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UNIFORM AND LOCALLY TAILORED EMISSIONS STANDARDS IN AMERICAN AND EUROPEAN AIR POLLUTION LAW: THE IMPACT OF HISTORICAL REGULATORY TRADITIONS

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This Piece operates at the intersection of comparative environmental law and legal history. It introduces a novel distinction between two paradigms of technology-based pollution standards: the first, uniform across all places and environmental conditions, and the second, tailored to local environmental and economic circumstances. It then compares the air pollution regimes of the United States and the European Union with an eye to the relative place of the two types of standards within each regime. This Piece finds that, in general, uniform standards characterize European regulation, whereas American regulation favors tailored standards.

This Piece argues that longstanding historical differences between Continental and Anglo-American approaches to regulating pollution are at the root of this transatlantic difference. Uniform technology standards accord with the permitting practices of France, Germany, and other European countries going back to the early Industrial Era. By contrast, tailored standards fit with the localist sensibilities of English common law–based environmental regulation going back centuries. This Piece seeks to illuminate the historical origins of transnational differences in environmental policy and how this history continues to shape contemporary environmental choices and debates.

INTRODUCTION 125
I. UBAT AND TBAT IN AMERICAN AIR POLLUTION REGULATION 132
A. 1967 Air Quality Act 132
B. 1970 Clean Air Act 133

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C. 1977 Amendments 135
D. 1990 Clean Air Act Amendments 137
II. UBAT AND TBAT IN EUROPEAN AIR POLLUTION REGULATION 138
A. The Air Framework Directive Regime: 1983–1994 139
B. Integrated Pollution Prevention and Control: 1996–2010 141
C. The Industrial Emissions Directive: 2010–Present 143
III. COMPARING THE UNITED STATES AND THE EUROPEAN UNION 145
IV. UBAT, TBAT, AND REGULATORY TRADITIONS 147
CONCLUSION 149

INTRODUCTION

Technology standards are central to air pollution–control regimes worldwide.[1] These standards, which hinge emission limits on technological and economic feasibility, are often known as BAT (Best Available Technique or Best Available Technology).[2] In some iterations, these standards apply to all plants within a particular industrial category, regardless of their surrounding conditions; in others, the stringency of the required reductions varies by location. The choice between these options, framed here as Uniform Best Available Technology (UBAT) and Tailored Best Available Technology (TBAT), is integral to the design of air pollution regulatory policy. Arguing for uniform standards across areas with different pollution levels assumes that feasible, incremental reductions of industrial emissions are inherently desirable. By disconnecting pollution control requirements from scientific proof of harm, uniform standards reflect a "precautionary" approach.[3] Tailored standards, conversely, reject a priori

1. See Env't Directorate, OECD, Report on OECD Project on Best Available Techniques for Preventing and Controlling Industrial Chemical Pollution, Activity 1: Policies on BAT or Similar Concepts Across the World 11 (2017), https://search.oecd.org/chemicalsafety/risk-management/policies-on-best-available-techniques-or-similar-concepts-around-the-world.pdf [https://perma.cc/ZEJ4-P8MM] ("All over the world, different policies and practices are being implemented to prevent and control industrial emissions in order to ensure a high level of environmental and human health protection. Many of these policies incorporate the concept of the BAT (best available techniques).").

2. Id. ("'Best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation . . . designed to prevent and, where that is not practicable, to reduce emissions . . . ." (citing Directive 2010/75, of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control), art. 10, 2010 O.J. (L 334) 17, 18 (EU))).

3. See id. at 13 ("[T]he all-BAT approach is based on the precautionary principle and allows no consideration for scientific uncertainties on the risks associated with pollutants. It is the fundamental philosophy for those who consider the environment as a limited and non-renewable resource . . . ."); Wendy E. Wagner, The Triumph of Technology-Based Standards, 2000 U. Ill. L. Rev. 83, 93 ("[T]he technology-based standards start out by demanding that every facility engaged in producing some generally defined externality 'do

requirements for emission reduction. Instead, TBAT is based on the belief that controls should be imposed only when emissions exceed the surrounding environment's carrying capacity. By definition, the degree of control is expected to differ by area.

The following example illustrates the difference between TBAT and UBAT. The production of biofuel ethanol results in the emission of various air pollutants, including volatile organic compounds (VOCs), which can contribute to ground-level ozone and smog.[4] Control technologies, like fermentation scrubbers, can significantly reduce these emissions.[5] Under UBAT, all ethanol plants would be required to deploy these technologies. In contrast, under TBAT, the requirement would depend on the existing level of VOCs in the location in question, with plants in relatively unpolluted areas exempt.

This Piece considers the places of both approaches in the air pollution regimes of the United States and the European Union. The comparison focuses on five substances regulated as "criteria pollutants" under the central program of the American Clean Air Act (CAA).[6] The push and pull between UBAT and TBAT marked the evolution of both American and European air pollution law, with examples of both approaches existing within each. Nonetheless, the two regimes diverge in their reliance on and attitudes toward UBAT. This divergence is most evident in the Clean Air Act's use of location-based air quality standards as its chief organizing framework.[7] By basing its goals on regional compliance with ambient standards, the Clean Air Act assumes that the control requirements applicable to individual sources would vary by region—that is, that they would

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their best,' and the standards often do not even leave the door open for the facility to argue that the best may not be necessary under the circumstances.").

4. See Ethanol Refining May Release More of Some Pollutants Than Previously Thought, Coop. Inst. Rsch. Env't Scis. (CIRES) (May 5, 2015), https://cires.colorado.edu/news/ethanol-refining-may-release-more-some-pollutants-previously-thought [https://perma.cc/UU8R-HYWG] (explaining that VOCs and nitrogen oxides react with sunlight to form ground-level ozone and smog).

5. See, e.g., Envitech Ethanol Scrubber Reduces Operating Costs, Envitech, https://www.envitechinc.com/ethanol_scrubber [https://perma.cc/LKE7-Q3CJ] (last visited Oct. 20, 2024) (claiming that the company's ethanol scrubber can recover ninety-nine percent of ethanol vapors).

6. 42 U.S.C. § 7408 (2018). The substances in question are sulfur dioxide (SO_2), ozone (O_3), particulate matter ($PM_{2.5}$ and PM_{10}), and lead (Pb). The CAA distinguishes between criteria pollutants, id. §§ 7408–7410, and Hazardous Air Pollutants (HAPs), id. § 7412. The European Union makes no such distinction, with both categories similarly regulated as pollutants under Regulation 166/2006, annex II, 2006 O.J. (L 033) 1 (EC).

7. 42 U.S.C. §§ 7408–7410.

take the form of TBAT. Within the European Union, by contrast, compliance with air quality standards is generally irrelevant to setting baseline levels of control.[8]

The relative prominence of location-based air quality standards in the United States is partly due to their compatibility with American federalism. By focusing on aggregate emissions rather than emissions from individual sources, tailored standards provide states with significant discretion in implementation.[9] The federalism argument, however, does not fully explain why the European Union chose a more centralized air pollution–control regime despite its multimember structure and commitment to member-state autonomy under the subsidiarity principle.[10] More importantly, federalism alone cannot account for the evident parallels between the British and American preferences for location-based air quality standards.

This transatlantic difference would likely have been starker had it not been for the pressure that the United Kingdom exerted toward greater reliance on tailored regulations throughout its membership in the European Union.[11] The regulatory instruments ultimately adopted as part of the E.U. air pollution regime reflected a compromise between the British preference for locally tailored standards and a countervailing German-led push for uniform technology-based permitting.[12] The core disagreement revolved around the need for a priori pollution control requirements. Working from the assumption that pollution could be safely

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8. See Directive 2010/75, of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control), art. 18, 2010 O.J. (L 334) 17, 19.

9. Under the CAA, the EPA sets National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. States are then required to develop State Implementation Plans (SIPs) that outline how they will achieve and maintain these standards through regulations and control measures. 42 U.S.C. §§ 7408–7410. The congressional findings with which Congress began the 1970 CAA were explicit on the fact that "air pollution control at its source is the primary responsibility of States and local governments." Id. § 7401(a)(3).

