THE POWER OF SUBNATIONAL ACTORS IN ENFORCEMENT OF THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

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Introduction

The Geneva Convention on Long-Range Transboundary Air Pollution (CLRTAP) was adopted in 1979 and continues to serve as the preeminent international framework for transboundary air pollution.[1] The international community has used a range of multilateral and bilateral cooperative arrangements to address international movement of harmful pollutants. Each has had to contend with the issue of ensuring compliance among party States. CLRTAP faces challenges in addressing transboundary pollution in non-Western countries despite clear evidence that air pollution is harmful to human health and technological developments that enable more accurate tracking of pollutants.[2]

In the absence of a model assigning liability for transboundary air pollution to States, the involvement of subnational actors in the enforcement of CLRTAP is crucial. Subnational actors—regions, states (as opposed to nation-states), provinces, cities, and non-governmental entities—have been a leading influence in environmental protection and climate change action.[3] Literature addressing the use of subnational actors has been broadly applied to climate change issues.[4] The related field of transboundary air

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1. Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 34 U.S.T. 3043, 1302 U.N.T.S. 217 [hereinafter CLRTAP].

2. World Health Org. [WHO], *WHO Global Air Quality Guidelines: Global Update 2021 Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide*, at 5, 74 (2021) [hereinafter *WHO Air Guidelines*].

3. Hamish van der Ven et al., *Valuing the Contributions of Nonstate and Subnational Actors to Climate Governance*, 17 GLOB. ENV'T POL. 2 (2017).

4. *See* Sharmila L. Murthy, *States and Cities As "Norm Sustainers:" A Role for Subnational Actors in the Paris Agreement on Climate Change*, 37 VA. ENV'T L. J. 2, 3 (2019); *see also Cities After Paris: The Role of Subnational Actors in Achieving*

pollution could benefit from a similar examination of the importance of subnational actors in enforcement mechanisms.

This note seeks to understand the role of subnational actors within the implementation of the 1979 Geneva Convention on Long-Range Transboundary Air Pollution and suggests a cooperative approach wherein the significance of subnational actors is recognized and they are utilized to encourage compliance with CLRTAP and the globalization of its goals. Part I briefly outlines the history of CLRTAP and the effect of subsequent updates to the framework. Part II addresses the problem of ensuring enforcement with international legal treaties without the participation of subnational actors and analyzes deficiencies within the current CLRTAP liability framework, particularly the lack of compliance and implementation within Eastern Europe, the Caucasus, and Central Asia (EECCA countries). This analysis draws on existing models of compliance for participation of States in international legal frameworks.[5] Part II also advocates for the expansion of the role of subnational actors in the implementation of transboundary pollution agreements through increased public access to information as well as engagement between international, national, and sub-national actors. This paper concludes that robust participation of subnational actors in CLRTAP is crucial for encouraging implementation of and compliance with the convention in EECCA countries.

I. BACKGROUND

A. THE DEVELOPMENT OF TRANSBOUNDARY POLLUTION FRAMEWORKS REQUIRED INTERNATIONAL COOPERATION BECAUSE THE SOURCES OF TRANSBOUNDARY POLLUTANTS COULD NOT BE IDENTIFIED.

The phrase "transboundary air pollution" refers to hazardous aerial emissions that cross over a country's political boundaries. Air pollutants include a number of substances, including sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), and heavy metals like mercury and lead. Fuel combustion (such as in gas and

International Goals, WILSON CTR., https://www.wilsoncenter.org/event/cities-after-paris-the-role-subnational-actors-achieving-international-goals (last visited Oct. 13, 2024); Jolene Lin, *The Role of Subnational Actors in Transnational Climate Change Law in* RESEARCH HANDBOOK ON TRANSNATIONAL ENVIRONMENTAL LAW 216, 216 (Veerle Heyvaert & Leslie-Anne Duvic-Paoli eds., 2020) (referencing the United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107).

5. *See* Andrew T. Guzman, *A Compliance-Based Theory of International Law*, 90 CAL. L. REV. 1823, 1827 (2002).

diesel-reliant road transportation), industrial processes (such as coal powered power plants and waste burning), and agriculture (such as heavily fertilized fields and livestock waste) are the predominant man-made sources of air pollutants in the atmosphere.[6] The problem of transboundary pollution emerged in the mid-1900s in Europe and North America.[7] Prior to 1970, Europe and North America were responsible for more than eighty percent of global SO2 emissions.[8] After the industrial revolution, the magnitude and geographical spread of pollution continued to grow, causing transboundary issues such as acid rain, forest decline, and ground-level ozone.[9] The growth of transboundary pollution problems led to the implementation of air pollutant controls at a country level, but it quickly became necessary to engage in international solutions.[10]

The international community struggles to balance State sovereignty, territorial integrity, and State responsibility for harmful transboundary pollution. The fixation of liability is central to assigning State responsibility for international wrongful acts such as transboundary environmental harm.[11] There is no consensus among States regarding what type of responsibility (fault liability or strict liability) should be adopted or the best way to adapt international treaties to address the complex interests and demands of individual States.[12] There is little incentive to cooperate in forming a shared legal regime to address transboundary pollution, especially among States that are major sources of emissions.[13] As a result, efforts to address

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6. *Air Quality in Europe 2022: Sources and Emissions of Air Pollutants in Europe*, EUR. ENV'T AGENCY, https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air (last modified Dec. 1, 2022); *see also A Major Source of Air Pollution: Farms*, COLUM. CLIMATE SCH. THE EARTH INST. (May 16, 2016), https://www.earth.columbia.edu/articles/view/3281.

7. David Fowler et al., *A Chronology of Global Air Quality*, 378 PHIL. TRANSACTIONS ROYAL SOC'Y A 1, 13 (2020).

8. *Id.* at 9.

9. *Id.* at 2. Ground-level ozone forms near the Earth's surface in the air we breathe. It is harmful to both people and the environment, damaging human lungs and causing crop die-offs. *See Ground-Level Ozone (O3) Pollution*, ARIZ. DEP'T OF ENV'T QUALITY, https://www.azdeq.gov/ground-level-ozone-o3-pollution (last visited Oct. 20, 2024); *Ground-Level Ozone Basics*, U.S. ENV'T PROT. AGENCY (last updated May 14, 2024), https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics.

10. Fowler, *supra* note 7. at 15.

11. Xuyu Hu, *The Doctrine of Liability Fixation of State Responsibility in the Convention on Transboundary Pollution Damage*, 20 INT'L ENV'T AGREEMENTS: POL. L. & ECON. 179, 180 (2020).

12. *Id.* at 192.

13. *Id.* at 180–81; Thomas W. Merrill, *Golden Rules for Transboundary Pollution*, 46 DUKE L. J. 931, 966 (1997).

transboundary pollution have centered on information-sharing and consultation mechanisms.[14]

Without interstate coordination, State responsibility for direct environmental harm to others due to a breached treaty obligation or customary law usually does not result in compensation to the harmed party.[15] In some instances, States engage in arbitration. The 1941 *Trail Smelter Arbitration* between the U.S. and Canada is one of the earliest and most fundamental cases in transboundary pollution.[16] The case established that States can be held liable for damage caused to another State by transboundary pollution under international law.[17] However, international environmental disputes are rarely litigated.[18]

Some States have instead opted to utilize treaties negotiated under the auspices of the United Nations, which often contain their own implementation, compliance, and enforcement mechanisms. The creation of the 1979 Geneva Convention on Long-Range Transboundary Air Pollution was motivated by public outcry over the detrimental health and environmental impacts of acid rain in Europe.[19] Acid rain was causing the destruction of forests, loss of fish stocks in lakes, and degradation of ecosystems in the Northern Hemisphere.[20] Research into the causes of acid rain in the 1960s indicated that emissions of sulfur dioxide and nitrogen oxides from thousands of kilometers away were major sources of the pollution problem.[21] The 1972 United Nations Conference on the Human Environment in Stockholm was the first time the consequences of transboundary air pollutants became a major focus at the international level.[22] In the years following the Conference, delegations from Norway and Sweden convinced other European

14. Hu, *supra* note 11, at 181.

15. *Id.*

16. *See* Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1905 (1938); Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1938 (1941). Both proceedings are referred to collectively as either the *Trail Smelter* case or *Trail Smelter Arbitration*.

17. Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1938, 1980 (1941).

18. Tim Stephens, *International Environmental Disputes: To Sue or Not to Sue?*, *in* LITIGATING INTERNATIONAL DISPUTES: WEIGHING THE OPTIONS 284, 288 (Natalie Klein ed., 2014).

19. Peinge Grennfelt et al., *Acid Rain and Air Pollution: 50 Years of Progress in Environmental Science and Policy*, 49 AMBIO 849 (2020); *see* Chris Wold et al., CLIMATE CHANGE & THE LAW (2009).

20. U.N. Econ. Comm'n for Eur., Protecting the Air We Breathe: 40 Years of Cooperation Under the Convention on Long-range Transboundary Air Pollution, 2, U.N. Doc. ECE/EB.AIR/NONE/2019/3 (Sept. 2019) [hereinafter Protecting the Air We Breathe].

21. *Id.* at 15.

22. *Id.* at 2.

nations to help address transboundary air pollution by presenting evidence showing that the devastating effects of acidification on fish populations in Norwegian and Swedish waters were the direct result of the atmospheric transport of pollution from other European nations.[23] The States' concern led to the establishment of CLRTAP.

B. CLRTAP EMERGED AS THE PRIMARY INTERNATIONAL LEGAL INSTRUMENT ADDRESSING TRANSBOUNDARY HARM.

In 1979, CLRTAP came into force as the first multilateral agreement addressing transboundary air pollutants.[24] CLRTAP was negotiated under the auspices of the United Nations Economic Commission for Europe (UNECE), one of the five regional commissions of the United Nations.[25] UNECE includes member States across Europe, North America, Central Asia, Western Asia, and Northern Asia.[26] Thirty-two countries became signatories of CLRTAP before enforcement of the convention began in 1983 and 51 parties have since ratified the agreement.[27] Transboundary pollution could not be addressed without a broad regional solution spanning beyond Western Europe.[28] Major polluting countries in Europe recognized the need to quantify inter-country transport of major pollutants and their environmental effects, but monitoring and analytical tools at the time were inadequate to support attribution of liability.[29]

A key success of CLRTAP was that it was able to establish cooperation between the East and West during the politically contentious Cold War period. [30] The United States and the Soviet

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23. U.N. ECON. COMM'N FOR EUR., CLEARING THE AIR: 25 YEARS OF THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION 10, U.N. Doc. ECE/EB.AIR/84, U.N. Sales No. E.04.11.E.20 (2004) [hereinafter CLEARING THE AIR]; *The Convention and Its Achievements*, U.N. ECON. COMM'N FOR EUR. [hereinafter *The Convention and Its Achievements*], https://unece.org/convention-and-its-achievements (last visited Oct. 20, 2024).

24. CLEARING THE AIR, *supra* note 23, at iii.

25. *Mission*, U.N. ECON. COMM'N FOR EUR., https://unece.org/mission (last visited Oct. 20, 2024).

26. *Member States*, U.N. ECON. COMM'N FOR EUR., https://unece.org/member-states (last visited Oct. 20, 2024).

27. Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 34 U.S.T. 3043, 1302 U.N.T.S. 217; Protecting the Air We Breathe, *supra* note 20, at 2.

28. Secretary-General of Org. for Econ. Coop. and Dev. [OECD], *Recommendation of the Council on Principles Concerning Transfrontier Pollution*, 4, OECD/LEGAL/0133 (Nov. 14, 1974). This study indicated that Western European countries could not address the issue alone.

29. Fowler, *supra* note 7, at 14.

30. CLEARING THE AIR, *supra* note 23, at 22.

Union (U.S.S.R.) engaged in a policy of détente during much of the 1970s, which allowed cooperation on issues of armament control, human rights, and economic affairs.[31] Degradation caused by transboundary pollution, particularly acid rain, was considered a pressing economic problem among the UNECE countries.[32] Further, environmental harm was viewed as an area of cooperation that "would pose little danger to the overall balance between the two power blocks and at the same time it could serve as the needed bridge or communication link between them."[33] Although negotiation of the main articles of the Convention was acrimonious and characterized by tensions between the Eastern and Western blocs, the parties were able to agree on mutually acceptable terms in the 1989 framework Convention.[34] The implementation of measures for reducing particular transboundary air pollutants was left for later negotiation, after more scientific and economic study.[35]

C. CLRTAP Introduced Groundbreaking Protocols to Address a Range of Trans-Boundary Pollution Issues, but Implementation Has Failed in EECCA Countries.

CLRTAP has adapted and modernized over time to reflect changes in the sources and effects of air pollution.[36] Eight Protocols have since been developed under the convention which have elucidated the specific obligations of the Parties beyond the broad and general framework of the original convention.[37] Between 1985 and

31. *Id.* at 21.

32. *Id.* at 9; Grennfelt et al., *supra* note 19.

33. CLEARING THE AIR, *supra* note 23, at 22. The U.S.S.R. was eager to conduct international diplomacy on this issue. It initiated negotiations, conducted them, and was the first country to ratify the Convention. *See generally id.* at 8–13.

34. *Id.* at 11–12.

35. *Id.* at 12.

36. Adam Byrne, *Trouble in the Air: Recent Developments Under the 1979 Convention on Long-Range Transboundary Air Pollution*, 26 REV. EUR., COMPAR. & INT'L ENV'T L. 210, 211 (Nov. 28, 2017) [hereinafter *Trouble in the Air*].

37. Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), *opened for signature* Sept. 28, 1984, T.I.A.S. No. 12086, 1491 U.N.T.S. 167; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at Least 30 Per Cent, *adopted* July 8, 1985, 1480 U.N.T.S. 215 [hereinafter Sulphur Protocol I]; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, *opened for signature* Nov. 1, 1988, T.I.A.S. No. 12086, 1593 U.N.T.S. 287 [hereinafter the Nitrogen Oxides Protocol]; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution

1994, Protocols on sulfur, nitrogen oxides, and volatile organic compounds were added.[38] In 1998 and 1999, three additional Protocols on heavy metals, persistent organic pollutants, and acidification were developed.[39] These three later Protocols increased the stringency of party commitments and added coverage for an important set of harmful chemicals. All Protocols to the Convention have entered into force by achieving ratification from two-thirds of the signatory States.[40] Although the advanced economies of Western European countries have ratified almost all of the Protocols, other geographical regions have been more selective.[41]

Many of the CLRTAP Protocols have resulted in substantial direct emissions reductions among party States. All parties to the 1985 Sulphur Protocol had achieved a 30 percent reduction in emissions by 1993, amounting to an average reduction of more than 50 percent among the party States.[42] These results can be attributed to both State action to implement obligations under the Protocol and the application of cleaner technology to emissions sources.[43] In Europe, CO2 emissions dropped markedly.[44] Emission of nitrogen oxides, non-methane volatile organic compounds, sulfur, ammonia, and carbon monoxide as a group decreased by forty to eighty percent between

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concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes, *opened for signature* Nov. 18, 1991, 2001 U.N.T.S. 187 [hereinafter the Volatile Organic Compounds Protocol]; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Further Reduction of Sulphur Emissions, *adopted* Jun. 13, 1994, 2030 U.N.T.S. 122 [hereinafter Sulphur Protocol II]; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals, *opened for signature* June 24, 1998, T.I.A.S. No. 12966, 2237 U.N.T.S. 4 [hereinafter Heavy Metals Protocol]; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants, *opened for signature* June 24, 1998, 2230 U.N.T.S. 79 [hereinafter Persistent Organic Pollutants Protocol]; Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-Level Ozone, Nov. 30, 1999, T.I.A.S. No. 13073, 2319 UNTS 81 [hereinafter Gothenburg Protocol].

