NAAQSs through an approved

97. See Powers, *supra* note 95, at 193-94, for a more detailed description.

98. See Powers, *supra* note 95, at 188-89, for a more detailed description.

99. See Gick, *Allowances*, *supra* note 43, at 14.

100. Clean Air Act Amendments of 1990, Pub. L. No. 91-604, 84 Stat. 1676 (1970) (codified as amended at 42 U.S.C. §§ 7401-7671q (1994)). See Nancy Kete, *The U.S. Acid Rain Control Allowance Trading System*, in CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 78, for a detailed analysis of the political factors finally leading to the enactment of the statute.

101. CAA §§ 108-109, 42 U.S.C. §§ 7408-7409 (1994).

102. The primary standard is 0.14 parts per million (ppm) averaged over 24 hours, and 0.030 ppm averaged annually. The secondary three-hour standard is 0.5 ppm averaged over three hours. See National Primary and Secondary Ambient Air Quality Standards for Sulfur Oxides (Sulfur Dioxide), 40 C.F.R. §§ 50.4 - 50.5 (1998). On May 22, 1996, the EPA published final rules in which it decided not to make significant changes to the SO₂ standards. National Ambient Air Quality Standards for Sulfur Oxides (Sulfur Dioxide) - Final Decision, 61 Fed. Reg. 25,566, 25,576 (1996) (to be codified at 40 C.F.R. pt. 50).

State Implementation Plan ("SIP").¹⁰³ This gives the states the opportunity to establish their own trading programs.

The final goal of Title IV of the CAAA is the reduction of SO₂ emissions by ten million tons and to reduce NO_x emissions by approximately two million tons from the levels in 1980.¹⁰⁴ While the reduction program for NO_x is designed with a traditional regulatory approach,¹⁰⁵ the SO₂ program neither sets uniform emissions limitations for every source, nor mandates a particular method to achieve regulatory compliance. Instead, an emissions trading program is employed to reduce and control SO₂ emissions.

In order to achieve the required annual reductions, Title IV places a cap on total SO₂ emissions. Beginning in 2000, utilities may emit only 8.90 million tons of SO₂ annually.¹⁰⁶ In addition, the Act sets individual emission caps for existing sources – determined by the plant's historical average fuel consumption rate¹⁰⁷ – and for future sources. Future sources will have to offset their emissions by obtaining emission reductions from existing sources by January 1, 2000.¹⁰⁸

As almost three-fourths of all SO₂ emissions are emitted by electric power plants, Title IV mainly deals with electric utility emissions. Presently, however, the Acid Rain Program only covers stationary sources while excluding mobile sources. Similar economic incentive programs have been developed for the latter, for example, the Mobile Source Emission Reduction Credit Pro-

103. See CAA § 110(a)(1).

104. See CAA § 401(b).

105. See CAA § 407.

106. See CAA § 403(a). The actual emissions cap for utilities is slightly higher than 8.90 million tons, because certain Midwestern, eastern, and southern utilities will receive a total of 50,000 additional allowances during Phase II. *Id.*

107. See CAA §§ 404(a), 405(a).

108. See *id.*

gram ("MERC").¹⁰⁹ This analysis is limited to the trading program for stationary sources.

Electric power plants are expected to reduce their annual emissions in two phases. Phase I began on January 1, 1995, and mandates that 110 of the highest-emitting electric utility plants reduce their emissions by 3.5 million tons.¹¹⁰ These plants were singled out because they emit more than 2.5 pounds of SO₂ per million British Thermal Units (lbs/mmBTu) and are larger than one hundred megawatts (MWe).¹¹¹ After Phase I, a 3.5 million ton reduction should be attained.¹¹² Phase II, which began on January 1, 2000, requires all Phase I plants, and most of the 700 remaining utilities, to reduce their annual emissions by another five million tons.¹¹³ It will apply to all Phase I plants and every other utility plant that emits more than 1.2 lbs/mmBtu and is larger than 75 MWe.¹¹⁴ Phase II also covers smaller and cleaner plants that range between 25 MWe and 75 MWe.¹¹⁵

The real innovation of the emissions trading program starts with the creation of allowances defined as an authorization to emit, during or after a specified calendar year, one ton of SO₂.¹¹⁶ The EPA Administrator ("Administrator") is authorized to allocate a specific number of SO₂ allowances to each utility based upon the plant's generating capacity, historical level of emissions between 1985 and 1987,¹¹⁷ and ability to qualify for bo-

109. Interim Guidance on the Generation of Mobile Source Emission Reduction Credits, 58 Fed. Reg. 11,134 (1993). See Goldschein, *supra* note 45, at 225, for an analysis of this program.

110. See CAA § 404(e)(3), Table A.

111. See CAA § 404.

112. See *id.*

113. See CAA § 405.

114. See CAA § 405(b)(1).

115. See CAA § 405(c)-(f), (h), (j).

116. See CAA § 402(3).

117. See CAA § 404(e).

nus allowances.¹¹⁸ Utilities may then buy, sell or bank allowances for use in the future. Emissions limitations for plants that commenced operation between 1986 and 1995 have their emissions limitations calculated according to a specific formula.¹¹⁹ Most plants established after the year 2000 will not receive allowance allocations from the EPA, but must obtain them from existing units.¹²⁰ No matter how many allowances a utility accumulates, it is prohibited from emitting SO₂ in excess of any NAAQS or SIP.¹²¹ By the end of any given year, each utility must hold emission allowances equal to or in excess of its recorded emissions.¹²² Utilities can use the allowances to meet EPA compliance standards at their own power plants, sell them to other utilities for plants that emit beyond their allowed levels, or hold on to them. The pollution allowance trading market is operated by the EPA and the Chicago Board of Trade.¹²³

Although trading may occur at any time during the year, Title IV requires the EPA to conduct an annual auction of the allowances reserved by the EPA for that year.¹²⁴ The Chicago Board of Trade has conducted the annual auction for the EPA since March 1993.¹²⁵ This auction is intended to stimulate trading in the initial phases of the program and to signal price information to the allowance market.¹²⁶ Private sellers may also sell or

118. See CAA § 405(a)(2).

119. See CAA § 405(g).

120. See CAA § 403(e).

121. See CAA § 403(f).

122. See CAA § 403(g).

123. See Chicago Board of Trade, *Emissions Allowance Auctions and Direct Sales* (visited Oct. 15, 1998) <http://www.cbtc.com/points_of_interest/ecocenter/about.html>.

124. See CAA § 416(d).

125. See Chicago Board of Trade, *supra* note 123.

126. See RESOURCES, COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION, U.S. GENERAL ACCOUNTING OFFICE (GAO), AIR POLLUTION - ALLOWANCE TRADING OFFERS AN OPPORTUNITY TO

purchase allowances at the EPA auction.¹²⁷ Unlike the allowances that the EPA offers for sale, private sellers may specify a minimum sale price.¹²⁸ Any person, including brokers or environmental groups, may acquire allowances and participate in the trading system, thereby reducing the number of allowances available to utilities.¹²⁹ Originally, the EPA examined each proposed trade. Now, because of the steadily increasing amount of proposed trades, the EPA allows states to adopt "generic trading rules" as part of a state implementation plan ("SIP").¹³⁰ These generic rules authorize states to approve certain types of individual transactions without case-by-case SIP revisions or federal review prior to approval.¹³¹

Each utility must install a continuous emissions monitoring system ("CEMS") to sample, analyze, measure, and provide an accurate and permanent record of emissions and flow on each affected unit of the source.¹³² A penalty of \$2,000 per ton of excess SO₂ will automatically apply to any utility that does not possess enough allowances to cover its yearly emissions.¹³³ In addition, the EPA will reduce allowance allocation for the following year.¹³⁴

REDUCE EMISSIONS AT LESS COST (GAO/RCED-95-30) (Dec. 1994) 20 [hereinafter GAO-REPORT].

127. *See id.*

128. *See id.*

129. *See* OFFICE OF AIR AND RADIATION, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ACID RAIN PROGRAM: ALLOWANCE AUCTIONS AND DIRECT SALES (EPA no. 430-F-92-017) (Dec. 1992) 1 [hereinafter EPA-AUCTIONS].

130. *See* ETPS, 51 Fed. Reg. at 43,831, 43,835-36 (1986).

131. *See id.*

132. *See* CAA § 412, 42 U.S.C. § 7651k (1994)

133. *See* CAA § 411(a).

134. *See* CAA § 411(b).

B. *Current Problems of the U.S. Pollution Trading System*

The Acid Rain Program has been described as an important and extremely successful concept.¹³⁵ As a result of this Program, costs have been reduced, levels of acid rain have decreased drastically,¹³⁶ and air quality has improved tremendously.¹³⁷ The Program was considered to have the best performance of any air quality program in the United States because industry achieved a 100% compliance with emission limits.¹³⁸ Despite these highly positive assessments, the trading program has not been without problems during the first years of operation. The market worked sluggishly and allowance transactions mainly occurred around the time of the EPA auction.¹³⁹ Furthermore, the allowances were traded at very low prices and several companies stopped selling credits.¹⁴⁰ Probably the most serious effect of the trading system is the pollution of the northeastern Adirondacks by Midwestern facilities, which is caused by large sales of New England utilities to the Midwest.¹⁴¹

135. See Schmalensee *et al.*, *supra* note 5, at 66.

136. See *id.*

137. See Goldschein, *supra* note 45, at 232; Christine Sansevero, *The Effect of the Clean Air Act on Environmental Quality: Air Quality Trends Overview*, 14 PACE ENVTL. L. REV. 31, 44 (1996).

138. See Center for Clean Air Policy, *supra* note 50. Possible explanations for the dramatically high level of compliance are: first, that allowances were expected to be more expensive in Phase II than in Phase I; and second, the market did not reflect that decreased rail rates would increase the penetration of low-sulfur Powder River Basin coal, and consequently, many over-invested in scrubbers and low-sulfur coal. See Schmalensee *et al.*, *supra* note 5, at 57.

139. See GAO-REPORT, *supra* note 126, at 29-30.

140. See *id.*

141. See *id.*

1. Sluggish Market

Estimates for cost savings through allowances traded *before* the implementation of the program reached up to \$10 billion.¹⁴² Whether such immense savings actually took place has not yet been proven. However, even if individual firms saved a substantial amount through trading, this did not stimulate a lively market in the first years of the trading program. Since the trading program began in 1992, there have been relatively few interutility trades. According to the GAO-Report, only 3% of Phase I utilities plan to include purchasing allowances as part of their compliance strategies.¹⁴³ From April 1992 to September 1994, only twelve utilities participated in the twenty-one trades of 5,000 or more allowances.¹⁴⁴ Illinois Power and Carolina Power & Light alone accounted for 61% of the interutility allowances traded.¹⁴⁵ Carolina Power & Light is using its extra allowances to postpone installation of scrubbers in Phase II.¹⁴⁶ Although other large utilities, such as Duke Power, are starting to participate in the private interutility market, the number of trades remained low.¹⁴⁷

Only during the last few years has the market seemed to become more active. The number of private transfers of emission allowances increased from almost zero in 1994 to more than 75 million in 1997.¹⁴⁸ As submission of allowance transfers to the EPA is voluntary, these numbers represent only those transfers of allowances, which are reported to the Allowance Tracking System

142. See Goldschein, *supra* note 45, at 231-32.

143. See GAO-REPORT, *supra* note 126, at 27.

144. See *id.* at 30.

145. See *id.*

146. See *id.* at 29.

147. See *id.*

148. See Environmental Protection Agency, *Cumulative Trading Activity Table* (visited Oct. 17, 1998) <<http://www.epa.gov/acidrain/ats/cumtrans.html>>.

("ATS").¹⁴⁹ While it appears that the "dry years" of the U.S. allowance market have passed, it is useful to analyze the reasons for the initial problems. This analysis not only helps to prevent another "dry period," but also offers important lessons for the establishment of similar trading programs. The following reasons might be causes of the shortcomings of the trading program.

a. False Estimations of Actual Reduction Capacities

It has been suggested that either the EPA and industry have simply exaggerated the projected cost of reductions when Congress debated the Amendments or that companies can lower their costs when faced with an affirmative obligation to meet a numerical limit.¹⁵⁰ The reductions have generally involved an application of well known and understood techniques rather than substantial innovation. These techniques chiefly utilize the use of low-sulfur coal or scrubbers.¹⁵¹ Besides the availability of these and other variances, easy enforcement policies are typically blamed for the low demand for allowances.¹⁵² The State of Connecticut, for example, tried to tackle these shortcomings by establishing a program that eliminates variances.¹⁵³ This program re-

149. The ATS is an automated system used to track the allowances held by utilities, other affected companies, and other organizations or individuals. It provides the allowance market with a record of who is holding allowances, the date of allowance transfers, and the allowances transferred. See Environmental Protection Agency, *The Allowance Tracking System: Accounting for SO₂ Allowances Under the Acid Rain Program* (visited Oct. 17, 1998) <<http://www.epa.gov/acidrain/ats/atsintro.html>>.

150. See David M. Driesen, *Five Lessons from the Clean Air Act Implementation*, 14 PACE ENVTL. L. REV. 51, 58 (1996).

151. See *id.* at 58.

152. See Richard E. Ayres, *The 1990 Clean Air Amendments: Performance and Prospects*, 13 NAT. RESOURCES & ENV'T 379, 381 (1998).

153. See *id.*

quires sources unable to comply with on-site emission reduction requirements to purchase emission allowances from other sources, which helps create a market and significantly improves air quality.¹⁵⁴

b. Uncertainty about the Market Price of an Allowance

To design a cost-effective emissions reductions program, a utility must have accurate price information for all available compliance options. Before a utility chooses to purchase an allowance, it must believe that the price paid will be less than the cost of removing one ton of SO₂ emissions by traditional methods. Although it is easy to calculate the price of one ton of coal or the cost of a new scrubber, the value of a SO₂ allowance is difficult to determine. Thus, buyers and sellers disagreed widely on what the market price should be.¹⁵⁵ Competition among the traditional compliance options available under the CAA, such as low sulfur fuel and smoke stack scrubbers has decreased prices: whereas in 1990 it was expected that a ton of low-sulfur coal would cost \$40, in 1995, prices went down to \$25.¹⁵⁶ Additionally, scrubber prices dropped sharply in response to the low-sulfur coal offers and innovations such as larger absorbers, new anticorrosive materials, and new processes to eliminate waste streams invaded the market.¹⁵⁷

c. Holding Allowances Without Intention to Use or Trade

Another reason for the sluggish market may be that allowances are being held by those with no intention to use or trade them. Although allowances are initially allocated only to existing facilities,¹⁵⁸ non-utilities are also

154. *See id.*

155. *See* GAO-REPORT, *supra* note 126, at 36.

156. *See id.* at 28.

157. *See id.* at 29.

158. *See* CAA § 403(a)(1), 42 U.S.C. § 7651b(a)(1)(1994).

permitted to participate in their trading.¹⁵⁹ Congress's intent behind including those provisions in the CAA and granting broad deference to market forces was to ensure liquidity in the allowance market.¹⁶⁰ There has been deep concern that many utilities might refrain from fully participating in the market and will hoard their allowances instead.¹⁶¹ In order to avoid this shortcoming, the allowance market, auctions, and direct sales were opened to everyone. The wide availability of allowances to non-utilities has enticed into the market many investors unaffiliated with the utility industry. Their participation contributed to stabilizing the price of the allowances and to creating a balance between demand and supply.¹⁶²

Besides bringing about the predicted advantages, this system also brought unwanted effects. Unfortunately, this was not the only consequence of the open market. Quite a few purchasers, rather than using or trading the allowances on the market, turned around and retired them for different reasons.¹⁶³ Environmental interest groups like the Natural Resource Defense Council ("NRDC"), the National Healthy Air License Exchange ("NHALE"), the World Charitable Trust, and C/O Resources for the Future bought allowances during the first auction held by the EPA in March 1993.¹⁶⁴ Other public interest organizations, like the Environmental Law Coalition ("ELC"), have been formed to purchase

159. *See id.*

160. *See* Hooper, *supra* note 20, at 577.

161. *See id.* at 577.

162. *See id.* at 578.

163. Further unwanted consequences of this policy were a decrease in the overall level of emissions intended by Congress, price inflation of the allowances and thereby an increase of costs for utilities and consumers, misleading price information to potential allowance bidders, and an undermining of the legitimacy of market-based environmental regulation. *See id.* at 578.

164. *See id.* at 579.

(and finally retire) allowances.¹⁶⁵ Their strategy was to reduce the amount of allowances on the market, thereby creating a higher demand and an increase in price for the credits.¹⁶⁶ These environmental interest groups acted in hopes of creating incentives for utilities to curb SO₂ emissions through technological improvements rather than by buying credits.¹⁶⁷ The actual number of allowances bought by environmental groups has, however, been quite low and has been more symbolic than effective.¹⁶⁸

A greater impact on the number of retired allowances has resulted from corporate activities. Corporations started to be aware of the potential benefits of publicly showing their dedication to environmental concerns. Some donated excess allowances to non-profit organizations. New England's largest electric utility holding company Northeast Utilities, for example, donated 10,000 SO₂ allowances to the American Lung Association ("ALA").¹⁶⁹ In another precedent, Niagara Mohawk Power Corporation donated 15,000 tons of credits to the Environmental Resources Trust ("ERT"), which subsequently took them off the trading market in July 1997.¹⁷⁰ These donations still did not contribute significantly to the reduction of allowances available on the market.

Other companies tried to attract publicity by retiring allowances themselves. Minnesota Mining and Manufacturing ("3M") and Long Island Lighting Company ("LILCO") developed policies to retire their unused credits instead of selling them. On April 29, 1998, LILCO

165. *See id.*

166. *See Hooper, supra* note 20, at 579.

167. *See id.* at 579.

168. *See id.* at 579-80.

169. *See id.* at 581.

170. *See* Mike Vogel, *Retiring of Emission 'Credits' to Speed Battle on Acid Rain*, BUFFALO NEWS, Aug. 27, 1997, at C16, available in Westlaw, 1997 WL 6457302.

signed an unprecedented agreement with the New York Governor's office in which it promised not to sell its excess SO₂ credits to utilities, manufacturers and other large-scale sources of SO₂ in fifteen states, most of them upwind from New York.¹⁷¹ Although one might consider this kind of agreement environmentally favorable, the amount of credits cannot be considered sufficient to reduce SO₂ pollution significantly. Even spokesman Samuel A. Thernstrom of the N.Y. Department of Environmental Conservation ("NYDEC") acknowledged that the agreement with LILCO may raise the price of allowances but is largely symbolic since Midwest utilities will still be able to buy allowances from other sources.¹⁷² Nevertheless, those companies in fact reduced the overall level of pollution and did not shift the pollution to other sources.¹⁷³

While initially it may seem strange that companies voluntarily retire or donate their allowances, it might not be totally unreasonable if carefully thought-out. One explanation for this behavior is the good publicity such acts bring. According to Stefanie A. Gossin, a LILCO spokeswoman, LILCO received a tremendous amount of negative press for the credits they were selling.¹⁷⁴ By donating credits for retirement, companies not only enjoy free publicity, but save potentially high transaction costs. Donating companies may additionally profit from a tax deduction under the Internal Revenue Code.¹⁷⁵ As these deductions can reach up to millions of dollars, this can provide a good reason to

171. See *LILCO to Stop Selling Pollution Credits In 15 States*, DOW JONES TELERATE ENERGY SERVICE, Apr. 29, 1998, available in Westlaw, 4/29/98 DJTES.

172. See Andi Esposito, *N.Y. Knows Which Way Wind Blows Agreement Aims to Cut Acid Rain from Midwest*, SUNDAY TELEGRAM WORCESTER, MA, June 14, 1998, at E1, available in Westlaw, 1998 WL 2737438.

173. See Hooper, *supra* note 20, at 580.

174. See Esposito, *supra* note 172, at E1.

175. See I.R.C. § 170 (a)(1) (1995).

donate instead of using allowances.¹⁷⁶ Although each of these three reasons separately will not have a great impact on the functioning of the allowance market, together they may have a significant influence on the supply of credits.

The retirement of allowances leads to several consequences. First, the major goal of environmental groups of reducing the amount of SO₂ emissions is clearly attained by every retirement. The overall amount of SO₂ in the air will be even less than the maximum level of 8.90 million tons as set forth in the CAA.¹⁷⁷ However, the reduction of tradeable allowances on the market also influences the functioning of the market. Without a sufficient amount of allowances, the market lacks liquidity and will ultimately fail to allocate costs in the most efficient manner.¹⁷⁸

d. Auction Design

Congress intended the EPA auction to stimulate the allowance market and signal price information.¹⁷⁹ According to the GAO-Report, however, the EPA auction only adds to the market.¹⁸⁰ The auction is designed to be price-discriminating, which means that each successful bidder pays what he bids.¹⁸¹ The GAO believes that this is a reason for the slow participation of allowance holders and buyers in the market. This practice often results in more than one winning price for allowances, which is a fungible commodity. Title IV also pre-

176. See Hooper, *supra* note 20, at 581.

177. Hooper finds that the emissions cap not only determines a maximum but also a minimum of allowed emissions and proposes to interpret Title IV to limit the use of allowances to four situations: compliance, reserve, future need, and speculation. See *id.* at 584.

178. See *id.* at 599.

179. See EPA-AUCTIONS, *supra* note 129, at 1.

180. See GAO-REPORT, *supra* note 126, at 53.

181. See CAA § 416(d)(2), 42 U.S.C. § 7651o(d)(2)(1994).

vents the EPA from setting a minimum price on the allowances it sells.¹⁸² Therefore, bidders tend to set their bids very low. The auction allowance prices have been almost one-third less than the prices set by the few interutility trades that have occurred at other times of the year.¹⁸³ The GAO-Report notes that these pricing trends have discouraged private firms from trading because buyers wait until the EPA auction to buy, and sellers are discouraged from participating because they feel that the pricing is unrealistically low.¹⁸⁴ The GAO therefore recommends changing the auction design into a single price auction.

The GAO-Report suggests that redesigning the EPA auction as a single price auction may help decrease market uncertainty and raise total auction proceeds.¹⁸⁵ According to the GAO, the establishment of an orderly, single price market would be consistent with the CAA's statutory language.¹⁸⁶ Such a market also would provide the accurate allowance price information required to satisfy Congress's goal of developing cost-effective compliance plans.¹⁸⁷

The March 1995 auction continued to demonstrate the ineffectiveness of the current auction design. The cost of an allowance on the private market in early 1995 had stabilized near \$135 as professional brokers continued to become increasingly involved in trades and obtaining allowance pricing information.¹⁸⁸ The allowance prices, however, began to drop as the auction date approached, and the average price of allowances purchased at the

182. *See id.*

183. *See* GAO-REPORT, *supra* note 126, at 54.

184. *See id.*

185. *See id.* at 58.

186. *See id.* at 55.

187. *See id.*

188. *See* EPA Allowance Auction Prices Average \$130, UTILITY ENV'T REP., Mar. 31, 1995, at 1.

1995 auction was only \$132.00.¹⁸⁹ Some market analysts complained that the current auction design causes the auction to act as an artificial depressant on allowance prices and undermines, rather than enhances, the private interutility trading market.¹⁹⁰

e. Difficulties in Ratemaking Process

The Federal Energy Regulatory Commission ("FERC") and state regulatory agencies' lack of regulatory guidance over how allowance trading will be incorporated into the utility-ratemaking process may help to explain the utilities' restrained behavior towards trading. Thus, it is suggested that the EPA should work together with FERC and state commissions to determine how the purchase and sale of allowances will be recognized in ratemaking on both the federal and state level because utility rates are directly related to the expenses and potential profits of a utility.

On the state level, state electric utility commissions regulate ratemaking. Traditional ratemaking limits the rates consumers pay for electricity by determining the utility's costs and then calculating a "fair rate of return or profit" for the utility.¹⁹¹ When assessing a utility's costs for ratemaking purposes, the state utility commission may exclude any investment or expense that it determines was imprudent or excessive in relation to any consumer benefit.¹⁹² State utility commissions have conditioned utilities to avoid activities, such as allowance trading, that have not been proven to earn a high rate of return and are not yet acceptable to state ra-

189. *See id.*

190. *See Elements of Acid Rain Program Undermined by Phased-In Implementation, Official Says*, 26 ENV'T REP. CURRENT DEVELOPMENTS (BNA), June 30, 1995, at 485.

191. OFFICE OF TECHNOLOGY ASSESSMENT, DOC. NO. OTA-E-561, ENERGY EFFICIENCY CHALLENGES AND OPPORTUNITIES FOR ELECTRIC UTILITIES 36-38 (1993).

192. *See* GAO-REPORT, *supra* note 126, at 46.

temaking authorities.¹⁹³ This policy obviously does not encourage utilities to take part in the allowance trading market. Until state utility commissions indicate how they will calculate allowance trading, including cost savings or possible losses, into the ratemaking formula, few utilities will participate extensively in the trading program.¹⁹⁴ Although not every possible solution is equally beneficial to the utility, each utility must be aware of how the utility commissions will respond to the risks or benefits of allowance trading.¹⁹⁵

The same problem exists on the federal level: according to GAO, FERC should offer utilities guidance as interstate transactions are becoming more common.¹⁹⁶ Although several utilities have asked FERC to address ratemaking and allowances in wholesale electricity sales and activities of multistate holding companies, FERC has been reluctant to offer any sort of regulatory framework.¹⁹⁷ After publication of the GAO-Report, however, FERC reconsidered its position. On December 5, 1994, FERC issued a policy statement and interim rule on ratemaking treatment of the cost of emissions allowances in coordination transactions.¹⁹⁸ A coordination transaction is a sale or exchange of specialized electricity services that allows buyers to realize cost savings or reliability gains that are not attainable if they rely solely on their own resources.¹⁹⁹ "Although coordination transactions are only a small fraction of interu-

193. *See id.* at 47.

194. *See id.*

195. *See* Eileen L. Kahaner, *GAO's Analysis of Title IV's Sulfur Dioxide Emissions Allowance Trading Program*, 2 ENVTL. LAW. 239, 249-250 (1995).

196. *See* GAO-REPORT, *supra* note 126, at 50.

197. *See id.*

198. *See* Policy Statement and Interim Rule Regarding Ratemaking Treatment of the Cost of Emissions Allowances in Coordination Rates, 59 Fed. Reg. 65,930 (1994) (to be codified at 19 C.F.R. pts. 2, 35).

199. *See id.*

tility transactions, this rulemaking indicates a willingness to increase regulatory guidance for allowing trading."²⁰⁰

f. High Transaction Costs

A further explanation for reduced participation in the trading market by a utility could be due to the high transaction costs. Transaction costs arise when a firm tries to identify a suitable trading partner, which may take up to a year and a half. As they are likely to reduce the number of mutually beneficial²¹ transactions, they reduce the number of trades that take place.²⁰¹ The magnitude of transaction costs in many cases may even exceed the market value of the credits exchanged, which is unattractive for firms interested in trading.²⁰²

There are several devices for expediting the process of identifying a suitable partner. First, a firm can trade internally, thus avoiding the search process completely.²⁰³ Second, it could approach an intermediary.²⁰⁴ This practice has been used to a great extent when enacting the RECLAIM trading program in California: 40% of all trades in California have been carried out by one intermediary firm.²⁰⁵ A third way in which high transaction costs are reduced is when an exchange is made of a great volume of credits instead of a small

200. Kahaner, *supra* note 195, at 251.

201. See Vivien Foster & Robert W. Hahn, *Designing More Efficient Markets: Lessons from Los Angeles Smog Control*, 38 J.L. & ECON. 19, 33 (1995).