10. The Treaty on European Union defines the subsidiarity principle as follows: The European Union shall act "in areas which do not fall within its exclusive competence" only when "the objectives of the proposed action cannot be sufficiently achieved by the Member States" and can "be better achieved at Union level." Consolidated Version of the Treaty on European Union art. 5(3), June 7, 2016, 2016 O.J. (C 202) 13, 18. Environmental policy is among the primary areas subject to this principle. See Sian Affolter, The Subsidiarity Principle in EU Environmental Law, E-Int'l Rels. (Mar 26, 2021), https://www.e-ir.info/2021/03/26/the-subsidiarity-principle-in-eu-environmental-law/ [https://perma.cc/J3WE-USYT] ("[I]t has to be assessed on a case-by-case basis whether the EU is able to better achieve the objective of the proposed action given either its scale or effects. Presumably, this will often be the case since interdependent ecosystems turn seemingly local environmental problems into cross-border challenges.").

11. See infra section II.B.

12. See infra section II.B.

absorbed and diffused below a "critical load," the United Kingdom considered scientific proof of harm to be a precondition for regulation.[13] In keeping with the precautionary principle, Germany forwent the need for such proof.[14] As Professor Gertrude Lübbe-Wolff described it, the British approach accorded a role to emission standards "only in so far as observing them is necessary to secure attainment of the relevant quality standards."[15] The Germans, by contrast, "insist[ed] on the binding force of general emission standards, irrespective of whether or not compliance with them is a prerequisite for the attainment of quality objectives."[16] As the Director of the European Commission's Environment and Consumer Protection Service put it in 1977:

> [I]ncredible as it may seem the rest of the Community do not necessarily agree on the absolute paramountcy of axioms which are close to the heart of British experts and officials. For example the 'continentals' tend to believe more in standards defined on the basis of best technical means and applied through mandatory instruments. They mistrust systems based on goodwill and voluntary compliance . . . . They have serious doubts about the absorptive capacity of the environment . . . .[17]

Several scholars have argued that the British approach has roots in the regulatory regime created under the Alkali Act in the late nineteenth century.[18] The defining element of that regime is said to have been a pragmatic, case-by-case approach to regulating pollution. Rather than imposing rigid, uniform demands for control, the Alkali Act directed industrial sources to "use the best practicable means of preventing the

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13. Catherine A. Ramus, The Large Combustion Plant Directive: An Analysis of European Environmental Policy 5–6 (1991); see also Maarten A. Hajer, The Politics of Environmental Discourse 114 (1995) (explaining how "[s]cientific understanding was . . . the only truly rational basis" for British environmental political action in the 1980s).

14. See Rüdiger K.W. Wurzel, Environmental Policy-Making in Britain, Germany and the European Union 19 (2002); see also Charles Lees, Environmental Policy in the United Kingdom and Germany, 16 German Pol. 164, 177 (2007) (discussing how "nation-specific environmental characteristics create[d] different incentive structures" for environmental regulation in the United Kingdom and Germany).

15. Gertrude Lübbe-Wolff, Efficient Environmental Legislation—On Different Philosophies of Pollution Control in Europe, 13 J. Env't L. 79, 85 (2001).

16. Id.

17. Ruth Levitt, Implementing Public Policy 93–94 (1980) (emphasis omitted) (quoting Michel Carpentier, A Review of the Scope and Progress of the Commission's Programme to Date, *in* The European Community's Environmental Policy 7 (1977)).

18. See Nigel Haigh, EEC Environmental Policy and Britain 15 (1984) (tracing the British pollution control practices to the approach established in the nineteenth century under the Alkali Inspectorate); Hajer, supra note 13, at 152–53 ("One of the pillars under the traditional-pragmatist approach in British air pollution regulation has always been the close consultation between the Inspectorate and the polluting industries. This materialized in the Victorian Era in the practice of Best Practicable Means (BPM)."); Ben Pontin, The Environmental Case for Brexit 12–23 (2019) (describing the "rich history" of the "British way of environmental protection").

discharge" of noxious gases into the atmosphere.[19] "Best practicable means" (BPM) would come to encapsulate the British approach going forward, contrary to a German norm of "*Stand der Technik*" (best available technology), which also dates to the nineteenth century.[20]

A core difference between *Stand der Technik* and BPM related to the impact of local conditions on required controls, which anticipated the distinction between UBAT and TBAT. Whereas *Stand der Technik* aimed for uniform permit-based controls of all similar sources, BPM assumed that "practicable" controls would vary with geographical, climatological, and demographic circumstances. As the first Chief Inspector of the Alkali Inspectorate put it in 1872:

> It would be very unfair to make a general law fixing the meaning of a nuisance to be the same in all conditions. Why should a manufacturer established in a desert part of the county be treated like one in a crowded thoroughfare? Or when no one complains, or, rather, when no one is hurt, why should the mere formality of keeping a law be observed?[21]

BPM and its localist underpinnings would remain the guiding principle of British air pollution legislation well into the twentieth century.[22] Consistent with this sensibility, the United Kingdom, as discussed below, advocated for TBAT over UBAT inside the European Union, with limited success.

This account still does not fully explain the reasons for the more localist orientation of the Alkali Act administration. Previous work by this author has identified the influence of common law nuisance doctrines as a contributing factor.[23] Within this framework, nuisance encapsulated two intersecting principles. The first was an understanding of pollution regulation as the responsibility of the local, rather than central, government;[24] the second was a requirement for proof of harm as a precondition for regulatory intervention.[25] In the name of these principles, opponents fought reform efforts that were patterned after the centralized permitting system that had spread from France to numerous continental countries by the later nineteenth century.[26] Within this

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19. Alkali Act (1863) Amendment Act, 37 & 38 Vict. c. 43 (UK).

20. Lees, supra note 14, at 167–69.

21. Eighth Annual Report by the Inspector of His Proceedings During the Year 1871, at 5 (1872).

22. The 1956 Clean Air Act defined "best practicable means" as depending partly on "local conditions and circumstances." Hajer, supra note 13, at 153.

23. Noga Morag-Levine, Is Precautionary Regulation a Civil Law Instrument? Lessons From the History of the Alkali Act, 23 J. Env't L. 1, 10–11, 21–22, 42 (2011) [hereinafter Morag-Levine, Precautionary Regulation].

24. See id. at 21–22.

25. See id. at 24.

26. Id.

context, BPM emerged as a "hybrid regulatory approach" melding continental-style, technology-based regulation with case-by-case decision-making in the spirit of the common law.[27]

Here, the same common law–based argument is extended to partially explain differences in the relative status of UBAT and TBAT in the U.S. and E.U. air pollution regimes. This Piece's primary purpose is descriptive: to identify common law ideology as a source of observed transatlantic differences rather than to offer normative policy prescriptions on the choice between TBAT and UBAT. The nature and origins of transatlantic differences in the selection of regulatory instruments, requirements for scientific proof, and related attitudes toward the precautionary principle occupy an extensive body of comparative environmental politics scholarship.[28] This Piece, along with the larger project it is a part of, contributes to that debate.[29]

Beyond providing a descriptive explanation, however, better recognition of embedded yet generally unacknowledged common law sensibilities in American regulatory discourse will help clarify the normative stakes at hand. The relationship between nuisance law and the scope of constitutional regulatory power was central to nineteenth- and early twentieth-century controversies over the validity of continentally modeled social and

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27. Id. at 42; see also Noga Morag-Levine, Chemical Pollution and Regulatory Choices at the Start of Industrialization: Comparing France and Great Britain, 70 Am. J. Compar. L. 558, 594–95 (2022) [hereinafter Morag-Levine, Comparing France & Great Britain] ("[T]he Alkali Act gave rise to a hybrid regulatory approach which melded precautionary implementation of technology standards with the common law's expectation, under the locality doctrine, that pollution control requirements would vary by social context.").

28. For a small sample of the literature on the transatlantic comparison, see generally Green Giants? Environmental Policies of the United States and the European Union (Norman J. Vig & Michael G. Faure eds., 2004) (comparing the environmental policies of the United States and the European Union and examining their approaches, effectiveness, and the factors influencing their respective successes and challenges); The Reality of Precaution: Comparing Risk Regulation in the United States and Europe (Jonathan B. Wiener, Michael D. Rogers, James K. Hammitt & Peter H. Sand eds., 2011) (disputing the existence of systemic differences between American and European approaches to risk, and arguing that the degree of precaution on either side of the Atlantic varies by context); David Vogel, The Politics of Precaution: Regulating Health, Safety, and Environmental Risks in Europe and the United States (2012) (analyzing the transatlantic divergence in health, safety, and environmental regulations, arguing that Europe has become more precautionary than the United States since the 1990s, reversing previous regulatory trends); Ágnes Botos, John D. Graham & Zoltán Illés, Industrial Chemical Regulation in the European Union and the United States: A Comparison of REACH and the Amended TSCA, 22 J. Risk Rsch. 1187 (2018) (arguing that the European Union has failed to export its approach to chemicals to the United States).