38. *See* Sulphur Protocol I, *supra* note 37; Sulphur Protocol II, *supra* note 37; Nitrogen Oxides Protocol, *supra* note 37; Volatile Organic Compounds Protocol, *supra* note 37.

39. *See* Heavy Metals Protocol, *supra* note 37; Persistent Organic Pollutants Protocol, *supra* note 37; Gothenburg Protocol, *supra* note 37;.

40. CLRTAP, *supra* note 1, art. 12.

41. *See* Adam Byrne, *The 1979 Convention on Long-range Transboundary Air Pollution: Assessing Its Effectiveness as A Multilateral Environmental Regime After 35 Years*, 4 TRANSNAT'L ENV'T L. 37, 58 (2015) [hereinafter *Effectiveness After 35 Years*].

42. CLEARING THE AIR, *supra* note 23, at 28.

43. *Id.* Some non-party States saw comparable emissions reductions throughout this period, but those reductions could be traced to economic and industrial decline and not implementation of State action outside of the obligations of the Protocol. *Id.*

44. Aurélie Slechten & Vincenzo Verardi, *Measuring the Impact of Multiple Air Pollution Agreements on Global CO2 Emissions*, 92 LAND ECON. 534, 548 (2016).

1990 and 2012.[45]

CLRTAP has more recently seen some adjustments in this core set of eight Protocols that have set higher standards for reductions of heavy metals and emissions ceilings for certain pollutants. In 2012, the Parties adopted amendments to the Protocol on Heavy Metals and the Gothenburg Protocol on acidification, the first agreement to target multiple air pollutants and their sources within one instrument.[46] Changes to the Gothenburg Protocol included the addition of fine particulate matter (PM2.5), specifically black carbon, which is a particularly potent contributor to climate change.[47] The 1998 Protocol on Heavy Metals included emission limit values and required the use of best available techniques for reducing new and existing major sources.[48] The 2012 update imposed stricter emission limits and included a larger range of sources.[49]

Overall, the CLRTAP Protocols have been widely acclaimed.[50] This success is attributed to the Protocols' extensive monitoring and modeling requirements, their usefulness as a forum for negotiation between States, and their coverage of a broad range of pollutants (especially given the multi-impact effects pollutants such as PM, NO2 and O3 can have on human health).

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45. *The Convention and Its Achievements*, *supra* note 23.

46. U.N. Econ. Comm'n for Eur., Decision 2012/5 on Amendment of the Text of and Annexes other than III and VII to the 1998 Protocol on Heavy Metals, U.N. Doc. ECE/EB.AIR/113/Add.1 (Dec. 13, 2012) [hereinafter Decision 2012/5]; U.N. Econ. Comm'n for Eur., Decision 2012/6 on Amendment of Annex III to the 1998 Protocol on Heavy Metals , U.N. Doc. ECE/EB.AIR/113/Add.1 (Dec. 13, 2012) [hereinafter Decision 2012/6]; U.N. Econ. Comm'n for Eur., Decision 2012/2 on Amendment of the Text of and Annexes II to IX to the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and the Addition of New Annexes X and XI, U.N. Doc. ECE/EB.AIR/111/Add.1 (Dec. 13. 2012) [hereinafter Decision 2012/2].

47. Decision 2012/2, *supra* note 46, art. 3.

48. Heavy Metals Protocol, *supra* note 37, art. 3.

49. *Compare* Decision 2012/5, *supra* note 46 (specifying emission reduction commitments for various pollutants by country, as well as the percent reduction from the 2005 level), *with* Heavy Metals Protocol, *supra* note 37 (establishing the initial emission limit values).

50. *See, e.g.*, *Effectiveness After 35 Years*, *supra* note 41, at 41. ("The Protocols are characterized by good levels of compliance . . . From a simple compliance perspective, the regime is effective because the contracting parties in general have fulfilled their commitments . . . .").

II. ANALYSIS: SUBNATIONAL ACTORS SHOULD BE USED TO INCREASE ENFORCEMENT OF CLRTAP

A. THE CLRTAP COMPLIANCE REGIME ATTEMPTS TO BALANCE BINDING COMMITMENTS WITH SOFT LAW IN ORDER TO ENCOURAGE ENFORCEMENT OF ITS PROTOCOLS.

The CLRTAP framework and its Protocols impose binding commitments on party States through their substantive provisions, but they also include many "soft law" characteristics.[51] Assessing compliance with commitments can be difficult, but it is necessary in order to determine whether CLRTAP is fulfilling its goals.[52] High levels of compliance with an international legal instrument may show that it has influenced the behavior of its party States, therefore indicating that it has been legally effective.[53] CLRTAP seeks to maximize enforcement of the Convention among UNECE through both stringent compliance commitments and implementation among a broad range of countries. Maintaining a balance between these two objectives can be difficult, as they can have conflicting incentives. For example, some scholars have criticized the wide scope CLRTAP and its lack of provisions attributing State liability for air pollution harms as ineffective.[54] Others have stated that incorporating soft law principles encourages the participation of smaller or economically disadvantaged States, who may not be able to meet the same emission reduction target commitments as other States.[55] State participation in CLRTAP, such as when a country implements and ratifies a treaty, increases a State's likelihood of meeting the commitments of the Convention.[56]

The LRTAP Framework Convention is focused on general policies

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51. *See* CLRTAP, *supra* note 1; *see generally* Jon Birger Skjærseth, Olav Schram Stokke & Jørgen Wettestad, *Soft Law, Hard Law, and Effective Implementation of International Environmental Norms* 6 GLOB. ENV'T POL. 104, 109–11 (2006).

52. *See* Edith Brown Weiss, *Understanding Compliance with International Environmental Agreements: The Baker's Dozen Myths*, 32 U. RICH. L. REV. 1555, 1556 (1999).

53. *Id.* at 1563. *But see id.* at 1564 ("Effectiveness is not necessarily correlated with compliance.").

54. Alfred Rest, *Responsibility and Liability for Transboundary Air Pollution Damage*, *in* TRANSBOUNDARY AIR POLLUTION: INTERNATIONAL LEGAL ASPECTS OF THE CO-OPERATION OF STATES 299, 303 (Cees Flinterman et al. eds., 1986).

55. *Effectiveness After 35 Years*, *supra* note 41, at 44, 58.