202. See *id.* at 42.

203. See *id.* at 33.

204. See Holger Bonus, *Emissionsrechte als Mittel der Privatisierung öffentlicher Ressourcen aus der Umwelt* [Emission Rights as Means to Privatize Public Resources from the Environment], in MARKTWIRTSCHAFT UND UMWELT [MARKET ECONOMY AND THE ENVIRONMENT] 54, 72 (Lothar Wegehenkel ed., 1981).

205. See Foster & Hahn, *supra* note 201, at 33.

number.²⁰⁶ This reduces the relative transaction costs of each trade, because a small volume of credits is likely to be adversely affected by the fixed nature of the transaction costs.²⁰⁷ This presupposes that a firm has a large number of credits to trade, which may not always be the case. Firms might therefore have to make investment plans for a longer period of time.

2. Trading Only Around Time of the EPA Auction

Unlike the New York Stock Exchange, where trading is virtually constant, most allowance trading occurs around the time of the annual EPA auction when prices are expected to be lower.²⁰⁸ During the period between the auctions in March 1993 and August 1994, only one interutility trade took place.²⁰⁹ A reason for this practice may be the expectation that allowance prices are lower at times closer to the auction.²¹⁰

3. Low Prices of Credits

At the first auction in 1993, 95% of all credits were sold for less than \$200.00.²¹¹ California Power & Light, for example, bought 85,103 allowances for \$135.00 each.²¹² Recently, allowance prices have recovered. In 1998, the monthly average price of SO₂ allowances increased to approximately \$190.²¹³ One explanation for the low initial prices is that the little trading that has

206. See *id.* at 35.

207. See *id.*

208. See GAO-REPORT, *supra* note 126, at 29-30.

209. See *id.* at 32.

210. See *id.*

211. See Gick, *Allowances*, *supra* note 43, at 20.

212. See *id.*

213. See Environmental Protection Agency, *Monthly Average Price of Sulfur Dioxide Allowances Under the Acid Rain Program* (last modified Jan. 2000) <<http://www.epa.gov/acidrain/ats/prices.html>>.

occurred has lowered compliance costs for the purchasers of credits. However, this reasoning is not convincing because the volume of trades has been so low that trading itself cannot explain the low costs.²¹⁴ Another possible explanation is that few suppliers and low demand may lead to a situation where potential sellers sell credits at a price that does not cover their own costs.²¹⁵ Other supporters of the allowance approach attribute the low prices of allowances to the fact that compliance decisions generally have to be made well before the start of 1995.²¹⁶ Most sources had to make their decisions to build scrubbers as early as 1992-1993, when they did not have sufficient information about allowance prices. Thus, allowance prices were overestimated and decisions were made in favor of scrubbers instead of trading.²¹⁷

4. Upwind Pollution

Several New England states must have realized that the pollution trading program was resulting in their region becoming more heavily polluted than before the program was implemented, despite the lack of industry growth. Surprisingly, the origin of the pollutants lies in the Midwest. The wind has blown their pollutants northeast, towards places like the Adirondack Park in New York. Polluted air drifts with normal weather patterns from sources in Midwestern and Southern states over to the most populated areas of the East Coast, compounding those cities' pollution problems. As Midwest sources were the most enthusiastic buyers of Northwestern pollution allowances, they filled the wind with more pollutants than they were allowed to emit

214. See Driesen, *Five Lessons*, *supra* note 150, at 58 n.34.

215. See Gick, *Allowances*, *supra* note 43, at 21.

216. See *id.*

217. See Schmalensee *et al.*, *supra* note 5, at 65.

under the former regulatory program. LILCO, for example, apparently sold more than 67,000 tons of pollution rights directly to Midwest companies, in addition to the 79,980 tons sold to brokers.²¹⁸ It is estimated that about 16,700 tons of these pollutants have already been emitted under the program and have gone upwind.²¹⁹

As mentioned above, LILCO voluntarily stopped selling some of their credits to Midwestern states. However, the amount was rather small and such acts by companies is rare. Observers doubt that LILCO's move will reduce pollution in New York State, since polluters in the South and the Midwest could turn to other companies to buy credits.²²⁰

While Midwestern sources may be forced to purchase credits in smaller parcels from many different companies with a resulting increase in transaction costs, it is doubtful that upwind pollution will decrease significantly. How can trading be regulated in a way so that selling companies will not be victims of subsequent trading of these allowances to states that will blow their discharges back to the original companies' state? A possible solution is the enactment of state regulations or the establishment of a requirement that an agency oversees each trade. State regulations could provide for prohibitions or even penalties when companies sell credits to upwind states. Several proposals consistent with these suggestions have already been put forth.

New York Assemblyman Richard Brodsky advanced such a proposal in 1993.²²¹ He introduced a Bill requiring state administrative review of all emissions allowance trades, giving New York the power to disallow trades that would result in a negative environmental impact on sensitive areas. This Bill would also author-

218. See Vogel, *supra* note 170, at C16.

219. See *id.*

220. See Raymond Hernandez, *LILCO Is to Stop Selling Credits to Upwind Polluters*, N.Y. TIMES, Apr. 30, 1998, at B1.

221. See *id.*

ize the New York Public Service Commission to "prescribe guidelines, rules and regulations regarding the participation of utility companies in allowance trading . . . to ensure sufficient review of the potential acid deposition of such actions in sensitive receptor areas of the state . . . and to provide for the adjustment of the proposed trade."²²² Unfortunately, this Bill did not pass the Senate in 1994. The same Bill was reintroduced during the 1995/96 legislative session, but again was rejected by the Senate.²²³

During the 1997/98 legislative session, both houses of the New York State legislature drafted legislation that would penalize upwind interstate transactions.²²⁴ Under this proposal, the NYDEC would review each credit sale and determine if it was environmentally sound. If found to be not environmentally sound, the company would be fined three times the value of the trade. The intent of the proposal was not to prevent such sales, but to make companies pay for any resulting upwind transactions. The penalty could also deny the utility revenue from trades with upwind states. As before, the bills did not pass the Senate.

Governor George Pataki later proposed an even stricter bill that would actually prohibit sales that lead to increases in acid rain levels in New York State. Under this Bill, an environmental assessment of each transaction must also be submitted to the NYDEC.²²⁵ However, the Governor never introduced his proposal.

Another proposal that uses a completely different approach has been suggested by the Adirondack Council. They propose that allowances be designated for use only

222. A. 3569, 216th Reg. Sess. (N.Y. 1993).

223. See A. 2075, 219th Reg. Sess. (N.Y. 1996).

224. See A. 4625 and S. 5629, 220th/221st Reg. Sess. (N.Y. 1997/1998).

225. See *Emissions Trading, N.Y. Gov. Pataki Proposes Legislation to Stop SO₂ Trades that Harm State*, UTILITY ENV'T REP., Jul. 18, 1997, at 8.

in a certain area.²²⁶ The most recent governmental proposal, made in April 1999, is less stringent than former proposals and fines participants in upwind trades only for the value of the transaction.²²⁷

Proposals for ways to restrict the allowance trading activities will face different problems. With regards to the effectiveness of these regulations, it has been suggested that restrictions will not succeed in reducing SO₂ deposition in the Northeast.²²⁸ Furthermore, restrictions may also be problematic from an economic perspective. If they result in an immense reduction of allowance exchanges, the goal of cost reduction might not be achieved. Something else that needs to be considered is whether a statute regionally limiting the sale of allowances is compatible with federal law; specifically, whether it violates the Supremacy Clause. Such a statute could limit the sale of allowances to the New England states, a smaller number of states or even to companies in the same state. Because the overwhelming amount of sales is going to Midwestern states, the analysis of the above issue shall not distinguish between these design options as long as sales to the Midwest are excluded in the state legislation.

A statute limiting the sale of allowances to a certain region could be in violation of the Supremacy Clause of the U.S. Constitution. The Supremacy Clause establishes that the Constitution and federal laws take precedent over state laws.²²⁹ State laws are invalid when

226. See *id.* at 9.

227. See *New York: Lawmakers Prepare Bill to Stop Emissions Trade*, American Political Network Greenwire, Apr. 23, 1999, available in Westlaw, 4/23/99 APN-GR 21.

228. See Esposito, *supra* note 172, at E1.

229. See U.S. CONST. art. VI, § 2 provides that “[t]his Constitution, and the Laws of the United States . . . shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.” *Id.*

they are in conflict with federal legislation.²³⁰ Such conflict may exist when Congress explicitly or implicitly preempts state law, or when a state law interferes with the fulfillment of the purpose of a federal law.²³¹ Thus, an analysis involving the Supremacy Clause requires a balancing of state and federal interests.²³² The CAA Acid Rain Program does not explicitly express an intent to preempt state law. While preemption could theoretically occur by implication, the Supreme Court has been reluctant to find such an implication. There is no evidence of an implied preemption under the CAA's program.

It therefore remains to be determined whether state law in this case is preempted because it actually conflicts with federal law. The Supreme Court defines this conflict as a case where it is "impossible to comply with both state and federal law, or where the state law stands as an obstacle to the accomplishment of the full purposes and objectives of Congress."²³³ Thus, in analyzing the CAA, its full purposes and objectives of Congress have to be determined. This determination requires distinguishing between the objectives sought to be advanced and the incidental effects of achieving

230. See *e.g.*, *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1, 209 (1824) (holding that a State regulation granting a steam boat permit was in conflict with a federal enactment granting a license on the same waters and was therefore held unconstitutional).

231. See LAURENCE H. TRIBE, *AMERICAN CONSTITUTIONAL LAW* § 6-25, at 481 n.14 (2d ed. 1988).

232. See Julie Long, *Ratcheting up Federalism: A Supremacy Clause Analysis of NAFTA and the Uruguay Round Agreements*, 80 MINN. L. REV. 231, 262 (1995).

233. *Silkwood v. Kerr-McGee Corp.*, 464 U.S. 238, 248 (1984) (quoting *Pacific Gas & Elec. Co. et al. v. State Energy Resources Conservation and Dev. Comm'n et al.*, 461 U.S. 190, 204).

those Congressional goals.²³⁴ If only the incidental effects are being affected by the state legislation, the latter is not considered an obstacle to federal law and therefore not in violation of the Supremacy Clause. While it may be difficult to identify the various goals of the CAA because of its diverse features, and to distinguish them from the merely incidental effects to the achievement of those goals, it may be said with certainty that the main objective of the Act is to protect and enhance air quality and to promote public health and welfare.²³⁵ However, this analysis concerns a state law that would regionally restrict allowance trading, which is federally regulated under Title IV of the Act. Thus, the more specific purpose of Title IV must be included in the examination. The purpose of Title IV provides a numeric limitation of SO₂ emissions requiring a reduction of ten million tons from 1980 emission levels.²³⁶ At the same time, it offers affected sources an emission allocation and transfer system as an alternative method to comply with this goal.²³⁷ A state law restricting the allowance trading would, therefore, be an obstacle to federal law if it either interferes with the overall goal of the Act or if it is incompatible with the methods prescribed by federal law in Title IV. This question has to be solved by analyzing the effects of such a state statute.

About 70% of LILCO's credits were sold to brokers who in turn sold the credits to upwind states.²³⁸ LILCO is not the only company in the Northeast which will not be able to find a suitable buyer within New York State or within the New England region. Regional restrictions

234. See Russell B. Korobkin, *Sulfur Dioxide and the Constitution: Legal Doctrine and Responses to the Clean Air Act Amendments of 1990*, 13 STAN. ENVTL. L.J. 349, 364 (1994).

235. See CAA § 101(b)(1), 42 U.S.C. § 7401(b)(1) (1994).

236. See *id.*

237. See CAA § 401(b).

238. See Vogel, *supra* note 170, at C16.

could lead to tremendous amounts of allowances that cannot be sold to the Midwest. Not only would this probably lead to a reduction in the total, nationwide emissions of SO₂ below the level provided for in the Acid Rain Amendments, but it would also compel Northeastern companies to leave their excess allowances unused and retire or bank them because of the strict New York state emission standards.²³⁹ On the other hand, companies in Midwestern states will not be able to find enough companies to offer them their required amount of credits. Both sides of the allowance exchange, the Northeast and the Midwest, would be deprived of one of their main compliance options: the sale of emission credits. The availability of this option has been one of the major goals Congress wanted to achieve through the Acid Rain legislation and it was probably the decisive feature, without which the Amendments would probably not have been enacted.²⁴⁰ Hence, if one state could affect the compliance choices of utilities in their own and in other states wishing to sell or purchase emissions allowances, it would alter the delicate political balance struck by federal legislation.²⁴¹ Allowing regional choice regarding compliance was not merely an incidental benefit of the trading provisions, but the intended goal of Congress.²⁴² Therefore, a statute restricting the sale of allowances by a regional limit would violate the Supremacy Clause and consequently be unconstitutional.

C. Lessons From the United States Acid Rain Program

The crucial question in all the above programs is how the market could be structured to be economically efficient on the one hand and environmentally protective on the other. The Acid Rain Program tried to achieve this

239. See Korobkin, *supra* note 234, at 373.

240. See *id.*

241. See *id.* at 373-74.

242. See *id.* at 374.

two-fold goal with a compromise by restricting companies in some areas while giving them leeway in others. The past nine years of experience with the Acid Rain Program suggests that the compromise neither completely met the expectations of economists nor environmentalists. The allowance market started off rather sluggish with few trades taking place. Also, environmental supporters of the trading program certainly did not anticipate the increase in upwind pollution from the Midwest to New England's Adirondacks that resulted from trading. Over-regulation of the trading activities has been suggested by some as the reason for the sluggish market.²⁴³ Excessive regulation and regulator attitudes have substantially hampered the evolution of a well-functioning permit market.²⁴⁴ Most of the permit market regulations have been based on suggestions that an emissions trading program would work well when coupled with strict rules and stringent monitoring.²⁴⁵ This would, on the one hand, satisfy environmentalists that are afraid of environmental damages if there is no governmental controls of the trading program. On the other hand, political resistance by industry to stringent limitations could be overcome through the establishment of a trading system.²⁴⁶ This latter expectation was not completely met. Even if coupled with economic instruments, those strict rules and stringent monitoring lead to the same opposition on the part of the industry. One of the key industry concerns about the CAA is the extensive requirements for monitoring, reporting, and record keeping.²⁴⁷ In sum, a trading program would only work successfully if used in a true free market mecha-

243. See McGee & Block, *supra* note 26, at 52.

244. See *id.*

245. See Driesen, *Five Lessons*, *supra* note 150, at 58.

246. See *id.*

247. See Elizabeth M. Morss, *Clean Air Act Implementation: An Industry Perspective*, 14 PACE ENVTL. L. REV. 63 (1996).

nism. The real advantages of economic efficiency - minimizing marginal costs while maximizing technological innovation - cannot be attained within a restricted market. Whether this "perfect" free market would actually work for emission allowances is uncertain. On the other hand, effective environmental protection can hardly be ensured without some kind of regulation.²⁴⁸

During the last couple of years, however, the situation has changed significantly. Improvements could be observed not only for the environment, but also for the development of the allowance market. Regarding the trading activity, the market seemed to have needed a few years in order to develop an active participation. The number of private transfers of emission allowances increased steadily during the last years.²⁴⁹ Even the allowance prices have increased.²⁵⁰

Moreover, the trading program has had positive effects on the environment. The sulfur concentration in rain decreased up to 25% in the Northeastern region of the U.S., whereas a decrease of 30% could be found in dry deposition between 1989 and 1995.²⁵¹ Ambient concentrations of SO₂ declined by 17% between 1994 and 1995.²⁵² Allowance trading thus provides an incentive for the utility industry to remain below the emission targets. The sources emitted well under their collective

248. See Dwyer, *Market Incentives in California*, *supra* note 91, at 103.

249. See Environmental Protection Agency, *Cumulative Trading Activity Table* (visited Oct. 17, 1998) <<http://www.epa.gov/ardpubl/acidrain/ats/cumchart.html>>.

250. See Environmental Protection Agency, *Monthly Average Price of Sulfur Dioxide Allowances Under the Acid Rain Program*, *supra* note 213.

251. See Environmental Protection Agency, *The Environmental Impacts of SO₂ Allowance Trading* (last modified Feb. 1998) <<http://www.epa.gov/acidrain/effects/tradefx.html>>. [hereinafter *The Environmental Impacts of SO₂ Allowance Trading*].

252. See *id.*

emissions limit in 1996. Phase I affected units were allocated 8.3 million allowances for the 1996 compliance year.²⁵³ But they only emitted a total of 5.4 million tons of SO₂, approximately 35% below 1996 allowable levels.²⁵⁴ Nearly every state containing Phase I affected units enjoyed overall emissions reductions. Ohio units, as one of the worst emitting states, emitted 410,714 fewer tons of SO₂ than allowed by their allocation, representing 26% over-compliance.²⁵⁵ In only two states, Illinois and Mississippi, did utilities not emit less SO₂ than originally provided for in their allowance allocation.²⁵⁶ There have been significant emission reductions in some of the highest emitting areas of the country. Electric utilities in Ohio and Indiana, for example, reduced SO₂ emissions by 46% and 37%, respectively, from 1990 levels.²⁵⁷ This outcome is important because emissions reductions in these high emitting states support a fundamental premise of Title IV's market-based approach. This premise suggests that the highest-emitting plants have an incentive to make substantial reductions in emissions because they can achieve these reductions at lower cost per ton than most lower-emitting plants. Concerns that the biggest emitters of SO₂ would simply buy allowances and continue to emit at their historical levels have thus far proven to be unwarranted.²⁵⁸

The Acid Rain Program achieved a 100% compliance rate with the statutory emission caps on SO₂.²⁵⁹ This is particularly astonishing as environmental targets are often not reached or at best are achieved only with great

253. *See id.*

254. *See id.*

255. *See id.*

256. *See id.*

257. *See The Environmental Impacts of SO₂ Allowance Trading, supra* note 251.

258. *See id.*

259. *See id.*

delay. Therefore, it is worth considering the lessons to be learned from the U.S. attempt to solve environmental problems with this economic instrument. Even if some of the experiences cannot be considered positive, they may nevertheless provide important lessons for similar programs in other countries. While the main lessons to be learned from the U.S. program will be discussed at this point, advice for the structural design of a trading system in Germany will be discussed where appropriate.

First, Phase I of the Acid Rain Program only covered 110 electric utility plants with 263 affected units instead of all 800 existing plants which would cover over 2,000 units.²⁶⁰ Although this phase opened the market to private participants and brokers, it did not lead to an active exchange of allowances either on the open market or at the auctions. Hopefully, Phase II's inclusion of all 800 electric utility plants will jump start the allowance market. The lesson to be learned from the economic shortcomings of Phase I is that a market for tradeable allowances should include as many sources as possible, even at the earliest stages of implementation. This idea applies to any national trading system, but should especially be the focus on an international level.²⁶¹

Second, an auction used as a complementary instrument for the sale of emission credits should not be designed as a price-discriminating auction as this may lead to a situation with multiple prices and no minimum price. Such a situation is hardly appreciated by the bidders in an auction. As the GAO suggested, the design of the auction should therefore preferably follow a single-price structure in order to work efficiently and encourage, rather than deter, bidding.²⁶²

260. See Environmental Protection Agency, *Program Overview* (last modified Sept. 1997) <<http://www.epa.gov/acidrain/overview.html>>.

261. See *infra* Part III.D.2.

262. See GAO-REPORT, *supra* note 126, at 55.

Third, federal or state agencies should provide guidance to electric utilities that will alleviate some of their anxiety over the rate-making process. Usually only the electric utility industry involves a rate-making process, so this lesson mainly applies to a potential German trading system for SO₂.

Fourth, high transaction costs frequently act as a deterrent for otherwise willing sellers and buyers. Transaction costs may be lowered by bringing in an intermediary firm. This practice has proven extremely successful in the Californian RECLAIM program, where 40% of all exchanges went through the hands of an intermediary.²⁶³

Fifth, the Acid Rain Program has resulted in the environmentally negative effect of acid deposition in regions that do not themselves emit SO₂. This process is called upwind pollution. A possible solution to this problem is to enact legislation prohibiting the sale of allowances to upwind utilities or penalizing upwind sales with high fees. Regional restrictions by state laws have been held to violate the Supremacy Clause of the U.S. Constitution.²⁶⁴ This does not necessarily apply in the context of any other national trading program (e.g., a German statute). On one hand, not every country will have the problem of upwind air pollution depending on different geographical and climatic conditions. On the other hand, the debate and history surrounding the enactment of the U.S. Acid Rain Amendments and the violation of the Supremacy Clause are most likely limited to the U.S. trading program and are not applicable to other countries. Any other national trading mechanism will therefore have to be analyzed according to its potential for upwind pollution and possible legal solutions pursuant to the laws of the nation governing the program.

263. See *supra* Part I.B.1.f.

264. See *supra* note 230.

II. INTRODUCING AN EMISSIONS TRADING PROGRAM INTO THE
GERMAN LEGAL SYSTEMA. *Current Economic Instruments*

Currently, there is no pollution trading system within the German legal system. Economic instruments have, however, been used in other German air pollution regulations. Even before the Acid Rain Program was incorporated into the Clean Air Act in the U.S. in 1990, the Technical Instructions for Air Purification ("Technical Instructions Air")²⁶⁵ allowed German utilities to use certain compensatory mechanisms in order to fulfill their

265. See *Erste Allgemeine Verwaltungsvorschrift zum Bundesimmissionsschutzgesetz - Technische Anleitung zur Reinhaltung der Luft* [First Administrative Regulation under the Federal *Immission* Control Act - Technical Instructions for Air Purification], amended by v. 27.2.1986 (GMBI. I S. 95, 202) [hereinafter *Technical Instructions Air*]. Technical instructions are administrative regulations, that were originally binding only on administrative agencies. Today, however, it is generally acknowledged that, at least under certain conditions, they are also binding on courts and regulated facilities. Initially, the Federal Administrative Court (*Bundesverwaltungsgericht*) held that since the standards were based on sound scientific evidence, they could be considered "anticipatory expert testimony" and were binding in the absence of new knowledge as to the harmful effects of the relevant pollutants. BVerwGE 55, 255 (*Voerde*). Thus, the standards had a "prima facie" effect. This decision was rendered under the *Technical Instructions Air* 1974 that provided for uniform standards with virtually no possibilities for case-by-case determinations. More recent judicial decisions tend towards an assessment of the technical instructions as so-called administrative provisions codifying norms. BVerwG, DVBL. 86, 190, 196. See also KLOEPFER, *ENVIRONMENTAL LAW*, *supra* note 49, § 7 n.36; JÜRGEN SALZWEDEL & WERNER PREUSKER, *THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE FEDERAL REPUBLIC OF GERMANY* 25 (2nd ed. 1982).

pollution control duties.²⁶⁶ This set of regulations is a particularly relevant technical guide to the control of air pollution. The Technical Instructions Air define the permitted maximum values for air emissions and *immissions*.²⁶⁷ *Immissions* are releases to the air of pollutants that may lead to a harmful impact on the environment, in contrast to emissions, which are releases of pollutants that may or may not necessarily cause any negative effects on the environment.²⁶⁸ German air pollution control law is based on the regulation of *immissions* instead of emissions.²⁶⁹

The Technical Instructions Air may be compared to American bubble policy. Under the Technical Instructions Air, several existing sources may be considered in the aggregate, or "bubbled." Within a bubble, each source may deviate from the regulatory provisions so long as emissions exceeding their regulatory obligations are compensated for by proportionately-reduced emissions of one of the other units within the bubble.²⁷⁰ That means that even new sources, *immissions* from which would lead to an excess over the permitted standard in that region,²⁷¹ may get a permit and thereby be admitted to the market, if the overall level of emissions will nonetheless be met.

This mechanism, first established through regulations (Technical Instructions Air), has been adopted by the

266. See Technical Instructions Air, *supra* note 265.

267. See SALZWEDEL & PREUSKER, *supra* note 265, at 25.

268. See *Immissions Data* (last modified May 11, 1998) <<http://www.umweltbundesamt.de/uba-info-datene/datene/hid.html>>.

269. That is why the German federal air pollution control law is called Federal *Immission* Control Act.

270. See MICHAEL KLOEPFER, ZUR GESCHICHTE DES DEUTSCHEN UMWELTRECHTS [THE HISTORY OF GERMAN ENVIRONMENTAL LAW] 113 (1994).

271. See Technical Instructions Air, *supra* note 265.

Federal *Immission* Control Act (BImSchG)²⁷² and represents the most important legislation for air quality in Germany.²⁷³ Under this statute, regulations provide that a facility can exceed emission standards,²⁷⁴ as long as the overall goal of the statute will be achieved.²⁷⁵ When the Government promulgated the Regulations on Large Combustion Plants (Thirteenth Regulation),²⁷⁶ it made use of this statutory authorization. The regulations place special requirements on large-scale combustion installations, which exceed a designated capacity.²⁷⁷ Both the Technical Instructions Air and the BImSchG limit the scope of compensatory mechanisms to *immissions* within the precautionary limits, i.e., to a situation that probably does not present harm to the environment. As soon as the danger limits are reached, i.e., a

272. Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnliche Vorgänge (Bundesimmissionsschutzgesetz) [Law for the Protection from Harmful Effects from Air Pollution, Noise, Vibrations and Similar Processes (Federal *Immission* Control Act)], v. 14.5.1990 (BGBl. I S. 721, 1190), *amended by* v. 26.11.1986 (BGBl. I S. 2089) [hereinafter BImSchG].

273. See SALZWEDEL & PREUSKER, *supra* note 265, at 24.

274. See § 7, paras. 1-3 BImSchG.

275. The purpose of this statute is to protect humans, animals and plants, the soil, water, the atmosphere and other goods from detrimental influences on the environment and as far as sources necessitating a permit are concerned, also from dangers, considerable disadvantages and considerable nuisances, that are being caused in another way, and to prevent the emergence of detrimental influences on the environment. See § 1 BImSchG.

276. Dreizehnte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über Großfeuerungsanlagen [Thirteenth Regulation for the Enforcement of the Federal *Immission* Control Act - Regulation on Large Combustion Plants], v. 22.6.1998 (BGBl. I, S. 719) [hereinafter Thirteenth Regulation].

277. See *id.*

situation with high probability of harm, no deviation from the statutory *immission* standards is possible. Also, any compensatory measures carried out under the Technical Instructions Air must seek an improvement of the human environment.²⁷⁸

Although these regulations are judged to have worked very successfully,²⁷⁹ they cannot be considered a comprehensive economic incentives program.²⁸⁰ The BImSchG is based on the traditional regulatory system which sets an emissions standard with which every source must comply.²⁸¹

B. Present Regulation of Sulfur Dioxide Emissions

1. Covered Source Categories

The BImSchG regulates the emission of SO₂ and other pollutants by regulating their sources. The permit requirement is applicable to facilities that, by reason of

278. See Gerhard Feldhaus *et al.*, *Die TA Luft 1986* [*The Technical Instructions Air 1986*], DEUTSCHES VERWALTUNGSBLATT [DVBL.] 641, 651 (1986).

279. See Deutscher Bundestag [German Federal Parliament], BTags-Drs. [Printed Matter of the Federal Parliament] 10/2965.

280. Further market mechanisms can be found in § 7d Einkommenssteuergesetz [Income Tax Law] [EStG] (grants tax reductions for investments in air pollution control techniques and similar subsidies). See also Feldhaus, *Market Economy and Air Pollution Control*, *supra* note 38, at 553.