29. See Noga Morag-Levine, The History of Precaution, 62 Am. J. Compar. L. 1095, 1099–1101, 1113–19 (2014) (tracing the historical development of the precautionary principle, highlighting its roots in European regulatory practices and contrasting it with the more risk-based approach dominant in American environmental law).

environmental measures.[30] The *Lochner* Court's conflation of substantive due process with nuisance law ostensibly ended with the New Deal's larger rejection of "common law ordering."[31] Nonetheless, nuisance law's key supposition, the conditioning of legitimate pollution control and other environmental measures on the tailoring of regulatory interventions to locally proven harm, retains its hold as a background norm. Reform initiatives that depart from this model, notably by calling for across-the-board reductions, have subsequently encountered the notion, endorsed by influential legal and other scholars, that in failing to tailor their intervention, uniform approaches were inherently unreasonable and even undemocratic.[32] Recognizing the continuity between these critiques and nineteenth-century admonitions against centralization and coercive administration would allow the policy debate to focus on the relative economic and social benefits of UBAT and TBAT, a subject left here for another day.

The remainder of the Piece proceeds as follows. Part I examines the place of uniform and tailored air pollution standards throughout the evolution of U.S. federal legislation, starting with the 1967 Air Quality Act and ending with the 1990 Clean Air Act Amendments. Next, shifting to the European Union, Part II describes the role of UBAT and TBAT across the European Union's various air pollution directives. The discussion highlights internal disagreements within the European Union over this choice and the divisions between Germany and the United Kingdom in this regard. Part III compares the respective status of UBAT and TBAT in the two regimes, finding substantially greater reliance on uniform standards in Europe relative to the United States. Part IV draws a parallel between contemporary American skepticism regarding the desirability and democratic legitimacy of uniform pollution control standards and British anti-centralist sentiments during the nineteenth century.

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30. Noga Morag-Levine, Common Law, Civil Law, and the Administrative State: From Coke to *Lochner*, 24 Const. Comment. 601, 641–43, 650–52 (2007); see also Markus Dirk Dubber, The Police Power: Patriarchy and the Foundations of American Government 111–12 (2005) (discussing prevalent nineteenth-century understandings of the police power as limited to the enforcement of the "sic utere" principle); Christopher G. Tiedeman, A Treatise on the Limitations of the Police Power in the United States: Considered From Both a Civil and Criminal Standpoint 4 (1886) ("[T]he police power of the government, as understood in the constitutional law of the United States, is simply the power of the government to establish provisions for the enforcement of the . . . maxim, *sic utere tuo* . . . .").

31. Cass R. Sunstein, After the Rights Revolution: Reconceiving the Regulatory State 19 (1990).

32. See infra text accompanying notes 43–50.

I. UBAT AND TBAT IN AMERICAN AIR POLLUTION REGULATION

A. *1967 Air Quality Act*

The option of basing air pollution regulation on uniform emission standards was squarely put before Congress in the lead-up to the 1967 Air Quality Act.[33] President Lyndon B. Johnson's original proposal would have authorized the Secretary of Health, Education, and Welfare (HEW) to promulgate uniform technology-based national emission standards for pollutants from designated industries.[34] Testifying in support of this proposal, John W. Gardner, the Secretary of HEW, offered that, "By setting emission control levels that apply to all communities and all competitors in a given industry, we move toward pollution control in a manner that is fair to everyone, to all industries and to all communities."[35] But Congress ultimately rejected the call for across-the-board emission reduction in favor of requiring that the states adopt and attain regional air quality standards "within a reasonable time."[36]

Senator Edmund Muskie, Chair of the Senate Air and Water Pollution Subcommittee of the Public Works Committee, took a leading role in enacting the statute.[37] Industry opposition to national emission standards, coupled with the influence of the coal-friendly Chair of the Public Works Committee, Senator Jennings Randolph of West Virginia, most directly explain the failure of the emission standards proposal.[38] Instructive, however, was the degree to which industry spokespeople emphasized in their testimony the incompatibility of uniform emissions with a principled requirement for control levels to vary with the air quality of each community.[39] The sentiment was echoed in testimony outside industry, including a representative of the AMA, who criticized national emission limits for their failure to address "the overall air pollution problems of the area in

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33. Air Quality Act of 1967, Pub. L. No. 90–148, 81 Stat. 485 (current version at 42 U.S.C. § 7401).

34. Richard J. Tobin, The Social Gamble 53–54 (1979).

35. Air Pollution—1967 (Air Quality Act) Part 2: Hearings on S.780 Before the Subcomm. on Air & Water Pollution of the Senate Comm. on Pub. Works, 90th Cong. 762 (1967) (statement of John W. Gardner, Sec'y, Dep't of Health, Educ. & Welfare).

36. Tobin, supra note 34, at 62.

37. John C. Esposito & Larry J. Silverman, Vanishing Air: The Ralph Nader Study Group Report on Air Pollution 22 (1970).

38. Id. at 276–77 (linking the coal industry's "considerable leverage within Congress" with the Senate's decision to reject "[n]ational emissions standards" in favor of a "'regional approach' for setting ambient air standards" in the Air Quality Act).

39. See Richard L. Revesz & Jack Lienke, Struggling for Air: Power Plants and the "War on Coal" 42 (2016) ("Utilities and manufacturers insisted that any emission standard imposed on an industrial source of pollution should be no more stringent than necessary to guarantee a safe concentration of total pollution in the ambient air.").

which the facility [was] located."[40] This line of argument found a sympathetic ear in Muskie. The choice, as Muskie described it during the subcommittee's hearings, was between adopting "an inflexible national standard which would be applied on a plant-by-plant basis wherever a given industry finds itself located" or allowing for adjustments "to be worked out regionally in the areas where the industry creates the problem."[41] The deficiency that he and others on the committee perceived in national emission standards was their uniform application to all plants "whether they are located in the heart of a large metropolitan area like New York or in the middle of Death Valley."[42] Under Muskie's leadership, Congress revised the statute to reflect a broader congressional consensus on the need for a more flexible, locally differentiated approach to air pollution control.[43] As this suggests, the rationale driving opposition to uniform national standards was the presumed regional variations and conditions in the immediate surroundings of plants rather than federalism and state autonomy.

B. *1970 Clean Air Act*

The 1967 Act's reliance on states to establish and implement ambient air quality standards with little federal oversight was quickly deemed a failure.[44] By 1969, Congress was debating new ways forward. An influential Ralph Nader study group report, published the following year, urged making emissions standards, rather than ambient air standards, the centerpiece of the contemplated new air pollution law.[45] But Congress, with one important exception, resisted that path.

The 1970 CAA expanded the federal government's role and imposed strict implementation deadlines.[46] But in keeping with its 1967 predecessor, the new act used location-based air quality standards, rather than uniform emission standards, as its cornerstone. The CAA directed the EPA to promulgate national ambient air quality standards (NAAQS), limiting the maximum allowable concentrations of listed criteria pollutants to levels

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40. Air Pollution—1967 (Air Quality Act) Part 3: Hearings on S.780 Before the Subcomm. on Air & Water Pollution of the Senate Comm. on Pub. Works, 90th Cong. 2172 (1967) (statement of F.J.L. Blasingame, Exec. Vice President, AMA).

41. Air Pollution—1967 (Air Quality Act) Part 4: Hearings on S.780 Before the Subcomm. on Air & Water Pollution of the Senate Comm. on Pub. Works, 90th Cong. 2332 (1967) (statement of Sen. Muskie).

42. Id. at 2255.

43. Robert Martin & Lloyd Symington, A Guide to the Air Quality Act of 1967, 33 Law & Contemp. Probs. 239, 242 (1968).

44. Tobin, supra note 34, at 71–72.

45. See Esposito & Silverman, supra note 37, at 307 ("The first priority of pollution control agencies . . . should be to determine the best means for controlling all forms of atmospheric pollution, and then to enforce strictly, across the board.").

46. Clean Air Amendments of 1970, Pub. L. No. 91-604, sec. 4(a), § 109(a), 84 Stat. 1676, 1679 (codified as amended at 42 U.S.C. § 7409(a)(1)(A)).

"requisite to protect the public health."[47] The task of allocating the pollution reductions necessary for the NAAQS to be attained was left up to each state to formulate via a state implementation plan (SIP).[48] In imposing the same air pollution goals everywhere in the country, the CAA assumed that pollution control requirements would be tailored to local conditions rather than uniform.