56. *See* Andreas Kokkvoll Tvet et al., *Screening or Constraining? The Relationship Between Participation and Target Achievement in Transboundary Air Pollution Treaties*, 17 EARTH SYS. GOVERNANCE, July 6, 2023, at 5–7 (examining the relationship between participation and target achievement).

and strategies to combat transboundary air pollution.[57] Parties that ratified the Convention committed themselves to working collaboratively to prevent and reduce discharges of air pollutants "by means of exchanges of information, consultation, research and monitoring" and to "exchang[ing] information on and review[ing] their policies, scientific activities and technical measures aimed at combatting, as far as possible, the discharge of air pollutants."[58] Other language within the treaty equivocates on the duties of the parties by requiring that they "shall endeavor to limit and, as far as possible, gradually reduce and prevent air pollution" through the use of "control measures compatible with balanced development."[59] The LRTAP Framework Convention's strengths lay not in any substantive binding commitments on the parties, but its adaptability and ability to unite the wide range of UNECE countries under a single cooperative framework for resolving transboundary air pollution.[60] However, fulfillment of CLRTAP's commitments primarily relies upon country-level enforcement. In international law, national governments are recognized under international law as the main, and sometimes only, entity responsible for treaty enforcement.[61] The CLRTAP regime relies on national governments to sign and ratify the Protocols, exchange information, and engage in national reporting of air pollution.[62]

The Protocols have steadily expanded compliance with CLRTAP. The Executive Body of CLRTAP decided to add a non-compliance procedure to the Convention in 1997.[63] The 1994 Sulphur Protocol II, which entered into force in 1998, "was the first protocol to [C]LRTAP to require the mandatory application of the emission limit values set forth in the Protocol."[64] The Sulphur Protocol II Article 7 "Compliance" establishes an Implementation Committee "to review the implementation of the present Protocol and compliance by the Parties

57. CLEARING THE AIR, *supra* note 23, at 12.

58. CLRTAP, *supra* note 1, arts. 3, 4.

59. CLRTAP, *supra* note 1, arts. 2, 6.

60. CLEARING THE AIR, *supra* note 23, at 11–13.

61. *See* JAMES R. CRAWFORD, BROWNLIE'S PRINCIPLES OF PUBLIC INTERNATIONAL LAW 115–17 (8th ed. 2012).

62. CLRTAP, *supra* note 1, arts. 8, 9, & 14.

63. U.N. Econ. Comm'n Eur. Exec. Body, Decision 1997/2 Concerning the Implementation Committee, Its Structure and Functions and Procedures for Review of Compliance 35, U.N. Doc. ECE/EB.AIR/75 (Feb. 1997) (conferring to the Executive body the power to review implementation of the Convention).

64. M. A. Fitzmaurice & C. Redgwell, *Environmental Non-Compliance Procedures and International Law*, 31 NETH. Y.B. INT'L L. 35, 36 n.2 (2000).

with their obligations."[65] The committee makes reports and recommendations to the Parties, which the Parties can choose to "call for action to bring about full compliance" with the Protocol, "including measures to assist a Party's compliance with the Protocol."[66] Emissions are monitored in each signatory country and compliance is achieved if the mean emission limit value (ELV) does not exceed the value of the emission standard.[67] Compliance under the 1998 Protocol on Persistent Organic Pollutants and the Gothenburg Protocol is also enforced.[68] Throughout this process, CLRTAP had to adapt its original meteorological and chemical monitoring and modeling network to perform the additional work of verifying compliance with treaty obligations.[69]

An important evolution of CLRTAP was the development of technology aimed at analyzing where emissions originate, which can aid in assessing State compliance. At the time the CLRTAP framework was negotiated, there was scientific evidence for the existence of transboundary movement of air pollution, but separating local pollution from sources imported from a larger geographic region was challenging.[70] Assigning individual liability to States for their pollutants was difficult due to the large number of possible sources, the complex chemical processes of pollutants, and the transportation of pollutants over long distances and international borders.[71] Source-receptor calculations are an evolving means to identify which emissions stay within a country's own national boundaries and which are transported to other countries.[72] Source-receptor matrices also allow for the calculation of transboundary fluxes from a selected country to other regions.[73] The Regional Acidification Information

65. Sulphur Protocol II, *supra* note 37, art. 7(1).

66. *Id.* art. 7.

67. *Id.* annex v.

68. Persistent Organic Pollutants Protocol, *supra* note 37, art. 11; Gothenburg Protocol, *supra* note 37, art. 9.

69. Peter H. Sand, *Transboundary Air Pollution*, *in* THE PRACTICE OF SHARED RESPONSIBILITY IN INTERNATIONAL LAW 962, 968 (André Nollkaemper & Ilias Plakokefalos eds., 2017).

70. *The Convention on Long-range Transboundary Air Pollution*, AIRCLIM AIR POLLUTION & CLIMATE SECRETARIAT, https://www.airclim.org/convention-long-range-transboundary-air-pollution-0https://www.airclim.org/convention-long-range-transboundary-air-pollution-0 (last updated Apr. 14, 2019).

71. *See generally* Phoebe Okowa, *Transboundary Air Pollution, in* THE OXFORD HANDBOOK OF INTERNATIONAL ENVIRONMENTAL LAW 475, 477 (Lavanya Rajamani & Jacqueline Peel eds., 2d ed. 2021) (discussing the causes of transboundary air pollution and the difficulty in tracing the precise sources of pollutants).

72. Protecting the Air We Breathe, *supra* note 20, at 5.

73. *Id.*

and Simulation (RAINS) was developed by the International Institute for Applied Systems Analysis (IIASA).[74] RAINS allowed for the development of agreements on required emissions ceilings and recognition of nitrogen as a contributor to acidification harms.[75] It was used in the development of the Gothenburg Protocol.[76] The RAINS model has been replaced with the Greenhouse Gas Air Pollution Interaction and Synergies (GAINS) model, which is able to estimate future emissions of air pollutants and greenhouse gas emissions consistent with current development on each of those issues.[77]

Despite the increasing ability to track emissions sources, CLRTAP does not impose a liability model of pollution.[78] The UNECE parties clarified in a footnote to the Convention that "[t]he present Convention does not contain a rule on State liability as to damage."[79] Indeed, "[s]tates have been reluctant to apply the concept of State liability for transboundary harm to air pollution."[80] Principles of State liability and common but differentiated responsibilities are rarely included in international legal instruments that address air pollution.[81] The ASEAN Agreement on Transboundary Haze Pollution, adopted in June 2002, also contains no specific provisions on State responsibility or compensation for harm.[82] Similarly, a liability scheme was left out of the Paris Agreement on climate change.[83] Despite having no liability model, CLRTAP has moved towards increasing the stringency of its commitments, which threatens to leave many smaller and economically disadvantaged nations behind due to their lack of implementation of its Protocols.

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74. Lars Bergman et al., *A Scheme for Sharing the Costs of Reducing Sulfur Emissions in Europe* 6 (Int'l Inst. For Applied Sys. Analysis, Working Paper No. 90-005, 1990).

75. Helen ApSimon et al., *Synergies in Addressing Air Quality and Climate Change*, 9 CLIMATE POL'Y 669, 673 (2009).

76. *Id.*

77. *Id.*

78. *See* Jergen Wettestad, *The 1999 Multi-Pollutant Protocol: A Neglected Break-Through in Solving Europe's Air Pollution Problems?*, *in* YEARBOOK OF INTERNATIONAL COOPERATION ON ENVIRONMENT AND DEVELOPMENT 2001 –02, at 35, 36 (Olav Schram Stokke & Øystein B. Thommessen eds., 2001).