281. See Rüdiger Breuer, *Grundprobleme des Umweltschutzes aus juristischer Sicht* [Basic Problems of Environmental Protection from the Legal Point of View], in ÖKOLOGIE, ÖKONOMIE UND JURISPRUDENZ [ECOLOGY, ECONOMY, AND JURISPRUDENCE] 21, 27 (Edgar Michael Wenz *et al.* eds., 1987) [hereinafter Breuer, *Basic Problems of Environmental Protection*], for an overview of German environmental regulatory instruments.

their construction or operation, may cause harmful environmental effects. The Regulation on Plants Subject to Permitting (Fourth Regulation)²⁸² specifies nearly hundreds of such facilities. Apart from new construction, significant modifications of major facilities are also subject to the permit requirement.²⁸³

Plants not subject to this requirement have to be built and operated in a way that harmful effects on the environment are to be avoided, if this is possible using a specified standard of technology. The standard of technology is defined in § 3, paragraph 6 BImSchG as state of development of advanced processes, equipment, or methods of operation that ensure the practicability of an emission limitation measure. These general terms are codified in the Regulation on Foundries (First Regulation).²⁸⁴

The regulations include permitting requirements and allow the agency to impose additional orders subsequently, after being permitted. Permit requirements are mostly laid down in the Thirteenth Regulation, which applies to combustion plants with a heating capacity of at least 50 MWe, and in the Technical Instructions Air applying to combustion plants with less than 50 MWe, and other kinds of sources. In addition, all sources

282. Vierte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über genehmigungsbedürftige Anlagen [Fourth Regulation for the Implementation of the Federal *Immission* Control Act - Regulation on Plants Subject to Permitting], v. 24.7.1985 (BGBl. I S. 1586), amended by v. 15.7.1988 (BGBl. I S. 1059) [hereinafter Fourth Regulation].

283. See § 15 BImSchG.

284. Erste Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über Kleinf Feuerungsanlagen [First Regulation for the Enforcement of the Federal *Immission* Control Act - Regulation on Foundries], v. 15.7.1988 (BGBl. I S. 1059) [hereinafter First Regulation].

have to comply with the emission standards as prescribed in the Technical Instructions Air.

The permit requirement only applies to new sources and not to existing facilities, but § 17 BImSchG authorizes an agency to issue a "subsequent order." A subsequent order enables the agency to require existing sources to comply with the Thirteenth Regulation and the Technical Instructions Air.²⁸⁵ The duty of complying with the principles in § 5 BImSchG may also be imposed on existing facilities by a subsequent order.²⁸⁶

2. Requirements for Sources Subject to Permitting

The major requirements for sources subject to permitting are laid down in § 5, paragraph 1 BImSchG which puts two of the central principles of German environmental law, the protection and the precautionary principles, in concrete terms.²⁸⁷ This requirement is the central principle of the BImSchG and may be compared to the CAA requirement forbidding the construction of a major new facility that would cause a violation of the ambient air quality standards.²⁸⁸ Both principles will be

285. See § 17 BImSchG.

286. See HANS D. JARASS, *DIE ANWENDUNG NEUEN UMWELTRECHTS AUF BESTEHENDE ANLAGEN: DIE ALTANLAGENPROBLEMATIK IM DEUTSCHEN RECHT, IM RECHT ANDERER EUROPÄISCHER STAATEN UND IM EG-RECHT* [THE APPLICATION OF NEW ENVIRONMENTAL LAW ON EXISTING SOURCES: THE PROBLEMATIC NATURE OF EXISTING SOURCES IN GERMAN LAW, IN THE LAW OF OTHER EUROPEAN COUNTRIES AND IN EC-LAW] 27-28 (1987) [hereinafter APPLICATION OF NEW ENVIRONMENTAL LAW].

287. § 5, para. 1, no. 1 BImSchG contains the protection principle. § 5, para. 1, no. 2 BImSchG describes the precautionary principle.

288. See ECKARD REHBINDER & ROLF-ULRICH SPRENGER, *THE EMISSIONS TRADING POLICY IN THE UNITED STATES OF AMERICA: AN EVALUATION OF ITS ADVANTAGES AND DISADVANTAGES AND ANALYSIS OF ITS APPLICABILITY IN THE*

explained in detail when analyzing the introduction of a trading system.

Section 5 of the BImSchG applies to any pollutant. However, in order to avoid case-by-case determination of whether a proposed facility meets the requirement, the Federal Government is empowered to adopt administrative guidelines that set forth ambient air quality standards.²⁸⁹ Pursuant to this authority, the government promulgated in the Technical Instructions Air both long-term and short-term ambient standards for a number of pollutants considered to be most important from the point of view of air pollution control, including SO₂.

The ambient air quality standards are intended to specify the duty not to cause environmental harm imposed by § 5 BImSchG. In contrast to U.S. standards, the ambient air quality standards normally do not have the force of law; they are administrative guidelines and are only binding upon the administration in principle. However, they may be considered to have the force of law if certain requirements for their promulgation have been met.²⁹⁰

C. *Why Should Germany Introduce an Emissions Trading System in the BImSchG?*

The Third *Immission Control Report* of the German Federal Parliament in 1984 referred to the "model-inherent problems" and "ecological risks" a trading pro-

FEDERAL REPUBLIC OF GERMANY 227 (1994) [hereinafter EMISSIONS TRADING POLICY].

289. Under § 48 BImSchG with the agreement of the Federal Council (*Bundesrat*). The Federal Council is one of the two organs of the federal legislative power and is the body through which the states (*Länder*) participate in the Federation.

290. See *supra* note 268.

gram might create.²⁹¹ Politically the introduction of a trading scheme would greatly benefit industry. Plants have been demanding deregulation through free market instruments for a long time. While energy-intensive companies take a fairly negative view of environmental taxes, trading and voluntary commitments are widely favored.²⁹²

Today, after more than nine years of experience with the U.S. Clean Air Act and several other trading programs, the German legislators' view of the situation might look different, since potential risks may be assessed more accurately. Although the Acid Rain Program has not been a complete success and still suffers from several shortcomings and flaws, it nevertheless has provided an effective tool for emission reductions. If used intelligently, a similar program may also be successful in Germany.

Although the German emission standard concerning SO₂ is already three times as stringent as that of the U.S.,²⁹³ introducing a trading program into the BImSchG may still be useful. Reduction standards alone are not indicators of the effectiveness of either traditional regulatory programs or economic mechanisms. The relative amount of reductions that are actually made within each of the two systems is the crucial factor which must be examined.

Certainly, the U.S. examples are based on American geographic, political and other peculiarities, which cannot simply be transferred into Germany. The question

291. See Deutscher Bundestag [German Federal Parliament], BTags-Drs. [Printed Matter of the Federal Parliament] 10/1354, 10/1356-57.

292. See Gick, *Allowances*, *supra* note 43, at 7.

293. The Thirteenth Regulation sets targets far below the Clean Air Act standards. Whereas the U.S. standard allows up to 1400 mg/m³ under 40 C.F.R. § 50.4, German standards permit no more than 400 mg/m³ for SO₂ emissions under § 6, para. 1 of the Thirteenth Regulation.

therefore is how to most efficiently set up a trading system suited to the situation in Germany and include it in the BImSchG. Similarly, it must be determined whether and how the BImSchG would have to be changed. This analysis assumes that the constitutional provisions of the German Constitution, the Grundgesetz ("GG")²⁹⁴ will be maintained. The issue of the legality of a pollution trading system within German law will be explored below. The results of the legal scrutiny may considerably differ, depending on the concrete design of the trading scheme. Therefore, several models for different aspects of a trading system shall be described beforehand, so that the legal analysis can refer to these models.

D. Models

Amongst a whole range of different models depending on various conditions to be included, the following four basic types can be distinguished.²⁹⁵ While some allow a completely unrestricted use of the credits, others are regionally limited. Models may also be based on emissions or on *immissions*. In all of these, issues arise regarding the duration of the credits, and their initial allocation. The design of these two elements shall be presented subsequently.

1. Unrestricted Emission Credit System

The basic model of a trading system would allow an unrestricted exchange of pollution credits after their al-

294. Grundgesetz für die Bundesrepublik Deutschland vom 23. Mai 1949 [Basic Law of the Federal Republic of Germany of 23 May 1949], v. 23.5.1949 (BGBl. I S. 1) [hereinafter Grundgesetz or GG].

295. See Erik Gawel, *Die Emissionsrechtelösung und ihre Praxisvarianten - eine Neubewertung* [Emissions Trading and its Applied Variations], ZEITSCHRIFT FÜR UMWELTPOLITIK UND UMWELTRECHT 31 (1993), for economic classifications of the different variations.

location. This exchange may take place without regard to the effects *immissions* may have on a certain area. The advantage of this model is its simplicity: the free market may develop without any impediments.²⁹⁶ On the other hand, this model may lead to severe environmental hazards, such as regional hot spots, for example, when a small area with a high density of utilities acquires a great amount of credits and emits an excessive amount of pollutants. As a consequence, this region will suffer from the augmented emissions, which would not occur under a system that sets regulatory emission caps.

2. Regionally Limited Emission Credit System

A solution for those unwanted side effects of a completely unrestricted model would be a system with regionally limited emission credits. Every region as a whole would be limited to a certain amount of emissions. The smaller the region, the more effective the cap would be, and thus, the smaller the probability of pollution hot spots. Unfortunately, the smaller the region, the smaller the market for credits. An increase of ecological effectiveness appears to go hand in hand with a decrease in economic efficiency.²⁹⁷

3. Basic *Immission*-based Credit System

Besides the two aforementioned models of emission-oriented credits, a trading scheme may also be based on

296. See ALFRED ENDRES ET AL., UMWELTZERTIFIKATE UND KOMPENSATIONSLÖSUNGEN AUS ÖKONOMISCHER UND JURISTISCHER SICHT [EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS FROM THE ECONOMIC AND LEGAL POINT OF VIEW] 93, 95 (1994) [hereinafter ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS].

297. See Cansier, *Environmental Allowance*, *supra* note 29, at 946; ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 95-96.

the amount of *immissions* in a certain area. There are two different methods of establishing *immission*-based credits. First, the permitted maximum value for emissions is determined by the amount of *immissions* that can be tolerated in a single or a few designated areas.²⁹⁸ For example, if a prevailing Southwest wind carries pollutants to the Northeast, a location in the Northeast would be used in determining the *immissions* cap, that again would represent the basis for determining the permitted value of emissions. The negative effect of this model is the fact that only one of a few areas is being protected, whereas others could still be harmed.

4. Comprehensive *Immission*-based Credit System

Therefore, a much more complicated system can provide a second alternative. This comprehensive system of measuring instruments would determine which emissions at which location will cause which *immissions* at which location. For each *immissions* location the admissible amount of pollution will be determined and an individual allowance market will be established. The allowances can be exchanged between the different markets, but their prices differ. The closer the emissions source is to the *immission* location, the more expensive the allowance. While this basic idea would probably be feasible, it gets much more complicated as every source will affect several *immission* locations. Consequently, every allowance price will be influenced by the distance to more than one *immission* location.

298. See Michael Bothe, *Rechtliche Voraussetzungen für den Einsatz von handelbaren Emissionszertifikaten am Beispiel von SO₂* [Legal Requirements for the Use of Tradeable Emission Allowances, For Example for SO₂], NEUE ZEITSCHRIFT FÜR VERWALTUNGSRECHT 937, 938 (1995) [hereinafter Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*]; Cansier, *Environmental Allowance*, *supra* note 29, at 946; ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 96.

The determination of the allowance price can therefore become highly complex and difficult. Although this model may at best consider the environmental effects the trade of allowances can cause, its structure is probably too complex to implement.

5. Duration of Credits

In any of the models, there are two different possibilities in establishing the duration of the credits. First, they could be valid for a limited period of time, for example one year. If the permits are limited for a certain time period, the agency could reduce the amount of total emissions each period and thereby adapt to any new ecological standards. While the state would gain flexibility in matters of environmental policy, the individual source would lack any kind of security. Sources could not foresee at what price credits will be available in the next period of time and future planning is difficult.²⁹⁹ Accordingly, short-term credits have been rejected in most trading programs.³⁰⁰

Second, credits could be of unlimited duration. This would eliminate the former problem of insecurity in planning. On the other hand, the state must retain the possibility of reducing the overall amount of emissions in order to meet ecological needs. This could be done in two ways.³⁰¹ First, the state could retain the authority to devalue the allowances. Second, the state could purchase them. If the state had the power of devaluation, it would be necessary to announce its plans in sufficient time so that industry can adjust its planning (otherwise the devaluation policy could lead to the same results as with limited credits).³⁰² In the case of devaluation, utili-

299. See Bader & Rahmeyer, *RECLAIM-Program*, *supra* note 91, at 46.

300. See *id.*

301. See *id.*

302. See *id.*

ties could purchase additional credits, if necessary, or reduce emissions, if possible, in order to avoid illegal emissions and a violation of the trading program. The distribution of credits without time limitations is generally favored by analysts of trading systems.³⁰³

6. Allocation

The third question to be solved by trading program modelists is how to allocate the credits initially. Three options are presented.

a. Auction

The first option is a state auction that sells allowances to the highest bidder. The main problem resulting from an initial auction is the impact on existing sources. Although old sources already acquired permits for the operation of their plants and therefore were allowed to emit a certain amount of pollutants, this right is taken away if they have to purchase allowances at an auction.³⁰⁴ This might conflict with the requirement in German law to protect the continuing existence of old sources, which will be discussed below.³⁰⁵ In addition, this policy leads to similar uncertainties in planning, like the allocation of credits limited in time, because sources cannot be sure that they will be able to acquire a sufficient amount of credits at the next auction. No long-term planning of operations is possible.³⁰⁶

303. *See id.*

304. *See* Environmental Protection Agency, *Greenhouse Gas Emissions Trading: A Country's - and Company's - Eye View* (visited May 13, 2000) <http://www.epa.gov/oppe-oeel/globalwarming/publications/actions/cop5/ghg_trading.html>.

305. *See infra* Part II.F.2.

306. *See* Bader & Rahmeyer, *RECLAIM-Program*, *supra* note 91, at 47; Bonus & Häder, *supra* note 47, at 38. For a strong pledge for auction markets instead of direct sales ar-

Another legal aspect affected by the allocation of the allowances through an auction is the qualification and destination of the payment the state receives from the bidders. It can probably not be considered a "special fee" (*Sonderabgabe*), but must be qualified as an "environmental utilization fee" (*Umweltnutzungsabgabe*) or "renting charge" (*Verleihungsgebühr*). It is still unresolved whether environmental utilization fees or renting charges are permissible instruments for the utilization of public goods.³⁰⁷

b. Sale

An initial sale of credits by the state leads to the same problems with the protection of existing sources.³⁰⁸ Furthermore, the state or the agency in charge of the allocation will face the task of setting an initial price for the credits, which might cause major difficulties. While an auction will lead to a market (scarcity) price based on supply and demand, the agency has no comparable value which could guide it in determining the price. The agency would have to know the costs to the plants of reducing or avoiding emissions, information which it does not normally have and which may be difficult to obtain. Therefore, most commentators reject this approach as not feasible.³⁰⁹

guing they are much more efficient because of a lower risk of hoarding and lower transaction costs. See Brennan Van Dyke, *Emissions Trading to Reduce Acid Deposition*, 100 YALE L.J. 2707, 2715 (1991); Tripp & Dudek, *supra* note 5, at 376-77 (1989).

307. See ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 118-19.

308. See discussion *infra* Part II.F.2.

309. See, e.g., Bader & Rahmeyer, *RECLAIM-Program*, *supra* note 91, at 47.

c. Free allocation

A third option for allocating emission allowances is to distribute them free of charge to previous holders of operating permits. The amount of pollutants that a source was allowed to emit until now is established and equivalent emission credits are assigned. This concept – also called grandfathering – seems to be the most promising as its advantages outweigh its disadvantages. Admittedly, the free allocation gives preferential treatment to those utilities that have polluted the environment in the worst manner: the more a facility emitted in the past, the more credits it will receive for the future. As such, it would seem that they would be awarded for their lack of investments in emission-reducing technologies.³¹⁰ Especially discriminated against are new sources, which will have to purchase credits for every emission they want to make. Some critics have pointed out that existing sources may hoard credits, so that new sources would not even get the chance to purchase them.³¹¹ On the other hand, free allocation is the only way to avoid the legal conflict with the continuing existence of old sources. Another advantage of this way of distribution is the planning flexibility for existing sources. They would not have to change all their operation policies. In addition, they would not be burdened with the extra costs for the allowances.

In conclusion, free allocation appears to present the fewest problems and can therefore be recommended as the best option.³¹²

310. See *id.* at 48; Gick, *Allowances*, *supra* note 43, at 19.

311. See Gick, *Allowances*, *supra* note 43, at 19.

312. See Bader & Rahmeyer, *RECLAIM-Program*, *supra* note 91, at 48; Michael Grubb & James K. Sebenius, *Participation, Allocation and Adaptability in International Tradeable Emission Permit Systems for Greenhouse Gas Control*, in CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 185, 191.

E. *Legal Issues*

Legal issues that arise when an emissions trading program is introduced into the German legal system can be both formal and substantive in nature. The formal scrutiny includes procedural aspects such as the authority of the legislature and administrative agencies over the subject matter at issue, the legislative procedure, and the form of the statute. A trading system must be enacted on the federal level. Depending on their particular nature, administrative functions should be divided between state and federal authorities. The substantive scrutiny analyzes the substantive compatibility of a proposed emissions trading program with existing legislation. A statute introducing a trading scheme into the German law system will have to fulfill certain structural requirements in order to be consistent with existing law.

1. Formal Issues

From among the formal issues to be observed when enacting an emissions trading statute, only the authority over the subject matter needs to be examined in particular. Procedural and form requirements need not be addressed since these are governed by general rules of Articles 76-78 of the Grundgesetz.³¹³ According to the structure of the Federal Republic of Germany, Articles 70 to 75 of the Grundgesetz divide the legislative and administrative powers between the Federation (*Bund*) and the states (*Länder*). Whereas the main responsibility for administrative matters lies with the states, the Federation plays a predominant role in making legislation.³¹⁴

313. Arts. 76 - 78 GG.

314. See WERNER F. EBKE & MATTHEW W. FINKIN, INTRODUCTION TO GERMAN LAW 86 (1996).

a. Legislative Authority

The first question regarding authority is whether the Federation or the states have the authority to enact legislation covering the enactment of and functioning of an emissions trading system. The power to legislate belongs to the states unless the Constitution specifies that it comes under the authority of the Federal Government.³¹⁵ The Federal Government may legislate either exclusively, concurrently with the states (so-called competing legislative authority), or enact framework laws to be implemented by the states.³¹⁶ If the Federation is granted a framework legislative authority, it then must create a system of rules which is complete. However, framework statutes should also leave substantial possibilities for regulation up to the states.³¹⁷ The determination of the legislative authority depends on the subject matter. The federal government was not given comprehensive authority in the field of environmental protection legislation. Due to its two-fold character, an emissions trading system can be considered an environmental issue as well as an economic matter.

The Federation does not have exclusive authority over the enactment of environmental statutes. The greater part of environmental law including the preservation of clean air under Article 74, paragraph 1, no. 24 GG falls within the competing legislative authorities of the Federation and the federal states. Competing legislative authorities allow the states to pass laws *only* to the extent that the Federation itself has not enacted conclusive legal provisions.³¹⁸ As the Federation exercised its right to enact clean air laws by passing the BImSchG, it has explicitly exhausted the legislative authorities conferred upon it. A trading system can be considered part

315. See art. 70, para. 1 GG.

316. See *id.* arts. 70-75.

317. See *id.* art. 75.

318. See *id.* art. 72, para. 1.

of the control regime, providing the Federation with additional authority to enact a trading statute. Article 74, paragraph 1, no. 24 GG may provide the Federation with authority to enact an emissions trading statute.³¹⁹

If the trading system is considered an economic issue, it may be considered "law relating to economic matters" under Article 74, paragraph 1, no. 11 GG, which allows for regulation of industry, supply of power, trades and others. This provision is part of the catalog for competing legislative authority and provides authority for a federal statute. The Federation could, therefore, also support its authority with this provision.³²⁰

However, a constitutional basis in one of the two provisions cited above is not sufficient in order to acquire federal legislative authority. The Grundgesetz imposes a second requirement: federal regulation must be necessary in order to assure equal living conditions in the federal territory or the preservation of legal and economic unity.³²¹ In the present case, the establishment of an emissions trading program in every single state would lead to several different regimes. Each regime would consist of different trading mechanisms, different market regulations and different competition features. Consequently, interstate trading would be confronted with a wide range of obstacles. Since such a system could hardly be implemented in a reasonable manner, a national program seems necessary to protect state interests.³²² Therefore, the requirements of legal and economic unity will be met. Thus, a trading scheme could be enacted as a federal statute regulating an environmental issue³²³ or an economic issue.³²⁴

319. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 39-40.

320. See *id.* at 40.

321. See art. 72, para. 2 GG.

322. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 41.

323. See art. 74, para. 1, no. 24 GG.

b. Administrative Authority

The second question regarding state or federal authority concerns the administration of a trading scheme. The enforcement of federal law relating to the environment forms the focus of the environmental authority of the states. Unless otherwise specified, states may determine for themselves how to execute federal statutes.³²⁵ Consequently, the states would be responsible for the implementation and administration of a trading system.

However, this does not necessarily mean that states also have the authority to establish an administrative agency in charge of allocating the permits and controlling the trading activities. Under Article 87, paragraph 3, sentence 1 GG, the federal legislature is authorized to establish independent federal higher authorities for matters on which the Federation has the power to legislate. The Federation has done so by establishing the Federal Environmental Agency ("*Umweltbundesamt*" or "UBA"). The UBA has no statutory powers to enforce laws and is thus limited to preparing and assisting functions, research, documentation, and publicity.³²⁶

A trading program would require the agency to carry out several different functions including: determination of the emissions cap, allocation of emissions allowances, organization of the market and the auction (in case there will be an auction), providing information to participating sources, and emissions control of the sources. Since the first four tasks involve overseeing all emissions and sources, they require a central agency to be in charge of the decision-making. Thus, it seems most appropriate to either expand the UBA's authority and capacities in order to organize the emissions trading, or to

324. See *id.* art. 74, para. 1, no. 11.

325. See *id.* arts. 30, 83-87.

326. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 89; SALZWEDEL & PREUSKER, *supra* note 265, at 8.

establish a new agency. The control of emissions at the individual sources, however, does not require a central decision. A federal agency would be overburdened with controlling all sources within the country. As the controls themselves may, depending on the particular arrangement,³²⁷ involve several other state agencies, it is best to defer authority to state agencies.³²⁸ In conclusion, federal and state agencies will have to share different tasks.

2. Substantive Issues

Every German statute has to be in accordance with German, European, and public international law. Therefore, substantive issues can arise in all of these three areas of law. A discussion of the various substantive issues in these areas of law follows.

a. German Law

An emissions trading statute may violate specific environmental laws including: the BImSchG, certain regulations under the BImSchG, the Technical Instructions Air, general principles of environmental law, and the Grundgesetz. The most important source of environmental legislation on the federal level is the BImSchG. The federal government can issue regulations to supplement the formal laws³²⁹ and did so in numerous regulations to the BImSchG. The Third, Thirteenth and Seventeenth Regulation will be of particular relevance for a trading program for SO₂. Additionally, the government is authorized to issue administrative instructions to help enforce the law. Of these, the Technical Instructions Air is a particularly relevant guide in which

327. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 222 (discussing a proposal on how to arrange the controls specifically).

328. See *id.* at 226.

329. See art. 80, para. 1 GG.

the permitted maximum values for emissions and *immissions* are defined.

(1) BImSchG

The BImSchG does not contain any provision that expressly prohibits the introduction of an emissions trading mechanism. A violation of the statute could nevertheless occur if one of the environmental principles expressly laid down in the BImSchG were violated. Section 5, paragraph 1 BImSchG contains two principles of German environmental law: the protection principle found in no. 1 and the precautionary principle found in no. 2. The latter, together with the causation and the cooperation principle of fundamental importance, form the so-called "principle trinity."³³⁰

(i) Precautionary Principle

The intent of the precautionary principle is to prevent damage or dangers before they occur and to avoid or at least minimize pollution. The precautionary principle therefore goes much further than merely reacting to the pollution once it arises. The precautionary principle is based on the idea that harm to the environment may be avoided through preventive measures taken in advance.³³¹ Precaution does not, however, mean the exclusion of all risk; the uncertain nature of scientific knowledge in any case prevents an absolute exclusion of all risks.³³²

The precautionary principle is established by section 5, paragraph 1, no. 2 BImSchG and in this context is considered indisputably binding on all facilities regu-

330. See HORST SCHLEMMINGER & HOLGER WISSEL, GERMAN ENVIRONMENTAL LAW FOR PRACTITIONERS 39-40 (1996).

331. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.4-7.

332. See SCHLEMMINGER & WISSEL, *supra* note 330, at 40.

lated under the Act.³³³ According to this provision, precaution must be taken to prevent harmful effects on the environment. In particular, emission control measures must be employed as appropriate according to best available technology. Otherwise, a source will be denied the requested permit. While details concerning the exact application of the principle are still contentious, it is generally acknowledged that emissions, even if they remain below the standards of the Technical Instructions Air, have to be reduced as long as it is feasible under current technology.³³⁴ The BimSchG defines the best available technology as the state of development of advanced processes of facilities or of modes of operation which is deemed to indicate the practical suitability of a particular technique for restricting emission levels.³³⁵ When determining the best available technology, special consideration shall be given to comparable processes, facilities, or modes of operation that have proven successful in practical operation.³³⁶

Although there might be differences between an unlimited trading scheme and restricted (regionalized) models, the introduction of any kind of emissions trading system could lead to a violation of the precautionary principle. This principle might be violated in two respects: its dynamic character and its technology approach. The principle has a dynamic aspect requiring sources to adjust their emission reductions dynamically, i.e., as current developments suggest.³³⁷ If the regula-

333. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.2.

334. See *id.* § 7-55; JÜRGEN SALZWEDEL, GRUNDZÜGE DES UMWELTRECHTS [ESSENTIALS OF ENVIRONMENTAL LAW] 87 (1982) [hereinafter SALZWEDEL, ENVIRONMENTAL LAW].

335. See § 3, para. 6 BimSchG.

336. See *id.*

337. See, e.g., Blankenagel, *Environmental Credits*, *supra* note 38, at 79; HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 204.

tion of air pollutants is left to a market mechanism like emission credits, this constant adaptation to recent scientific and technological developments may be jeopardized.³³⁸ Some authors suggest that one could deviate from this important obligation as long as the new strategy (i.e., the trading scheme) shows substantial promise of reaching the goal of best available technology.³³⁹ Other authors do not interpret the precautionary principle as requiring an automatic adoption of better technology as soon as it has developed.³⁴⁰ As long as emissions are constantly being reduced, the precautionary principle would allow a trading program.³⁴¹ However, under either of these interpretation approaches, the dynamic features of the precautionary principle as laid down in § 5, paragraph 1, no. 2 BImSchG would have to be changed or abandoned.

Another manner in which the principle may be met is by the constant devaluation of emission allowances.³⁴² Such constant devaluation of the credits would not lead

338. See Blankenagel, *Environmental Credits*, *supra* note 38, at 80; Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 939.

339. See, e.g., Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 939.

340. See, e.g., Joel A. Tickner, *Rethinking Decision-Making in the Face of Scientific Uncertainty: Operationalizing the Precautionary Principle* (visited Apr. 3, 2000) <http://es.epa.gov/ncerqa_abstracts/fellow/99/ticknerjo.html>.

341. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 204; Burkhard Huckestein, *Umweltlizenzen - Anwendungsbedingungen einer ökonomisch effizienten Umweltpolitik durch Mengensteuerung* [Emission Credits - Requirements For An Economically Efficient Environmental Policy Through the Control by Quantities], ZEITSCHRIFT FÜR UMWELTPOLITIK UND UMWELTRECHT 1, 11 (1993) [hereinafter Huckestein, *Emission Credits*].

342. See ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 112.

to the same results as a "natural" adjustment through application of the best available technology. However, it is arguable that regulation using standards of technology is not necessarily superior to a constant devaluation within a trading system. Since the regulatory approach has no means to encourage technological innovations, it is considered to be one of the economic idea's advantages. Theoretically, the trading system provides a strong incentive for industry to develop better technology, so that no emission allowances would have to be purchased. Within a regulatory system, the legislature can prescribe the use of best available technology, but it cannot force industry to invent more efficient and less pollutant-producing technology.³⁴³ However, the dynamics conflict might be alleviated, but never completely solved.

The second feature of the precautionary principle is its reliance on best available technologies. If sources under a trading system are free to decide whether they modernize their plants by applying the most recent technological innovation or whether they buy emission credits from other utilities (which preferred the former alternative), they might choose the former alternative. A regulation allowing this choice would violate the precautionary principle, which requires utilities to reduce the amount of emissions as long as it is technically feasible. Therefore, several authors believe that the precautionary principle as standardized in section 5, paragraph 1, no. 2 BImSchG would have to be changed by the legislature.³⁴⁴ One possibility to avoid a conflict with the

343. See *id.* at 112-13.

344. See Gick, *Allowances*, *supra* note 43, at 36; Eckard Reh binder, *Übertragbare Umweltgenehmigungen (Lizenzen) aus juristischer Sicht [Transferable Environmental Allowances (Licenses) from a Legal Point of View]*, in *UMWELTZERTIFIKATE - DER STEINIGE WEG ZUR MARKTWIRTSCHAFT [EMISSIONS TRADING - THE STONY PATH TO MARKET ECONOMY]*, *supra* note 5, at 73 [hereinafter Reh binder, *Transferable Environmental Allow-*

precautionary principle, could be a combination of technology with trading provision.³⁴⁵ For example, the U.S. Clean Air Act provides that credits may only be traded if a certain standard of technology is being applied by the source. However, this might undercut market efficiency.

(ii) Protection Principle

The protection principle requires sources to avoid dangers to the environment.³⁴⁶ This principle is less comprehensive than the precautionary principle, as it only applies to actual rather than threatened dangers. However, it is stricter than the precautionary principle as it prohibits dangers without paying attention to any other factors, such as the standard of technology.

The protection principle is specifically reflected at a statutory level in section 5, paragraph 1, no. 1 BImSchG and requires each source to be operated in such a way that it does not produce harmful effects on the environment nor other hazards, significant disadvantages or significant nuisance to the general public and the neighborhood. Moreover, a source will not receive a permit if it does not comply with these requirements. This requirement is the central principle of the BImSchG and may be compared to the CAA requirement prohibiting the construction of a major new facility that

ances]. According to Endres *et al.*, unrestricted trading would definitely violate the principle, whereas the violation would be potentially less severe with regionalized models. It is doubtful whether violation can be measured in terms of "severe" and "less severe." ENDRES *ET AL.*, EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 109-10.

345. See Blankenagel, *Environmental Credits*, *supra* note 38, at 80-81.

346. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.23.

would cause a violation of the ambient air quality standards.³⁴⁷

Emissions trading could lead to high concentrations of a pollutant in a small area, thereby creating a hot spot. This would violate not only the protection principle,³⁴⁸ but also the Grundgesetz as it requires a minimum of protection against hot spots.³⁴⁹ A trading system would therefore have to be designed to prevent any kind of hot spots. This means that allocation and purchase of credits may never lead to a situation exceeding the prescribed *immission* caps.³⁵⁰ Consequently, a trading system compatible with the protection principle would require *immission*-based corrections, so that all sources, even sources using trading mechanisms, are bound by the *immission* limit values.³⁵¹ This would correspond to the U.S. Clean Air Act model.³⁵² A pure emissions trad-

347. See REHBINDER & SPRENGER, EMISSIONS TRADING POLICY, *supra* note 288, at 227.

348. See Blankenagel, *Environmental Credits*, *supra* note 38, at 79; Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 938; KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 5, n.305; Rehbinder, *Transferable Environmental Allowances*, *supra* note 344, at 70, 72; Martin Wasmeier, *Marktfähige Emission-slizenzen - Das Zertifikatsmodell und seine Umsetzung in den USA [Marketable Emission Credits - The Allowance Model and its Implementation in the USA]*, NATUR UND RECHT [NATURE AND LAW] 219, 223 (1992) [hereinafter Wasmeier, *Marketable Emission Credits*].

349. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 5-305.

350. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 938; Gick, *Allowances*, *supra* note 34, at 37.

351. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 938; ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 110.

352. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 938.

ing system would not be compatible with the protection principle.³⁵³

In setting up the *immission*-based corrections, two different cases have to be distinguished in order to comply with the protection principle. In the first case, it is highly probable that at the moment the credit is transferred, the emissions will exceed the designated limit. In this case, the protection principle would require the agency to forbid the transfer of the credit.³⁵⁴ In the second case, *immissions* in a certain area may exceed the standard unexpectedly. A similar problem may arise if, during the term of a credit, new scientific findings or discoveries suggest a violation of the protection principle. In order to avoid violations in those cases, an administrative "subsequent order" pursuant to section 17 BImSchG might have to be issued.³⁵⁵ This provision allows the competent authorities to issue subsequent orders to fulfill the duties arising from and regulations made by the Act, including compliance with the ambient air quality standards.³⁵⁶ Two important conditions limit the availability of subsequent orders: the order must be economically feasible and achievable by applying state of the art technology. Economic feasibility refers to the feasibility for the individual source operator. However, subsequent orders may also be issued if the measure is economically feasible at least for the operator of an av-

353. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 204.

354. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 938.

355. See *id.*

356. Where the public or the neighborhood is not adequately protected from harmful environmental effects, that is, in particular, where the ambient quality standards are exceeded, the normal discretion the authorities enjoy in determining whether or not to issue such orders is reduced. Unless there are paramount countervailing interests, the authorities must issue a subsequent order. See REHBINDER & SPRENGER, EMISSIONS TRADING POLICY, *supra* note 288, at 232.

erage (standard) facility of the same kind. Under the prevailing view, the operator of the facility, or an average facility, makes a reasonable profit after installing the required technology.³⁵⁷ Since it is difficult to demonstrate economic feasibility for a fictitious average source, in practice, individual circumstances are controlling. The interference of such subsequent orders with the credit market could represent a serious impediment to free trade. Not only would the market be deprived of those "unusable" credits, but also sources would refrain from acquiring credits whose use might potentially be forbidden at a later time by the regulating agency. Such uncertainty about the potential value of the credit would seriously erode the source's faith in the credit's usefulness. Thus, the issuance of subsequent orders might cause several difficulties and is, therefore, a rather unfavorable remedy.

Finally, there is the question of whether the protection principle may be derogated or changed by the legislature or whether its existence is guaranteed by the Grundgesetz. The necessity for a protection principle could be derived from the constitutional right to life and physical integrity³⁵⁸ or from the constitutional right to property.³⁵⁹ However, neither right on its face provides for a clearly defined protection principle. The effects and exact meaning of the principle are case-specific and cannot be described in general. Consequently, there is no unambiguous, unique way to interpret the protection principle, but there are different possibilities for implementing it.³⁶⁰ Nevertheless, since the system may not be allowed to cause any disproportional harm to life, health or

357. *See id.*

358. Everyone has the right to life and to physical integrity. *See* art. 2, para 2 GG.

359. Property and the right of inheritance are guaranteed. *See* art. 14, para. 1 GG.

360. *See* Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 939.

property, it would be unconstitutional to completely ignore the protection principle completely when setting up a trading system. An unrestricted, purely emissions-based model would be incompatible with the Constitution, whereas an *immissions*-based scheme can be set up in a way reconcilable with the protection principle.

(iii) Participation of Third Parties

The BImSchG allows third parties to make objections when a source applies for a permit.³⁶¹ Even if a market system is introduced for the allocation of emission credits, utilities will still have to apply for operating permits. These operating permits, however, will no longer limit the amount of emissions as the latter will be part of the traded allowances. Most objections raised by third parties during the permitting process assert violations of the protection and the precautionary principles as laid down in section 5, paragraph 1, no. 1, 2 BImSchG. Since violations of these principles would no longer be considered valid by the permitting agency, third parties will be deprived of their basis for objections.³⁶² Also, potential lawsuits by third parties will suffer from the same. The introduction of an emissions trading system consequently leads to a serious reduction of third party participation.

(2) Non-Statutory Law

The introduction of a trading mechanism might violate not only the BImSchG, but also non-statutory law comprising the general principles of environmental law, chiefly the principle of continuing existence, regulations under the BImSchG and the Technical Instructions Air.

361. See § 10, paras. 3, 6 BImSchG.

362. See *Blankenagel, Environmental Credits*, *supra* note 38, at 82; *Rehbinder, Transferable Environmental Allowances*, *supra* note 344, at 78.

The environmental principle of continuing existence is not codified within the BImSchG. Several other important environmental principles exist.³⁶³ They do not develop binding force unless they are expressly incorporated into a standard or statute.³⁶⁴ Nevertheless, they can cause legal effects if combined with statutory provisions. Their importance has recently been shown by the decision of the Federal Constitutional Court in the packaging and waste taxes case, where the taxes were overturned for violating the co-operation principle.³⁶⁵ The principle of continuing existence is intended to maintain the status quo by preventing any deterioration or degradation of the environment.³⁶⁶ The principle as an environmental principle guaranteeing people the right to maintain air quality may well be distinguished from the principle of continuing existence in connection with the Constitutional right of old sources to stay in business.³⁶⁷ In its environmental sense, the principle is derived from the state's obligation to protect human health and integrity under Article 2, paragraph 2 GG, and the principle of a social state as laid down in Article 20, paragraph 1 GG.³⁶⁸ The principle of continuing existence may be regarded as a part of the precautionary

363. Other environmental principles include: the protection principle, the principle of continuing existence, the caution principle, the cradle-to-grave principle, the sustainability principle, the principle of ecological balancing.

364. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.2.

365. See BVerfGE 98,83; BVerfGE 98,106.

366. It is also called the principle prohibiting deterioration. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.26. According to another opinion, the principle prohibiting deterioration represents an independent principle. See SALZWEDEL, ENVIRONMENTAL LAW, *supra* note 334, at 91.

367. See *infra* Part II.H.

368. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 45. See *infra* Part II.F.1., for a discussion on the principle of a social state.

principle, which seeks to improve the environment. The former in this respect creates the lower limit for environmental protection. It may not, however, be applied in individual cases to prohibit a source from operating solely because it causes further emissions. The principle may only be understood in a general sense to prohibit the deterioration of the environment as a whole.³⁶⁹ It is not expressly standardized in the BImSchG, but the compensatory regulations in the BImSchG³⁷⁰ and the Technical Instructions Air³⁷¹ may be considered an expression of the principle's idea.³⁷² The principle applies in particular to SO₂ emissions.³⁷³ With an emissions-based trading system, regional deterioration cannot be ruled out and therefore the present air quality can not be guaranteed. Consequently, this would violate the principle of continuing existence.³⁷⁴ An *immissions*-based system with sufficiently strict limitations, on the other hand, should be forearmed against regional deterioration of the existing air quality and consequently be reconcilable with the principle of continuing existence.

A trading system will have to be designed observing the emission standards set forth in the regulations under the BImSchG. Relevant for the trading of SO₂ allowances are the Regulation on the Sulfur Content of Light Heating-Oil and Diesel Fuel (Third Regulation),³⁷⁵ the

369. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.26.

370. § 7, para. 3; See *infra* Part II.A.1.

371. See Technical Instructions Air, *supra* note 265.

372. See KLOEPFER, ENVIRONMENTAL LAW, *supra* note 49, § 4, n.27; SALZWEDEL, ENVIRONMENTAL LAW, *supra* note 334, at 91.

373. See SALZWEDEL, ENVIRONMENTAL LAW, *supra* note 334, at 91.

374. See ENDRES ET AL., EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 110.

375. See Dritte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über Schwefelgehalt von leichtem Heizöl und Dieselkraftstoff

Thirteenth Regulation,³⁷⁶ and the Regulation on Incineration Plants for Wastes and Similar Combustible Material (Seventeenth Regulation).³⁷⁷ The Third Regulation prescribes emission standards for the sulfur content of certain fuels. The provisions of the Thirteenth Regulation set specific emission standards for SO₂ and thereby put the precautionary principle in concrete terms.³⁷⁸ The Seventeenth Regulation contains standards to be observed when burning solid, liquid substances or combustible materials that are not normal fuels.³⁷⁹ These emission limits might be exceeded if a source acquires more emission rights than it would be allowed according to these provisions. Furthermore, the provisions and emission standards of the Technical Instructions Air have to be met. As explained in more detail above, the Technical Instruction Air is considered a legal provision of environmental law with a somewhat restricted binding force.³⁸⁰ In sum, a trading system would have to have emission standards stringent enough to meet the standards set forth in the above regulations and the Technical Instructions Air. If the trading system cannot

[Third Regulation for the Enforcement of the Federal *Immission* Control Act - Regulation on the Sulfur Content of Light Heating-Oil and Diesel Fuel], v. 15.1.1975 (BGBl. I, S. 264), amended by v. 14.12.1987 (BGBl. I S. 2671) [hereinafter Third Regulation].

376. See *supra* note 276 and accompanying text.

377. See Siebzehnte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über Verbrennungsanlagen für Abfälle und ähnliche brennbare Stoffe [Seventeenth Regulation for the Enforcement of the Federal *Immission* Control Act - Regulation on Incineration Plants for Wastes and Similar Combustible Material] v. 23.11.1990 (BGBl. I S. 2545, 2832, 1999, 186) [hereinafter Seventeenth Regulation].

378. See §§ 6, 11, 16 of the Thirteenth Regulation.

379. See § 5 of the Seventeenth Regulation.

380. See *supra* note 265.

meet the standards, the concerned provisions must be changed.

F. *The German Constitution*

An emissions trading system also has to remain within constitutional limits. The relevant provisions of the Grundgesetz are those regarding fundamental rights and constitutional principles. Before analyzing any particular provision, this Article will examine how the Grundgesetz treats the use of regulatory and economic instruments in general.

1. Duty of the State to Regulate Air Pollution Control

A trading scheme would, at least partially, replace regulatory provisions. Of course, this is the goal of the introduction of economic instruments. This replacement might, however, interfere with the state's obligation to protect the environment, if such an obligation exists. Environmental protection is one of the tasks of the government, which is charged with preserving the natural resources and basic elements for living.³⁸¹ The government's mandate is to protect society from both selfish decisions and the development by industry of an exclusively self-interested economy.³⁸² This "task," however, only means that the government may regulate, and does not mean that it is obligated to do so. On the one hand, this task cannot be completely handed over to industry.³⁸³ On the other hand, a legal "duty" to regulate could only be imposed by an explicit authorization by

381. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 29-30; MICHAEL KLOEPFER ET AL., UMWELTGESETZBUCH [AN ENVIRONMENTAL LAW STATUTE] 6-7 (2d ed. 1991) [hereinafter KLOEPFER ET AL., UGB].

382. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 30.

383. See Feldhaus, *Market Economy and Air Pollution Control*, *supra* note 38, at 553.

the Constitution. In the absence of a provision authorizing environmental legislation, such authority could be based on a combination of other principles and rights found in the Constitution, specifically the principle of social justice, the rule of law, and fundamental rights.³⁸⁴

The principle of a social state, as laid down in Article 20, paragraph 1 GG seeks to ensure general social justice, and shall be guaranteed by intervention by the state.³⁸⁵ Although the principle functions as a normative directive to legislation, it has never served as the basis for a successful challenge to an action. Therefore, it can only require the preservation of an "ecological minimum level of existence."³⁸⁶ Consequently, the requirement of a completely regulatory approach to environmental protection cannot be derived from the principle of a social state by itself.

The provisions guaranteeing fundamental rights, however, could help in determining whether the state is obligated to regulate SO₂ emissions or whether it is allowed, or maybe even required, to leave some of it to the private sector. A strong argument for the latter could be made if fundamental rights provide a footing for a trading program. While the fundamental rights in German law not only guarantee the individual freedom from the state, they also impose certain duties on the government. The rights and freedoms of the individual from the state are based on the so-called *status negativus* of the fundamental rights, whereas the governmental duties stem from *status positivus*.³⁸⁷ This *status positivus* function of the GG could serve as a basis for environ-

384. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 30.

385. See EBKE & FINKIN, *supra* note 314, at 55; MICHAEL KLOEPFFER ET AL., UGB, *supra* note 381, at 7.

386. See Feldhaus, *Market Economy and Air Pollution Control*, *supra* note 38, at 553; MICHAEL KLOEPFFER ET AL., UGB, *supra* note 381, at 7-8.

387. See EBKE & FINKIN, *supra* note 314, at 67.

mental protection. Certain rights, such as Article 2, paragraph 2, 14 GG bind the state to protect individuals from suffering substantial harm to their health, life or property.³⁸⁸ Of course, this does not mean that the state is compelled to do so by means of a statute. A statute is only necessary when the "theory of the essential" (*We-sentlichkeitstheorie*) requires one. Under this theory, the state has to regulate a subject matter by statute, if it appears to be essential. Thus, the threshold question deals with determining what is essential. In an early case, the Federal Constitutional Court ("*Bundesverfas-sungsgericht*" or "BVerfG") did not squarely address this question, but stated that the use of land as a scarce good may not be left to the market because of its non-reproducibility and because man cannot do without it.³⁸⁹ The next decision relevant to this matter was the *Naßauskiesungsbeschuß*, where the Court held that the use of ground water may not be entirely up to the discretion of the individual.³⁹⁰

The question of what is essential has been addressed by the Federal Constitutional Court in the famous *Kalkar Case*.³⁹¹ This case defined the theory of the essential regarding the obligation of the state to enact statutes in order to protect fundamental rights. Although this opinion is based on a nuclear energy case, it has been applied to the entire field of environmental law.³⁹² In the case, the Court states that the question whether to make peaceful use of nuclear energy is a fundamental and essential decision because of its far-reaching con-

388. See Feldhaus, *Market Economy and Air Pollution Control*, *supra* note 38, at 553; MICHAEL KLOEPFER ET AL., UGB, *supra* note 381, at 8; *Development of Environmental Law*, *supra* note 25, at 416.

389. See BVerfGE 21, 73, 82-83.

390. See BVerfGE 58, 300, 344.

391. See BVerfGE 49, 89 (*Kalkar*).

392. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 31.

sequences for people, in particular to their rights to freedom and equality, and on their general living conditions.³⁹³ Thus, the legislature alone is authorized to make that decision. Its authority includes the regulation of environmental harms and dangers and precautionary measures, thus standardizing the protection and precautionary principles. However, the legislature is not capable of comprehensively excluding all risks. Therefore, unavoidable remaining risks cannot be subject to governmental regulation.³⁹⁴

If the initial question – whether the legislature is obligated to regulate air pollution by statute or whether it is authorized to leave part of the decision-making to the industry through emissions trading – is considered in light of these conditions, a trading system seems to be permissible. This depends, however, on the particular model selected for emission reductions. A “pure” model of emissions trading is not capable of protecting the environment from potential harms. Without any kind of regional or *immissions*-based restrictions, this might lead to a violation of the precautionary or even the protection principles. Thus, it is not reconcilable with the state’s obligation to protect the environment, as set forth above.³⁹⁵ A regulatory approach is imperative to control actual dangers to the environment.³⁹⁶ However, according to one commentator, the regulation of clean air may be left to a market without violating the Constitution as long as an appropriate transition period is guaranteed.³⁹⁷

393. See BVerfGE 49, 89.

394. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 30.

395. See Breuer, *Basic Problems of Environmental Protection*, *supra* note 281, at 53; *Development of Environmental Law*, *supra* note 25, at 416.

396. See *Development of Environmental Law*, *supra* note 25, at 416.

397. See Blankenagel, *Environmental Credits*, *supra* note 38, at 87.

In conclusion, there is no overall duty of the government to achieve environmental protection by using regulatory mechanisms. Economic instruments can be employed as long as actual harm to the environment is avoided. Since these instruments cannot guarantee that they will avoid actual harm, they can never replace regulatory instruments completely, but only complement them.³⁹⁸ Besides, the intervention by the state seems to be required politically.³⁹⁹

398. See STEFAN SCHUPPERT, NEUE STEUERUNG-SINSTRUMENTE IM UMWELTVÖLKERRECHT AM BEISPIEL DES MONTREALER PROTOKOLLS UND DES KLIMARAHMENÜBEREINKOMMENS: KOSTENEFFEKTIVITÄT UND INNOVATIONSWIRKUNGEN ALS GRUNDSÄTZE IN INTERNATIONALEN VERTRÄGEN [NEW REGULATORY INSTRUMENTS IN INTERNATIONAL ENVIRONMENTAL LAW, FOR EXAMPLE IN THE MONTREAL PROTOCOL AND THE FRAMEWORK CONVENTION ON CLIMATE CHANGE: COST EFFECTIVENESS AND INNOVATIVE EFFECTS AS PRINCIPLES IN INTERNATIONAL CONVENTIONS] 20 (1998) [hereinafter SCHUPPERT, NEW REGULATORY INSTRUMENTS]. How the side by side existence of regulatory and economic instruments could be carried out was analyzed by Rüdiger Breuer, *Zunehmende Vielgestaltigkeit der Instrumente im deutschen und europäischen Umweltrecht - Probleme der Stimmigkeit und des Zusammenwirkens* [Increasing Diversity of the Instruments in German and European Environmental Law - Problems of Harmony and Cumulation], 9 NEUE ZEITSCHRIFT FÜR VERWALTUNGSRECHT 833, 845 (1997) [hereinafter Breuer, *Diversity of Instruments*], where he warns about an uncoordinated cumulation of instruments; see also Wasmeier, *Marketable Emission Credits*, *supra* note 348, at 223.

399. See Karl-Heinrich Hansmeyer, *Ökonomische Anforderungen an die staatliche Datensetzung für die Umweltpolitik und ihre Realisierung* [Economic Requirements for Establishing Data for Environmental Policy by the Government and their Implementation], in MARKTWIRTSCHAFT UND UMWELT [MARKET ECONOMY AND THE ENVIRONMENT], *supra* note 204, at 6, 9.

2. Fundamental Rights

The introduction of an emissions trading system could affect the fundamental rights as laid down in Arts. 1 to 20 of the Grundgesetz. Article 12 GG, guaranteeing choice and exercise of an occupation, and Article 14 GG, which grants the right to maintain a commercial enterprise, are of particular interest in the case of trading. These rights may be violated, depending on how the allowances are initially allocated among new and old sources and how their future, or duration, is designed. Regarding the initial allocation, two main options may be distinguished: free distribution to existing sources according to their historic emissions, and purchase, which may be in the form of an auction or a sale. At either auction or sale, new and old sources have the same chances to obtain allowances.⁴⁰⁰ Whereas free distribution could possibly conflict with the right to choose an occupation on the part of new sources, the purchase system could interfere with a potential right to property of existing sources.

Determining whether violation of a fundamental right of the Grundgesetz occurs is generally an exercise consisting of three steps. In the first step, the "scope of protection" of the fundamental right is examined. At the same time, it must be determined whether or not the proposed governmental action (here: the statute introducing an emissions trading program and its relevant provisions in particular) interferes with the scope of protection. Next, one must determine whether the fundamental right may be restricted through certain "limitations." Limitations, consisting mostly of statutes, are usually allowed by the constitutional provision itself. The mere fact that the Constitution allows a fundamental right to be restricted by a limiting statute does

400. As a third option, the distribution of free allowances to new sources has been proposed. See ENDRES *ET AL.*, EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 124.

not mean, however, that the statute is constitutional. It is always subject to the "principle of proportionality." Therefore, the last part of the three-part-inquiry requires scrutiny of the proportionality of the statute. In other words, the limitation of the fundamental right must be proportional to the purpose of the statute. Only if this final requirement is also fulfilled will the governmental action considered not to be in violation of the fundamental right.⁴⁰¹

G. *Article 12 of the German Constitution*

Free allocation of allowances to existing sources according to their former emissions (based on a fairly long reference period) could interfere with the right of potential new sources to choose an occupation or profession as guaranteed in Article 12 GG.

According to this provision, all Germans "have the right to freely choose their occupation, their place of work, and their place of study or training." Although "the exercise of an occupation can be regulated by or pursuant to a statute," the fundamental right is considered a uniform right dealing in the same manner with both the choice of one's occupation and its practice.⁴⁰² Thus, the right to choose one's occupation is protected, as is the right to exercise it. Under a trading program, a potential new source will need to acquire allowances from existing sources in order to operate. This may implicate Article 12 GG. Yet it is not sufficient to establish that Article 12 is implicated. It is enough, however, to determine which aspect of the right and to what extent it has been interfered with. This determination affects additional inquiries, because the limitations imposed by

401. The scrutiny of a fundamental right may slightly vary depending on the particular right.

402. THEODOR MAUNZ ET AL., 2 GG-KOMMENTAR [ANNOTATIONS TO THE GG] art. 12 n.295 (5th ed. 1998) [hereinafter MAUNZ ET AL., ANNOTATIONS TO THE GG].

the intervening regulation depend on the particular kind of intervention. This differentiation was developed by the Federal Constitutional Court in the so-called "three-step-rule"⁴⁰³ in the *Pharmacy Case*.⁴⁰⁴ The Court distinguished between regulations affecting the exercise of the occupation (step one), those affecting the choice by establishing subjective criteria (step two), and those affecting the choice through objective criteria (step three). Subjective criteria are those that require the applicant to fulfill certain conditions that depend on the applicant's individual abilities and characteristics,⁴⁰⁵ whereas objective criteria are those that are oriented toward external circumstances, that is, independent from the individual applicant.⁴⁰⁶ Depending on which step is implicated, the regulation needs to meet certain requirements in order to be constitutional. The freedom to exercise an occupation in step one may be regulated to the extent that reasonable consideration of public interest dictates.⁴⁰⁷ If the freedom to choose a profession is being restricted by subjective conditions (step two), the principle of proportionality applies so that the conditions may not be out of proportion to the purpose of achieving an orderly conduct of the profession.⁴⁰⁸ A restriction on the choice of profession using objective criteria is only allowed under exceptionally strict prerequisites. Generally, only in defense against ascertained and highly probable dangers for a public good of para-

403. *Drei-Stufen-Regelung*.

404. BVerfGE 7, 377.

405. For example, before being allowed to open a practice, a doctor has to successfully complete and graduate from medical school (*subjective* requirement).

406. The doctor might nevertheless be denied permission to open a practice in a certain area, if there are already a certain amount of practices and their number is limited (*objective* limitation).

407. See BVerfGE 7, 377 (378).

408. See *id.*

mount importance will justify such a measure.⁴⁰⁹ A regulation distributing allowances free of charge to existing sources, but requiring new sources to have such allowances in order to operate their plants, would be an interference with the new sources' right to exercise their occupation. Therefore, it would fall under step one.