The prime mover behind the 1970 Act was, once again, Senator Muskie. Emboldened by the growing environmental movement and his own presidential ambitions, Muskie advanced a far more extensive federal regulatory program this time.[49] But he remained wedded to using air quality standards, rather than technology standards, as the revised law's primary instrument. Muskie's expressed worry in the lead-up to the 1970 CAA was over the likelihood that standards based on feasible controls would fail to provide sufficient protection for health. As he put it, "The first responsibility of Congress is not the making of technological or economic judgments—or even to be limited by what is or appears to be technologically or economically feasible. Our responsibility is to establish what the public interest requires to protect the health of persons."[50]

The 1970 Act did deviate from its health-based and locally tailored emission controls in one important provision: a requirement for new source performance standards (NSPS) to be applied to emissions from new and modified stationary sources within industrial categories to be listed by the EPA.[51] Cement manufacturing, petroleum refining, steam electric production, and pulp and paper milling operations were just a few of the long list of national industries Congress had in mind.[52] The rationale behind the NSPS requirement, as Muskie explained in a conference report, was to ensure that "areas which have levels of air quality which are better than the national standards should not find their air quality degraded by the construction of new sources."[53] His concern stemmed from an unintended consequence of the NAAQS regime: an incentive for

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47. The NAAQS are to be set at levels "the attainment and maintenance of which[,] . . . allowing an adequate margin of safety, are requisite to protect the public health." Id. § 109(b)(1), 84 Stat. at 1680.

48. Id. § 110(a)(1).

49. Brigham Daniels, P. Follett & Joshua Davis, The Making of the Clean Air Act, 71 Hastings L.J. 901, 906 (2020) ("Senator Muskie, propelled by presidential ambitions, upped the ante again by pushing through Congress the remarkably comprehensive 1970 Clean Air Act Amendments.").

50. 116 Cong. Rec. 32,901–02 (1970) (statement of Sen. Muskie).

51. Clean Air Amendments of 1970 § 111.

52. Env't Pol'y Div. of the Libr. of Cong., 93d Cong., A Legislative History of the Clean Air Amendments of 1970, at 111, 133 (1974) (Conference Report and Debates).

53. 116 Cong. Rec. 32,902 (Senate consideration of the conference report, Sept. 21, 1970). On the desire of Congress members from dirty-air states to level the playing field in the competition for new plants, see Bruce A. Ackerman & William T. Hassler, Clean Coal/Dirty Air 11 (1981).

new plants to locate in clean areas with fewer pollution control demands. In particular, labor unions feared that to avoid strict emission controls, manufacturers would opt to relocate away from Northern industrial regions to the less polluted (and less unionized) South.[54] Notably missing from the relevant legislative history is any principled endorsement of UBAT along the lines of the Nader report.

Under the 1970 Act, the "standard of performance" to be used in setting the NSPS had to reflect "the degree of emission limitation . . . achievable through the application of the best technological system of continuous emission reduction which (taking into account the cost of achieving such emission reduction . . .) the Administrator determines has been adequately demonstrated."[55] This is a less demanding standard than "best available technology" because available technology whose achievability was not adequately demonstrated would not pass muster. The EPA's discretion was further constrained by the requirement that it show that the standard would need to be "achievable" for the industry as a whole.[56]

C. *1977 Amendments*

Manifest challenges in complying with the 1970 Act's ambitious goals led to significant revisions of the CAA in 1977, which included a substantial expansion of the role of technology standards. Like the NSPS, the added technology standards targeted new rather than existing sources. But in contrast to the NSPS, the technology standards added in 1977 were not uniform. Their stringency varied, instead, by whether the area in question was in or out of compliance with the NAAQS.

In nonattainment areas, new and modified major sources were required to reduce their emissions to the lowest achievable emission rate (LAER).[57] The EPA is statutorily required to issue guidance documents to assist states in setting emission standards under LAER.[58] As defined by the CAA, LAER must reflect the lowest emission rate that any SIP in the country requires of a relevant source category or "is achieved in practice" by

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54. Revesz & Lienke, supra note 39, at 52.

55. Clean Air Act Amendments of 1970 § 111(a)(1).

56. Nat'l Lime Ass'n v. Env't Prot. Agency, 627 F.2d 416, 431–34 (D.C. Cir. 1980) (examining whether sample plants the EPA tested adequately represented achievability for the industry as a whole). "NSPS does not represent the best technology available; it instead represents the best technology available nationwide, regardless of climate, water availability, and many other highly variable case-specific factors. The NSPS is the least common denominator . . . ." Letter from Gary McCutchen, Chief, New Source Rev. Section, EPA, to Richard E. Grusnick, Chief, Air Div., Ala. Dep't of Env't Mgmt. (July 28, 1987), https://www.epa.gov/sites/default/files/2015-07/documents/crucial.pdf [https://perma.cc/J3WA-83XD] (responding to a BACT determinations inquiry).

57. Clean Air Act Amendments of 1977, Pub. L. No. 95-95, §§ 129(b), 173(2), 91 Stat. 685, 748 (codified as amended at 42 U.S.C. § 7503(a)(2)).

58. 42 U.S.C. § 7508.

any plant within the source category.[59] These standards provide for exemptions if "the owner or operator of the proposed source demonstrates that such limitations are not achievable."[60]

New and modified sources in attainment areas were subject, instead of LAER, to the less demanding best available control technology (BACT) standard.[61] When there was already an NSPS for the relevant source category, BACT had to be at least as strict. Beyond that, however, the 1977 amendments left it up to the permitting authorities of each state to determine the appropriate BACT "on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs."[62] According to a 1978 EPA guidance document, the intent behind this language was to allow "some flexibility in emission control requirements" to accommodate "local preferences."[63]

The EPA's initial approach to BACT determination, known as the "bottom-up" method, allowed the permit applicant to select the appropriate technology standards as a first step and placed the burden of establishing the justification for a stricter emission limit on the permitting authority. Evidence that "bottom-up" resulted in minimal state involvement and BACT standards set at or near the minimum standards required under the NSPS led the EPA to adopt a new "top-down" approach in 1987.[64] Under the latter, the permit applicant carried the "burden of demonstrating that significant technical defects, or substantial local economic, energy, or environmental factors or other costs warrant a control technology less efficient than [the most stringent technology available]."[65] Nonetheless, the expectation that control requirements

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59. Id. § 7501(3)(B).

60. Id. § 7501(3)(A).

61. Clean Air Act Amendments of 1977 § 127(a).

62. Id. § 127.

63. EPA, Guidelines for Determining Best Available Control Technology (BACT) 4 (1978), https://nepis.epa.gov/Exe/ZyPDF.cgi/9400253T.PDF?Dockey=9400253T.PDF [https://perma.cc/2YMR-BLES]. This interpretation is supported by the statutory requirement that "interested persons" be allowed to submit their views on "control technology . . . and other appropriate considerations" in the context of a public hearing. 42 U.S.C. § 7465(a)(2).

64. See Memorandum from Craig Potter, Assistant Adm'r for Air & Radiation on Improving New Source Review (NSR) Implementation to Regional Administrator Regions I-X, at 3–4 (Dec. 1, 1987), https://archive.epa.gov/airquality/ttnnsr01/web/html/p8_23.html [https://perma.cc/3MDS-2W9T] (explaining the change to a top-down approach to BACT, asserting that greater state involvement and more stringent controls will bring consistency to the BACT process).

65. In re Honolulu Resource Recovery Facility, 2 E.A.D. 375, 379 (EAB 1987); EPA, Transmittal of Background Statement on "Top-Down" Best Available Control Technology (BACT) 3 (1989), https://www.epa.gov/sites/default/files/2015-07/documents/topdawn.pdf [https://perma.cc/D2PK-R5B6]; see also John-Mark Stensvaag, Preventing Significant Deterioration Under the Clean Air Act: The BACT Determination—Part I, 41

could vary under different local circumstances remained integral to the BACT process.

LAER and BACT were both, as already indicated, geared toward the control of new and modified major sources. Regarding existing sources, the 1977 amendments again distinguished between attainment and nonattainment areas. No additional controls were required of existing sources in attainment areas. In nonattainment areas, however, the states were instructed to include within their SIPs a requirement that existing sources reduce their emissions via reasonably available control technology (RACT).[66] Notably, Congress offered no further definition of the meaning of RACT.[67] Over time, the EPA, in practice, limited the RACT requirement to source categories for which the agency had issued "control techniques guidelines," including "presumptive RACT."[68] The 1990 amendments varied the stringency of the required RACT for sources emitting VOCs by the severity of the area's nonattainment of the ambient standard for ozone.[69] In this, Congress again opted for locally differentiated technology standards, meaning TBAT.