79. CLRTAP, *supra* note 1, art. 8(f) n.1.

80. Yulia Yamineva & Seita Romppanen, *Is Law Failing to Address Air Pollution? Reflections on International and EU Developments*, 26 REV. EUR. COMPAR. & INT. ENV'T LAW 189, 192 (2017).

81. *Id.* at 193.

82. *Id.*; *ASEAN Agreement on Transboundary Haze Pollution*, June 10, 2002, http://www.aseansec.org/pdf/agr_haze.pdf.

83. Paris Agreement to the United Nations Framework Convention on Climate Change, *adopted* Dec. 12, 2015, T.I.A.S. No. 16-1104.

B. FURTHER UTILIZATION OF SUBNATIONAL ACTORS WOULD HELP OVERCOME CLRTAP'S HURDLE IN ENFORCING EXISTING PROTOCOLS UNDER THE CONVENTION.

CLRTAP has been viewed as a largely effective instrument, but it faces serious shortcomings in participation, implementation, and engagement with its Protocols.[84] CLRTAP has had a widening enforcement success gap between its North American and Northern/Central European Parties and Parties in Eastern Europe, the Caucasus, and Central Asia (the EECCA).[85] The EECCA group includes twelve States: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.[86] Each of these nations was a part of the Soviet Union. State participation in CLRTAP through the implementation of its protocols is a central measure of its effectiveness, but Belarus, Ukraine, Russia, and Moldova are the only EECCA countries that are parties to a CLRTAP Protocol.[87] No EECCA nations are party to the Sulphur I Protocol, the Sulphur II Protocol, the Heavy Metals Protocol, and the Volatile Organic Compounds Protocol.[88] In contrast, most Northern and Central European

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84. *Effectiveness After 35 Years*, *supra* note 41, at 64.

85. U.N. Econ. Comm'n for Eur., Decision 2018/5 Long-term Strategy for the Convention on Long-range Transboundary Air Pollution for 2020–2030 and Beyond, 9 (2018) [hereinafter Decision 2018/5].

86. U.N. Econ. Comm'n for Eur., Rep. of Gothenburg Protocol Rev. Grp., *Barriers to Ratification and Implementation of the Gothenburg Protocol, as Amended in 2012, and Potential Solutions*, 1 (Aug. 2022) [hereinafter *Barriers to Ratification*], https://unece.org/sites/default/files/2022-09/Barriers%20to%20ratification%20and%20implementation%20and%20solutions%20-%2008082022_1.pdf.

87. U.N. Econ. Comm'n for Eur., *Europe's Environment: The Fourth Assessment: Air Quality* 19 (2007), https://unece.org/fileadmin/DAM/env/europe/monitoring/workshops/wksp%207.06.07.Geneva/chapter_ii_section_ii2_quality_10-05-2007pdf__EN_1.pdf.

88. Status of Treaties: Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Reduction of Sulphur Emissions or Their Transboundary Fluxes by at Least 30 Per Cent, U.N. TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-1-b&chapter=27&clang=_en (last updated Nov. 11, 2024); Status of Treaties: Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Further Reduction of Sulphur Emissions, U.N. TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-1-e&chapter=27&clang=_en (last updated Nov. 12, 2024); Status of Treaties: Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals, U.N. TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1-f&chapter=27&clang=_en (last updated Nov. 11, 2024); Status of Treaties: Protocol to

countries were quick to join all eight Protocols, with the majority ratifying the Heavy Metals Protocol within two to seven years.[89] A demonstrated lack of enforcement, particularly through implementation hurdles, in the EECCA countries is a serious threat to the future success of CLRTAP.

UNECE believes that a combination of political, financial, institutional, regulatory, knowledge, and technical barriers are at fault for the Parties' failure to ratify the recent CLRTAP Protocols.[90] This disparity is linked to the challenges EECCA nations faced in the early 2000s as they experienced the fall of the Soviet Union and its centralized economy.[91] Environmental enforcement was particularly challenging at a time when the national governments of the EECCA lacked the political and social capital to address environmental harms and their priorities were impacted by the special interests of powerful lobbies.[92] Reports from the UNECE have shown that the slow pace of governance and economic reforms, a complicated legal framework, and poor economic conditions (which created a lack of funding for the enforcement agencies), may have contributed to the lack of adoption of the Protocols by the EECCA governments.[93] CLRTAP enforcement has been especially challenging in Central Asia, where emissions are increasing due to a lack of implementation of scientific and technological changes in order to meet CLRTAP's emission targets.[94]

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the 1979 Convention on Long-Range Transboundary Air Pollution concerning the Control of Emissions of Volatile

Organic Compounds or their Transboundary Fluxes, U.N. TREATY COLLECTION, https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1-d&chapter=27&clang=_en (last updated Nov. 11, 2024).

89. Status of Treaties: Convention on Long-Range Transboundary

Air Pollution on Persistent Organic Pollutants, U.N. TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-1-g&chapter=27&clang=_en (last updated Nov. 12, 2024). However, note that Montenegro and Serbia did not become a party to the Heavy Metals Protocol until 2011 and 2012, more than a decade after some other countries. *Id.* Portugal did not approve the convention until 2017. *Id.*

90. *Barriers to Ratification*, *supra* note 87, at 2–5.

91. SOCIAL POLICY, POVERTY, AND INEQUALITY IN CENTRAL AND EASTERN EUROPE AND THE FORMER SOVIET UNION: AGENCY AND INSTITUTIONS IN FLUX 11 (Sofiya An et al. eds., 2019).

92. Org. for Econ. Coop. and Dev. [OECD], *Progress in Modernising Environmental Regulation and Compliance Assurance in Eastern Europe, Caucasus, and Central Asia* , 10–15, U.N. Doc. ENV/EPOC/EAP(2007)5 (Feb. 28, 2007).

93. *See Barriers to Ratification*, *supra* note 87; *see also* U.N. Econ. Comm'n for Eur. Comm. on Env't Pol'y, *From Intentions to Actions: Overcoming Bottlenecks: Critical Issues in Implementation of Environmental Policies*, at iii, U.N. Doc. ECE/CEP/136 (2007).

94. U.N. Env't Programme, *Air Pollution Series: Actions on Air Quality in Europe and Central Asia: Executive Summary*, 2 (Sept. 7, 2022).

Ammonia emissions, in particular, rose rapidly between 2010 and 2017.[95]

In response to these identified challenges in EECCA enforcement, UNECE has attempted a number of methods to improve EECCA national systems. CLRTAP's long-term strategy for 2020 through 2030 acknowledges the policy and institutional gaps between EECCA and the other UNECE members, proposes further communication of the successes of the convention at a political level, and recommends adopting additional flexibility within the convention's Protocols to encourage further implementation among EECCA countries.[96] In 2010, a coordinating group was created to promote communication with, and enforcement of CLRTAP among, EECCA countries.[97] Further, the Batumi Action for Cleaner Air Initiative (BACA) was endorsed in 2016.[98] BACA is a voluntary initiative that seeks to support countries in improving air quality through "inspiring national actions and promoting cooperation within and beyond the UNECE region."[99] BACA has received engagement from some countries, like Uzbekistan and Azerbaijan, that are not signatories of the CLRTAP Protocols.