If, however, the initial allowance allocation leads to a situation in which new sources do not have any possibilities to obtain emission credits, they might not be able to operate their plants at all and would be excluded from the market. They would be practically deprived of their right to freely choose their occupation. The question is whether this deprivation is based on subjective or objective criteria. A regulation distributing allowances to existing, but not new, sources is not affected by the applicant's individual abilities. It would therefore be considered an objective restriction on the choice of occupation, which requires meeting the strictest prerequisites.

Although a statute providing for free allocation to existing, but not new, sources affects the scope of protection of Article 12 GG, it can still be constitutional. Article 12, paragraph 1, sentence 2 GG allows the regulation of the right to an occupation by or pursuant to a statute. Because Article 12 GG treats choice and exercise of one's profession equally, this limitation applies not only to the right to choose, but also to the right to exercise one's occupation.⁴¹⁰ The statute introducing the emissions trading system would meet this requirement.

Even if the statute is a permissible limitation under Article 12, paragraph 1, sentence 2 GG, the limitation of a constitutional right must be proportional to the purpose of the statute. Proportionality is determined by using a three step test: the interference of the statute

409. *See id.*

410. *See MAUNZ ET AL., ANNOTATIONS TO THE GG, supra* note 402, art. 12 n.318.

with fundamental rights must be appropriate, necessary and reasonable, i.e., proportional in the narrow sense. While proportionality in the broad sense entails all three requirements, proportionality in the narrow sense is synonymous with reasonableness as the third requirement. The reasonableness test has been specified by the German Constitutional Court in the "three-step-rule" as established above in the *Pharmacy Case*.

Interference is "appropriate" if it promotes the objective of the regulation in any way, although it does not have to be the best means of doing so. The objective of introducing a trading system is to establish an economically efficient market for pollution rights, eventually leading to cost-effective and environmentally efficient air pollution control. An allowance trading scheme appears to be suitable to achieve this objective and is therefore "appropriate." "Necessary" means that there is no way of achieving this objective that would be less injurious to the rights of the citizen.

In principle, the least invasive means must always be chosen. With respect to trading, two alternatives shall be analyzed as potentially less invasive means for achieving environmental protection. First, the traditional regulatory approach may be less burdensome for new sources. Usually, the regulation of emission standards determines a cap of how much emissions are overall admissible. If all old sources already emit this admitted amount of emissions, even a regulatory approach would not allow new sources to start operation of their plants, because the cap may not be exceeded. They would not receive an operating permit from the permitting agency, so that the same result were obtained in a regulatory model.⁴¹¹ The regulatory system consequently cannot necessarily provide a less burdensome model. It may therefore not be considered less invasive than a trading system. Second, a less invasive

411. See ENDRES *ET AL.*, EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 121.

means for new sources for achieving the objective could be a regulation providing that as soon as sources no longer need their allowances, they would automatically revert to the state.⁴¹² This would guarantee that there would always be a supply of allowances for new sources. However, such regulation would probably pose an impediment to the free functioning of the market. If sources cannot expect to sell their surplus credits for high prices on the market, there is no incentive at all for them to reduce emissions. It is highly doubtful that any surplus credits would be produced at all, or if they were, that the sources would report having additional allowances. This proposal can therefore not be considered to be a reasonable alternative to a trading scheme. Thus, no less burdensome means are apparent, so that the trading scheme is "necessary."

The third element of the proportionality principle is reasonableness or proportionality in the narrow sense. Reasonableness means that the interference must be commensurate with the object sought to be achieved, which is a means-purpose-relationship test. This test underlies the special limitations of the "three-step-rule" as established above. For the two different kinds of interference with Article 12 GG it means that two different criteria of assessment have to be applied.

1. Interference on Step One

If the allocation method only interferes with Article 12 GG on step one, it is proportional in the narrow sense as long as reasonable consideration of public interest requires the regulation.⁴¹³ The public interest in such regulation is the interest in effectively providing for clean air, cost-efficient control of pollution and compliance with the regulatory standards. If new sources will have to acquire emission allowances in order to operate

412. *See id.*

413. *See* BVerfGE 7, 377 (378).

their plants, this does not seem unduly burdensome or intolerable. Reasonable consideration of public interest therefore justifies the interference with Article 12 GG for new sources, and such a consideration is proportional in the narrow sense. Hence, a regulation interfering in the rights of new sources of Article 12 GG, without completely depriving them of the possibility of acquiring allowances, does not lead to a violation of Article 12 GG.

2. Interference on Step Three

If, however, the initial allowance allocation leads to a situation in which new sources do not have any possibility of obtaining emission credits, they might not be able to operate their plants at all and would be excluded from the market. They are deprived of their right to freely choose their occupation, and step three is implicated. However, this interference with step three can only be proportional and can therefore be justified if the defense against ascertained and highly probable dangers to a public good of paramount importance requires such a measure.⁴¹⁴ It must therefore be determined whether an allocation program would pose probable dangers to a public good of paramount importance, and thus require the free allocation to existing sources.

There are several arguments why free allocation to old sources is necessary. First, existing plants might have a constitutional guarantee of the protection of their continuing existence.⁴¹⁵ If they do have such rights, they might conflict with and be restricted by the rights of new sources inherent in Article 12 GG. The right to protection of their continuing existence therefore cannot be considered a public good of paramount importance. If no other allocation method appears to be available, then one might have to give up the whole trading ap-

414. *See id.*

415. *See* ENDRES *ET AL.*, EMISSIONS TRADING AND COMPENSATORY INSTRUMENTS, *supra* note 296, at 121.

proach. A second argument for free allocation is that it is necessary for the preservation of the existence of a strong and properly functioning economy and the stabilization of the utility industry.⁴¹⁶ Third, the labor market must be safeguarded.⁴¹⁷ While this is certainly a strong argument, it is doubtful whether the economy will remain strong and stable if no new sources will be able to enter the market. It might lead to a situation without competition. New sources bring new ideas, new technology, new jobs, and contribute to a constant change in composition in the utility industry and the stock market. They provide for a flourishing labor market. If the entrance of new sources to the market is impeded, the economy will much more likely become unstable than if the allowances are allocated to existing and new sources in the same manner. Consequently, a public good of paramount importance does not seem to be in sufficient danger so as to require a trading program to employ a free allocation system. A regulation that does not ensure the entrance of new sources to the market would thus not be proportional and would violate the new sources' right to choose an occupation as guaranteed in Article 12 GG.⁴¹⁸

Allocating free emission credits to existing sources while forcing new sources to purchase their needed allowances may hence interfere with the rights of new sources under Article 12 GG and is therefore unconstitutional.

H. *Article 14 of the German Constitution*

A violation of the property right guaranteed in Article 14 GG may arise from three kinds of regulations: a

416. *See id.*

417. *See id.*

418. *See* HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 48.

trading system in general, the design of credit allocation, and the devaluation of credits.

1. Trading System in General

The introduction of a trading system in itself could violate the fundamental right of property as guaranteed in Article 14 GG. First, it must be determined whether a trading system interferes with the scope of protection of the Constitutional provision. All vested rights and goods fall under the concept of property in Article 14 GG.⁴¹⁹ Even the right to carry on a commercial enterprise has been held by the Federal Constitutional Court to fall under the scope of this fundamental right.⁴²⁰ However, Article 14 GG protects the existence but not the acquisition of property rights; rather, acquisition is protected by the provisions of Article 12 GG. Expropriation of these rights is only possible by a legislative act of parliament for the good of the general public and only when compensated.⁴²¹ If a trading mechanism is being introduced, this could affect all sources that are involved in the production of the traded pollutant. If a trading market is functioning well, every source will try to take part in order to stay competitive. The sources will either have to purchase allowances or invest in emission reduction technology. Both reactions to the trading scheme, at least in the beginning, require additional costs for the source, although it originally had a valid permit to operate its plants. These investments are triggered by the market system, but they are independent from the statute allowing the sources to trade with their pollution rights. The scope of protection of Article 14 GG is thus not implicated by these market effects. The introduction of a trading system into the air

419. See BVERFGE 58, 300 (335-36); INGO VON MÜNCH & PHILIP KUNIG, 1 GG-KOMMENTAR art. 14 n.11 (4th ed. 1992).

420. See EBKE & FINKIN, *supra* note 314, at 72.

421. See *id.*

pollution control law of Germany would consequently not violate the property right as guaranteed in Article 14 GG.⁴²²

2. Allocation Method

A violation might occur through the method of allocating the emission allowances to the individual sources. The first possibility of distributing allowances to existing sources for free while requiring new sources to buy needed allowances has been analyzed above.⁴²³ An alternative to this method is the creation of a completely new situation for all former and new participants by making a clean sweep of all emission rights (*tabula rasa*): every source would have to buy its emission allowances either at auction or directly from the state agency. However, this model could lead to a violation of the property right of Article 14 GG.

As already presented above, Article 14 GG protects all property rights including the right to a commercial enterprise ("*Recht am eingerichteten und ausgeübten Gewerbebetrieb*" or "ReaG"). If every source is now required to buy allowances in order to operate its plants, existing sources are clearly affected in their commercial enterprise. This interference results from the regulation of the allocation method and is therefore within the scope of protection of Article 14 GG.⁴²⁴

The interference on the part of the state may be justified if it is carried out by a congressional statute determining content and limits of the restriction of the property right under Article 14, paragraph 1, sentence 2 GG.

422. Authors Johannes Heister & Peter Michaelis come to the same conclusion, although they assume the scope of protection affected. The interference of the latter with GG art. 14 is acknowledged to be reasonable. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 47.

423. See *supra* Part II.F.2.

424. See HEISTER & MICHAELIS, ENVIRONMENTAL POLICY, *supra* note 29, at 46-47.

The introduction of the trading scheme will most likely occur through the enactment of a statute. Thus, the requirement of a statute will be fulfilled.

Although the legislature has broad discretion in enacting statutes limiting property rights, it is not completely free in doing so. Its discretion is certainly bound by the principle of proportionality. Thus, the restriction of the property right is only permissible if, and as long as, public interest under consideration of the proportionality principle requires it.⁴²⁵ Under this principle, the proposed regulation has to be appropriate, necessary and proportional in a narrow sense in order to achieve the envisioned objective. This objective consists in the establishment of a system that is capable of the most cost-effective and most environmentally efficient abatement of air pollution. The described allocation method is a part of the whole concept of emissions trading and contributes from the very beginning of the program to a market system. The initial sale of allowances means that all sources are in the same way forced to participate in the trading system. A faster and more effective balance between demand and supply will be established with the greater number of sources that are included in the market mechanism. The allocation method is therefore an "appropriate" means of reaching the above purpose.

The method must also be necessary. In other words, the legislature must choose the least injurious means appropriate to achieve the objective. A less injurious means, which would be in the interest of the source owners, seems to be a method allocating permits for free to existing sources while new sources would be obligated to purchase their needed allowances. As seen above, this method could lead to a violation of the right to choose a profession as guaranteed under Article 12 GG, if new sources are deprived of their right to start

425. See APPLICATION OF NEW ENVIRONMENTAL LAW, *supra* note 286, at 83-84.

operating their plants. Thus, no less invasive means appears to be suitable to reach the goal in the same way. The allocation method is therefore "necessary."

It remains to be discussed whether the method is also reasonable, i.e., proportional in the narrow sense. Therefore, public interests on the one hand have to be weighed against the interests of the owner on the other hand. The business of the owner will most likely be interfered with because he will have to acquire permits in order to keep his plants in operation. A regulatory system, however, can trigger similar effects. In general, law protects the confidence of the owner of the source in the validity of his permit. Once a facility has received a permit, it is allowed to operate its plant as long as it is in compliance with the permit. In case a statute provides for stricter standards than before, the source can be subject to a subsequent order under § 17 BImSchG requiring compliance with the new standard.⁴²⁶ The authorization to issue subsequent orders is restricted only by the principle of proportionality.⁴²⁷ This authorization granted by statute means that the protection of vested rights granted by the operation permit is considerably qualified and minimized.⁴²⁸ This is not the only case in which the confidence of the source owner in the further developments is not fully protected. The permit must have been issued under air pollution control laws in order to provide certainty in the permit conditions. If it was issued, for example, under construction law, the confidence of the holder in its permit is not protected from a change in the emission standards. In this case, he may only rely upon the requirements imposed on him by the construction law.⁴²⁹ Another instance in

426. See *supra* Part II.E.2.a.(1)(ii).

427. See § 17, para. 2 BImSchG.

428. See SCHLEMMINGER & WISSEL, *supra* note 330, at 79.

429. See APPLICATION OF NEW ENVIRONMENTAL LAW, *supra* note 286, at 85.

which the confidence of the owner in his permit is reduced is when he operates his plant with an illegal permit. If the permit should not have been issued in its condition at that time, the holder has no right to rely upon it.⁴³⁰ If the owner of the plant never received an actual permit, but only gave notice of his construction,⁴³¹ his confidence will also lack protection. All of these examples show that the confidence of the permit holder is not absolute.

On the other side stands the public interest in the most cost-effective and environmentally efficient way of controlling and reducing air pollution. The initial allocation of the permits can be of great importance for achieving this purpose, because it would involve a much greater number of market participants right from the outset. The expected advantages from a functioning market might happen much faster than if only new sources were required to buy credits. Whether these effects will indeed be the result of the allocation method cannot be determined with certainty. In contrast, it seems highly probable that a number of old sources will be forced to shut down if they cannot afford to buy enough allowances or to install new technology. Even if they do not have to shut down completely, they might have to take other cost-reducing measures. The utility market will certainly not remain as stable as it is now.⁴³² Negative effects on the labor market similarly cannot be ignored. Whether the proposed allocation method will contribute to a flourishing market may not be predicted with high certainty. An unstable economic situation for the utility industry including variations on the labor and

430. *See id.*

431. Under § 19 BImSchG.

432. *See* Hans Christoph Binswanger, *Emissionsrechte als Erweiterung der Eigentumsordnung* [*Emissions Rights as Extension of Property Rights*], in *MARKTWIRTSCHAFT UND UMWELT* [*MARKET ECONOMY AND THE ENVIRONMENT*], *supra* note 204, at 87, 91.

stock market could outweigh the envisioned advantages of the allocation method. The purpose of the method can therefore not clearly justify the interference with the sources' ReaG. This means that source owners, at a minimum, cannot be deprived of their right to a continuing existence of their property from one day to the next.⁴³³ A transitional period to adjust to the new system is necessary. In the beginning, the sources would have to receive the allowances for free; after a certain time period, they would have to pay a part of the allowance price, and in a third phase, they would have to be treated in the same way new sources are. This seems to be the only way the proposed allocation method is reconcilable with Article 14 GG. The Federal Constitutional Court ruled in *Naßauskiesungsbeschluss*⁴³⁴ that the status quo of the business enterprise is not absolute or immune to limitations, as long as appropriate transitional periods are met.

In conclusion, an allocation system treating old sources like new sources and requiring every source to purchase allowances is only compatible with Article 14 GG if existing sources are allowed a transitional period for adjustment to this new system.

433. Both finds that the ReaG is not violated if the allowance prices are not "strangling." He considers them to be taxes, so that only tremendously high, so-called "strangling" taxes are inadmissible under art. 14 GG. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 940. Cansier suggests that old sources had to receive indemnities under art. 14 GG. See generally Cansier, *Environmental Allowance*, *supra* note 29, at 946. This seems to deprive the system of its purpose: if they are "paid" for buying allowances, they might as well receive them for free.

434. BVerfGE 58, 300.

3. Devaluation of the Credits

Irrespective of whether the credits are initially sold or distributed for free, they will have to be devaluated over time or their design must at least allow for devaluation. Otherwise, the government would not be able to meet its obligation to protect the environment.⁴³⁵ Two kinds of devaluation alternatives are conceivable: on the one hand, a time limit could be incorporated into the allowance (for example, the credit can be used from the year 2000 until 2005); on the other hand, the legislature could reduce the amount of pollutants that the holder is allowed to emit per credit (for example, it could determine that the amount of pollutants allowed to be emitted per credit will be reduced from one ton to 0.75 tons). Both devaluation practices might interfere with the source owner's property right.

Article 14 GG protects any source owner from violation of his property rights including the ReaG. The first possibility for devaluing the emission credits is to incorporate a time limit of, for example, five years into the permit. This means that the holder cannot use the permit after the time period is expired. But because the holder knows in advance that his permits will be invalid after that period, he cannot develop confidence in the continuation of his right to emit. Thus, he cannot claim that his ReaG is being interfered with. Certainly, he will have to make management plans a long time in advance and it is difficult to deviate from these plans, as the credits will only be valid for the assigned period. The source owner would lose the money invested in the credits if he suddenly decided to change his operation technology instead of using his credits. Nevertheless, he is assured of the validity of the credits and thus will not be disappointed in his confidence. Therefore, this devaluation method does not interfere with the scope of protection of Article 14 GG.

435. See *supra* Part II.F.1.

In a second alternative for devaluating the emission allowances, the legislature determines a few years after allocating the first permits that they cover a smaller amount of SO₂ emissions than before. This would mean a subsequent withdrawal of already granted rights. Thus, every source owner would be affected in his right to a commercial enterprise guaranteed by Article 14 GG.

This right may be restricted by a legislative statute according to Article 14, paragraph 1, sentence 2 GG. Thus, the devaluation method has to be regulated by statute.

Even if a statute provides for the devaluation mechanism, it has to be in accordance with the principle of proportionality. This means that the devaluation has to be appropriate, necessary and reasonable in order to achieve the overall purpose. Devaluation of the credits term is intended to enable the legislature to reduce emissions gradually. It retains the authority to lower the standards when and to the amount it deems necessary. Devaluation through a statutory provision is therefore an "appropriate" means to reduce emission standards and adjust them to environmental needs.

It also has to be the "necessary" method in order to reach that goal. The proposal to set a time limit and incorporate it into the permit appears to be less invasive. This method would make it impossible for the legislature to adapt the emission standards to current environmental needs before the time limit is expired. However, it is not flexible enough to react to new environmental or technological developments. Due to this inflexibility, it is not a suitable means to achieve the envisioned goal of the devaluation mechanism, and it cannot be considered a less injurious but as effective measure. The proposed method is consequently "necessary."

Furthermore, the method must also be reasonable, i.e., its means must be proportional compared to its objective. The objective of the proposed devaluation method is to have a flexible instrument for the legisla-

ture to adjust emission standards to current developments in environmental protection. It should be able to act promptly if recent scientific findings suggest the reduction of the old standards. This must not only be possible in order to prevent acute dangers, but is also required under the precautionary principle, which demands the adjustment to the state of the art technology. The property right of the source owners, on the other hand, is an important constitutionally guaranteed right and deserves attention. Again, allowances cannot be partially withdrawn, which would be the factual effect of this devaluation method, without any kind of mitigation measure. In order to avoid a violation of Article 14 GG, the devaluation method also requires a transition period. In this case, the legislature must notify all sources in advance of its devaluation plans, so that the sources can adjust their investment and management practices, even if they do not yet know how much the devaluation will be. Such regulation will prevent the devaluation method from being unproportional in the narrow sense. With an appropriate notification of future devaluation plans, the proposed devaluation method would not violate the right to a commercial enterprise, as guaranteed by Article 14 GG.

The following conclusions concerning the violation of fundamental rights can be drawn. An allocation method distributing allowances for free to existing sources while requiring new sources to pay for them can lead to a violation of the right to choose a profession under Article 12 GG. In contrast, requiring all existing and new sources to buy allowances in the same manner does not violate the property right of Article 14 GG, as long as a transition period for old sources is granted. A devaluation method enabling the legislature to subsequently reduce the amount of emissions allowed per permit is similarly only possible with a fair transition period. The trading system in itself does not violate Article 14 GG.

In order to be reconcilable with German law, the introduction of a trading mechanism has to fulfill certain requirements. First, the precautionary principle as laid down in the BImSchG⁴³⁶ will have to be changed, so that neither its dynamic nor its technology aspects will be violated. The protection principle of the BImSchG⁴³⁷ and the principle of continuing existence require the introduction of an *immissions*-based model, because any emission-based scheme cannot guarantee that pollution hot spots will be avoided or that air quality will be maintained. The rights of third parties to object during the process of issuing operation permits will be reduced, as will the grounds for a claim by a third party. However, this does not violate existing law. The trading system will have to be designed to meet emission standards of the affected regulations under the BImSchG and the Technical Instructions Air, if these are not changed. An allocation method distributing allowances for free to existing sources and requiring new sources to purchase their needed credits would violate the fundamental right to an occupation under Article 12 GG, whereas a system treating old and new sources alike requires a transitional period in order to be compatible with the property right guaranteed by Article 14 GG. Emission credits may only be devaluated if the sources are notified within an appropriate period of time.

I. *Law of the European Union*

By reason of the Federal Republic of Germany's membership in the European Union ("EU"), German environmental law cannot be viewed in isolation. The "precedence of Community law" means that goals that the European Communities set for national legislation must always be taken into consideration. Although the EU was a relative latecomer to the issue of air pollution,

436. § 5, para. 1, no. 2 BImSchG.

437. § 5, para. 1, no. 1 BImSchG.

it has achieved great progress in reducing SO₂ emissions. International pressures have certainly been important goals for these developments.⁴³⁸

European Union law consists of so-called primary and secondary law. The treaties of the three European communities - the Treaty establishing the European Coal and Steel Community ("ECSC"),⁴³⁹ the Treaty establishing the European Community ("EC") and the Treaty establishing the European Atomic Energy Community ("Euratom"),⁴⁴⁰ as amended, and the Maastricht Treaty on European Union⁴⁴¹ - are the primary sources of Union law. The Maastricht Treaty on European Union renamed the original Treaty Establishing the European Economic Community ("EEC Treaty")⁴⁴² as the EC Treaty. The institutions of the EU treaties, the Council of Ministers, the Commission, the Parliament and the Court of Justice, to which the Court of First Instance was attached, have generated a complex body of "secondary" European Union law.

438. See, e.g., CHARLES LISTER, *EUROPEAN UNION, ENVIRONMENTAL LAW* 203 (1996).

439. TREATY ESTABLISHING THE EUROPEAN COAL AND STEEL COMMUNITY, Apr. 18, 1951, 261 U.N.T.S. 140. The original six member states were Belgium, France, Germany, the Netherlands, Italy, and Luxembourg.

440. TREATY ESTABLISHING THE EUROPEAN ATOMIC ENERGY COMMUNITY, Mar. 25, 1957, 298 U.N.T.S. 167 [hereinafter *Euratom Treaty*].

441. TREATY ESTABLISHING THE EUROPEAN COMMUNITY, Feb. 7, 1992, O.J. (C 224) 1 (1992), [1992] 1 C.M.L.R. 573 (1992) [hereinafter *EC Treaty*].

442. TREATY ESTABLISHING THE EUROPEAN ECONOMIC COMMUNITY, Mar. 25, 1957, 298 U.N.T.S. 267 [hereinafter *EEC Treaty*].

1. Primary Law: The EC Treaty

The three foundation treaties of the European Communities do not provide a comprehensive basis of authority for enacting legislation in the sphere of environmental protection; in fact, they do not even mention the subject.⁴⁴³ Thus, an express authorization of the European Community to issue regulations that enabled comprehensive environmental legislation was created within the framework of the Single European Act⁴⁴⁴ by including Article 130 r-t in the EEC Treaty.⁴⁴⁵ In that

443. As a result of the growing political significance of environmental protection, the European Communities have, however, increasingly come to disregard the lack of an express basis of competence, and have attempted - with the aid of various legal constructions (in particular relying on Arts. 2, 3 in conjunction with Art. 235 EEC Treaty or by way of a so-called implied power) - to found corresponding legislative competencies of the EC, and to give the appropriate normative bases to a comprehensive EC environmental policy through Community-wide regulations. Given the lack of authority of the EEC to legislate in this manner, this form of legislative implementation of European environmental policy was ultimately dependent upon the goodwill of the member states.

SCHLEMMINGER & WISSEL, *supra* note 330, at 19-20.

444. Single European Act, Luxembourg, Feb. 17, 1986, and The Hague, Feb. 28, 1986, in force July 1, 1987 O.J. (L 169) 1, 25 I.L.M. 506 (1986); U.K.T.S. 31 (1988), Cmd. 372 [hereinafter SEA].

445. In addition, the introduction of art. 100 (a) and (b) into the EEC Treaty means that environmental protection is now also taken into consideration in the sphere of harmonization of the national legal systems in the member states. Through the Treaty on the European Union (Maastricht Treaty), the structure of European Community law regarding the environment has undergone further development. Environmental protection has now been established as an objective in both art. 2 and art. 3k of the EEC Treaty. However, by reason of the imprecision of these objectives, they do not impose a direct obligation on the Community to act. Yet, according to art. 5, para. 2 EEC Treaty, Member States are un-

Article, the precedence given to combating harmful effects on the environment at their source, and the doctrine of causation, are codified as principles of environmental policy along with the principles of precaution and prevention.⁴⁴⁶

Article 30 of the EC Treaty prohibits member states from imposing "quantitative restrictions on imports" or "measures having an equivalent effect" unless justified as consistent with the Treaty. This prohibition is understood to encompass any measure likely directly or indirectly, actually or potentially, to hinder trade within the Community. This encompasses "not only measures which discriminate facially against foreign producers, but also measures that, although formally equally applicable to domestic and foreign producers, in fact erect barriers to interstate trade."⁴⁴⁷ This provision could present a problem if the credits were imposed on certain products. Emission reduction allowances, however, only affect plants as a whole, not their products. A trading system for SO₂ emission credits thus would not violate Article 30 of the EC Treaty. But even if such a system were considered a "measure having an equivalent effect," it could be justified by a separate provision, Article 36 EC Treaty, on grounds of the protection of health and life of humans, animals or plants. In the jurisdiction of the European Court of Justice ("ECJ"), the protection of the environment is usually considered to

der an obligation to refrain from any action which could pose a threat to the realization of these objectives. See SCHLEMMINGER & WISSEL, *supra* note 330, at 20. For an overview of the development of environmental law in the European Community, see generally PHILIPPE SANDS & RICHARD G. TARASOFKY, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW III, DOCUMENTS IN EUROPEAN COMMUNITY ENVIRONMENTAL LAW* (1995).

446. See EEC Treaty, *supra* note 442, art. 130 r, para. 2, S. 1, 2.

447. See ECKARD REHBINDER & RICHARD B. STEWART, *ENVIRONMENTAL PROTECTION POLICY* 28-29 (1988).

be a compelling reason to impose a restriction on Article 30 of the EC Treaty.⁴⁴⁸ Thus, there is no violation of primary European law.

2. Secondary Law: Directives

A violation of European law could, however, occur through a violation of secondary European law including directives and regulations, the two primary types of legislative acts. EC regulations are directly applicable in the Member States and, in this respect, are similar in form to administrative regulations commonly found in the U.S.⁴⁴⁹ A directive establishes Union policy and leaves it to the Member States to implement the directive in a manner appropriate to their national legal systems. As Article 189 of the EC Treaty indicates, a directive is "binding as to the result to be achieved" but "leave[s] to the national authorities the choice of form and methods." The following directives could affect the introduction of an emissions trading system into the German air pollution control law. This discussion follows the chronological order of adoption of the directives.

a. Directive on Sulfur Dioxide and Suspended Particulates (80/779/EEC)

The Council Directive on Sulfur Dioxide and Suspended Particulates (80/779/EEC)⁴⁵⁰ was adopted in 1980 in order to control and reduce concentrations of the two pollutants in the ambient air. The directive creates two sets of "limit" values for ambient concentra-

448. See Huckestein, *Emission Credits*, *supra* note 341, at 13-14.

449. See RALPH FOLSOM ET AL., EUROPEAN UNION LAW AFTER MAASTRICHT 5 (1996).

450. Council Directive 80/779 Sulfur Dioxide and Suspended Particulates, 1980 O.J. (L 229) 30 [hereinafter Council Directive 80/779/EEC].

tions of SO₂ and particulates in the atmosphere. In Annex I, it establishes both EU-wide mandatory limit values, and in Annex II, it specifies more stringent "guide" values. The latter are intended to be long-term reference values, toward which the member states are expected gradually to move, and to provide a basis for establishing zones of special protection. Both annual and winter values are established, as well as higher short-term values that may not be exceeded for more than three consecutive days. The values all apply to ambient air levels, but they are intended to be measured at ground level. Annexes III and IV introduce requirements for the application of the guidelines. They require member states to establish monitoring and reporting systems. The amended directive aims to establish comparable sampling and analytical protocols for limit values.