D. *1990 Clean Air Act Amendments*

Congress introduced a significant new UBAT element into the CAA when it overhauled the regulation of hazardous air pollutants (HAPs) in 1990. HAPs are toxic pollutants suspected of causing cancer and other adverse impacts, even at very low concentrations.[70] Relying on the same health-based approach it used for criteria pollutants, the 1970 Act required that HAPs be subject to national emission standards sufficient to provide "an ample margin of safety to protect the public health."[71] The strict health-based mandate proved nearly impossible to implement.[72] In

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Env't L. Rep. News & Analysis 11,101, 11,104–05 (2011) (describing the top-down approach and how it encourages "applying the most stringent control technology available").

66. Clean Air Act Amendments of 1977 § 129(b).

67. EPA describes RACT as "[t]he lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility." General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas—Supplement, 44 Fed. Reg. 53,761, 53,762 (Sept. 17, 1979).

68. David R. Wooley & Elizabeth M. Morss, Clean Air Act Handbook § 2:3, Westlaw (2023).

69. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, § 103, 104 Stat. 2399, 2426, 2430 (codified at 42 U.S.C. § 7511a(a)(2)(A), (b)(2)).

70. What Are Hazardous Air Pollutants?, EPA, https://www.epa.gov/haps/what-are-hazardous-air-pollutants [https://perma.cc/ZZ42-FRYJ] (last updated Dec. 7, 2023).

71. Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4(a), 84 Stat. 1676, 1685 (formerly codified at 42 U.S.C. § 7412(b)(1)(B) (Supp. 1989)).

72. Out of hundreds of potential air toxins, the EPA listed a total of eight HAPs (and regulated only seven) between 1970 and 1990. 40 C.F.R. § 61 (1990). See Victor B. Flatt, Gasping for Breath: The Administrative Flaws of Federal Hazardous Air Pollution Regulation and What We Can Learn From the States, 34 Ecology L.Q. 107, 113–14 (2004)

1990, Congress abandoned this approach in favor of one based on technology standards. Under the 1990 Act, major sources of 189 HAPs listed in the statute were subject to maximum achievable control technology standards. The requirement applies to both new and existing sources, albeit at substantially different levels of stringency.[73] Congress coupled this technology-based approach with a health-based requirement that specific source categories be subject to additional residual risk controls.[74]

Simultaneously, the 1990 amendments pivoted away from technology standards by creating a new sulfur dioxide (SO_2) cap and trade program.[75] Growing concerns over acid rain and associated environmental injuries demanded more significant reductions in levels of SO_2. But rather than strengthen the NSPS for coal-burning power plants as the EPA had controversially done in 1979,[76] the 1990 Act looked to pollution trading as a solution.[77] In this respect, the American response to the acid rain problem diverged from the European Union's, to which the discussion turns below.

II. UBAT AND TBAT IN EUROPEAN AIR POLLUTION REGULATION

The European Union first began regulating pollution in the mid-1970s. Its initial focus was on water rather than air pollution, and it was in that context that intra-European divisions over regulatory instrument choice first emerged. Whereas the European Commission favored uniform technology-based emission limits, the United Kingdom insisted on a water-quality-based approach, resulting in a compromise solution.[78] These divisions remained in place when the European Union turned its attention to air pollution soon thereafter.

Under the European Union's first (1973) and second (1977) Environmental Action Programs, air quality objectives and standards were the sole envisioned instrument for Community regulation of atmospheric pollution. Consistent with this approach, the European Union issued a

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(describing how "the EPA identified only eight of the hundreds of HAPs already listed by state agencies, and many of these were spurred by litigation against the agency").

73. Clean Air Act Amendments of 1990 § 301.

74. Id.

75. Id. § 403.

76. Ackerman & Hassler, supra note 53, at 2.

77. See Wooley & Morss, supra note 68, § 7:1 ("Facilities have the option under the program of reducing their own emissions or, in effect, paying someone else to achieve the necessary reductions for them.").

78. Council Directive 76/464/EEC, art. 3, 1976 O.J. (L 129) 23, 25 (EC) (codified as 2006/11/EC); Owen Lomas, Environmental Protection, Economic Conflict and the European Community, 33 McGill L.J. 506, 516 (1988).

1980 directive setting air quality limits for SO_2 and suspended particulates.[79] In 1982, a second air quality directive stipulated permissible lead levels.[80] Under the 1983 Third Environmental Action Program, the door was opened to coupling air quality standards with the establishment of "emission standards, where necessary, for certain sources."[81] From then on, air pollution regulation in the European Union proceeded via parallel technology and air-quality-based tracks.[82] While Germany pushed for greater reliance on community-wide technology standards, the United Kingdom promoted air quality standards and more locally differentiated technology standards. The relative influence of the German and British approaches varied at different periods, as described below.

A. *The Air Framework Directive Regime: 1983–1994*

Prompted by growing concern over air pollution in general and the contribution of SO_2 emissions to acid rain in particular, Germany imposed strict new reductions on the emission of seven major pollutants from new and existing electric utilities and other large industrial sources in 1983.[83] The intent behind the regulation, consistent with the *Stand der Technik* principle guiding German law,[84] was to spur the deployment of two primary pollution control technologies: flue gas desulfurization (FGD) and catalytic reduction of NO_x.[85]

In parallel, Germany pushed to align E.U. air pollution requirements with its own.[86] By 1984, the result was a new E.U. framework directive on combating air pollution.[87] New to that directive was an E.U. requirement for preauthorization of new and substantially altered plants that fell within

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79. Council Directive 80/779, 1980 O.J. (L 229) (EC). Member States were obligated under the directive to "take appropriate measures to ensure" that by April 1983, the limit values for the two pollutants regulated under it were not exceeded. Id.

80. Council Directive 82/884, arts. 1–2, 1982 O.J. (L 378) 15, 16 (EC).

81. Resolution of the Council of the European Communities and of the Representatives of the Governments of the Member States, Meeting Within the Council, of 7 February 1983 on the Continuation and Implementation of a European Community Policy and Action Programme on the Environment (1982 to 1986), 1983 O.J. (C 46) 10.

82. Massimiliano Montini, Atmospheric Pollution, *in* Oxford Handbook of Comparative Environmental Law 401, 402–05, 414 (Emma Lees & Jorge E. Viñuales eds., 2019).

83. Sonja Boehmer-Christiansen & Jim Skea, Acid Politics: Environmental and Energy Policies in Britain and Germany 173 (1991).

84. Id. at 169.

85. Id. at 173, 185.

86. German efforts to upload these requirements onto the European Union began even before the domestic German legislation was itself finalized. Id. at 235.

87. Council Directive 84/360, annex 1, 1984 O.J. (L 188) 20, 24 (EC). The industrial categories subject to the directive included power plants, oil refineries, metal foundries, and various chemical plants. Id.

listed industrial categories.[88] Preauthorization was, in turn, conditioned on the compliance of any such plants with technology-based emission limits.[89] Member States were additionally required to adopt "appropriate measures[] for the gradual adaptation of existing plants."[90] While each Member State was free to decide on the actual emission limits to be imposed, the framework directive authorized the European Council to set these limits "if necessary."[91]

Skeptical of the concept of E.U.-wide emission limits, the United Kingdom conditioned its consent to the framework directive on two concessions. The first was a change in the definition of the pertinent technology standard from "Best Available Technology" (as was initially proposed) to "Best Available Technology Not Entailing Excessive Cost" (BATNEEC).[92] The second conditioned any future E.U. emission limits on a unanimous agreement in the Council (rather than a qualified majority as the initial proposal foresaw).[93] With that veto power in place, the United Kingdom led the opposition to the German-modeled Large Combustion Plant Directive (LCPD), which the European Commission had first proposed in 1983.[94] In 1988, after four years of complex negotiations, the LCPD finally entered E.U. law.[95]

The LCPD applied to new and existing combustion plants with thermal output greater than fifty megawatts within listed industrial categories (including electric utilities, oil refineries, chemical industries, and steel producers).[96] For new plants, the LCPD specified maximum emission limit values for SO_2, NO_x, and suspended particulates applicable everywhere in the European Union.[97] The limit values assumed the use of FGD as BATNEEC.[98] When emissions from existing plants were concerned, the LCPD required each Member State to reduce overall emissions by specified percentages relative to 1980 levels.[99] It was followed the next

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88. Id. art. 3.