UNECE's other attempt to increase implementation focuses on providing additional flexibility to the Protocol commitments for EECCA countries. Sulphur Protocol II and the Gothenburg Protocol contained a range of flexible provisions, both in the 1999 and amended 2012 editions, designed to facilitate ratification by EECCA countries.[100] The liability scheme of Sulphur Protocol II and the Gothenburg Protocol allow parties to propose adjustments to their emission reduction commitments.[101] Parties must include supporting documentation for their adjustment, which will then be reviewed by Parties present at the Executive Body.[102] A soft law structure that relaxes commitments can better support the participation of the EECCA countries by allowing the treaty regime's profile to be

95. *Id.*

96. Decision 2018/5, *supra* note 85, at 10, 70.

97. *See* U.N. Econ. Comm'n for Eur., Decision 2010/17 on the Establishment of a Coordinating Group on the Promotion of Actions Towards Implementation of the Convention in Eastern Europe, the Caucasus and Central Asia, U.N. Doc. ECE/EB.AIR/106/Add.1 (Feb. 24, 2011).

98. Protecting the Air We Breathe, *supra* note 20, at 14.

99. *Id.*

100. U.N. Econ. Comm'n for Eur., *Rev. of the Flexibility Provisions to Facilitate Ratification and Implementation*, ¶ 1, U.N. Doc. ECE/EB.AIR/2022/6 (Oct. 3, 2022).

101. Sulphur Protocol II, *supra* note 37, art. 11; Gothenburg Protocol, *supra* note 37, art. 13.

102. Sulphur Protocol II, *supra* note 37, art. 11; Gothenburg Protocol, *supra* note 37, art. 13.

maintained, while providing those countries with political leverage to gain financial and technical support from more advanced economies.[103] Cyprus, Macedonia, Monaco, and Lithuania have all used this provision as new Parties to Sulphur Protocol II to adjust their commitments.[104] However, these provisions have not yet proven adequate or effective in facilitating further ratifications of the Protocols among EECCA countries.[105] Additional mechanisms to increase enforcement of CLRTAP in the EECCA region are necessary.

In addition to existing challenges for boosting enforcement within EECCA countries, recent World Health Organization (WHO) guidelines have indicated that emissions commitments should be strengthened to prevent damage to human health. The WHO guidelines show that exposure to air pollutants is dangerous at much lower levels than previously thought.[106] WHO released new guidelines in 2021 for air quality for the first time since 2005, significantly lowering the safe levels for pollutants such as fine particulates (PM2.5) and nitrogen dioxide (NO2).[107] In 2019, more than 90% of the global population lived in areas where concentrations of PM2.5 exceeded the 2005 WHO annual air quality guideline level of 10 μg/m3.[108] Updated WHO guidance from 2021 recommends an annual PM2.5 air quality guideline level of 5 μg/m3, which will likely be difficult for States to meet.[109] The air quality guideline level of nitrogen dioxide was quartered between 2005 and 2021, falling from 40 μg/m3 to 10 μg/m3.[110] This new information shows the importance of reaching broad compliance with CLRTAP. This decrease in safe levels also makes it more difficult for countries to bring their emissions in line with the new WHO guidelines.

Despite CLRTAP's repeated emphasis on the importance of having a "solid scientific underpinning of the Convention," CLRTAP has struggled to get data from the EECCA region. The 1979 CLRTAP established a monitoring network through the European Monitoring and Evaluation Programme to take consistent measurements across the European continent.[111] Assessment of national air quality depends

103. *See Trouble in the Air*, *supra* note 36, at 216.

104. *Id.* at 217.

105. *Id.* at 216.

106. Lauri Myllyvirta, *The WHO's New Air Quality Guidelines Add New Urgency to the Clean Energy Transition*, CTR. FOR RSCH. ON ENERGY & CLEAN AIR (Sept. 22, 2021), https://energyandcleanair.org/who-2021-air-quality-guidelines/.

107. *Id.*; *WHO Air Guidelines*, *supra* note 2, at xiv.

108. *Id.* at 6.

109. *Id.* at 78.

110. *Id.* at 115–116.

111. ApSimon et al., *supra* note 75, at 673.

on the quality and completeness of the available data, which still needs improvement in EECCA countries.[112] The WHO's updated guidelines are based on advancements in scientific understanding of the health effects of air pollution that have occurred since the early 2000s.[113] The scientific research supporting the 2005 global update came almost exclusively from Europe and North America; in contrast, the 2021 report is based on studies that span almost all of the regions where the WHO is active.[114]

CLRTAP must be reframed to be relevant at a global scale. CLRTAP's long-term strategy for 2020 through 2030 recognizes that air pollution is increasingly a global, rather than regional, issue.[115] CLRTAP intends to begin increasing its cooperation with international organizations and countries outside the UNECE region to ensure its continued relevance.[116] A missing component of CLRTAP's strategy, however, is engagement with subnational actors who could offer a chance to revitalize enforcement of the framework on a global scale.

C. THE INVOLVEMENT OF SUBNATIONAL ACTORS COULD FACILITATE FURTHER IMPLEMENTATION OF AND COMPLIANCE WITH CLRTAP

Subnational actors should be utilized to address transboundary air pollution on an international scale.[117] Subnational actors are political entities that operate below the level of national government including regional, state, provincial, city, and non-governmental entities. Subnational considerations are a core part of the effective enforcement of environmental law.[118] The environmental federalism theory highlights the potential for local governments to play a gap-filling function by furthering environmental protections within their jurisdictions.[119] However, subnational environmental innovation can come into conflict with, and be preempted by, federal law. Within CLRTAP, subnational actors should be relied upon to increase enforcement by working in conjunction with nation-state parties. CLRTAP should engage in compliance assistance, which "encourages

112. Decision 2018/5, *supra* note 85, at 11.

113. *WHO Air Guidelines*, *supra* note 2, at 2.

114. *Id.* at 13.

115. Decision 2018/5, *supra* note 85, at 2.

116. *Id.*

117. Jolene Lin, *The Role of Subnational Actors in Transnational Climate Change Law*, *in* RESEARCH HANDBOOK ON TRANSNATIONAL ENVIRONMENTAL LAW 216, 220 (Veerle Heyvaert & Leslie-Anne Duvic-Paoli eds., 2020).

118. *See generally* Sarah Fox, *Localizing Environmental Federalism*, 54 U.C. DAVIS L. REV. 133 (2020).

119. *Id.* at 133.

observance of the law through outreach, education, and other promotional activities."[120] It can also provide compliance incentives, "a set of policies and programs that provide concrete benefits to those organizations that meet certain compliance objectives," to both national and subnational actors.[121]

CLRTAP does not provide robust or explicit support for the place of subnational actors in the treaty framework, despite some acknowledgment of the importance of connections between subnational actors and national decision makers. The Gothenburg Protocol, Protocol on Heavy Metals, and Protocol on Persistent Organic Pollutants all acknowledge some form of the following statement: "the important contribution of private and non-governmental sectors to knowledge of the effects associated with these substances and available abatement techniques, and their role in assisting in the reduction of emissions to the atmosphere."[122] CLRTAP's long-term strategy for 2020 through 2030 comments on the expected role of subnational actors in ensuring enforcement of the convention. It states that "it is increasingly evident that local air pollution, including in cities, is heavily influenced by the long-range and transboundary transport of pollutants. Improved multi-scale models and increased cooperation between different levels of government are needed."[123] The strategy also draws attention to the need for further political engagement and awareness-raising to increase ratification and implementation of the three most recent CLRTAP protocols.[124]

Despite these acknowledgements, there has been little public participation or participation from subnational actors in ensuring the success of CLRTAP. Prior to the 1999 Gothenburg Protocol, the CLRTAP framework did not contain any specific provisions relating to or encouraging public access to information.[125] The Gothenburg Protocol required States to "promote the provision of information to the general public" on subjects including national annual emissions and emissions reduction targets, pollution levels, strategies and measures applied to reduce air pollution problems, and

120. International Network for Env't Compliance and Enf't, *Principles of Environmental Compliance and Enforcement Handbook*, at 7 (2009) [hereinafter *INECE Handbook*].