Section 12 of the Directive implements the protection principle. This provision requires that in developing reference methods of sampling and analysis there must not be any direct or indirect modification of effective concentration values.⁴⁵¹ Since the directive is binding on all the member states, it has the following consequences for a German trading system: first, a trading scheme must guarantee that the emission standards prescribed by the Directive are not exceeded. Second, the trading system must be established in such a manner as to be reconcilable with the protection principle.⁴⁵² As demonstrated above, the design of the trading system would have to follow an *immissions*-based approach in order to be consistent with the protection principle. Hence, even if German law would allow a deviation from the principle, Section 12 would prohibit the introduction of an emissions-based trading system.

451. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 940.

452. See *id.*

*b. Directive on Air Pollution from Industrial Plants
(84/360/EEC)*

The 1984 Council Directive on Air Pollution from Industrial Plants⁴⁵³ requires the permitting of industrial facilities listed in Annex I of the Directive⁴⁵⁴ before they can commence operating or undertake any significant alteration in their operations. Permits are to be issued only if certain requirements are fulfilled. Under Article 4, no. 1 of the Directive, facilities must employ all appropriate measures to prevent air pollution, including the application of the best available technology not entailing excessive cost ("BATNEEC"). Any new source may only deviate from the BATNEEC if the new technology is disproportionately costly. Yet, the Directive provides no guidance on how to determine when a technology is "disproportionately costly." This provision is considered to embody the precautionary principle.⁴⁵⁵ Additionally, Article 8 of the Directive requires the Council to set emission standards under the precautionary principle. Furthermore, the permit must require that the use of the plant will not cause "significant" air pollution by SO₂, NO_x and other compounds listed in Annex II. However, this "standard" is left without any quantitative or other definition. Third, the Directive requires that none of the expressly specified emission limits will be exceeded, and fourth, that all applicable air quality limits will be taken into consideration.⁴⁵⁶

453. See Council Directive 84/360 Combatting Air Pollution from Industrial Plants, 1984 O.J. (L 188) 20 [hereinafter Council Directive 84/360/EEC].

454. Targeted industries include plants in the energy industries, the production and processing of metals, the manufacturing of non-metallic mineral products, chemical plants, large pulp mills, and waste disposal facilities.

455. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 941.

456. See Council Directive 84/360/EEC, *supra* note 453, art. 4, nos. 3-4.

As the Directive only requires the member states to observe the precautionary principle, it means that they are free to choose which mechanisms they employ to implement the directive. At a minimum, they must ensure that the best available technology is installed. However, as previously discussed, this is generally not feasible in a trading system. Although some commentators suggest that a trading system would be possible if it included certain reduction limits,⁴⁵⁷ it is doubtful that the constant adaptation of new technology would be guaranteed under such a system. As a result, such a system would violate the Directive unless the Directive is modified or at least interpreted differently. For example, because the purpose of the dynamic feature is to tighten the emission standards, this goal could be better attained by an emissions trading system than by a regulatory system if the distribution of emission credits is strictly limited. This would encourage the development of new technology through a strong demand on the part of industry. A regulatory system could not provide this incentive. The goal of the dynamics provisions would thus be achieved through a trading mechanism. However, to achieve this result, the exact language of the dynamics provision would have to be changed.⁴⁵⁸

c. Directive on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants (88/609/EEC)

In 1988, the Community adopted the Council Directive on the Limitation of Emissions of Pollutants into the Air from Large Combustion Plants in order to reduce SO₂ and nitrogen dioxide emissions from large energy plants

457. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 941.

458. See Gick, *Allowances*, *supra* note 34, at 36; HEISTER & MICHAELIS, *ENVIRONMENTAL POLICY*, *supra* note 29, at 255.

with thermal inputs of 50 MWe or more.⁴⁵⁹ The Directive was based in large part on Article 8 of the 1984 Directive, which had authorized the Council to adopt specific emission standards for industrial plants. It was also stimulated in part by the Geneva Convention on Long-Range Transboundary Air Pollution ("Geneva Convention").⁴⁶⁰ The 1988 Directive was in turn supplemented in 1994 by Council Directive 94/66/EC, which provides supplemental rules covering combustion plants with rated thermal inputs between 50 and 100 MWe.⁴⁶¹

The Directive establishes emission limit values for new plants with respect to SO₂, oxides of nitrogen, and dust.⁴⁶² All applications for the construction of new plants, which were defined as those coming into operation after June 1987, were required to satisfy those values.⁴⁶³ The 1994 Directive establishes an emission limit value of 2,000 milligrams per cubic meter of SO₂ for new combustion plants, but also permits the member states to grant grace periods to achieve this level. They must,

459. Council Directive 88/609 Limitation of Emissions of Certain Pollutants Into the Air from Large Combustion Plants, 1988 O.J. (L 336) 1 [hereinafter Council Directive 88/609/EEC].

460. Geneva Convention on Long-Range Transboundary Air Pollution, U.K.T.S. 57 (1983), Cmd. 9034; T.I.A.S. No. 10541; 18 I.L.M. 1442 (1977) [hereinafter Geneva Convention].

461. See Council Directive 94/66 Amending Directive 88/609/EEC on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants, 1994 O.J. (L 337) 83 [hereinafter Council Directive 94/66/EC].

462. See Council Directive 88/609/EEC, *supra* note 459, art. 4, para. 1.

463. Derogations from certain of these limitations were, however, permitted for plants which operate for no more than a specified number of hours annually, or which use indigenous solid fuel. Plants using indigenous solid fuel must, however, achieve a rate of desulfurisation prescribed in another annex.

however, ensure that new plants decrease SO₂ emissions by 80% by the year 2003. Existing plants built before 1987 must reduce SO₂ emissions by 25% by the year 1993, 43% by 1998, and 60% by 2003. All the targets are based on 1980 emission levels.

The emission standards prescribed by the two Directives and the reduction requirements are binding on Germany, so that the introduction of an emissions trading system must not lead to a violation of the standards or to an exceedance of the above time frames.

*d. Directive on Municipal Waste Incineration Plants
(89/369/EEC)*

In 1989, the EU adopted rules to control air pollution from new and existing municipal waste incineration plants. This was done through two directives: one for existing plants and another for new plants. Both directives are specific applications of the very general principles established by the 1984 Directive regarding atmospheric emissions from industrial facilities. Only the Council Directive on the Prevention of Air Pollution from New Municipal Waste Incineration Plants (89/369/EEC) for new plants contains emission limits for SO₂.⁴⁶⁴ New plants are defined as all those plants first authorized to operate in or after December 1990. These standards, again, have to be observed when setting up a trading scheme.⁴⁶⁵

To summarize, the Directive on Sulfur Dioxide and Suspended Particulates (80/779/EEC) standardizes the

464. Council Directive 89/369 Reduction of Air Pollution from New Municipal Waste Incineration Plants, 1989 O.J. (L 163) 32 [hereinafter Council Directive 89/369/EEC]. Rules for existing plants are contained in the Council Directive 89/429, Reduction of Air Pollution from Existing Municipal Waste Incineration Plants, 1989 O.J. (L 203) 50 [hereinafter Council Directive 89/429/EEC].

465. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 941.

protection principle and therefore requires an *emissions*-based trading scheme. The precautionary principle is embodied in the Directive on Air Pollution from Industrial Plants (84/360/EEC) and requires constant adaptation to new technology. This could also be achieved by a trading system, but the language of the Directive would have to be changed. The Directive on the Limitation of Emissions of Pollutants into the Air from Large Combustion Plants (88/609/EEC) sets several emission standards and deadlines for their achievement, which must be met by all member states, including Germany, so that a trading system will have to ensure compliance with this Directive and its successor Directive 94/66/EC. Additionally, the standards of the Directive on Municipal Waste Incineration Plants (89/369/EEC) have to be met.

J. Public International Law

German legislation has to follow not only European law, but also public international law. Among the traditional sources of the latter are, according to the Statute of the International Court of Justice ("ICJ-Statute"), general or specialized international conventions, international custom as evidence of a general practice accepted as law, general principles of law recognized by civilized nations, and, as subsidiary means, international judicial decisions and doctrine.⁴⁶⁶ New sources of international law comprise texts issuing from international organizations and diverse activities that can contribute to the development of a new rule of law.⁴⁶⁷ The introduction of a trading system could violate some of these laws discussed in the following sections.

466. See art. 38, para. 1 ICJ-Statute.

467. See ALEXANDRE CHARLES KISS & DINAH SHELTON, INTERNATIONAL ENVIRONMENTAL LAW 95 (1991).

1. Oslo Protocol

The Oslo Protocol to the Geneva Convention⁴⁶⁸ imposes certain standards for the content of SO₂ in the air that may have to be attained by German law. Germany is bound by the Geneva Convention not only by its own signature, but also by its membership in the EU. The European Community adopted a "Council Decision on the Conclusion of the 1979 Convention on Long-Range Transboundary Air Pollution,"⁴⁶⁹ implementing the Geneva Convention.⁴⁷⁰ The Convention aims to protect human health and the environment from air pollution by requiring signatories to monitor and reduce air pollution, in particular trans-frontier pollution by SO₂. Because long-range air pollution is extremely difficult to regulate on an international level, the Geneva Convention only contains an action program and leaves it to additional protocols to define more precise obligations.⁴⁷¹ The 1979 Geneva Convention has been supplemented by four protocols that establish further requirements for

468. Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Further Reduction of Sulfur Emissions, Oslo, June 14, 1994, 33 I.L.M. 1540 (1994) [hereinafter Oslo Protocol].

469. Council Decision 81/462 Conclusion of the Convention on Long-Range Transboundary Air Pollution, 1981 O.J. (L 171) 11.

470. This decision was superseded by Council Decision 86/277 Protocol to the 1979 Geneva Convention on Long Distance Transboundary Air Pollution Concerning the Funding of a Long Term Programme of Cooperation for the Constant Monitoring and Evaluation of Long Distance Atmospheric Transfer of Pollutants in Europe (EMEP), 1986 O.J. (L 181) 1 [hereinafter Council Decision 86/277/EEC].

471. The Convention calls for the sponsorship of research, exchanges of information between states, the adaptation of management programmes, and other steps designed to limit and reduce transboundary air pollution.

the conduct of its state parties,⁴⁷² the last one of which is the Oslo Protocol.⁴⁷³

Article 2, paragraph 1 of the Protocol provides that certain levels of sulfur precipitation, so-called critical loads, shall not be exceeded in certain areas. In a trading system, these critical loads could define the upper limit for the admissible accumulation of emission credits and thereby form the basis for their allocation.⁴⁷⁴ The allocation must, of course, make sure that the Protocol's maximum standards are not exceeded. Another provision that must be taken into consideration when determining the initial cap for emissions is Article 2, paragraph 2 of the Protocol. It requires a step-by-step reduction of total national emissions. However, there is no obligation to use specific technologies or BATNEEC, which is merely mentioned in Article 2, paragraph 4 of the Protocol as an example. Third, Article 2, paragraph 5, in conjunction with Annex V of the Protocol, prescribes certain emission standards which might cause legal problems. The standards are immediately binding for new sources, and take effect in 2004 for old sources. An emissions trading system must therefore obey these limits. If it encourages even more reductions of emissions, it is certainly feasible under the Protocol.

2. Rule of International Law Forbidding Transfrontier Pollution

Unlike the United States, which borders only three foreign countries,⁴⁷⁵ Germany shares borders with no less than ten other European states. Additionally, be-

472. The Protocols were adopted in Geneva on Sept. 28, 1984, in Helsinki on July 8, 1985, in Sofia on Oct. 31, 1988, and in Oslo on June 14, 1994.

473. See Oslo Protocol, *supra* note 468.

474. See Bothe, *Legal Requirements for the Use of Tradeable Emission Allowances*, *supra* note 298, at 942.

475. Including the Alaskan border with Russia.

cause of the concentration of highly industrialized nations in a comparably small territory, transfrontier pollution problems are much more likely to arise in Europe than on the North American continent. They might not even be limited to conflicts with adjacent states.

If extensive amounts of SO₂ travel to another country after being emitted on German territory, this could violate the rule of international law forbidding transfrontier pollution. The customary law character of this rule was first affirmed in the *Trail Smelter Case* before an Arbitral Tribunal.⁴⁷⁶ Although the original conflict mainly deals with questions of damages, the Arbitral Tribunal was challenged to make a statement on general international customary environmental law. The Tribunal ruled in this case, first, that a state was responsible for acts of pollution having their origin on its territory and causing damage on the territory of other states, even if the polluting acts are not imputable to the state itself or its organs. Second, the case transcends international responsibility to solve the problem before it, aiming towards a common regulation of the issue. It affirmed the existence of a rule of international law forbidding transfrontier pollution.⁴⁷⁷ Consequently, the German trading system would have to make sure, that bordering states would not suffer from SO₂ emissions.

In conclusion, it appears that German trading system would have to follow the emission limits of the Oslo Protocol to the Geneva Convention on Long-Range Transboundary Air Pollution in order to be in compliance with public international law. Additionally, it may not lead to acid deposition in adjoining states as prohibited by the Rule of International Law Forbidding Transfrontier Pollution.

476. 1931 - 1941, 3 U.N.R.I.A.A. 1905.

477. See PHILIPPE SANDS, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW I, FRAMEWORKS, STANDARDS AND IMPLEMENTATION* 194 (1995); ALEXANDRE KISS & DINAH SHELTON, *INTERNATIONAL ENVIRONMENTAL LAW* 125 (1991).

III. AN INTERNATIONAL POLLUTION TRADING SYSTEM

Even though, in 1996, the introduction of tradeable permits for greenhouse gas emissions was still considered largely hypothetical, if not utopian,⁴⁷⁸ the negotiators of the third Conference of the Parties ("COP3") did in fact agree on the introduction of an emissions trading scheme at the Kyoto and the Buenos Aires Conferences. Supporters of international pollution trading not only enthusiastically support the proposal,⁴⁷⁹ but also predict that trading could reduce costs to the industrialized (referred to as Annex I) countries by over 80% (or over one trillion U.S. dollars) per year.⁴⁸⁰ Whether the accords can really be considered successful, and how the details would have to be designed to achieve the desired results, is analyzed in the following section.

A. *Differences between the U.S. and the International Trading Systems*

Where the U.S. trading system deals with allowances covering SO₂, the international trading scheme focuses on the emission of greenhouse gases.⁴⁸¹ Greenhouse

478. See Peter H. Sand, *International Economic Instruments for Sustainable Development: Sticks, Carrots, and Games*, 36 INDIAN J. INT'L L. 8 (1996).

479. See generally Lars-Erik Nelson, *Cutting Through Fog Surrounding Global Warming*, N.Y. DAILY NEWS, Dec. 12, 1997, at 65.

480. See Center for Clean Air Policy, *supra* note 50.

481. Greenhouse gases include: carbon dioxide (CO₂), primarily produced by the burning of fossil fuels, mainly coal, oil and gas; methane (CH₄) from agricultural processes, energy production and distribution; nitrous oxide (N₂O) from agricultural and industrial processes; and the three "synthetic" or "exotic" GHGs, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆), that originate from a various industrial and consumer uses. The loss of so-called sinks, such as forests that sequester carbon, is also a source of GHGs. See Clare Breidenich *et al.*, *The*

gases, which are produced by burning fossil fuels such as coal, oil and natural gas, are assumed to be responsible for the global warming of the last decades. Sulfur dioxide, on the other hand, originates from the combustion of heavy fuel oils and gas oils, and its primary adverse effect is acidic deposition (so-called acid rain).

The peculiarity of an international trading system for greenhouse gases, in contrast to the U.S. Acid Rain Program, and its special prospect of success results from the fact that greenhouse gas emissions do not impact locally, but globally: no matter where the gases are emitted, they contribute to global warming at any place on Earth. In contrast, the emission of SO₂ and NO_x has, if not local, at least regional consequences, since the effects are "carried" to another place by the wind, as in the case with Midwestern utilities contributing to the pollution in the Adirondacks.⁴⁸² Greenhouse gases do not result in harmful deposits, but cause problems simply by being emitted. These ecological differences have important consequences for the legal issues evolving when emission allowances are being traded. For example, the problems of upwind sales, inter-regional sales, emissions from small/big sources, and different kinds of sources do not arise. Hence, an emissions trading system for CO₂ will work most efficiently if set up on an international basis.⁴⁸³

Another difference between the two systems is that, within the U.S. system, the companies themselves trade their emissions. Within the international model, the transactions are in the first place effected by the nations that are parties to the Convention and the Protocol. They may allocate their allowances to companies, but

Kyoto Protocol to the United Nations Framework Convention on Climate Change, 92 AM. J. INT'L L. 315, 317 (1998).

482. See *supra* Part I.B.4.

483. See Marchant, *supra* note 29, at 626, for a proposal on establishing a national U.S. carbon dioxide emissions trading program.

essentially they are free to decide how they want to comply with their national targets.

B. *Development of an International Trading Scheme
within the Climate Agreements*

In 1992, the United Nations Framework Convention on Climate Change ("UNFCCC") was adopted in Rio de Janeiro, Brazil.⁴⁸⁴ Economic instruments are extolled in the Preamble.⁴⁸⁵ The commitments of the parties concerning the reduction of greenhouse gases were only voluntary,⁴⁸⁶ and were in fact followed by an increase in the discharge of CO₂.⁴⁸⁷

484. The adoption of the Convention was the culmination of a thirteen-year process involving two World Climate Conferences in 1979 and 1990. See Charlotte Booncharoen & John Gase, *International Commitment Toward Curbing Global Warming: The Kyoto Protocol*, 4 ENVTL. LAW 917, 919 (1998). The UNFCCC did not enter into force until March 21, 1994. See Glenn M. Wiser, *The Clean Development Mechanism Versus the World Trade Organization: Can Free-Market Greenhouse Gas Emissions Abatement Survive Free Trade?*, 11 GEO. INT'L ENVTL. L. REV. 531, 534 (1999).

485. See U.N. Conf. on Env't & Dev.: Framework Convention on Climate Change, U.N. Doc. A/AC.237/18 (1992), reprinted in 31 I.L.M. 849 (1992) [hereinafter UNFCCC]. Besides emissions trading, two more economic instruments are regulated in the climate change conventions: Joint Implementation (JI) in art. 6 of the UNFCCC and the Clean Development Mechanism (CDM) for emissions trading between Annex I and developing countries, regulated under art. 12 of the Kyoto Protocol. See *infra* note 494, art. 12.

486. Art. 4 (2)(a) UNFCCC provides that the Annex I parties "shall adopt national policies and take corresponding measures" to protect the atmosphere from greenhouse gases.

487. See William C. Burns, *Global Warming - the United Nations Framework Convention on Climate Change and the Future of Small Island States*, 6 DICK. J. ENVTL. L. & POL'Y 147 (1997); Greenpeace, *Information Paper 4 to the Climate Conference in Kyoto, 11/97* (visited Oct. 15, 1998) <http://www.greenpeace.de/gp_system/cwhk43wk.htm>.

The first Conference of the Parties ("COP"), COP1, took place in Berlin, Germany, in 1995 and adopted the "Berlin Mandate,"⁴⁸⁸ urging the parties to agree on binding obligations concerning the reduction of greenhouse gases during one of the next two conferences. No progress was made at COP2 in Geneva, Switzerland, in 1996, but the adoption of the Kyoto Protocol at COP3 in Kyoto, Japan, resulted in the first legally binding document setting target reductions, as well as a timetable to achieve these reductions. In this document, the Annex-I parties, i.e., the industrialized countries, committed themselves to cut emissions of six greenhouse gases by an average of 5% below 1990 levels by the period 2008-2012.⁴⁸⁹ The Kyoto Protocol also allows for flexibility in the international context by providing for the use of emissions trading and other market-based mechanisms.⁴⁹⁰ The new idea of the Kyoto Protocol was the introduction of an international trading regime for emission credits in Article 17.⁴⁹¹ However, an agreement on the details for this trading system was postponed to the next conferences, which were supposed to define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability. During the last conference in Buenos Aires, Argentina, in November 1998, the parties could not yet agree on specific rules governing an emissions trading system,

488. UNFCCC Conference of the Parties, 1st Sess., UN Doc. FCCC/CP/1995/7/Add.1, Decision 1/CP.1, at 4-6 (June 6, 1995) [hereinafter Berlin Mandate].

489. See art. 3.1 Kyoto Protocol. UNFCCC, *supra* note 488, 3rd Sess., art. 3.1(Dec. 1997) [hereinafter Kyoto Protocol].

490. See arts. 4, 6, 12 and 17 of the Kyoto Protocol authorize the use of such mechanisms to reduce GHG emissions under certain circumstances.

491. The system is accounted for in art. 3 (10) and 3 (11) Kyoto Protocol.

but set a deadline of two years (late 2000) in the final document.⁴⁹²

Since the Kyoto Protocol opened for signature on March 16, 1998, nearly 60 countries have signed the pact, including nearly all "developed" countries except the United States and Iceland.⁴⁹³ However, by signing a treaty, a state only indicates that it recognizes the authentic text, intends to complete the procedures for becoming legally bound by it, and is committed not to act against the treaty's objectives before being so bound. Signature is not the key political act; it is ratification, or its alternatives of acceptance, approval, or accession, whereby a State binds itself to observe the treaty. Depending on a country's system of governance, signature may be simply an executive decision, while ratification may require legislative approval.⁴⁹⁴ The Kyoto Protocol will not enter into force until ninety days after it has been ratified by at least 55 parties to the Convention. These parties must include developed countries representing at least 55% of this group's total 1990 CO₂ emissions.⁴⁹⁵

492. According to the World Wildlife Fund (WWF), the "technical workplan agreed in Buenos Aires does move things forward," but provides "no assurance that any of the Kyoto loopholes will be closed." WWF, *Ministers Agree Process But Fail To Give Guidance*, Press Release, Nov. 14, 1998. The Buenos Aires Conference obviously was not even intended to bring great progress for the development of market-based mechanisms but only a plan of action. See Milo Mason, *Interview with Stuart E. Eizenstat*, NR&E Fall 1998, 430, 433 (1998).

493. See generally Joby Warrick, *Administration Signs Global Warming Pact*, WASHINGTON POST, Nov. 13, 1998, at A26.

494. See Third Conference of the Parties, *Press Release* (visited Nov. 18, 1998) <<http://www.cop3.de>>.

495. See art. 25 Kyoto Protocol.

C. *Legal Issues of an International Emissions Trading System*

An international emissions trading system within the climate change conventions provokes several legal problems. They include the question whether industrialized countries may fulfill their reduction targets mainly by trading activities instead of domestic reductions, and whether such policy would violate the climate change conventions or international environmental principles. Furthermore, the so-called net approach of including CO₂ sinks into calculations of reduction targets will be discussed.

1. Trading Allowances – Current Regulation

Article 17 of the Kyoto Protocol provides that allowance trading “shall be supplemental to domestic actions” for the purpose of meeting reduction commitments. The definition of the term “supplemental” was postponed to the following conferences of the parties. The recent fourth Conference of the Parties, COP4, in Buenos Aires could not agree on further details concerning the emissions trading program, but decided that emissions reductions should be made “partially” through trading mechanisms. The parties set the next conference in the year 2000 as final deadline for defining the terms “supplemental” or “partial.”

2. Trading Allowances – The Conflict

The size of domestic contribution of emission reductions is under active discussion amongst the different nations. On the one hand, the U.S. and other industrialized countries do not want to put any restrictions on the methods for achieving the Kyoto targets.⁴⁹⁶ The

496. Countries in favor of this approach include Australia, New Zealand, Canada, Russia, Ukraine, and Japan. See Edward A. Smeloff, *Utility Deregulation and Global*

Clinton Administration's economic analysis of the Kyoto Protocol, for example, assumes that it will achieve 75% of its emissions reductions through international emissions trading. The analysis does not consider domestic emissions reduction potential at all.⁴⁹⁷ The European Union, on the other hand, is in favor of a solution placing specific limits on the amount of a country's reductions that can be achieved through emissions trading.⁴⁹⁸ This conflict involves several environmental, economic and legal aspects.

The public debate mainly revolves around economic arguments: the U.S. argues that restrictions on the quantity of the units would rob the free-market mechanism of its effectiveness.⁴⁹⁹ The ability to trade without quantitative restrictions would "encourage earlier emission reductions and minimize the overall cost of achieving the collective Annex B environmental objective."⁵⁰⁰ The crucial question then is whether the free market would in fact be impaired by imposing limits on the trading option and would therefore require a trading system without any kind of restrictions. If the free market would not be impaired by any limits, the argument of the U.S. remains purely political: trying to please the

Warming: The Coming Collision, 12 NAT. RESOURCES & ENV'T 280, 282 (1998).

497. See WWF, *Press Release*, July 31, 1998 (visited Sept. 28, 1998) <http://www.panda.org/climate/ccc/news/news_6.htm>.

498. See generally *No Consensus on Global Warming Policy* (visited April 13, 2000) <<http://www.cnn.com/SPECIALS/1997/global.warming/disagreements/html>>.

499. See William K. Stevens, *Deadline is Set for Rules to Cut Emissions*, N.Y. TIMES, Nov. 15, 1998, at 11.

500. National Environmental Trust, *Climate Bulletin*, June 6, 1998 (visited Oct. 14, 1998) <http://data.envirotrust.com/envirotrust/pressrelease/pressarchive/qry?function=detail&tbl_pressrelease_uid1=39>.

opposing industry.⁵⁰¹ Additionally, it will have to be determined how the trading system should be set up in order to work most effectively. However, this analysis will focus on the legal, rather than economic, aspects of the issue. The legal question that must be addressed is whether a restriction on the contribution of trading to achieve the national reduction targets would violate international law, or whether international law actually requires some kinds of limits.

3. Violation of International Law

International environmental law as a part of public international law has the same sources as the latter, that is, general or specialized international conventions, international custom as evidence of a general practice accepted as law, general principles of law recognized by civilized nations, and, as subsidiary means, international judicial decisions and doctrine.⁵⁰² New sources of international law comprise not only texts issued by international organizations, but also diverse activities, which can contribute to the development of a new rule of law.⁵⁰³ Following the order of this enumeration, is an examination of whether a violation of the subsequent agreements or principles could occur by the introduction of a trading system.

a. International Agreements

First, an international trading system without any kind of numerical restriction of the reductions through trading could violate the existing international agreements on climate change, i.e., the UNFCCC and the Kyoto Protocol, if they required such numerical restriction. In order to resolve this question, the overall objec-

501. The American Petroleum Industry and other companies are strong opponents to the Kyoto Protocol.

502. See *supra* Part II.E.2.

503. See KISS & SHELTON, *supra* note 467, at 95.

tive of both agreements must be determined. The ultimate objective of the UNFCCC, as noted in the Preamble of the Kyoto Protocol, is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."⁵⁰⁴ Concerning the implementation of this goal, the UNFCCC realizes that the steps to address this objective will be "environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations."⁵⁰⁵ But even though economic mechanisms are considered to be helpful and parties are encouraged to use them to address the overall objective, it remains a purely environmental goal: the stabilization of greenhouse gases. Thus, how can the objective of achieving a stabilization of greenhouse gases be most effectively met? As explained above, the U.S. and other industrialized nations claim that a 50% limit is not acceptable and would harm the free market.