89. Id. art. 4.

90. Id. art. 13.

91. Id. art. 8.

92. Boehmer-Christiansen & Skea, supra note 83, at 233.

93. Id.

94. The United Kingdom questioned both the sufficiency of the scientific evidence on the environmental impact of acid emissions and the steep cost of FGD technology. Id. at 233. In addition to the United Kingdom, Italy, Spain, Portugal, Greece, and Ireland had strong reservations about the LCPD. Ramus, supra note 13, at 28.

95. Council Directive 88/609, 1988 O.J. (L 336) (EC); see also Hajer, supra note 13, at 111 (arguing that the "agreement . . . gave Britain more lenient terms" and "reflected the old biases in British air pollution regulation").

96. Council Directive 88/609, supra note 95, art. 1.

97. Id. art. 18.

98. Ramus, supra note 13, at 16.

99. Council Directive 88/609, supra note 95, art. 3(1).

year with a daughter directive that limited emissions from new and existing municipal waste incinerators,[100] and then again in 1994, with one geared at emissions from hazardous waste incinerators.[101] Overall, however, Professor Andrew Jordan has written, "[O]pposition from the British (among others) effectively reduced the Commission-directed process of agreeing 'daughter' Directives for individual pollutants to a snail's pace."[102]

B. *Integrated Pollution Prevention and Control: 1996–2010*

With the United Kingdom leading the way this time, the European Union revised its approach to pollution control in 1996 with a new Integrated Pollution Prevention and Control Directive (IPPCD).[103] Rather than air pollution alone, the IPPCD brought air, water, and soil pollution under one "integrated" permit, following the approach the United Kingdom had adopted in 1990 under its Environmental Protection Act.[104] The intended benefits of integrated pollution control (IPC) were both environmental and economic.[105] In allowing for a more holistic consideration of the effects of pollution and a more streamlined administrative process, some believed the IPC would further regulatory flexibility and efficiency.[106] The United Kingdom's efforts to impose the IPC model onto the European Union were in full swing by 1991.[107] But by the completion of the negotiation in 1996, the final directive was "a curious hybrid of British and German approaches."[108]

In line with the German approach, the IPPCD extended the reach of technology-based preauthorization requirements. Covered industrial facilities ranged from producers of energy, organic chemicals, and timber

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100. Council Directive 89/429, 1989 O.J. (L 203) (EC).

101. Council Directive 94/67, 1994 O.J. (L 365) (EU).

102. Andrew Jordan, The Europeanization of British Environmental Policy 161 (2002).

103. Council Directive 96/61, 1996 O.J. (L 257) (EC). In addition to air pollution, the IPPCD regulated water and soil pollution through an integrated process designed to prevent the shifting of pollution from one media to another in response to differences in the stringency of the applicable regime.

104. Environmental Protection Act 1990, c. 43 §§ 1, 6 (UK); David Horrocks, Environmental Protection Act 1990 Integrated Pollution Control: An Evaluation of the New Regulatory Regimes, 112 J. Royal Soc'y Health 20, 20 (1992) ("The Environmental Protection Act 1990, for the first time, provides HMIP [Her Majesty's Inspectorate of Pollution] with new regulatory powers giving it clear responsibility for controlling discharges to all media from certain classes of process . . . .").

105. Dep't Env't & Welsh Off., Integrated Pollution Control: A Practical Guide 3–4 (1993).

106. Michael G. Faure & Jürgen G.J. Lefevere, The Draft Directive on Integrated Pollution Prevention and Control: An Economic Perspective, 5 Eur. Env't L. Rev. 112, 113 (1996); Horrocks, supra note 104, at 20–21.

107. Jordan, supra note 102, at 161.

108. Id. at 165.

pulp to slaughterhouses and food manufacturers.[109] As Article 3 prescribed, Member States were to ensure that "all the appropriate preventive measures [were] taken against pollution, in particular through application of the best available techniques" concerning each covered installation.[110] The same permit requirement applied to existing and new (or modified) installations, though with different compliance deadlines.[111]

When it came to the meaning of BAT, however, the United Kingdom left its evident imprint. In a clear departure from the UBAT orientation of the air framework directive, the IPPCD shifted towards TBAT.[112] The explanatory memorandum accompanying the initial proposal in 1993 went as far as to argue "that the setting of emission limit values can generally best be done at local level, taking into account appropriate environmental conditions. The same standards are not always appropriate at each and every location in the Community."[113] In keeping with this localist sensibility, under Article 9(4), the IPPCD included "the technical characteristics of the installation concerned, its geographical location and the local environmental conditions" as factors to be considered as part of the meaning of "best available techniques."[114]

Nevertheless, aspects of the IPPCD maintained and facilitated European Community–wide standards. To begin with, the directive did not displace uniform standards issued under existing sectoral directives, notably the LCPD. In 2001, a revised LCPD increased the pressure on existing sources with a requirement that they either comply with the same emission limits as new sources, choose to be included under a national emission reduction plan, or be forced to limit their total hours of operation to 20,000 and shut down by the end of 2015.[115] Further, to assist Member States in the standard-setting process (and contribute to greater harmonization in the resulting standards), the IPPCD required the European Commission to "organize an exchange of information" among Member States, industry representatives, and environmental nongovernmental organizations (NGOs).[116] Following this mandate, a European Integrated Pollution Prevention and Control (IPPC) Bureau was established in

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109. Council Directive 96/61, supra note 103, at annex 1.

110. Id. art. 3.

111. New and substantially changed installations were expected to meet the directive's requirements by October 30, 1999, whereas existing installations had to come into compliance by October 30, 2007. Id. art. 20–22.

112. Marc Pallemaerts, The Proposed IPPC Directive: Re-Regulation or De-Regulation?, 5 Eur. Env't L. Rev. 174, 177 (1996).

113. Commission Proposal for a Council Directive on Integrated Pollution Prevention and Control, at 12, COM (1993) 423 final (Sept. 14, 1993).

114. Council Directive 96/61, supra note 103, art. 9(4).

115. Council Directive 2001/80, art. 4(3), 2001 O.J. (L 309) 1, 4 (EC).

116. Council Directive 96/61, supra note 103, art. 16(2).

Seville, Spain.[117] To facilitate the required exchange of information, the IPPC Bureau began to publish BAT reference notes (BREFs) that specified the BAT for specific sectors or processes. The BREFs were not mentioned in the IPPCD and instead evolved as an informal innovation. Their role within that context was strictly advisory, with Member States free to deviate from the BREFs in their permitting decisions.[118]

C. *The Industrial Emissions Directive: 2010–Present*

By the beginning of the twenty-first century, the discretion that the IPPCD relegated to Member States was the subject of growing criticism.[119] In 2004, the European Parliament noted "remarkable variations" in the directive's implementation and called for more guidance and monitoring.[120] A 2005 European Commission report concurred and warned that "[t]he full implementation of the IPPC Directive by October 2007 remains a challenge in the large majority of Member States."[121] In 2007, the Commission published a proposal to revise and recast the IPPCD, the LCPD, and five other sectoral directives into a new Industrial Emissions Directive (IED).[122] In 2010, following nearly three years of "laborious" negotiations, the IED entered E.U. law.[123]

Like its predecessor, the IED combines the regulation of air, water, and soil pollution under an integrated permitting requirement to be

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117. Eur. Bureau for Rsch. on Indus. Transformation and Emissions, More Information on the European Bureau for Research on Industrial Transformation and Emissions (EU-BRITE): Origin and Mission of EU-BRITE, Eur. Comm'n, https://eippcb.jrc.ec.europa.eu/about/more_information [https://perma.cc/RHP4-P7LQ] (last visited Aug. 23, 2024).

118. European Commission, Commission Staff Working Document Evaluation of the Industrial Emissions Directive (IED) at 19, SWD (2020) 182 final (Sept. 23, 2020), https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2020:0181:FIN:EN:PDF [https://perma.cc/68WB-AT7N].