121. *Id.*

122. Gothenburg Protocol, *supra* note 37; Heavy Metals Protocol, *supra* note 37; Protocol on Persistent Organic Pollutants, *supra* note 37.

123. Decision 2018/5, *supra* note 85, at 8.

124. *Id.* at 9.

125. *Effectiveness After 35 Years*, *supra* note 41, at 62.

environmental and human health improvements.[126] The language of the requirement is somewhat loose, especially the requirement to only promote the "improvements" in human health associated with attaining emissions reductions.[127] Adding stronger language to any future changes to the protocols is an essential step towards equipping civil society organizations with the best tools to advocate for emissions reductions, policy changes, and perhaps even CLRTAP ratification.

Public information within the EECCA countries is particularly important because environmental issues can be politically sensitive, which may encourage governments to withhold important information for the sake of control. The 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters helped encourage the release of emissions data among UNECE countries.[128] CLRTAP has always been supported by a foundation of scientific knowledge-sharing on transboundary air pollution, most notably through joint monitoring and modeling programs involving an international network of scientists and policymakers.[129] With developments in source-receptor matrices and the modeling of emissions, science is able to more precisely identify the regional and local sources of air pollution. This technology can further facilitate the creation of practical, functional goals by smaller units than the national government. The ability of subnational actors to receive emissions information, health data, and compliance reports would support their ability to advocate for CLRTAP ratification. This is especially important now that some consistent emissions data is available in the EECCA region.

Harmonizing domestic and international law can lead to more effective enforcement,[130] especially when the input of expert advice is incorporated into compliance efforts.[131] Involving civil society in the process of developing international frameworks "helps build support, reduces resistance and conflict, and eases implementation."[132]

126. Gothenburg Protocol, *supra* note 37, art. 5.

127. *Id.*

128. Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters arts. 4, 5, June 25, 1998, 2161 U.N.T.S. 447.

129. *The Convention and its Achievements, supra* note 23.

130. Noah D. Hall, *Transboundary Pollution: Harmonizing International and Domestic Law*, 40 U. MICH. J.L. REFORM 681, 682 (2007).

131. *See* Sonja Boehmer-Christiansen, *Reflections on Scientific Advice and EC Transboundary Pollution Policy* 22 SCI. & PUB. POL'Y 195 (1995).

132. *INECE Handbook*, *supra* note 120, at 33.

Because civil society has an interest in clear and effective international governance of their environmental law, laws that include substantive requirements (such as the emissions limits and best available technology requirements of the newest Protocols) may make it easier for subnational actors to promote, monitor, and enforce the treaty.[133]

Subnational actors have been shown not only to ease implementation, but to substantially advance the goals of the convention through regional action.[134] The major barrier to CLRTAP enforcement is the lack of ratification among EECCA countries. As a first step, CLRTAP can encourage the growth and engagement of strong subnational advocates for international environmental law in EECCA countries through the BACA organization. Engagement at multiple levels can help solve institutional and political barriers to ratification.

CLRTAP should encourage compliance assistance and introduce compliance incentives. Although some subnational actors have been able to act without formal acknowledgment within the treaty language, they face considerable barriers when national and international policy does not facilitate their involvement.[135] Subnational actors could be aided by the reinforcement of their role in fighting transboundary air pollution through explicit acknowledgment and support in future amendments of the Protocols.

Cities and civil society organizations in the EECCA have the potential to encourage further adoption of CLRTAP's goals. The institutionalization of environmentalism in post-Soviet Central Asia at the international level demonstrates the feasibility of this tactic, even when it is applied to autocratic national governments.[136] Many Central Asian countries are autocratic States, which can result in a lack of communication and mutual assistance with subnational actors.[137] Authoritarian States continue to exert increasing levels of power in international law, which could lead to the repurposing of international legal standards in a way that fits their illiberal

133. *Id.* at 34.

134. *See, e.g.*, Danielle Spiegel-Feld & Katrina M. Wyman, *Cities as International Environmental Actors: The Case of Marine Plastics*, 62 Ariz. L. Rev. 487, 487 (2020).

135. Lin, *supra* note 4, at 227.

136. Filippo Costa Buranelli, *The Institutionalization of Environmentalism in Central Asia*, *in* CLIMATE CHANGE IN CENTRAL ASIA 137, 140 (Rahat Sabyrbekov et al. eds., 2023)

137. Milana Nikolova, *Environmental Activism Begins to Make its Mark in Central Asia*, EMERGING EUR. (Feb. 27, 2021), https://emerging-europe.com/culture-travel-sport/environmental-activism-begins-to-make-its-mark-in-central-asia/.

interests.[138] The investment of authoritarian States in international agreements such as CLRTAP suggests that there are significant benefits to those States in engaging in international conventions, such as enhanced legitimacy, cooperation with other States, and even a heightened ability to repress.[139] Civil society and subnational actors hold a complex role within authoritarian society; while governments restrict and repress some actors, they engage with and provide support for others.[140] For Central Asian countries, engagement with actors involved with environmental issues appears to have more support than actors aimed at democratization.[141]

Effective engagement with subnational actors on environmental issues is likely to increase enforcement due in part to the importance of kinship structures and other forms of subnational social organization in Central Asia. Central Asian societies were traditionally organized based on strong tribal and clan identities that centered on extended-family connections.[142] This system was drastically changed under the Soviet government.[143] Central Asian nations, after finding independence in the early 1990s following the dissolution of the U.S.S.R., were expected to make a gradual transition to liberal economic and democratic systems.[144] Civil society, and by extension subnational actors, are influenced by these historical and cultural influences, both post-Soviet and tribal. Therefore, understanding the civil society of Central Asia requires a "more nuanced view of the social structures and relations, institutions, and practices that have built up . . . with the interaction of local culture, traditions and political systems."[145] International actors that seek to engage with subnational actors in the region must have an awareness of how they will fit into society differently and have different motivations from well-established subnational actors in Western democratic countries.[146]

One example of the changing role of subnational actors within

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138. Tom Ginsburg, *How Authoritarians Use International Law*, 31 J. DEMOCRACY 44, 44–45 (2020).

139. *Id.* at 44.

140. *See* Stefan Toepler et al., *The Changing Space for NGOs: Civil Society in Authoritarian and Hybrid Regimes*, 31 INT'L J. VOLUNTARY & NONPROFIT ORGS. 649, 650–58 (2020).

141. *Id.* For more discussion of this, as applied to climate change, *see infra* texts accompanying notes 142–146, 158–161.

142. JANICE GIFFEN ET AL., THE DEVELOPMENT OF CIVIL SOCIETY IN CENTRAL ASIA 4 (2005).

143. *Id.*

144. *Id.*

145. ASIAN DEV. BANK, CIVIL SOCIETY BRIEF: UZBEKISTAN 1 (2021).

146. *Id.*; GIFFEN ET AL., *supra* note 142, at 4–5.

environmental issues in Central Asia can be seen in Uzbekistan. In January 2024, the air in the Uzbek capital, Tashkent, measured particle pollution levels 15.8 times higher than the WHO recommended safe limit of 5 μg/m3, so the Uzbek national government increased incentives to participate in cooperative solutions to transboundary emissions.[147] While it continues to be an autocratic State, Uzbekistan has stated that it seeks to follow a more liberal and outward-looking path, with further governmental support for civil society.[148] The long-standing environmental crisis of the Aral Sea, which spans Kazakhstan and Uzbekistan, has begun to foster some transnational collaboration in the region.[149] In addition, reports from Uzbekistan's civil society organizations show that environmentalists and youth organizations are gradually occupying a more visible position in society.[150] These developments show that, while environmental organizations and other non-governmental subnational actors may not have full independence from governmental influence, subnational actors have become established enough to have the potential to play a substantial role in the implementation of CLRTAP.