The legal question is, therefore, whether a 50% limit would impair the objective of achieving a greenhouse gas ("GHG") stabilization. Without any limit, the parties would still have to achieve their reduction limits, but could also do so completely through the purchase of emission allowances. Theoretically, the limit does not impair the stabilization objective.

The member states could argue though that the objective may not be achieved in *any* way and by *any* means, but by the "economically most effective" way as laid down in Principle 16 of the Preamble of the UNFCCC. If this limitation is deemed to be part of the objective, it could in fact undercut efforts to achieve the objective. Assuming that a free market would most effectively contribute to the objective of economically most cost effective reductions, the 50% limit would impair this objective if it harmed the free market. The restric-

504. Art. 2 UNFCCC.

505. Principle 16 of the preamble of the UNFCCC.

tion of 50%, however, does not concern any factors *within* the market, but restricts the amount of reductions made by trading, in contrast to domestic actions. Thus, only an individual party's amount of potential transactions is being restricted by the 50% limit. A free market does not mean that *all* existing goods of that kind must be at disposal to the participants; thus, the market itself would not necessarily be directly affected.

However, the effectiveness of the market could still be indirectly impaired if the number of tradeable goods is small, which could be the case if, for example, there are only few participants or if only a few transactions are actually being affected. In that case, the market would actually be impaired. Such a situation could lead to effects similar to those which occurred in the U.S.: fewer market participants result in a functionally disordered market. It consequently remains to be determined whether in the case of GHG allowance trading, the reduction of potential transactions would lead to a functionally disordered market. This depends on the amount of potentially circulating allowances under the 50% limit. As will be proven below, the amount of allowances potentially for sale from Russia and the Ukraine is so immense that, if bought by the U.S., the U.S. could even increase its actual emissions. This shows that the amount of credits available in the market offers no reason for concern about a lack of demand and supply. The number of potentially tradeable goods will still be substantial, so that the market would not be impaired by the restriction. Hence, there is no convincing legal reason to object to a 50% limit on the amount of reductions made through emissions trading.

The group of parties to the conventions that favors the 50% limit asserts not only that a 50% limit would *not* harm the market, but also that international law actually requires such restriction. Two of those parties, Russia and the Ukraine, have been in serious economic trouble for some time, resulting in a collapse of their

economies. Most of their worst emitting facilities were closed, resulting in a dramatic reduction of pollution, including GHG emissions. Because this happened after the Kyoto Protocol base year 1990, they will be left with an unexpectedly high amount of pollution credits at their disposal. Russia presently remains 30% below the reduction targets established at Kyoto, and could annually sell emission credits representing about 800 million tons of greenhouse gases.⁵⁰⁶ The Ukraine could sell credits for approximately 230 million tons. The two countries will not be able to rebuild their economies fast enough to be able to use the credits themselves.

If only the Russian allowances were sold to the U.S., which, as the worst CO₂ emitter⁵⁰⁷ the U.S. committed itself to reduce emissions by 7%, it would increase its CO₂ emissions by 9% for fifteen years and still fulfill its obligations under the Kyoto Protocol.⁵⁰⁸ The U.S. has already announced its intention to buy those credits. Thus, the Kyoto Protocol represents an opportunity for the U.S., as well as other Annex I parties, to increase their emissions instead of reducing them, but still fulfill their convention targets. Since greenhouse gases would not be reduced through an active climate policy, these potential trades are being called "hot air."⁵⁰⁹ Such trades would not improve the present state of the environment, because the buyer could emit more gases using its allowances, instead of reducing its emissions. This practice seems to be environmentally unsound.

506. See WWF, *Press Release*, Dec. 11, 1997 (visited Sept. 28, 1998) <http://www.wwf.de//c_bibliothek/c_presse/...archiv/c_pm_9712/c_presse_pm_971211.html>.

507. See generally WWF, *Report on the Results of the December 1997 Kyoto, Japan International Climate Change Negotiations* (visited Sept. 28, 1998) <<http://panda.org/climate/kyoto/report.htm>>.

508. See WWF, *Press Release*, Dec. 12, 1997.

509. See, e.g., WWF, *Daily Diary Archives*, Dec. 8, 1997 (visited April 13, 2000) <<http://www.panda.org/climate/kyoto/diaries/entry8.html>>.

However, as long as the trade of allowances is provided by the international agreements, which it expressly is, and the targets are being achieved by the parties, i.e., in 2012 the level of 1990 is being achieved, one could argue that global emissions are still being reduced.⁵¹⁰ There is consequently no violation of the international agreements. In sum, neither would a restricted emissions trading program violate the UNFCCC or the Kyoto Protocol, nor would a 50% limit be required by these international agreements.

b. International Principles

An unrestricted trading model could nevertheless violate international law if international environmental principles prohibited it. General principles of international environmental law may refer to rules of customary international law, to rules derived from treaties, to general principles of law as stated in Article 38(i)(c) of the ICJ-Statute, or to logical propositions resulting from judicial decisions.⁵¹¹ The following international principles of environmental law, the precautionary, the polluter pays, and the proximity principles might possibly be violated by an international emissions trading system.⁵¹²

510. For more information, see generally *Money to Burn?*, *supra* note 67, at 86.

511. Statute of the International Court of Justice, 1945 I.C.J. Acts & Docs., art. 38.

512. Other international environmental principles include, but are not limited to: the principle of sovereignty and responsibility, the principle of good neighborliness and international cooperation, the principle of preventive action, the duty to compensate for harm, the principle of common but differentiated responsibility, and the principle of sustainable development. See generally Max Valverde Soto, *General Principles of International Environmental Law*, 3 ILSA J. INT'L & COMP. L. 193, 208-09 (1996).

The precautionary principle occupies a prominent position in various international treaties including the EC Treaty,⁵¹³ other European Union documents,⁵¹⁴ the Rio

513. The Treaty Establishing the European Economic Community (EC Treaty) was signed in 1957, amended in 1986 by the Single European Act, again in 1992 by the Treaty Establishing the European Community (Maastricht Treaty), and in 1997 by the Amsterdam Treaty. See Treaty Establishing the European Economic Community, Mar. 25, 1957, 298 U.N.T.S. 11; Single European Act, Feb. 17, 28, 1987 O.J. (L 169) 1, *reprinted in* 25 I.L.M. 503 (1986); Treaty Establishing the European Community, Feb. 7, 1992, O.J. (C 224) 1 (1992), *reprinted in* 31 I.L.M. 247 (1992), Treaty of Amsterdam Amending the Treaty on European Union, the Treaties Establishing the European Communities and Certain Related Acts, Oct. 2, 1997 (Amsterdam Treaty). The EC Treaty deals with the common policy of the member states regarding economic affairs and other subjects, including environmental measures. With the passage of the Maastricht Treaty of Feb. 7, 1992, the European Union (EU) was founded. The EU is based on the European Communities, which still continue to exist, and is supplemented by a common policy regarding foreign affairs, defense, and a common currency. The EC Treaty forms the basic constitutional law for the entire European Community and has a direct legal effect in all of the member states of the European Union. It can therefore be considered to be supranational law. The environmental policy is dealt with in Title XVI of the EC Treaty. Amended EC Treaty, arts. 130 r - 130 t.

514. Council Decision 95/308 Conclusion, on Behalf of the Community, of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1995 O.J. (L 186) 42 [hereinafter Council Decision 95/308/EEC]; Council Decision 94/911 Adopting a Specific Programme of Research and Technological Development, Including Demonstration, in the Field of Environment and Climate (1994-1998), 1994 O.J. (L 361) 1 [hereinafter Council Decision 94/911/EC]; Council Directive 83/129 Concerning the Importation into Member States of Skins of Certain Seal Pups and Products Derived Therefrom, 1983 O.J. (L 91) 30 [hereinafter Council Directive 83/129/EEC].

Declaration on Environment and Development (Rio Declaration),⁵¹⁵ the Convention on Biological Diversity,⁵¹⁶ the UNFCCC, and other international legal documents.⁵¹⁷ Although divergent meanings are attributed to the precautionary principle as a principle of international law, they all have a common element: measures to prevent damage to the environment may not be deferred solely because insufficient scientific evidence exists about the environmental effects of a particular activity. It is assumed that science does not always provide the insights needed to protect the environment effectively, and that undesirable effects may result if measures are delayed until science does provide such

515. Rio Declaration on Environment and Development, U.N. Conference on Environment and Development, U.N. Doc. A/Conf. 151/5/Rev. 1, June 13, 1992, *reprinted in* 31 I.L.M. 814 (1992).

516. United Nations Convention on Biological Diversity, June 5, 1992, S. TREATY DOC.NO. 20 (1993), *reprinted in* 31 I.L.M. 818 (1992).

517. Art. 2, para. 5-5(a) of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, March 17, 1992, 31 I.L.M. 1312, 1316; Para. 3 (iii), at 5 of the Ministerial Declaration of the Sixth Trilateral Governmental Conference on the Protection of the Wadden Sea, Nov. 13, 1991, Den.-Ger.-Neth.; Ministerial Declaration of the International Conference on the Protection of the North Sea, Bremen, Nov. 1, 1984; Ministerial Declaration of the Second North Sea Conference, London, Nov. 25, 1987; Third North Sea Conference, The Hague, Mar. 8, 1990; Ministerial Declaration on Sustainable Development in the European Economic Community Region, Bergen, May 15, 1990; art. 4 (3)(f) of the Bamako Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, Jan. 29, 1991, 30 I.L.M. 773; art. 2, para. 2 of the Convention for the Protection of the Marine Environment of the North-East Atlantic, Sept. 22, 1992, 32 I.L.M. 1069, 1076; art. 3, sec. 2 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, April 9, 1992, 30 I.L.M. (1992) (not in force).

insights.⁵¹⁸ Furthermore, in a number of situations a planned activity may be allowed only when there is scientific certainty that this activity has no detrimental effect on the environment.⁵¹⁹

The exact meaning of the Principle varies within the different agreements. As incorporated explicitly into Article 130r of the EC Treaty, the Principle requires Community policy to "be based on the precautionary principle."⁵²⁰ Some of the literature interprets this to require not only that environmental damage shall be remediated, but also that it should be avoided to the maximum extent possible.⁵²¹ This means that auditing and environmental management systems have to be used to find and correct environmental problems before the damage is done, which has led to global efforts to establish standards for environmental management systems.⁵²² Furthermore, read in combination with the next paragraph of Article 130r, the Community should take into account "available scientific and technical data."⁵²³ Article 15 of the Rio Declaration states that the "precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."⁵²⁴ So when it is known beforehand that an ac-

518. See Burns, *supra* note 487, at 147.

519. See Chris W. Backes & Jonathan M. Verschuuren, *The Precautionary Principle in International, European, and Dutch Wildlife Law*, 9 COLO. J. INT'L ENVTL. L. & POL'Y 43, 44 (1998); SCHUPPERT, *NEW REGULATORY INSTRUMENTS*, *supra* note 398, at 47.

520. EC Treaty, *supra* note 441, art. 130 r, para. 2.

521. See Michael J. Quinn, *International Environmental Law*, SB04 ALI-ABA 371, 374 (1996).

522. See *id.*

523. EC Treaty, *supra* note 441, art. 130 r, para. 3.

524. Rio Declaration, *supra* note 515, agenda 21, principle 15.

tivity will be harmful to ecological values, advantages (in economic terms) and costs (damage to ecological features) will always have to be weighed.⁵²⁵ The crucial question will then be whether under either the EC Treaty or the Rio Declaration an activity can or must be prohibited, or whether possibly expensive measures can or need to be imposed for the protection of the environment, despite the lack of scientific data about the effects on the environment.⁵²⁶ This element of cost-effectiveness as a characteristic of the precautionary principle, required by the EC Treaty and the Rio Declaration, is rarely found in international agreements.

It is notable, however, that the precautionary principle in the Rio Declaration is only relevant to cases where there is a danger of "serious or irreversible" damage, which incorporates an element of proportionality into the principle. In fact, "if the threat of damage to the environment is limited and the advantages of the detrimental activity (or the costs of the protective measures to be taken) are considerable, then the precautionary principle" does not apply.⁵²⁷ Yet the seriousness of the environmental damage is not the only factor remaining to be included in the weighing process; as explained above, only "cost-effective" measures need to be utilized in an effort to protect the environment. In sum, if scientific certainty about the presumed detrimental effect of a measure is not available, it must be proportional in view of the costs involved, the degree of scientific uncertainty, and the environmental benefit to be obtained through those measures.⁵²⁸

The relation between scientific uncertainty about potential environmental effects of an activity and environmental protection under the precautionary principle and its cost-effectiveness standard may also be relevant to

525. See Backes & Verschuuren, *supra* note 519, at 50.

526. *See id.*

527. *See id.*

528. *See id.*

the Framework Convention on Climate Change.⁵²⁹ The relationship between CO₂ and its effects on climatic change are still not conclusively proven, although a causal link is almost certain. The Convention therefore provides that where "there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such [precautionary] measures, taking into account that policies and measures to deal with climate change should be cost-effective."⁵³⁰ Most other international agreements do not involve any kind of cost factors and may even exclude them from the balancing process.⁵³¹ Thus, the Rio Declaration and the UNFCCC have a more restricted version of the precautionary principle, since if full scientific evidence is lacking, only cost-effective measures must be taken.

If an emissions trading program is judged by the precautionary principle as an international principle, it must be judged by the precautionary principle as interpreted in its specific context, i.e., the climate change conventions. In other words, when analyzing whether the emissions trading program can be incorporated into the climate change conventions, their restricted interpretation of the precautionary principle has to be used as the standard. The question is, therefore, whether a CO₂ emissions trading program without any minimum requirement for domestic reductions would meet the requirements of cost-effectiveness, scientific certainty and environmental protection as required by the precautionary principle in this context. As mentioned above, the causal relationship between the release of CO₂ by hu-

529. See Burns, *supra* note 487, at 147 n.89 (discussing conceptual weaknesses of the precautionary principle as articulated in the UNFCCC).

530. Rio Declaration, *supra* note 515, agenda 21, principle 15.

531. See Backes & Verschuuren, *supra* note 519, at 52, 58.

man fuel combustion and global warming through the destruction of the ozone layer is almost proven with certainty. But even if there is not full scientific support, both the trading mechanism and domestic reductions are intended to reduce CO₂ emissions on a global scale. Hence, the fact that there is insufficient scientific certainty can be ignored when weighing the factors.

It remains to compare the environmental damage through the introduction of an unlimited trading scheme with its cost-effectiveness. If the threat of damage to the environment is "serious or irreversible," the requirement for cost-effectiveness of the precautionary measure is less strict. The proposed trading program has been designed to provide a much more cost-effective tool for reducing CO₂ emissions by the Convention's parties. It is projected to save a tremendous amount of money and is arguably significantly more cost-effective than the traditional approach of relying on domestic CO₂ reductions. For example, in the U.S., measures to stabilize CO₂ at 1990 levels have been estimated to amount to 2.5% of the annual gross domestic product by the year 2030.⁵³² Consequently, the threat of damage to the environment has to be serious or irreversible in order to outweigh the benefits of the unrestricted trading program. If the trading program is completely unlimited regarding the amount of reductions through trading or through domestic reductions, it is most likely that industrialized nations like the U.S. will attempt to comply with their international targets, mainly by buying emission allowances from countries like Russia and the Ukraine, as they previously announced. Although these "hot air" emissions would never have actually occurred in Russia or the Ukraine, they will occur in the U.S., thereby resulting in two adverse effects: further global warming and an additional destruction of the ozone

532. See Smeloff, *supra* note 496, at 280.

layer.⁵³³ Whether these effects will cause serious damage to the environment is unknown. If damage to the ozone layer occurs, it is certainly irreversible, as no remedy has yet been developed for restoring the ozone shield. In case of an "irreversible" damage to the environment, as seen above, cost-effectiveness is given less weight in the balancing test. Thus, even if the costs for domestic reductions will be much higher than through the purchase of emission credits, a totally unrestricted trading market would violate the precautionary principle.

The threshold question of when a preventive action is legally required has been answered differently by different conventions. The Bamako Convention⁵³⁴ states in its Article 4 (3)(f) that the parties have to adopt and implement the "precautionary approach to pollution which entails, inter-alia, preventing the release into the environment of substances which may cause harm to humans or the environment without waiting for scientific proof regarding such harm."⁵³⁵ Hence, it does not require the possibility of damage to be serious, thus lowering the level at which the lack of scientific evidence triggers action.⁵³⁶ The Convention for the Protection of the Marine Environment of the North-East Atlantic,⁵³⁷ on the other hand, increases the threshold needed to im-

533. See *supra* Part III.A. (explaining that greenhouse gases covered by the climate change conventions not only include carbon dioxide, but also hydrofluorocarbons and perfluorocarbons, as well as others, that are at the same time ozone-depleting substances).

534. Organization of African Unity: Bamako Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, Jan. 29, 1991, 30 I.L.M. 773.

535. See *id.* at 781.

536. See Soto, *supra* note 512, at 202.

537. Convention for the Protection of the Marine Environment for the North-East Atlantic, Sept. 22, 1992, 32 I.L.M. 1069.

plement preventive measures, requiring more than a mere possibility of damage. Under Article 2 (2)(a) of the convention, preventive measures are to be taken, when there are "reasonable grounds for concern . . . even when there is no conclusive evidence of a causal relationship between the inputs and the effects."⁵³⁸ Thus, the precautionary principle does not clearly give an answer to the question of exactly where the line for non-domestic emission reductions has to be drawn, and whether the expected damage must be serious or not.

Under the polluter pays principle, the generator of environmental pollution is held liable for that pollution. When this principle was first announced by the Organization for Economic Co-operation and Development (OECD) in 1972, it imposed liability on generators of hazardous substances in European countries. In case "the actual generator is not available or is incapable of performing a clean up, the principle has been stretched to justify imposing liability on entire industrial sectors, the owner of the property, or taxpayers at large."⁵³⁹ Further extensions of this principle can be observed, from mere liability to the obligation to take back packaging waste, used automobiles, electronic equipment, and other products.⁵⁴⁰ The principle may be difficult to implement and may have significant implications for trade issues.⁵⁴¹ Nevertheless, it has been incorporated into Article 130 r of the EC Treaty.

The polluter pays principle might be violated if emission rights can be bought without restriction from other countries, which emit less than their international obli-

538. 1992 *Ospar Convention: Convention for the Protection of the Marine Environment of the North-East Atlantic* (last modified Oct. 1998) <http://www.ospar.org/eng/html/convention/ospar_conv1.htm>.

539. Quinn, *supra* note 521, at 373-74.

540. *See id.* at 374.

541. *See id.* at 373.

gations allow.⁵⁴² At first glance, emissions trading seems to implement just this principle, as the carbon dioxide-emitting country – the “polluter” – prefers to purchase allowances – “pay” – rather than reduce emissions through technological improvements. However, the actual effects of such regulations have to be considered. First, a tremendous amount of “hot air” allowances would be acquired by developed nations, so that CO₂ will be emitted although it would never have been emitted without the trading system. Second, the polluter pays principle should not be interpreted too literally. The principle can also be described as a causation principle. In this sense, it implies that the person who causes damage not only bears the cost, but also is first of all responsible for the damage and must try to avoid or minimize it. Otherwise, the principle would be of a purely *ex post* remedial nature. If a country could buy as many allowances as it needs to fulfill its Convention targets, it could keep emitting CO₂ and contributing to the effects of climate change. Although it is “in compliance” with the international agreements, it would *cause* further pollution. Considering these circumstances, an unrestricted trading system seems to be difficult to reconcile with the polluter pays principle.

The third principle is the so-called proximity principle, requiring that pollution be eliminated close to its source.⁵⁴³ Like the previously discussed principles, it is included in Article 130r of the EC Treaty. It was also taken up by the Basel Convention on the Control of the Transboundary Shipment of Hazardous Wastes and

542. See WWF, *Press Release, Glimmer of Hope for Closing Loopholes in Kyoto Climate Change Agreement*, June 12, 1998 (visited April 13, 2000) <http://www.panda.org/news/press/news_216.html>.

543. See Quinn, *supra* note 521, at 374.

Their Disposal ("Basel Convention"),⁵⁴⁴ which provides that wastes may only be exported if the exporting country does not have adequate disposal capacity, or if the wastes are required as raw material for recycling or recovery industries in the importing country. In addition, the Convention not only requires member states to develop adequate facilities for environmentally sound management of hazardous and other wastes located within its national borders "to the extent possible," but also to ensure that transboundary movement of such waste be approved only when the exporting state lacks sufficient facilities to ensure "environmentally sound and efficient disposal."

The proximity principle would clearly be violated by an unrestricted trading scheme if CO₂ and other air pollutants had the same effects as other types of pollution. But as demonstrated above, CO₂ damages the ozone layer and harms all countries in the same way. It does not cause local "pollution." Thus, the potential violation of the proximity principle depends on whether one focuses on the region where the pollution is *created* or where it causes the *damaging effects*. None of the international agreements mentioned had to deal with this issue because the pollution always caused "localized" damage. However, the language of the principle requiring the elimination of pollution "close to the source," strongly suggests that the region where the pollution was caused is supposed to take care of its elimination, reminiscent of the "polluter pays" or "causation" principle. Considering the intent of the proximity principle is instructive; its purpose seems to be directed towards the protection of one country from being burdened with the pollution produced by another country. This interpretation leads one to suppose that the principle intends to avoid the shifting of damaging effects to other countries.

544. The Convention was adopted and opened for signature March 22, 1989. The Convention became effective on May 5, 1992.

Thus, both the language and the purpose of the principle suggest that it is not important that the country of origin be held responsible, but that other countries are protected from having the burden of the pollution transferred to them. As a result, it does not matter *where* CO₂ is being reduced, as long as other countries will benefit in the same way from the positive *effects* of the reduction. The unrestricted trading system is therefore compatible with the proximity principle.

In sum, unrestricted trading scheme would violate the precautionary principle. Furthermore, it is hardly reconcilable with the polluter pays principle, but it is compatible with the proximity principle.

D. *Designing a Model for an International Trading Program*

A final assessment of an international trading program for CO₂ can not reasonably be made without considering the different features it should contain. Its effectiveness can not be maximized without giving careful attention to the legal and technical design and implementation of such a program.⁵⁴⁵

1. Introduction: The UNCTAD-Earth Council Pilot Programme

After spending six years on the research, design and implementation of an international greenhouse gas emissions trading system, published in seven volumes between 1992 and 1996,⁵⁴⁶ the United Nations Conference on Trade and Development ("UNCTAD") and the

545. See Marchant, *supra* note 29, at 628.

546. See UNCTAD, *Press Release, Greenhouse Gas Emissions Trading Forum to be Launched by UNCTAD and the Earth Council*, 6/12/97 (visited Oct. 14, 1998) <<http://www.unctad.org/en/press/pr2707.html>>.

Earth Council⁵⁴⁷ launched the initial phase of an international greenhouse gas emissions trading program.⁵⁴⁸ This pilot trading program is intended to alleviate the concerns expressed by countries such as China and India regarding how emissions trading would work. According to previous UNCTAD studies, emissions trading is the most cost-effective way to achieve agreed to "caps" on emissions.⁵⁴⁹ Under the proposed scheme, companies that succeed in holding their emissions below a legislated "cap" level will be able to sell the spare capacity allowed by their permits to other companies seeking cost-effective solutions.⁵⁵⁰ This would contribute to the

547. The Earth Council is an international non-governmental organization (NGO) that was created in September, 1992 to promote and advance the implementation of the Earth Summit agreements. The Earth Council consists of 18 Members, who represent some of the world's political, business, scientific and non-governmental communities, and 16 Honorary Members. The Earth Council Institute functions as an advisory board to the Earth Council. See generally Earth Council, *The Earth Council* (visited Apr. 21, 1999) <<http://www.ecouncil.ac.cr/about>>.

548. Other efforts to develop an international emissions trading system have been made by the Center for Clean Air Policy (CCAP). See CCAP, *New Jersey and the Netherlands Initiate Historic Joint Effort on Climate Change, Press Release* (visited Apr. 26, 1999) <<http://www.ccap.org>>. On a national basis the Canadian Greenhouse Gas Emission Reduction Trading Pilot (GERT) creates a foundation for a possible full-scale emission trading system in the future. See GERT, *GERT* (visited Apr. 26, 1999) <<http://www.gert.org>>.

549. See UNCTAD, *Press Release, Climate Change: UNCTAD Can Help*, Dec. 11, 1997 (visited April 13, 2000) <<http://www.unctad.org/en/press/pr2736en.html>>.

550. See UNCTAD, *Note To Correspondents No. 31, Greenhouse Gas Emissions Trading Forum Launched in Chicago by UNCTAD and the Earth Council*, June 30, 1997 (visited Oct. 14, 1998) <<http://www.unctad.org/EN/press/nc9731.html>>.

early and effective implementation of the Kyoto Protocol.⁵⁵¹

Under the auspices of the two organizations, the Greenhouse Gas Emissions Trading Policy Forum was established with roughly eighty participants from governments, corporations and environmental non-governmental organizations ("NGOs") joining the dialogue. The Forum has established both a "policy framework" and a "market design and operations" working group, each with a number of task forces to work out specific details. Its approved workplan would enable a market to be launched in the latter part of the year 2000. The first meetings of the Greenhouse Gas Emissions Trading Policy Forum took place on June 19-20, 1997 in Chicago, U.S., and on November 12-14, 1997 in Toronto, Canada.

The following part will consider the design of the UNCTAD-Earth Council Programme,⁵⁵² along with other proposals for GHG trading, and will suggest, based on Part II, the different elements that an international trading scheme should contain in order to work successfully.

2. Design of an International Trading Program

An international trading program will consist of different elements including participants, the traded commodity, the allocation of emission rights, the functioning of the market, the costs, and technical aspects of permit duration and possible revisions.

551. See UNCTAD, *Press Release*, Dec. 11, 1997, *supra* note 549.

552. See generally *A Pilot Greenhouse Gas Trading System: The Legal Issues*, UNCTAD-Earth Council, UNCTAD/GDS/GFSB/Misc. 2 (1996).

a. Participants

Ideally, an emissions trading program for greenhouse gases would be most effective if the international agreement encompasses all nations. If the program were limited to industrialized nations, significant problems from deforestation and agriculture in developing countries would be ignored. Also, it would provide incentives for new industry to locate in unregulated countries.⁵⁵³ Thus, even if the program started only with developed countries, it is a matter of great urgency to include developing countries as soon as possible. It is especially desirable to include countries with large potential growth as they will prospectively become significant emitters of greenhouse gases.⁵⁵⁴

However, there is no expectation that an international trading system would commence with universal participation, rather, only a limited number of countries would take part in an initial allowance market.⁵⁵⁵ Still, even if only two or three countries signed an initial agreement, a trading program could be workable and provide environmental benefits.⁵⁵⁶ One proposal suggests starting with the twenty-four OECD member states as they con-

553. See John P. Dwyer, *California's Tradeable Emissions Policy and its Application to the Control of Greenhouse Gases*, in CLIMATE CHANGE: DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 41, 55 [hereinafter Dwyer, *California's Tradeable Allowances*].