119. Inst. Eur. Env't Pol'y, Implementation of the IPPC Directive (96/61): Analysis and Progress of Issues 8–9 (2003).

120. Comm. on the Env't, Pub. Health & Consumer Pol'y, European Parliament Resolution on Progress in Implementing Council Directive 96/61/EC Concerning Integrated Pollution Prevention and Control, Eur. Parl. Doc. COM(2003) 354 - C5-0410/2003 - 2003/2125(INI), ¶ 27 (2004) ("[I]n view of enlargement, the overall lack of clarity, the remarkable variations in implementation and the absence of effective monitoring mechanisms weaken the capacity of Directive 96/61/EC, particularly as far as environmental issues are concerned, to stimulate sustainable production patterns . . . .").

121. Report of the Commission on the Implementation of Directive 96/61/EC Concerning Integrated Pollution Prevention and Control, at 8, COM (2005) 540 final (Mar. 11, 2005).

122. Proposal for a Directive of the European Parliament and of the Council on Industrial Emissions (Integrated Pollution Prevention and Control) (Recast), COM (2007) 844 final (Dec. 21, 2007).

123. Peter Vajda, The Role of the Industrial Emissions Directive in the European Union and Beyond, 17 ERA F. 487, 490 (2016).

implemented by the competent authorities in each Member State. As with the IPPCD, the permit is based on BAT. The IED significantly differs from the IPPCD, however, in its elevation of the BAT conclusions included in the BREFs from a nonbinding recommendation to a mandatory requirement.[124]

The United Kingdom's position during the negotiations on the status of the BREF conclusions was that the information exchanges used to establish BAT-associated emission levels are not of a sufficient uniformly high standard to justify their being imposed in all but the most unusual circumstances. Still, the United Kingdom held that it may be able to support the proposal, subject to securing a commitment that the quality of BREFs will be improved, and that the circumstances in which they would not be applied would be clarified sufficiently.[125]

Under the influence of the Netherlands and the United Kingdom, the 2007 IED initial draft proposal allowed for using an emissions trading system as an alternative to BAT-based permitting in certain circumstances, an option that was strongly opposed by Germany and NGOs and ultimately removed.[126]

In what was likely an essential concession to the United Kingdom, the IED included a derogation clause allowing for deviation from BAT under certain conditions. To qualify for such derogation, the competent authority had to show that compliance with the BAT conclusion would "lead to disproportionately high costs compared to the environmental benefits" because of the "geographical location or the local environmental conditions" or the "technical characteristics of the installation concerned."[127] The European Environmental Bureau (EEB), a Brussels-based environmental umbrella organization, "strongly regretted" the derogation clause during the negotiations due to the danger of it becoming a "loophole" that "may lead to implementation difficulties and divergence which have led to the revision of the IPPC Directive in the first place."[128] The EEB pushed for the IED text to specify "strict and binding criteria" when derogations could be granted.[129] The United Kingdom resisted this idea due to the concern that "strict criteria may reduce regulators' latitude

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124. Council Directive 2010/75, supra note 8, art. 14(3).

125. House of Commons, Select European Scrutiny Committee, Eleventh Report, 2007–08, HC 16-x, at 8 (UK) (quoting Joan Ruddock, Minister for Climate Change, Biodiversity & Waste at Dep't of Env't, Food & Rural Affs., Explanatory Memorandum, Jan. 17, 2008).

126. Andrew Farmer, Revising IPPC: Incremental Change Rather Than a Radical Overhaul of EU Industrial Emissions Policy, 10 Env't L. Rev. 258, 266 (2008).

127. Council Directive 2010/75, supra note 8, pmbl. ¶ 6, art. 15(4).

128. Eur. Env't Bureau, New Features Under the Industrial Emissions Directive 7 (2011), https://eeb.org/wp-content/uploads/2020/09/New-features-under-the-Industrial-Emissions-Directive-2.pdf [https://perma.cc/BUU7-Y5WK].

129. Id.

to grant exceptions even further."[130] Ultimately the criteria for granting derogations under the 2010 IED remained vague, with the door left open for the Commission to further clarify via nonbinding guidance documents.[131]

The European Union published in April 2024 a set of revisions to the 2010 IED.[132] With the United Kingdom out of the picture,[133] the criteria for granting derogations are now more clearly specified. The methodology and factors on which competent authorities must base their justifications for derogation are detailed in a replacement of the 2010 directive's Annex II.[134] In addition, under Article 15, the IED now requires the Commission to adopt via an implementing act "a standardised methodology for assessing the disproportionality between the costs of implementation of the BAT conclusions and the potential environmental benefits."[135]

Going back to the 1970s, E.U. air pollution regulation shifted between UBAT and TBAT in response to the waxing and waning influence of Germany and the United Kingdom. Even so, the balance over time tilted toward UBAT. In allowing local circumstances to factor into the setting of BAT, the IPPC represented the high watermark of U.K. influence. But under the IED, BAT is once again to be defined without regard to surrounding conditions, with derogations standing as an exception. Within this framework, in pushing for pollution reductions everywhere, uniformity is cast as a virtue rather than a vice.

III. COMPARING THE UNITED STATES AND THE EUROPEAN UNION

Competing pulls between UBAT and TBAT characterize air pollution regulation in Europe and the United States. As shown above, examples of both approaches can be found in American and European air pollution laws. But whereas the European regime aspires toward UBAT, the American one does not.

In the European Union, BAT is the sole applicable technology standard, regardless of location. Local environmental conditions are considered only as part of the derogation process rather than in the initial

130. ENDS Rep., UK Fears Loss of Freedom to Set IPPC Limits *in* Policy Briefing National 43, 44 (2008).

131. Eur. Envt'l Bureau, supra note 128, at 32.

132. Directive 2024/1785 of the European Parliament and of the Council of 24 April 2024 Amending Directive 2010/75/EU of the European Parliament and of the Council on Industrial Emissions (Integrated Pollution Prevention and Control) and Council Directive 1999/31/EC on the Landfill of Waste, art. 15, 2024 O.J. (L Series) (EU) [hereinafter Amending Directive].

133. Following a 2016 referendum, the United Kingdom formally withdrew from the European Union in 2020. Jeff Wallenfeldt, Brexit, Britannica, https://www.britannica.com/topic/Brexit [https://perma.cc/MND4-K762] (last updated Sept. 18, 2024).

134. Amending Directive, supra note 132, at annex III.

135. Id. art. 15(5).

determination of the applicable BAT. The same emission limit values (meaning the same BAT conclusions) apply to both new and existing installations, albeit with different timelines.

NSPS are the only uniform technology standards directed at controlling criteria pollutants under the CAA.[136] While the NSPS apply uniformly across the country, the requirements they impose are often described as modest and unambitious.[137] For this reason, when the 1977 amendments sought to tighten pollution requirements, they supplemented the NSPS with newly formulated technology standards. In doing so, however, the amendments shifted from UBAT to a form of TBAT by linking the stringency of the required new source controls to the area's attainment status. Only within nonattainment areas do the strictest reduction requirements, meaning LAER, apply. Otherwise, it is sufficient that new sources comply with the less demanding BACT. In requiring that the latter be made on a "case-by-case basis," the CAA further ensures that local conditions will be considered.[138] The Act's requirement that stakeholders be granted an opportunity for a public hearing as part of the BACT process serves the same purpose.

In further distinction from the European Union, existing sources of criteria pollutants are only regulated in the United States via TBAT. E.U. law expects existing installations to comply over time with the same BAT requirements demanded of new sources or to shut down. The CAA, by contrast, does not regulate existing sources in attainment areas and imposes a more lenient standard (RACT) on existing sources in nonattainment areas. Notably, RACT requirements can vary across similar sources within nonattainment areas due to "site specific considerations, such as geographic constraints."[139]

By opting for locally tailored emission standards over uniform ones, American air pollution regulation recalls the localist orientation of the British BPM. With this parallel elucidated, the common law underpinnings of TBAT become apparent.

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136. The regulation of HAPs under section 112 utilizes UBAT, as already noted. See supra notes 69–72. The distinction under the CAA between criteria pollutants and HAPs, a distinction absent in the EU, can arguably be seen as a means of tailoring pollution requirements to environmental risk.

137. See 2 Env't L. Inst., Law of Environmental Protection § 12:45 (Cynthia R. Harris, Donald W. Stever & Stanley P. Abramson eds., 2023) ("[T]he NSPS often settled for second- or third-best technologies, because of the restraint built into the process by the need to demonstrate achievability, [and] the slow pace of revisions . . . ." (footnote omitted)).

138. Clean Air Act Amendments of 1977 § 127 (codified at 42 U.S.C. § 7479(3) (2018)).

139. Approval and Promulgation of Revisions to the Michigan State Implementation Plan to Control Particulate Emissions From Iron and Steel Processes, 45 Fed. Reg. 59,329, 59,331 (proposed Aug. 13, 1979).