D. RECOGNITION OF THE ROLE OF SUBNATIONAL ACTORS IN INTERNATIONAL TREATIES ON CLIMATE CHANGE CAN BE EXTENDED TO THE CLOSELY-RELATED FIELD OF TRANSBOUNDARY AIR POLLUTION.

The recognition that subnational actors have received from literature and policies related to climate change should be extended to CLRTAP. Air quality and climate change closely overlap in the regulatory sphere, and some measures have targeted addressing both issues collectively.[151] CLRTAP's long-term strategy for 2020 through 2030 acknowledges that a range of the pollutants noted in the convention should be "addressed through a multi-pollutant, multi-effect approach that includes their potential interaction with climate

147. Farangis Najibullah & Khurmat Babadjanov, *Creeping Death: Uzbek Capital's Extremely Poor Air Quality Worries Residents*, RADIO FREE EUROPE/RADIO LIBERTY (Jan. 21, 2024), https://www.rferl.org/a/tashkent-uzbekistan-air-pollution/32785574.html.

148. Nikolova, *supra* note 137.

149. *Id.*

150. ASIAN DEV. BANK, *supra* note 145, at 5.

151. *Improving Air Quality While Fighting Climate Change*, U.N. ECON. COMM'N FOR EUR., [hereinafter *Improving Air Quality*], https://unece.org/unece-and-sdgs/improving-air-quality-while-fighting-climate-change (last visited Oct. 20, 2024).

change, the nitrogen cycle and biodiversity."[152] The Gothenburg Protocol was the first legally-binding agreement aimed at reducing a spectrum of short-lived climate pollutant, including particulate matter, black carbon, and ground-level ozone precursors.[153] Despite the similarities between climate change and transboundary air pollution, the role of subnational actors. has received far wider recognition related to climate change

Study of multilevel governance in climate change law shows that there is room for considerable influence and effectiveness of subnational actors in transnational agreements.[154] States and cities have been at the forefront of implementing climate emissions goals. Some scholars argue that subnational actors acted as "norm sustainers" of the Paris Climate Agreement by monitoring and reporting their progress in reducing emissions and demonstrating the feasibility of climate actions.[155] The Paris Agreement "explicitly acknowledged" the "inherently multilevel nature of climate governance" and modeled its implementation on the expected contributions of subnational actors to climate commitments.[156] Additionally, gaps in the effectiveness of the United Nations Framework Convention on Climate Change (UNFCCC) at the State level left room for subnational actors to play a growing role in finding solutions to climate change.[157]

Climate change has also been an important step for regional cooperation between the Central Asian republics, who took part in the 26th Conference of the Parties in Glasgow as a single entity to advocate for international progress on climate change.[158] All five Central Asian republics have signed and ratified the Paris Agreement and each has undergone at least one Environmental Performance

152. Decision 2018/5, *supra* note 85.

153. *Improving Air Quality*, *supra* note 151; Gothenburg Protocol, *supra* note 37.

154. Lin, *supra* note 4, at 227 (referencing the United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107).

155. *See* Sharmila L. Murthy, *States and Cities As "Norm Sustainers": A Role for Subnational Actors in the Paris Agreement on Climate Change*, 37 VA. ENV'T L.J. 1 (2019).

156. Lin, *supra* note 4, at 217.

157. *Id.*; The Trump Administration's pledge to withdraw the U.S. from the Paris Agreement accelerated the introduction of subnational actors into international climate law enforcement. Thomas Hale, *The Role of Sub-state and Non-state Actors in International Climate Processes*, CHATHAM HOUSE 8–9 (Dec. 2018), https://www.chathamhouse.org/sites/default/files/publications/research/2018-11-28-non-state-sctors-climate-synthesis-hale-final.pdf. The role of subnational actors in the UNFCCC process been particularly strong since 2014, when U.N. Secretary-General Ban Ki-Moon invited mayors, CEOs, civil society groups, and others to a Climate Summit in New York in addition to heads of state. *Id.*

158. Costa Buranelli, *supra* note 136, at 137.

Review as part of their work with UNECE compliance.[159] These Central Asian States have also signaled their intent to incorporate climate change into their national policies.[160] The shared goal of climate change has helped mobilize civil society organizations and other subnational actors across Central Asia. These subnational actors have been instrumental to fighting climate change by mobilizing resources to take local climate and environmental measures, thanks to their awareness of the locally-attuned knowledge and capacities of the local population.[161]

The engagement of subnational actors in transnational lawmaking often takes the form of involvement in negotiations and transnational networks.[162] This form of engagement led to the establishment of a norm among subnational actors: that their participation is essential for the success of global transboundary problems because they are "more nimble policy actors than [S]tates while also being more responsive and adaptive to local circumstances and needs."[163] Subnational actors are useful contributors to lawmaking because they have local knowledge, are more adaptive actors than States, and can help the reach of State enforcement power. These qualities help to fill the policy gaps of CLRTAP by encouraging the ratification of the Protocols and compliance in a broader geographic range. Successful international compliance with CLRTAP could help bring global emissions levels in line with WHO health guidelines.

CONCLUSION

Enforcement of international treaties is a challenging prospect, especially in the field of transboundary issues where there is sometimes a lack of technological capability or political will to assign harm to individual countries. CLRTAP has achieved remarkable success in the fight against air pollution and climate change in North America and Europe, but its success story has left behind the EECCA

159. *Id.* at 140.

160. *See Central Asian Countries Highlighted the Importance of Strengthening Measures on Climate Risks*, CTR. FOR EMERGENCY SITUATIONS & DISASTER RISK REDUCTION, https://cesdrr.org/en/central-asian-countries-highlighted-the-importance-of-strengthening-measures-on-climate-risks (last visited Oct. 20, 2024).

161. *Id.* at 153. Fabienne Bossuyt, *The Importance of Boosting Societal Resilience in the Fight Against Climate Change in Central Asia*, *in* FIGHTING CLIMATE CHANGE IN CENTRAL ASIA: DECARBONIZATION, ENERGY TRANSITION AND CLIMATE POLICY 149, 153 (Rahat Sabyrbekov et al. eds., 2023)

162. Lin, *supra* note 4, at 220.

163. *Id.* at 223.

countries. Further emphasis on the effective involvement of subnational actors could help with the expansion and implementation of CLRTAP. Some consideration of the role of subnational actors has been included within the existing framework, but evidence from climate change studies shows that subnational actors have the capacity to play a bigger role in enforcement.

The evolution of the environmental activism and political engagement of subnational actors within EECCA also provides evidence for their potential utility within CLRTAP. CLRTAP has evolved from a broad information-sharing framework to a series of substantive Protocols with binding emissions commitments. It must evolve further to meet the disparities between European and North American Parties and the other UNECE parties. The participation of subnational actors can be furthered within CLRTAP by increasing information transparency and collaboration between subnational actors and national governments. Collaboration between international frameworks and subnational bodies in transboundary air pollution could build a strong coalition for practical action.