554. See Michael Grubb & James K. Sebenius, *Participation, Allocation, and Adaptability in International Tradeable Emission Permit Systems for Greenhouse Gas Control*, in CLIMATE CHANGE: DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 189; Bunli Yang & Arthur H. Rosenfeld, *Incentives to Address Global Warming: Sharing the Responsibility*, in CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 139, 142.

555. See Grubb & Sebenius, *supra* note 312, at 189.

556. See *id.*

tribute half the global, energy-related emissions of CO₂.⁵⁵⁷ Later, developing countries would be included.

International emissions trading between firms may be easier to implement than between countries, but since countries, not firms, sign international agreements, trades between companies would inevitably have to be accounted for at the national level. Otherwise, it could not be guaranteed that the total private permit holdings matched the national total of emissions. The participation of private firms causes a number of issues. First, international trading between firms in developed countries and firms in developing countries implies transfers of currency that governments may not support, especially if they do not control these transfers.⁵⁵⁸ Also, it might present an opportunity for firms to evade emission limits, leading to increased emissions, if there is not adequate regulation and enforcement in both countries.⁵⁵⁹ However, efficiency gains are assumed to be larger if governments can pass some or all of their national permits through to private or state entities, which can then themselves engage in international trades. Private entities could probably better exploit abatement opportunities and thereby enlarge the economic gains of this approach.⁵⁶⁰

b. Traded Commodity

Some commentators argue that an effective fight against global warming must attack *all* greenhouse

557. See Yang & Rosenfeld, *supra* note 554, at 142.

558. See Rob Swart, *Greenhouse Gas Emissions Trading: Defining the Commodity*, in CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 149.

559. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 55.

560. See Grubb & Sebenius, *supra* note 312, at 189; Daniel J. Dudek & Tom Tietenberg, *Monitoring and Enforcing Greenhouse Gas Trading*, in CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM, *supra* note 29, at 253.

gases together. An international emissions program would remain a partial solution and would never be completely successful, when countless small sources, such as motor vehicles, are not covered.⁵⁶¹ The UNCTAD-Earth Council model proposes to initially include energy-sector CO₂, hydrochlorofluorocarbons ("HCFCs") and hydrofluorocarbons ("HFCs"), and eventually also include forest-sector CO₂, methane and NO_x.⁵⁶² In theory, it might be true that a trading program will only be a full success if all gases are covered. In practice, however, a policy encompassing all potential sources could lead to serious problems. Greenhouse gases stem from a large variety of sources. Carbon dioxide is emitted through both deforestation and the burning of fossil fuels by industrial and transportation sources; methane is emitted from rice paddies, livestock, coal mining operations, and natural gas production, as well as storage and transmission facilities; and halocarbons are produced by industry for both industrial and consumer uses.⁵⁶³ An emissions trading program including all these sources would require reliable quantitative data about current emissions from innumerable sources, including non-industrial sources, and also data about the countervailing impact of greenhouse gas sinks. To date, no comprehensive data exists, not even on industrial sources.⁵⁶⁴ It would additionally pose substantial practical problems to monitor non-industrial sources. And it is highly doubtful whether it is even possible to gather data on the absorption capacity of greenhouse gas sinks.⁵⁶⁵ Therefore, it has been sug-

561. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 59.

562. See *A Pilot Greenhouse Gas Trading System*, *supra* note 552, at 7.

563. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 55.

564. See *id.* at 56.

gested that a modest initial approach restricting the program to CO₂ from industrial sources would attack an important part of the problem without overwhelming existing regulatory resources.⁵⁶⁶

The second problem is the inclusion of all greenhouse gases. Again, theoretically, it may seem useful to consider an inter-pollutant trading scheme producing greater savings, because there would be more potential trading partners. However, the different gases not only have completely different radiative forcing potential, but they are also emitted in completely different quantities. Methane, for example, has a global warming potential 32 times higher than CO₂ and, together with the halocarbons, constitutes about 40% of the total global warming impact.⁵⁶⁷ The relatively less harmful CO₂, on the other hand, is emitted in much greater quantities than other gases with greater heat-trapping capacities. Nevertheless, there exist significant uncertainties concerning the radiative forcing potentials of various greenhouse gases at existing concentrations, the dependence of radiative forcing potential on concentrations and on the presence of other greenhouse gases, the atmospheric lifetimes of greenhouse gases, and the indirect effects of greenhouse gases on atmospheric chemistry.⁵⁶⁸

It is therefore critical to find an index with which to compare the environmental impacts of the different gases. Without adequate scientific information to permit reasonable comparison and a scientifically sound exchange of emission credits, a substantial risk remains

565. See WWF, *Die internationale Klimapolitik am Scheideweg* [The International Climate Change Policy Facing a Crucial Decision] (visited Sept. 28, 1998) <http://www.wwf.de/c_bibliothek/c_hintergrund/c_hintergrund_kyoto/c_hintergrund_kyoto1.html>.

566. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 56.

567. See *id.*

568. See *id.*

that inter-pollutant trades could actually exacerbate the greenhouse effect.⁵⁶⁹ Even authors generally favoring an interpollutant trading scheme warn about the inclusion of sources and gases that cannot be accurately measured or whose warming potential has not yet been scientifically agreed upon.⁵⁷⁰

c. Allocation of Emission Rights

The way in which permits are initially allocated is a key determinant of a tradeable permit system, as it will strongly influence the nature and breadth of participation.⁵⁷¹ The UNCTAD-Earth Council program proposes to allocate emission allowances to the member states, which would in turn distribute them to their national sources of emissions.⁵⁷²

Allowances must first be allocated to all the participants of the international agreement. This means that national emission limits have to be set, which could cause a problem if simplistic formulas are being used. If, for example, the limits are set in proportion to the population, a massive dislocation in industrialized countries would result.⁵⁷³ If the national limits were based on historical emissions, developing countries would be condemned to permanent poverty, at least for as long as national economies depend on carbon fuel.⁵⁷⁴ The parties will therefore have to agree on a different criterion. This will most likely involve equitable considerations, including perceptions of responsibility for past

569. See *id.*; Kete, *supra* note 100, at 102.

570. See Grubb & Sebenius, *supra* note 312, at 185; Kete, *supra* note 100, at 102.

571. See Grubb & Sebenius, *supra* note 312, at 193.

572. See *A Pilot Greenhouse Gas Trading System*, *supra* note 552, at 6.

573. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 55.

574. See *id.*

and current contributions to the problem of global warming. While the definition of what is equitable is unclear and must be thoroughly discussed in negotiations, equity arguments have an intrinsic role and impact on structuring agreements.⁵⁷⁵ Criteria to be considered when basing the initial allocation on equity will most likely include gross national product ("GNP"), real GNP, population, land area, and dependence on fossil fuel production.⁵⁷⁶

The industrialized countries have accumulated an immense "natural debt" in the course of their development by clearly dominating emissions since the 1960s. Considered on a per-capita basis, the differences are larger still.⁵⁷⁷ The same result would occur if the criterion for accountability was based on who benefited from the fuel production or combustion; the industrialized countries have been the chief beneficiaries of those processes and therefore carry the main responsibility for the emission of greenhouse gases.⁵⁷⁸

Once the total national emissions limit has been determined on the international level, the national regu-

575. See Grubb & Sebenius, *supra* note 312, at 193.

576. See generally Robert N. Stavins, *Policy Instruments for Climate Change: How Can National Governments Address a Global Problem?*, 1997 U. CHI. LEGAL F. 293 (1997).

577. See Grubb & Sebenius, *supra* note 312, at 194.

578. See *id.*

Comparing "more" and "less" developed countries regarding total carbon dioxide emissions cumulatively from 1960 until 1986 under three aspects, country, capita and land, the more developed countries excessively exceeded the less developed countries:			
	Country	Capita	Land
More developed countries (per capita incomes about US\$ 3,000)	2.92	3.18	1.65
Less developed countries	0.36	0.35	0.49

See id. at 195.

latory agency responsible for the allocation of the credits will distribute allowable emissions among sources. If the agency allocates the rights in proportion to existing emissions, it favors existing sources and creates a bias against new ones, which will either have to substantially eliminate emissions or offset them by reductions from other sources. This policy would also give an unwarranted advantage to sources that have successfully delayed or resisted former pollution reduction obligations. If the agency lacks sufficient information about the existing amounts of emissions from each source, this approach will turn out to be very expensive and time-consuming.

d. Functioning Market

Like any other market, an allowance trading market requires both a healthy balance of supply and demand and rules that guarantee that the market remains competitive. Competition might be restricted if sources refrain from selling their surplus of credits due to fear that the government will impose stricter emission limits or confiscate banked credits. They could also be afraid that the value of the credits might increase when they need it for expansions.⁵⁷⁹ In order to avoid these doubts on the industry side, legislatures will have to provide legally enforceable assurances protecting emission rights. However, this might not be desirable from the environmental point of view. As legislators still lack complete or accurate information about the relationship between emissions and environmental quality, they have to rely on the constantly changing and improving scientific knowledge about greenhouse gases. Thus, they need to be without any constraints to adjust their environmental policies as circumstances may warrant.

579. See Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 58.

A well-functioning market requires not only adequate supply, but also adequate demand. In order to ensure the demand, so that the market is functioning, existing firms should be included in the program by permitting trades between existing firms.⁵⁸⁰ Requiring existing sources to reduce emissions by a specified percentage could also create demand.⁵⁸¹ Other proposals to ensure sufficient demand suggest limiting exemptions. Since some sources might have difficulty acquiring credits on the open market, especially for small amounts, emission banks might be established where they could purchase credits.⁵⁸² In order to ensure confidence in the trading program, an adequate system to register credits and to monitor and enforce emission limits seems essential.

Furthermore, the trading market must remain competitive and normal trading conditions must not be distorted. Some observers fear that a trading market could be subject to collusive and cartel-like action. On the one hand, developing countries are concerned that industrialized countries will buy up the market. Industrialized countries, on the other hand, fear that developing countries might form an OPEC⁵⁸³ - like cartel, where major resources are concentrated in a relatively small group of culturally-related countries. The best medicine against such potential disturbances is a great number and diversity of participants. The wider the holding entities, the smaller the chances of undue market power.⁵⁸⁴

Another measure mitigating these dangers is to continue rounds to allocate new permits, thus insuring wider distribution, a more liquid market, and the flexibility required to adapt to changing conditions.⁵⁸⁵ Con-

580. *See id.* at 57.

581. *See id.*

582. *See id.*

583. Organization of Oil Producing and Exporting Countries.

584. *See* Grubb & Sebenius, *supra* note 312, at 191.

585. *See id.*

stant re-distribution of allowances is a way to insure that the allowances will not end up in the hands of a small number of players.⁵⁸⁶ Finally, market abuse could also be avoided by anti-monopoly rules against price-fixing and cartel-like actions. These rules could, for example, prohibit participants from holding credits more than 10% in excess of their emission needs.⁵⁸⁷

e. Costs

The implementation of an emissions trading program for GHGs will most likely involve extensive capital expenditures for transaction, administrative, and monitoring costs. The administration of the individual trades by a national agency will inevitably cause costs. If regulators decide to review and approve each trade, the costs will be significant.⁵⁸⁸ In addition to the transaction costs, monitoring costs will also be incurred. These costs will include bookkeeping and preparation of annual reports on net emissions, independent checks on the member's national monitoring and reporting programs, review of the annual reports on net emissions and determination of their accuracy, and certification of each member's net emissions for each year.⁵⁸⁹ If the countries want to make sure that so-called "paper trades" are avoided, costs will be substantial. Paper trades occur when sources sell credits for a reduction that was established through false or erroneous accounting instead of an actual reduction.⁵⁹⁰ Transaction costs include search costs, negotiation costs, approval or certification costs, enforcement costs, and insurance costs. Whereas the searching and negotiating costs for

586. *See id.*

587. *See id.* at 192.

588. *See* Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 59.

589. *See* *A Pilot Greenhouse Gas Trading System*, *supra* note 552, at 9.

590. *See* Booncharoen & Gase, *supra* note 484, at 938.

big firms will probably decline in the course of time, they might be impossibly high for small sources, such as automobiles and home furnaces.⁵⁹¹

IV. OUTLOOK

After the detailed foregoing analysis of trading systems, this Part will not confine itself to summarizing the results of the legal analysis. It will go further and give some thought to the question of whether and how trading might work in the real world. It will begin with the summary of the results of this Article. This Part will distinguish between the German and the international results. The main focus of this Part will be an examination of certain structural features of a trading program and how these features might be shaped in the real world because of unpredictable and unforeseeable influences. Even if the trading components are legally flawless, they might cause some unwanted side effects when exposed to uncontrollable external factors, such as administrative or scientific uncertainties. The second Part of this outlook will discuss the general question of whether trading is "good" or "bad," and will then address some structural elements under the influence of external factors. Finally, this Part will make some suggestions regarding long-term air pollution policy.

A. A Review of the German and International Systems

The introduction of an SO₂ emissions trading scheme into the German law system must observe several requirements in order to be in accordance with existing law. In particular, the precautionary principle will have to be changed, while the protection principle and the principle of continuing existence will require an *immisions*-based model in order to avoid pollution hot spots.

591. See *id.* at 939. See also Dwyer, *California's Tradeable Allowances*, *supra* note 553, at 59.

The first allocation of emission allowances could interfere with Article 12 GG if new sources had to buy them from existing sources. Therefore, a system that treats both groups equally is required. Further, Article 14 GG demands a transitional period for existing sources. Lastly, the trading system will have to be designed to meet emission standards as prescribed by the BImSchG and the Technical Instructions Air, European Council directives and the Oslo Protocol to the Geneva Convention on Long-Range Transboundary Air Pollution, so that no relapse into former (higher) emission levels can occur. If the statute writer meets all of these structural requirements, a trading system may well be a successful tool to reduce SO₂ emissions in Germany.

Concerning an international pollution trading program, the analysis shows that a trading system that allows countries to come into compliance with their reduction targets merely by buying allowances and without any reduction of emissions domestically violates international law. It is irreconcilable with the international precautionary principle and interferes with the polluter pays principle. In order to comply with international law, the countries will have to agree on a domestic reduction requirement.

B. Structural Features in the Real World

However detailed it may be, the above legal analysis of trading systems does not yet say anything about whether these systems would actually be a welcome development in other countries or even on a supranational level. Legal analysts follow their specific approach by focusing on legal aspects. In the case of the emissions trading system, legal analysts adopted the recommendation of economists who were enthusiastic about those "highly efficient" economic instruments and consequently favored their introduction as pollution abatement mechanisms. These economists, in turn, have mainly been interested in the economic aspects and ef-

fects of the trading system. This is, of course, a natural behavior, as each profession has its own analytic methods and researches according to its inherent approach. But the area of air pollution control requires a look beyond one's own field in order to espy the interdisciplinary effects. Besides the legal and economic aspects, they include political, ideological and societal effects, as well as scientific and environmental points of interest. The following discussion of the emissions trading concept will consider the diverse influences and arguments to which such a system is subjected.

Before going into structural details, the question that from the outset of the trading idea until today, has been hovering above the whole discussion must be addressed: that is, is emissions trading "good" or "bad"? This question is essentially a debate between regulatory and economic instruments. Typically, emissions trading is regarded as an archetypical economic mechanism in environmental pollution control, along with environmental taxes and offsets. Viewed more closely, however, all currently used trading systems, including the SO₂ allowance trading program or the RECLAIM program, are not even close to pure economic instruments. They are all integrated in a regulatory framework with strict emission limitations. Therefore, they cannot be considered purely economic. Bearing this in mind, one must also be aware that, at this time, no one is talking about replacing the regulatory system with an economic one. Even strong proponents of economic incentives consider them as a complement to the regulatory system. They are intended to provide an incentive to comply with the emission limits set by regulatory means. Consequently, those who might be concerned about an unregulated free market have little to fear.

Economic instruments are also intended to involve the industry sector in political decision-making. Among economic instruments, industrial representatives generally favor emissions trading over environmental taxa-

tion. Even if their motivation does not result from a sudden environmental consciousness, allowance trading has the unique characteristic of making the market price for pollution control visible. No other regulatory or economic instrument provides this important advantage. Industry involvement is a very important step towards pollution control in general and cleaner air in particular. Such policy creates an awareness of the environmental costs not only on the side of the industry, but also on the side of the public. Participation in the decision-making process always leads to a better understanding and acceptance of both economic and social conditions; it fosters responsibility on the part of the industry, contributing to a higher interest in negotiating and developing pollution abatement technologies. Companies entering the allowance trading market will hopefully engage in investigations of the financial relations between their production and their contribution to environmental pollution, and they will expand their economic horizon to environmental issues and will ultimately promote emission minimization. Economic instruments are a logical consequence of the idea that a powerful and successful government has public participation as a prerequisite. Thus, economic instruments can hardly be argued away.

The discussion of whether environmental policy should include economic instruments appears to be outdated at this point. The introduction of economic instruments has been agreed to at the international level and codified in the Kyoto Protocol. Also, many countries are showing a growing interest in the American experience of national trading programs and are contemplating passing similar legislation. We seem to have passed the stage of the whether or not question. Rather, the debate should now be directed towards the structural components of a trading system. Which structural elements will be necessary to establish a well-working, environmentally effective and economically ef-

ficient trading system? What problems might arise even if the trading system is legally immaculate? Again, such considerations may not ignore the different aspects mentioned above.

The decision of which companies will be subject to a trading program can cause a distortion of normal trading conditions. It could lead to serious inequities within one industry sector and could even be the origin of monopolization. If a company, for legal or financial reasons, cannot participate in the allowance market, it could be disadvantaged. It might ultimately be forced to cease operations. Other businesses could buy up these firms and slowly create a monopoly. This could cause problems with competition law and economic unwanted effects.

Even more delicate is the participation of one of the biggest sources of air pollution on the trading market: the entire fleet of mobile sources, plus individual emitters. Their constituency could claim to be discriminated against if they are excluded from the trading activities. On the other hand, stationary sources could similarly be interested in the participation of mobile sources as potential trading partners. However, their involvement would require an enormous administrative effort in setting up a system that would be capable of adequately considering the numerous parameters. The question is whether the advantages justify the costs accompanied by the administrative process.

Besides the kind of emission sources, the kind of pollutants will always be an issue of debate. At first glance, the more comprehensive in terms of pollutants a trading system is, the more successful in terms of environmental effectiveness it seems. But even if only one pollutant is being traded successfully, it contributes to environmental protection. Every single reduction, however small it may be, should be regarded as a positive effect. One should not reject a program because of its restriction to a small number of pollutants demanding a

more comprehensive one. This leads not only to a zero reduction, if the more comprehensive program is not approved, but also to endless political discussions and frustration.

The debate about the inclusion of as many emitted compounds as possible not only buzzes in the context of air pollution, but it is also an issue in the climate change debate. As discussed above, some commentators favor the inclusion of as many greenhouse gases as possible on the trading market. Because of the lack of adequate data, this currently cannot be supported. The international system is, at this time, restricted to a single compound: CO₂. Whether it will be expanded to include further gases remains to be seen.

Meanwhile, the main issue concerning the traded commodity on the international level is the so-called net approach: countries would be able to count CO₂ sinks as a reduction credit. The Kyoto Protocol considers two factors in calculating the reduction commitments. First, Article 3 paragraph 3 provides that changes in GHG emissions from "sources and removals by sinks resulting from direct human-induced land use change and forestry activities" shall be used to offset a party's GHG emissions. Sink activity is limited to "afforestation, reforestation, and deforestation since 1990." Second, parties may gain or transfer emission reduction units and credits from projects complying with Articles 6 and 16 bis to meet their reduction targets (Article 3, paras. 10-11).⁵⁹² Annex I Parties may also transfer ERUs arising from emissions reduction projects or carbon sinks under Article 6, paragraph 1.

The Kyoto Protocol also envisions giving credit for preserving tropical rainforests and other natural reserves, as well as for reforestation.⁵⁹³ As the amount of CO₂ in the atmosphere increases not only from burning fossil fuel, but also from destroying forests, it has been sug-

592. See Booncharoen & Gase, *supra* note 484, at 925.

593. See Kyoto Protocol, *supra* note 489, art. 3, no. 3.

gested that reduction efforts should take into account all human activities that contribute to or reduce the concentration of CO₂ in the atmosphere. While the idea seems appealing, its practical implementation appears to be almost impossible. The actual measurement of the removal of CO₂ from the atmosphere by forests and soils is highly problematic,⁵⁹⁴ and it is doubtful whether such indeterminable values can be used to comply with international targets. Moreover, even if a tree is not being harvested by man, it will ultimately die a natural death and decompose, thereby releasing an even higher amount of stored CO₂. The calculation is purely short-term based and is thus unjustifiable.

The most important and fundamental element of a trading scheme will always be a comprehensive monitoring and compliance verification system. No matter how well-functioning a trading system might be, it will never serve the purpose of providing for clean air if it is not coupled with intense monitoring of the actual emissions. The U.S. can certainly build on its existing monitoring devices, which have already been in use. This might not be taken for granted in other countries, where previous air pollution control has not been combined with a monitoring system. If an emissions trading system would now be imported into such countries, they might be exposed to an overwhelming expenditure of administrative regulations and financial expenses. This problem will probably most likely arise in developing countries that have little experience in emissions monitoring and control.

In other countries, such as many of those in Europe, where pollution control has not been unknown for a few decades, numerous other administrative difficulties can occur: how could transboundary air pollution be taken

594. See Smeloff, *supra* note 496, at 283; Daniel J. Dudek & Tom Tietenberg, *Monitoring and Enforcing Greenhouse Gas Trading*, in *CLIMATE CHANGE, DESIGNING A TRADEABLE PERMIT SYSTEM*, *supra* note 29, at 251, 259.

into consideration? For example, as Germany bases its emission limitations on *immissions*, other countries' pollutants could be responsible for a fair amount of pollution in Germany. How could such pollution be measured technically and who would be responsible for measuring these emissions? The process of following the different gases from their source, the smokestack, until their final destination, a forest, is a very time and cost intensive one. Even if it were possible to follow a certain gas from its source to its final destination, an additional problem could arise: who is responsible, if two kinds of pollutants from two different countries combine and form a new, possibly more serious, pollutant? Can the responsibility be shared on a proportional basis? Moreover, how can all these factors be accounted for in the issuance and distribution of the emission allowances? All these questions have to be dealt with by the European Union, since they cross national borders and exceed national responsibilities. European legislation and administration is still a lengthy process. Also, the EU would have to erect a central agency in charge of distributing allowances, monitoring emissions and verifying compliance. One might, in this context, ask how the costs for the administration of the trading system should be gathered. Is it legitimate to finance it with EU funds, meaning that ultimately the taxpayer bears the burden, as trading could be regarded as a means to provide for cleaner air in *all* member states and benefit *everyone*? Or should only the market participants pay for the privilege of taking part in a trading system?

An additional problem would be caused by Switzerland and other bordering countries that are not members of the European Union. Since they are emitting pollutants that contribute to higher pollution levels in member states, their responsibility would also have to be taken into consideration.

But even with excellent monitoring devices and methods of measuring transnational air pollution, one cannot avoid natural phenomena, like the so-called upwind pollution, as occurred in the northeast U.S. Scientific uncertainties such as these are unpredictable. They make it highly uncertain whether emission trading will result in better air quality. As seen in the case of acid rain in the U.S., the upwind trades caused higher pollution levels in the Northeast than before the program started. Similar effects could occur in other parts of the world. Without the trading option, such effects would certainly not evolve.

On the other hand, one must not forget that the 1990 Amendments would never have been passed by Congress if they did not contain the trading mechanism. Without the new economic instrument as provided for in Title IV, none of the other provisions serving the final goal of cleaner air would have had a chance to succeed. It was clearly a political compromise in this case. Trading presented a refreshing and attractive novelty that won support for the overall package of amendments. The same political constellation could occur in other countries: a trading program as a sweetener for other, less appreciated, regulations, ultimately leading to the acceptance by the legislative authority. If the trading system is coupled with strict emission limitations, it could even be a low-calorie solution. Such a compromise might seem to be a sweet and sour one, but it must not necessarily be considered a negative development. At least a certain amount of reductions will be achieved. The fundamental environmentalist might be strictly opposed to this reasoning, but reality does not always allow for waiting for the perfect environmental solution. Legislative compromises are more likely to be achieved, and therefore should be accepted as slow steps towards the final goal.

However, this argument requires overall acceptance by the industry constituency and other market partici-

pants. This certainly has been, and still is, the case in the Acid Rain Program. California's RECLAIM Program, on the other hand, is not as appreciated as the Acid Rain Program. Whether other trading programs will be popular remains to be seen. Even if the proposed program is being welcomed before and during its initial phase, it is never guaranteed that the enthusiasm will continue. After a certain period of allowance exchange, the technological possibilities for pollution control might be exhausted. The constant interaction between demand and supply could come to a standstill. Yet the proposed trading system would have fulfilled its task of finding the best available control technology and setting the environmental price. It is a question of great uncertainty *when* such developments will occur. Prognoses are very hard to make and no one really has dared to make any predictions yet. It will probably be easier to estimate the duration of a trading program after the Acid Rain Program's Phase II, starting in the year 2000, has been in operation for a few years.

C. *Recommendations*

If the trading activities start to become slow after a certain period of time, the CO₂ trading program might provide an incentive for energy companies to invest in the development of energy saving and alternative fuel technology. The possibility for the companies to sell their entire stock of allowances on the market could create an increased interest in the production of renewable energy. Worldwide production of fossil hard and brown coal is still increasing. The use of renewable energy sources, including wind and water power, as well as solar energy, all of which do not produce CO₂, could result in CO₂ trading becoming completely superfluous. Whether nuclear energy might also be a viable alternative is a question of environmental safety.

Furthermore, governments could increase their promotion of research in the areas of energy reduction

measures and alternative technologies. This would involve research resulting from the exploration of resources to the final whereabouts of any residues. Educational programs that stimulate reduced energy use should be developed. The use of energy for electrical appliances running on a stand-by basis should be minimized. Currently, two nuclear power plants are exclusively providing electricity for stand-by use in Germany.

If alternative energy technologies were developed in industrialized countries, they could be transferred to developing countries, as the Joint Implementation provisions of the Kyoto Protocol suggest. Instead of emission credits, technology would be the traded commodity. Technology transfer could even be a much more lucrative policy than emissions trading. Both partners to the transfer, the investor and the recipient of the reduction technology, could profit from such activities. However, before alternative energies can replace CO₂-producing technologies, enormous changes will have to occur. During this time, the international trading system will most likely be in operation. Experience has proven that the inclusion of market-based mechanisms in the Kyoto Protocol has already resulted in numerous incentives for businesses to comply early. Nevertheless, an international CO₂ allowance trading system within the framework of the climate change conventions should be developed very carefully regarding its environmental impacts. It should be set up in a way that will guarantee that industrialized nations cannot buy off their responsibility to make actual CO₂ reductions within their own countries. This is not only dictated from a political and moral point of view, but also from a legal one, as described above. Regarding the political impact, developing countries have had the impression that they are in an unfortunate position and have felt economically discriminated against by industrialized countries since the origin and promotion of environmental policy in the

1970s. This impression could be changed if industrialized countries started to export emission reduction or renewable energy technology to developing countries. The latter would make significant progress towards industrialization and, at the same time, increase their production in an environmentally sound way. Developing countries would no longer feel that they were the object of industrial exploitation or discrimination.

Overall, a well-considered combination of different instruments like regulations, tradeable or leasable emission rights, taxes, subsidies, and sanctions at both the national and international levels appears to be the most effective solution. While preparing the right mixture of these ingredients for the menu, the chef should always keep the final goal in mind: clean air.