IV. UBAT, TBAT, AND REGULATORY TRADITIONS

The choice between locally tailored and uniform air pollution control defined the emergent regulatory regimes of early industrial Britain and France.[140] The locality doctrine, a version of which existed in both countries, tied actionable pollution to the norms of different areas. Under this doctrine, the identity of the victims of pollution was material to whether sources of pollution were subject to removal or allowed to stay in place. Manufacturers in both countries pushed for these restrictions to be relaxed in the name of economic growth. Under an 1810 decree, France introduced a permitting regime granting chemical manufacturers substantial protection against removal, even against the complaints of the well-to-do, in exchange for the obligation to deploy technological mitigation measures.[141] This approach spread from France across continental Europe, notably to Germany.[142]

In Britain, however, efforts to follow the French example faced stiff resistance from proponents of local self-government and anti-centralization.[143] Within this line of thought, nuisance law and the locality doctrine it incorporated were the sole constitutional means for regulating pollution. Britain ultimately settled for BPM as a flexible, locally sensitive, technology-based standard, as mentioned. A century later, the localist sensibilities underpinning this approach continued to shape late twentieth-century British air pollution policy.

The United States would have no centralized air pollution control statute until the modern environmental era. Instead, pollution regulation remained exclusively within the domain of local governments and nuisance law. The underlying assumption was that pollution control should be tailored to the demographic conditions and perceived preferences of each community. This was the backdrop against which the CAA came into being. By opting for national air quality standards, the 1970 Act departed from the common law's locality doctrine. In the words of Senator Muskie, the intent behind the Act was that "all Americans in all parts of the country shall have clean air to breathe within the 1970's."[144] Even with this sweeping statement, he and others in Congress were reluctant to embrace across-the-board requirements for pollution control, absent proof that these interventions were locally justified. While it is not possible to fully ascertain the impact of common law sensibilities in this regard, the parallels with British BPM are evident. Recall in this connection the similar

140. See Morag-Levine, Comparing France & Great Britain, supra note 27, at 559–61.

141. Id. at 576.

142. Morag-Levine, Precautionary Regulation, supra note 23, at 21–27.

143. Id.

144. 116 Cong. Rec. 42, 381 (1970).

"plant in the desert" scenario offered as grounds for locally differentiated standards by both the Chief Alkali Inspector and Senator Muskie.[145]

By the 1980s, the limited adoption of uniform emission standards in American environmental law had unleashed a barrage of criticism from prominent American legal scholars, based primarily on their ostensible rigidity and failure to consider local conditions and circumstances.[146] This critique was based in part on economic efficiency. "Uniform BAT requirements," wrote Professors Bruce Ackerman and Richard Stewart, "waste many billions of dollars annually by ignoring variations among plants and industries in the costs of reducing pollution and by ignoring geographic variations in pollution effects."[147] But in addition, and perhaps more deeply, uniform technology-based standards were portrayed as less than fully democratic.

The democratic critique is difficult to pinpoint but essentially boils down to the assertion that in their focus on available means, uniform technology-based standards impede public deliberation over the proper goals of environmental regulation.[148] Notwithstanding their own complexity, alternatives to uniform standards—be they air quality standards or emissions trading—were presumed to be more conducive to public participation.[149] The rather thin foundation of the argument from democracy is at odds with its rhetorical hyperbole, best illustrated in the vilification (on more than one occasion) of uniform technology-based standards as "Soviet-style central planning."[150] The resonance of this rhetoric is best

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145. See text accompanying footnotes 21 and 41.

146. For a recent overview of this literature, see William Boyd, The Poverty of Theory: Public Problems, Instrument Choice, and the Climate Emergency, 46 Colum. J. Env't L. 399, 434–40 (2021).

147. Bruce A. Ackerman & Richard B. Stewart, Reforming Environmental Law: The Democratic Case for Market Incentives, 13 Colum. J. Env't L. 171, 173 (1988) (footnote omitted).

148. See id. at 189–90.

149. Cass R. Sunstein, Administrative Substance, 1991 Duke L.J. 607, 629 ("[T]he BAT approach is severely deficient from the standpoint of a well-functioning political process. BAT strategies ensure that citizens and representatives will focus their attention on largely incidental and nearly impenetrable questions about currently available technologies rather than on the appropriate level of reduction."). For a skeptical account of the democratic benefits of emissions trading, see Lisa Heinzerling, Selling Pollution, Forcing Democracy, 14 Stan. Env't L.J. 300, 341–42 (1995).

150. See, e.g., Bruce A. Ackerman & Richard B. Stewart, Reforming Environmental Law, 37 Stan. L. Rev. 1333, 1334 (1985) ("The current system does not in fact 'work' and its malfunctions, like those of Soviet-style central planning, will become progressively more serious . . . ."); Richard B. Stewart, Controlling Environmental Risks Through Economic Incentives, 13 Colum. J. Env't L. 153, 154 (1988) ("Our current environmental regulatory system . . . has grown to the point where it amounts to nothing less than a massive effort at Soviet-style central planning of the economy to achieve environmental goals."); Cass R. Sunstein, Paradoxes of the Regulatory State, 57 U. Chi. L. Rev. 407, 412 (1990) ("[A] large source of regulatory failure in the United States is the use of Soviet-style command and

evident in the extent to which "command and control," a term with obvious authoritarian connotations, came to serve as an ostensibly neutral descriptor of technology standards in American regulatory discourse.[151]

The alleged illegitimacy of centralized pollution control standards in American regulatory discourse is strongly reminiscent of the British rhetoric mobilized in opposition to French-style public health and environmental regulation during the nineteenth century. Whereas the common law origins of this critique were explicit in the earlier British context, they remain hidden in the contemporary American setting. This is not to suggest that American critics of uniform standards were motivated by common law ideology or directly inspired by nuisance law. Instead, background norms rooted in Anglo-American constitutionalism granted democratic critiques of uniform technology standards more plausibility in the United States than would otherwise have been the case. Conversely, the legitimacy of uniform emission standards in the European Union is backed by a continental regulatory tradition dating back to the nineteenth century.

CONCLUSION

The choice between tailoring required pollution controls to surrounding conditions on the one hand and across-the-board mitigation (regardless of place) on the other has been central to the evolution of air pollution policy from the early Industrial Era. Still, this Piece is the first to make the distinction between uniform and tailored technology-based standards. With this distinction elucidated, it becomes easier to compare the ways in which various contemporary regulatory regimes have resolved this question.

Viewed through this lens, heretofore hidden differences between the American and European air pollution regimes come into view. While the push and pull between uniform and tailored regulation is integral to both systems, uniform standards have made greater headway in the European Union. While allowing for derogations, the European Union conceives of them as a concession to be eliminated over time. The aspiration for universal mitigation stands as an overarching goal, something that could not be said of the United States.

The contribution of underlying legal traditions to this transatlantic split is best seen through the similarity between the American and British approaches. While a member of the European Union, the United Kingdom repeatedly resisted uniform regulation and promoted various more tailored alternatives, an expression in part of its historic, common

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control regulation, which dictates, at the national level, . . . strategies . . . in a nation that is exceptionally diverse . . . in terms of geography, costs and benefits of regulatory control.").

151. For an empirical study of the diffusion of the term "command and control" and its association with tyranny, see Jodi L. Short, The Paranoid Style in Regulatory Reform, 63 Hastings L.J. 633, 662–75 (2012).

law–based regulatory tradition. This tradition is a shared legacy of the United Kingdom and the United States. In both the United States and the European Union, a host of competing political and economic interests shaped the selection between UBAT and TBAT. The argument from regulatory traditions does not question or deny this reality. Rather than the determinative factor, the respective traditions amount to a thumb on the scale that, over the past half-century, has helped tilt the balance differently on the two sides of the Atlantic.

The choice between localized and centralized responses to pollution has been at the heart of centuries of environmental history. The longstanding continental approach has favored centralization. In the Anglo-American world, however, environmental centralization has long confronted skepticism rooted in the common law's affinity with local governance. The policy debate has largely been ahistorical, however, as if a simple search for remedies to industrial pollution has inevitably yielded local tailoring as a solution. As long as the historical foundations of this approach remain obscured, they will continue to inseparably entangle with U.S. ideas on environmental governance. By contrast, identifying the history that is silently informing U.S. policy can enable more open debate over the relative merits of the competing approaches to industrial pollution control.